Equivalent to PTO/AIA/15 (07-12)
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	**111054-0001U4C7**
First Inventor	**James A. Proctor, Jr.**
Title	**EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED**
Express Mail Label No.	**N/A EFS-Web Filing**

APPLICATION ELEMENTS

SEE MPEP chapter 600 concerning utility patent application contents.

1. ☐ Fee Transmittal Form (e.g., PTO/SB/17)
   (Submit an original and a duplicate for fee processing)
2. ☒ Applicant claims small entity status.
   See 37 CFR 1.27.
3. ☒ Specification *Total Pages:[47]*
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP § 608.01(a))
4. ☒ Drawing(s) (*35 U.S.C. 113*) *Total Sheets: [14]*
5. Inventor's Oath or Declaration *Total Sheets:[ ]*
   a. ☐ Newly executed (original or copy)
   b. ☐ Copy from a prior application (37 CFR 1.63 (d))
6. ☒ Application Data Sheet. *See Note below
   See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (*Appendix*)
8. Nucleotide and/or Amino Acid Sequence Submission
   (if applicable, items a.-c. are required)
   a. ☐ Computer Readable Form (CRF)
   b. ☐ Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ paper
   c. ☐ Statements verifying identity of above copies

ADDRESS TO: **Commissioner for Patents**
P.O. Box 1450
Alexandria VA 22313-1450

ACCOMPANYING APPLICATION PARTS

9. ☐ Assignment Papers
   (cover sheet & documents(s))
   Name of Assignee: _____
10. ☒ 37 CFR 3.73(c) Statement ☒ Power of Attorney
    (*when there is an assignee*)
11. ☐ English Translation Document
    (*if applicable*)
12. ☒ Information Disclosure Statement
    (PTO/SB/08 or PTO-1449)
    ☐ Copies of citations attached
13. ☐ Preliminary Amendment
14. ☐ Return Receipt Postcard
    (MPEP 503) (Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s)
    (if foreign priority is claimed)
16. ☐ Nonpublication Request
    under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. ☒ Other: Certification And Request For Prioritized Examination Under 37 Cfr 1.102(E)

Note: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

18. CORRESPONDENCE ADDRESS

☒ Customer Number : 24267 **OR** ☐ Correspondence address below

Name	**DAVID J. THIBODEAU, JR.**				
Address	**CESARI AND MCKENNA, LLP**				
	88 BLACK FALCON AVENUE				
City	**BOSTON**	*State*	**MA**	*Zip Code*	**02210**
Country	**US**	*Telephone*	**(617) 951-2500**	*Fax*	**(617) 951-3927**
Name (Print/Type)	**DAVID J. THIBODEAU, JR.**		*Registration No. (Attorney/Agent)*		**31,671**
Signature	**/DAVID J THIBODEAU JR REG NO 31671/**			*Date*	**September 21, 2016**

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop Patent Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Google Exhibit 1002
Google v. SecCommTech

Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/AIA/424 (04-14)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	James A. Proctor, Jr.	Nonprovisional Application Number (if known):	Not Yet Assigned
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.

2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.

3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /David J Thibodeau Jr Reg No 31671/	Date September 21, 2016
Name (Print/Typed) David J. Thibodeau, Jr.	Practitioner Registration Number 31671

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.**

☑ *Total of 1 forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	111054-0001U4C7
	Application Number	
Title of Invention	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James	Arthur	Proctor	Jr.

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	Indialantic	State/Province	FL	Country of Residence	US

Mailing Address of Inventor:

Address 1	1680 Riverside Dr.		
Address 2			
City	Indialantic	State/Province	FL
Postal Code	32903	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	James	Arthur	Proctor	III

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	Indialantic	State/Province	FL	Country of Residence	US

Mailing Address of Inventor:

Address 1	735 Oak Ridge Drive		
Address 2			
City	Indialantic	State/Province	FL
Postal Code	32903	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	111054-0001U4C7
	Application Number	
Title of Invention	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	24267		
Email Address	docket@c-m.com	Add Email	Remove Email

Application Information:

Title of the Invention	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED		
Attorney Docket Number	111054-0001U4C7	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	14	**Suggested Figure for Publication (if any)**	

Filing By Reference :

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	24267		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	111054-0001U4C7
	Application Number	
Title of Invention	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the application number blank.

Prior Application Status	Pending			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	
	Continuation of	14861563	2015-09-22	
Prior Application Status	Pending			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	
14861563	Continuation of	14472477	2014-08-29	
Prior Application Status	Patented			Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14472477	Continuation of	13775435	2013-02-25	8849698	2014-09-30

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13775435	Continuation of	13212723	2011-08-18	8374592	2013-02-12

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13212723	Continuation of	12364828	2009-02-03	8090359	2012-01-03

Prior Application Status	Expired			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	
12364828	Claims benefit of provisional	61095001	2008-09-08	
Prior Application Status	Expired			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	
12364828	Claims benefit of provisional	61095359	2008-09-09	

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	111054-0001U4C7
	Application Number	
Title of Invention	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	111054-0001U4C7
	Application Number	
Title of Invention	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

Organization Name	Proxicom Wireless, LLC

Mailing Address Information For Applicant:

Address 1	1680 N. Riverside Dr.		
Address 2			
City	Indialantic	**State/Province**	FA
Country	US	Postal Code	32903
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	111054-0001U4C7
	Application Number	
Title of Invention	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	/David J Thibodeau Jr Reg No 31671/			Date (YYYY-MM-DD)	2016-09-21
First Name	David J.	Last Name	Thibodeau, Jr.	Registration Number	31671

Additional Signature may be generated within this form by selecting the Add button. Add

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent C o o p eration Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

RELATED APPLICATION(S)

This application is a continuation of pending U.S. Patent Application No. 14/861,563, filed September 22, 2015 which is a continuation of pending U.S. Patent Application No. 14/472,477, filed August 29, 2014 which is a continuation of U.S. Patent Application No. 13/775,435, filed February 25, 2013, now issued as U.S. Patent No. 8,849,698 on September 30, 2014 which is a continuation of U.S. Patent Application No. 13/212,723, filed August 18, 2011, now issued as U.S. Patent No. 8,374,592 on February 12, 2013 which is a continuation of U.S. Application No. 12/364,828, filed February 3, 2009, now issued as U.S. Patent No. 8,090,359 on January 3, 2012 which claims the benefit of U.S. Provisional Application No. 61/095,001, entitled "Central Server Enabled Proximity Based Applications Utilizing Both Short Range, and Wide Area Wireless Radios", filed on September 8, 2008 and U.S. Provisional Application No. 61/095,359, entitled "Central Server Enabled Proximity Based Applications Utilizing Both Short Range, and Wide Area Wireless Radios", filed on September 9, 2008. The entire teachings of the above applications are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Several key internet applications have become increasingly popular in recent years. A current trend in internet usage involves social networking. Social networking involves making use of internet services which allow for the interaction and sharing of information between users of service.

Recently, mobile wireless communication standards have progressed to the point where relatively high speed data connections are possible to the phone over the wireless wide area network (WWAN). These standards include 1xEV-DO, HSDPA, EDGE, GPRS, Wi-Max (IEEE802.16e) and the like. Some social networking sites have included interfaces to their web sites optimized to make use of such high data rate mobile services for use on a mobile phone. These services are referred to as mobile social networking. For the most part, these services are simply versions of the standard social networking, redesigned to be usable on a mobile phone, adding little in the way of increased capability.

With the common capability of global positioning system (GPS) receivers being incorporated into phones, some additional capabilities have been added to some mobile social networking interfaces by incorporating location information for the user and that of the individual they interact with.

These services are utilizing GPS to determine the location of one mobile wireless user and to another to facilitate mobile social networking. An example of an existing application utilizing this approach is Loopt (www.loopt.com), which coordinates location based social interaction. One problem with GPS based mobile application involves the GPS receiver not receiving sufficient signal strength in many indoor locations. As a result these enhanced capabilities have typically been targeted at either navigation to a specified location, or as in the case with Loopt, allowing a user to see where their friends are located in a relatively large geographic location, on a map.

Another popular application for the internet is electronic commerce. Just as with social network, e-commerce services have provided interfaces optimized for use on mobile phones which provide basically the same capabilities as the standard interfaces. Very little location or proximity information has been used to enhance the mobile e-commerce experience.

Some attempts have been made to utilize RFID (Radio Frequency Identification) chips to perform mobile payments. This approach requires the additional hardware on a

phone in the form of a RFID chip, or other specialized features. As a result, mobile electronic commerce has mostly allowed users to perform transaction with a remote party, such as purchasing an item on ebay (www.ebay.com). To date mobile electronic payments for individuals who are in close proximity to each other have not been practical for a number of reasons. First there is a need for the individuals to have a third trusted party to help facilitate the electronic transaction. Secondly, there needs to be a convenient, electronically secure, personally secure and anonymous method for each of the individuals to specify the party with which they wish to engage in a transaction. Thirdly, there is a need to cross validate the identities of the individuals engaged in the transaction. Finally, this method must work in indoors locations.

Most mobile phones on the market today support at least two wireless standards; one for the cellular wireless wide area network connection (WWAN) and one for a wireless personal or local area network (WPAN, WLAN). The cellular connection or WWAN is utilized for voice and data and can adhere to many different standards such as CDMA (IS-2000), GSM, W-CDMA, WiMax, etc.. The WPAN or WLAN connection is typically for short range communications and is often used for wireless hands free devices, such as headsets, peripherals, or higher speed internet connections. The typical standards used for the sort range wireless communications include Bluetooth, Wi-Fi, and in some cases Ultra-Wide-Band (UWB).

In another approach to mobile social networking some services have attempted to utilize short range wireless capabilities often available on phones such as IEEE802.11 (Wi-Fi) or Bluetooth to facilitate peer to peer communications. These are also referred to a MANETs or Mobile Ad-hoc Networks. These services typically consist of a software application operating on a mobile phone using peer to peer networks to facilitate communication between wireless devices. Examples of such existing applications include Mobile-Cheddar, Peer-2-Me, and Flobbi. Published US Patent application US 2008/0182591 A1 filed December 13, 2007 describes one such peer to peer approach. One issue with these approaches is that one can not communicate with a peer once the devices are no longer in

proximity. A further disadvantage is that all information to be exchanged must be stored locally on each of the peer devices as the communication occurs directly between the two devices and any policy for the delivery of locally stored content is difficult to enforce without the potential for fraud such as spoofing identities between the peers. Such fraud may lead to concerns of personal safety or privacy allowing the identity of an individual to be determined when it is not desired. Further this peer to peer model is inadequate for mobile electronic commerce in part due to the lack of an independent third party to facilitate the services required for a secure proximity based mobile electronic transaction as previously mentioned.

SUMMARY OF THE INVENTION

The present invention is generally concerned with facilitating the exchange of information and transactions between two entities associated with two wireless devices when the devices are in close proximity to each other utilizing both a short range and a long range wireless capability.

Preferred embodiments of the present invention are generally concerned with facilitating the exchange of information and transactions between two entities associated with two wireless devices when the devices are in close proximity to each other. In one embodiment, this can be accomplished by a first device using a first short range wireless capability to detect an identifier transmitted from a second device in proximity to the first device, ideally using existing short range radio communication standard capabilities such as Bluetooth (IEEE802.15.1-2002) or Wi-Fi (IEEE802.11). The detected identifier, being associated with the device, is also associated with an entity. Rather than directly exchanging application data flow between the two devices using the short range wireless capability, a second wireless capability then allows for one or more of the devices to communicate with a central server via the internet, and perform an exchange of application data flow. By using a central server to draw on stored information and content associated with the entity or entities, the server can broker the exchange of information between the entities and the devices. In a preferred embodiment, this exchange may be comprised of information stored on the server

associated with a detected entity, and it may be comprised of information received from the detected device via the second wireless capability and facilitated by the server.

In addition, the server can also allow for a brokering service, ideally independent of the entities, to enable the application of policy based on the identity of the two entities for the disclosure of stored information associated with the entities, the flow in information between the devices and the entities, and the enablement of procedures such as security verification between the entities.

Applications running on a device may also interact with the server to perform various functions, for example retrieving information associated with an entity or device, by utilizing a detected identifier. Such information may include stored content associated with the entity's account record such as music, pictures, links to social networking sites, instant messaging addresses, advertising content, and even executable scripts or application such as in AJAX. An example of such an application may include the detection of a device's identifier in a fixed location allowing for tour guide like information to be provided for that location.

As the server may be running applications which perform more function than just the retrieval of content, a pre-defined interaction process may also be applied by the server to the devices such as allowing the approval to share private content with the entity associated with the detected device. This process may eventually allow or disallow the sharing of information and to facilitate the interacting with another entity.

As a more complex example, in other embodiments, the devices may utilize the server as a third party to provide for new capabilities such as a secure three way e-commerce transaction between two entities. In this more complex process, the server may require confirmation of each party's identity with visual cross verification of the parties using pictures or other unique identifiers. The server may use this visual cross verification in conjunction with detecting that the individuals are in proximity with each other. The server may verify the proximity using GPS or using the peer to peer detection process in another

embodiment. Further, the server may facilitate a process requiring each party to perform a step by step confirmation during the transaction including the stages of: the request for purchase, the payment, the receipt of goods and services, and the providing of payment receipt.

This differs from the approaches employed by prior art location aware mobile social networking techniques in that no GPS is needed to determine when one device is in proximity to another. Many wireless devices in use are not GPS-capable, and even when they are, GPS will often not operate indoors or where the GPS signal is weak. Using a peer to peer detection process to locate nearby devices allows for the operation of proximity detection indoors.

Preferred embodiments of the present invention can also differ from known peer to peer based social networking in that the information flow between the devices running the applications are over the wide area network via a central server, rather than carried over the peer to peer network itself. An example of this is a service called Flobbi, as discussed previously, where community members can identify each other via Bluetooth transmissions, then interact with chat. The messaging in this case is carried over Bluetooth itself. A distinction from such peer to peer approaches is the use of a central server to "broker" the transactions between peers, enhancing the ability to manage security and information disclosure. Such use allows for the opportunity to customize delivered content to include elements such as advertising or other content customized to the recipient based on additional information such as known personal purchasing history, or interests.

A further distinction of the preferred embodiment is the use of a central server to determine identities of detected peer devices, which additionally allows for secure and fraud resistant application of policies for the disclosure of information and content. An issue with the existing pure peer to peer approaches is that they are not capable of enforcing policy associated with the disclosure of information to unknown entities in a secure and fraud resistant manor. One reason for this is that information related to a user's device must be disclosed in the process of detection in the form of a static identifier. By the nature of the

identifier, it must be static or peers would not be able to directly determine the identity of a friend over time with the information stored on their device. By using a central server, the system may coordinate the change of the identifiers from time to time such that the disclosure of an identifier by one device to another does not compromise the identity of the device. In this case the identifier may be assigned from a central server and such server coordinate the identifier's change from time to time.

Reliance on a central server also allows the secure and fraud resistant application of disclosure policy. Such policy might include the verification of the identity of the party to which information (identity and presence for instance) or content (pictures of the account owner) is to be provided. Such verification is performed in an anonymous way such that in the process of verifying information associated with each party, no personal information is disclosed between the parties prior to satisfaction of some pre-set policy such as inclusion on a friend list or belonging to a specific group or organization. Another important policy required for such services would be the determination of any past negative feed back ratings by other past peers for behavior for the particular user to which the information is to be provided. An individual with significant poor ratings having detected a peer, may be denied access to personal information or even notification of arrival of the detected peer based on the server policy setting by the detected peer or the server in general.

A further distinction is to enable electronic payments for individuals who are in close proximity to each other. The central server can act as a third trusted party to help facilitate the electronic transaction between the individuals. Secondly, the server allows for a convenient, electronically secure, personally secure and anonymous method for each of the individuals to specify the party with which they wish to engage in a transaction. Thirdly, participants in a transaction can cross validate the identities of the individuals engaged in the transaction. Finally, because this method is proximity based it will also work indoors or in other situations where GPS location information is not available.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing will be apparent from the following more particular description of example embodiments of the invention, as illustrated in the accompanying drawings in which like reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating embodiments of the present invention.

Figure 1 is a block diagram of two mobile devices utilizing a preferred embodiment.

Figure 2 is a block diagram of a fixed broadcast device and a mobile device.

Figure 3 is a flow diagram of the operation of an application on the mobile devices.

Figure 4 is a message sequence chart showing the Bluetooth discovery process using in one embodiment.

Figure 5 is a message sequence chart showing the Bluetooth Remote Name Request Process.

Figure 6 is a message sequence chart showing the IBSS beacon process.

Figure 7 is a message sequence chart showing the interaction between the server and two devices performing a detection and entering a chat application.

Figure 8A is a message sequence chart showing an E-commerce example.

Figure 8B is a continued example message sequence chart showing an E-commerce example.

Figure 9 is a message sequence chart showing an example of a mobile device and a fixed broadcast device interaction.

Figure 10 is a flow diagram for the server processing associated with the detection process.

Figure 11 is an example individual account record stored in the server associated with an Entity.

Figure 12 illustrates a timing reference for intermittent active and dormant times.

Figure 13 shows a diagram of functional blocks associated with management of dynamically assigned device identifiers.

DETAILED DESCRIPTION OF THE INVENTION

A description of example embodiments of the invention follows.

The teachings of all patents, published applications and references cited herein are incorporated by reference in their entirety.

Figure 1 is a block diagram of two mobile devices utilizing a preferred embodiment.

Referring to Figure 1, a central server 100 is connected to devices 106 and 108 by an internet protocol (IP) based network, carried over a series of connections, at least one of which is a wireless connection. For example, the server 100 has a connection allowing IP based communications to a cellular network 102 using connection 101. The cellular network is connected to devices 106 and 108 by wide area wireless links 104 and 103 respectively, allowing for IP based communications between the devices (106 and 108) and the server 100.

Devices 106, 108 can be considered "client(s)" of the server 100. The clients 106, 108 and server 100 provide processing, storage, and input/output devices for executing wireless system protocols, interfaces, and application level programs according to the invention. Client devices 106, 108 can also be linked through various communications

networks to other computing devices, including other client devices/processes and other server computer(s). Communications network(s) providing the connection 101 can typically be part of a remote access network, a global network (e.g., the Internet), a worldwide collection of computers, Local area or Wide area networks, and gateways that currently use respective protocols (TCP/IP, 3G Wireless, Bluetooth, etc.). Other electronic device/computer network architectures are suitable.

The internal structure of devices 106, 108 or server 100 includes one or more data processors (not shown in detail) that are well known in the art to include a system bus for data transfer among the other internal components of a computer system (e.g., processor, disk storage, memory, input/output ports, network ports, etc.). Attached to the bus are other input/output devices (e.g., keyboard, mouse, displays, printers, speakers, network interfaces, etc.). Network interfaces allow the computer to connect to various other devices attached to a network. Memory provides volatile storage for computer software instructions and data used to implement an embodiment of the present invention (e.g., applications programs and the like). Disk storage can provide non-volatile storage for computer software instructions and data used to implement an embodiment of the present invention.

In one embodiment, the invention may include a computer program product including a computer readable medium (e.g., a removable storage medium such as one or more DVD-ROM's, CD-ROM's, diskettes, tapes, etc.) that provides at least a portion of the software instructions for the invention system. Computer program product can be installed by any suitable software installation procedure, as is well known in the art. In another embodiment, at least a portion of the software instructions may also be downloaded over a cable, communication and/or wireless connection. In other embodiments, the invention programs are a computer program propagated signal product 107 embodied on a propagated signal on a propagation medium (e.g., a radio wave, an infrared wave, a laser wave, a sound wave, or an electrical wave propagated over a global network such as the Internet, or other network(s)). Such carrier medium or signals provide at least a portion of the software instructions for the present invention.

More particularly, a given device 106, 108 uses a short range wireless link 107 such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link to detect the presence of other devices such as device 108, and uses the wide area wireless network connections 103, 104 such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100, and to perform the actual substantive communications between the wireless devices 106 and 108. Device 108 typically uses the short range wireless link 107 and wide area wireless link 103 in a similar manner to locate and initiate communicate with device 106. One distinction relative to prior art is that the short range wireless 107 is only used for the detection process, or to advertise a device's presence. In this embodiment, specific information called "wireless identifier" or simply "identify" (described in more detail below) is passed between devices 106 and 108 over the short range link 107. By transmitting a wireless identifier using the short range Wi-Fi, Bluetooth or other short range wireless link 107 and receiving wireless identifiers from other devices, this short range wireless link 107 will allow for a proximity detection process.

The support for IP based networking is standard for WWAN or 3G connections such as 1xEV-DO or HSPA, and as a result, communication between one device to another using the WWAN is currently supported in many devices with no modification. The use of simple detection of one or more identifiers requires significantly less resources in a phone than performing a complete peer to peer based communication network protocol, which accommodates dynamic configuration of nodes being added and dropped continuously. It is noted that the IP address on the WWAN interface is not location dependent in the present embodiment, but is addressing approaches are location dependent when true Peer to Peer topologies are used. The present embodiment has the advantage that communication between two devices may continue after the devices have left proximity of each other, but in the same manner as they had been communicating previously. As a result, a user who detects a short range transmission of an identifier, then begins a conversation or some other interaction with that device via the wireless wide area network may continue that conversation even in the case where the two devices move out of the proximity of the each other, and are no longer within the reception range of the short range wireless

communication protocol. Further, since it is contemplated that the wireless identifiers transmitted on the short range wireless link from the devices would occasionally change, for security reasons, the present embodiment has the advantage that ongoing communications between mobile devices will not be interrupted despite a change in one of the device's identifier. In the case where the identifier is a MAC address of the short range wireless network adapter for one of the devices, it is not otherwise possible to change this address and easily maintain on going communications in a true peer to peer topology.

Referring to Figure 2, central server 100 is connected to the cellular network 101, and is able to communicate information to and from wireless device 202 using a wide area wireless link such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like within structure 205. Device 204 does not have a wide area wireless or cellular link, but transmits identifying information using short range wireless link 203. Device 202 is capable of receiving the indentifying information and requesting information related to that device from server 100.

An example of an application using this infrastructure follows. The device 204 will simply broadcast an identifier, with no WWAN connection but may facilitate advertising or local information. For instance, an account associated with one or more identifiers may belong to a museum. As a museum patron walks to an exhibit, the patron's device 202 will receive an identifier sent from museum broadcast device 204 operated by the museum. The patron device 202 passes the identifier or museum device 204 to the central server 100, which in-turn recognizes it as being associated with that exhibit within that museum and passes relevant information back to the user's device 202. A distinguishing feature of this approach relative to prior art is that the patron device 202 in this example may move out of proximity of broadcast device 204, yet continue to view the content being provided by the server 100 related to the detected broadcast device 204. Content may include text, pictures, web pages, application software such as games, informative display applications, or other content such as audio or video to be offered to the user's device as well. Other examples

might include electronic coupons (such as in a grocery store), menus or special offers in a restaurant.

Figure 3 is a block diagram with further detail of this operation. A device 106, 108, or 202 after performing a search (Fig 3, step 301) for identifiers on the WPAN or WLAN, will subsequently use the WWAN link to communicate with the central server 100. If the device does not find identifiers 302 it will either continue to search, or search at a later time 301. If identifiers are found in 302, the device may employ an action function 303, which would act as a filter that determines which of the detected identifiers should be passed to the server. This function may instead be omitted and all identifiers passed to the server 100. The idealized effect of the action function would be to reduce the number of requests to the server by not re-requesting recently requested identifiers which have already been passed to the server, for some period of time. In step 304, if no identifiers require server information, searching is continued in step 301.

Assuming there are identifiers which are new to the device, the device will pass along a list of currently detected identifiers and request 305 that the server return information related to any other local device. The server will return the information related to any identifier that meets certain policy requirements. For instance, information is returned which is 1) relevant to that device, and 2) that the device is authorized to receive.

As an example of the overall process, a detected identifier may be relevant to the receiving device if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this determination. In the preferred embodiment, the server would determine the identity and the relevance of the detected identifiers, and the action function 303 would work to reduce frequency of re-requests to the server. Figure 7 describes an example of how to use this for messaging associated with the device and server interaction during the detection and identifier inquiry process, with a more detailed explanation to follow.

To enable server 100 to associate an identifier with an entity, each device or entity (such as the museum) associated with an identifier has an account on server 100 or a related server as is common in information technology. The account is associated with the entity and the device and the current identifier.

As used herein, an "entity" may be a legal entity, such as an individual person or a business.

An "object" is intended to include a physical thing, such as a product that is being offered for sale, and may include a tangible article or intangible such as an electronic music or video file or photograph.

There is various information associated with each account. An example data record for an account is shown in Figure 11. When the account is associated with an individual or (other entity), there may be personal information such as the individual's name, contact information, information regarding allowed communication, such as chat or IM, links to their other social networking services, and the like. When the account is associated with a broadcast device 204 the account may contain content to be displayed to the detecting device 202. By utilizing the central server 100, broadcast devices may be tied to a location or product thereby providing relevant information about the location such as in the museum tour example previously discussed. In this situation, the content delivered to device 202 may be informative information about an exhibit including pictures, text, audio, or video and the like. In the case of a broadcast device being in a supermarket and near a specific product, advertisement or discounts with electronic coupons my be stored in the account and provided to device 202.

There can also be policy based permissions associated with each account and applied to any information associated with that account. The stored policy permissions can be used to determine what information and under which situations information may be disclosed to another device or user associated with another account. For example, the entity (person in this case) associated with device 202 may have set a policy in their account to not receive

any unsolicited information from a broadcast device so as to not be disturbed. However, the person associated with 202 may see the broadcast device and a sign stating a discount is available, and provide input to their device to request any broadcast information on a one time exception basis. The messaging associated with an example mobile and broadcast device process will be described in more detail to follow associated with Figure 9.

As already mentioned above, in step 301 of Figure 3, each device performs a search function looking for identifiers sent from other devices utilizing a short range wireless capability. The following describes the process of devices detecting identifiers from other devices in more detail.

The identifiers themselves may be a hardware address such as the MAC address of the wireless device, or they may be another label such as the SSID for a IEEE802.11 device, or the device name for a Bluetooth device. Referring to Figure 4, in the case where a Bluetooth wireless personal area network device is utilized, a first device 401 transmits an inquiry (ID_Packet) message 404, and any proximal Bluetooth devices 402, 403 respond with messages identifying the MAC address, called BD_ADDR in IEEE802.15.1 of each device using a message referred to as an "Inquiry Response" FHS message 405 containing the BD_ADDR or Bluetooth device address of the detected device. In the Bluetooth standard all devices 402, 403 are required to respond in this manner assuming they are enabled to be discoverable. To enable this, an application on the mobile device ensures the Bluetooth device is set to discoverable mode. Device 1 (401) will attempt to locate Devices on different channels by scanning the channels and transmitting multiple Inquiry (ID_Packet) messages. Such an example is shown with inquiry exchange 406 and 407 to discover Device N (403).

In one embodiment the BD_ADDR or MAC address of the Bluetooth device can be used as the Identifier and no further Bluetooth interaction is required until the next scan process is performed.

In another embodiment, the Bluetooth "Device Name" is used as the identifier. Figure 5 shows the process of a first device "Device 1" (501) determining another Bluetooth enabled device's (502) Bluetooth Device Name. Following the device discovery process completion from Figure 4, Device 1 501 sends a Page message 503 to another device (Device L 502). Message 504 is sent in response to create a temporary Asynchronous Connectionless Link (ACL) to be established between Device 1 501 and Device L 502, without an explicit connection request. Not having an explicit connection request indications the Entity associated with Device L would not have to provide explicit approval for a connection from their user input on the device, as would be the case if other services were requested from the device such as might be the case with a wireless headset or remotely connected GPS receiver to a phone. An ACL connection allows link management packets to be exchanged, and following interchanges of messages 505 and 506 to determine features of the devices, a temporary connection is established between the two devices. A name request message (507) is then sent by Device 1 to Device L, and Device L responds with at least one LMS_name_res message 508 containing the Bluetooth device name of Device L 502. If the name is longer than that allowed within the LMS_name_res message, additional messages follow to allow for the entire name to be delivered. Finally the connection is ended with message 509, LMP_detach.

The transmitted identifiers associated with any given device are only known to the central server and the device transmitting the identifiers. These identifiers may change from time to time, making a user's or a device's identity anonymous over time. The central server and any particular device must be coordinated such that the identifier and any device transmitting it, remains identifiable by the central server. This process is coordinated between the wireless device, and the central server utilizing the WWAN or cellular data link, carrying messaging between them and using an identifier manager 1303 to maintain a list of device identifiers 1302 in a central but secure location. This is shown in more detail in Figure 13.

Referring to Figure 6, an example of using on IEEE802.11 link as the short range wireless capability is discussed. Generally, Wi-Fi devices operation in a so-called infrastructure mode which utilizes a BSS or basic service set. One component of a infrastructure network based wireless LAN is the use of a central access point or AP. In a mobile network the use of a central AP is not practical, as only the AP transmits an identifier, which does not meet the requirements of the preferred embodiment. The second topology for Wi-Fi networks is the so-called Ad-Hoc mode of operations, referred to as an independent basic service set or IBSS. In an IBSS all devices participating or advertising their interest in participating in an ad-hoc network transmit identifiers called beacons. These beacons contain the MAC address of the transmitting network adapter, the basic service set identifier (BSSID), and ad-hoc network name or service set identity (SSID). The BSSID in a typical ad-hoc network is generated by the first station to enter the BSSID and is locally administered, typically a randomly generated 48 bit number matching the format of a MAC address. In an ad-hoc network, each device 601, 602, 603 participating or desiring to participate transmits a beacon. There are several embodiments related using the IBSS beacons and the identifiers. First the identifier may be used as the MAC address of the station device or network adapter, and one or both the BSSID and the SSID may be used to indicate these particular beacons are associated with a service. In other embodiments, one or more of the BSSID and the SSID may be used as the identifier. In any of the embodiments for delivery of the identifier in an IBSS beacon, it is possible to coordinate the change of those identifiers with the server 100. As the MAC address is always broadcast in any operation of a Bluetooth or Wi-FI link, the use of a MAC address as an identifier provides for an additional level of security for the device 601, 602, 603, when identifier is changed from time to time as devices may be detected and identities tracked using a constant MAC address. In the preferred embodiment, where the MAC address is used for the identifier, all the devices participating would likely have the same network name and SSID to aid in the identification of the device as being enabled, although not necessarily required. Examples using an 802.11 network in ad-hoc mode transmitting beacons are showed as messages 604, 605, and 606.

Chat Example between two mobile devices

Figure 7 shows an example of a message flow diagram for an embodiment where an individual is in a library for example, and a friend arrives. The individual is notified by their device receiving an identifier that their friend is present and they enter a chat session. Each person has a device (Figure 1, 106 and 108 respectively) that implements the preferred embodiments described above. The first individual associated with Device 1 (702) referred to as Entity 1 (EI1) performs a detection process as described in Figure 4, 5, and 6 previously (step 704) . The device identifier associated with Device 2 (703), DI2 is thereby detected. Device 1 (702) then transmits an inquiry message 705 using the WWAN (cellular data link such as GPRS, EDGE, 1xEV-DO, IS-2000, Wi-Max, LTE, or the like) to the server 701 inquiring if information related to the account and entity associated with DI2 is relevant, and available to the entity EI1 associated with Device 1 (702). The server 701 retrieves the account information related to EI1 and determines that EI2 is listed in a friends list in the account associated with EI1 and that EI1 should be notified when EI2 is detected. Next the server retrieves the account information associated with EI2 and determines that EI1 is on a list of entities which are allowed to be notified of EI2 being present and personal information such a the name of the individual, their phone number and the like. The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details. A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707. The user of Device 1 provides input to the device directing it to request a chat session with the entity associated with Device 2 (703), and a message 708 is sent the server 701 commanding "send 'Hello' to EI2". The server acknowledges reception of the message with a "ACK" message 709, in return. Next server 701 sends "Request Chat: 'Hello' from EI1" to Device 2 703. The user of Device 2 accepts the chat and returns a message "I'm by the front door" with message 711, sending it to the server to be relayed to device 1 (702).

E-commerce between two mobile devices

Figures 8A and 8B show a message flow diagram for an embodiment where two individuals are performing a financial transaction on the street (for example, a customer and a street vendor). Each has a device (Figure 1, 106 and 108 respectively) enabled with the preferred embodiments described above. In this example, an individual's device would see a vendor and the vendor's device (enabled with the current invention) would notify them that the vendor was also enabled with a device supporting the identifier search and other protocols described above, as well as being capable of electronic payments. These steps are performed in the following way. In step 804 the customer's device 802 (Device 1) performs an identifier search process as previously described, and detects a device identifier 2 (DI2) sent from Device 2 (803) belonging to the merchant. Device 1 will send a message to the server 801 (also represented by 100 in Figure 1) using the WWAN (cellular data link such as GPRS, EDGE, 1xEV-DO, IS-2000, Wi-Max, LTE, or the like) 104 requesting information related to DI2 and its relevance to the entity related to device 1 802. The server 801 then determines the relevance of DI2 based on the account properties stored in the account associated with the consumer Device 1. In this case, the account settings only allow messages from or notifications of entities on a friends list stored in the account record (represented in Figure 10) associated with the consumer. Server 801 responds to device 802 with "no" indicating that DI2 is not relevant to the Consumer.

The customer, having an account enabled with electronic payments, and wanting an item the vendor has, would press a button or make other input to his phone (or other device) which would indicate they would like to make a purchase and pay using their device (808). In this case the input selection would be "search for merchants." The customer's device would then send a message (809) to the central server directing the server to perform a one time search for merchants, despite the current account settings. In one embodiment, the server would then direct the consumer's device 802 to initiate another search (809). Other embodiments may not include the server commanding Device 1 (802) to perform the search, but rather the search may be performed automatically, or use results from a recent search. In Step 811, Device 1 (802) performs another search and detects the identifier from Device 2 (803), DI2. Device 1 then sends a message 812 to the server again requesting information for

all relevant devices detected, which will include at least DI2. In Step 813 the server, having received the request and list including DI2, looks up account information associated with DI2 and determines that the associated entity is a merchant. As the settings of the account associated Device 1 now allow for the notification of the user when a merchant is detected in proximity, DI2 is determined to be relevant to Device 1 and the Entity 1 (EI1) should be notified. The server then sends a message 814 to Device 1 (802) stating merchant services are available in proximity with a list of available merchant's information including information related to the entity (EI2). The user of device 1, Entity 1 (EI1) then provides input in step 815, (pressing a soft key on a touch screen for instance), selecting the specific merchant EI2 to engage with in a transaction. Device 1 (802) will then send a message (816) to the server requesting a transaction with EI2 associated with Device 2 (803). The server (801) will then respond in this embodiment with a message 817 to Device 1 confirming receipt of the requested transaction and providing information to allow the EI1 associated with Device 1 to independently confirm the identity of EI2 associated with Device 2 (803). In this embodiment the identifying information can include the name of the merchant, the merchant's logo, a picture of the vendor, or their mobile shopping cart. In other embodiments, the picture may be of a specific unattended vending machine in the location it is currently operating. It may also include other information such as the address of the merchant in cases where a fixed store location is provided. As this particular merchant in this example is a street vendor, an address may not be used. GPS information stored in the account associated with Device 2 may be used as further confirmation in some instances. However, in this example, GPS coordinates are not be available on Device 2 due to lack of capability, or Device 2 being indoors and without sufficient signal to determine a location. Further GPS information from Device 1 (802) may be used to provide further confirmation information. In this embodiment the photograph sent in message 817 shows a picture of the particular merchant and also his city issued business license in text and as a picture of where it is displayed on the cart. The consumer entity EI1 provides input to Device 1 in step 818 confirming the identity of EI2, the merchant entity associated with Device 2 (803). Device 1 then sends a message 819 to the server 801 confirming the identity of the merchant.

Server 801 then sends a message 820 to the merchant's device 803 notifying them of the request for a transaction with EI1. Device 2 (803) then indicates to the merchant that a customer with the capability and desire to pay electronically is in proximity. In step 821 the customer associated with Device 1 (802) places an order with the merchant associated with Device 2 (803) and a list of products to be purchased is generated and the merchant provides input to Device 2 (803) to proceed with a electronic transaction. In step 822 Device 2 performs a scan of identifiers and DI1 associated with device 1 (802) and the Consumer is detected. A request is sent to the server 801 with a list of identifiers which were detected to determine if any of them are relevant to the merchant. Note that while the merchant device 803, (and the merchant) have now been notified of the desire for EI1 to enter a transaction, they do not necessarily know the identifier for EI1 yet. In other embodiments, the identifier associated with EI1 and Device 1 (802) may be sent in message 819, and a confirmation that this identifier is detected during the scan process 821 may be performed at the device. In the preferred embodiment, further security may be provided by the having the server perform this function independently. The server performs this confirmation in step 824 may matching the device 1 identifier DI1 with the information stored in the account associated with Entity 1 (EI1) also referred to as the Consumer.

The server than generates a message 825 to Device 2 (803) indicating that EI1 is relevant, and the transaction participant is present. The message in the preferred embodiment can also include a picture of the Consumer. Additionally, the message could also include other pictures of other individuals allowed to use this device for purchases. If more than one identifier was detected in step 822 and matched in step 824 to entities having requested transactions previously which are pending for that merchant, a list of information for each entity involved with a pending transaction request can be provided in message 825. The merchant then selects the correct consumer using the picture of that consumer, confirming the identity of the part to the transaction in step 826. The consumer information provided in message 825 in another embodiment may simply be the name of the customer and the merchant may either ask their name, or request identification such as a driver's license. In the preferred embodiment, where a picture is passed in message 825, it is not necessary that

the individual's name be passed to the merchant for the merchant to be able to provide confirmation of the identity of the Consumer thus providing a level of anonymity to the transaction such as may be present when cash is used.

Following the confirmation by the merchant of the identity of the Consumer participating in the current transaction in step 826, Device 2 sends a message 827 to the server confirming the identity of the Consumer as Entity 1 (E1), and with information required for the transaction including the list of products to be purchased, their prices, the total price, and a request to charge E1 this total amount. Server 801 then confirms receipt of this message in step 828. The server then sends a message 829 to Device 1 requesting the Consumer to confirm the list of goods to be purchased and the total price to be paid. In step 830, the Consumer (Entity 1) reviews the list and amount to be paid and provides input to device 1 confirming the accuracy of the information and they the authorizing the server to pay. In step 832 the server charges E1 utilizing stored preferred charge card information, stored credit, or other payment methiod such as a PalPal™ user name (PayPal is a trademark of Ebay, Inc.) and password stored in the account associated with E1, and charges the consumer. In the case where a stored credit is used, the Consumer's account can be debited, and the credits not applied to the merchants account until a later step. In the case of a credit card, or PalPal™ transaction, the server provides payment to E2 (the merchant) utilizing information stored in the account associated with Device 2. The server then indicates payment is made to the merchant, and instructing the merchant to deliver the goods with message 833. E2 (the Merchant) then provides the goods and provides input to Device 2 that the goods have been delivered in step 834. Message 835 is generated by Device 2 (803) to the server confirming product delivery, and acknowledging the receipt of the payment confirmation message 833. The server can then send message 836 requesting the Consumer to confirm they received the goods. If a confirmation is not received in response to this request, this information may later be used to settle any dispute that might arise. In step 837 the consumer confirms receipt of the products, and message 838 is generated to the server confirming the receipt of goods by the consumer. In Step 839 the server concludes the transaction by completing any steps required to credit the Merchant with the payment amount

from the Consumer, if required. The server then sends a message 840 to the Merchant indication the transaction is complete, which is acknowledges in message 841. The Consumer is notified of the completed transaction with message 842, which is acknowledged with message 843.

Finally, the transaction details may be stored by the server, or sent to a thirdly party server for tracking spending habits of that account holder, or customers of that merchant allowing the merchant to track that specific customer's behavior and cater to them in the future with various specials delivered via email, or during their next visit via their device in the form of an electronic coupon. This process can be performed with a goal to help the merchant expose the customer to other products or services the merchant believes the customer might find desirable.

The present invention can be extended to facilitate other types of transactions as well. In one specific application, consider use of the invention to facilitate a transaction such as the rental of an automobile. A well known business called ZipCar ™, presently operating in several major urban areas in the United States, makes available a fleet of vehicles for shared use by their club members who pay a monthly fee plus a per use charge. Using the present invention, the club member would have a wireless device that serves as the "Consumer device" (Device 1) and the ZipCar vehicle would be equipped with a wireless device serving as the "Merchant" device (Device 2). The consumer would walk up to an available ZipCar vehicle and, using their wireless device, start an initial exchange of identifiers with the desired Merchant device, for example, using the short range local wireless network. The Consumer device and/or Merchant device would send a message to an application running on the Server requesting that a person associated with an account for the Consumer be granted access to a specific vehicle (e.g., an "object") that is in the vicinity of and associated with the Merchant device. A set of confirmatory messages (such as to exchange access codes, to confirm the location of the vehicle, the per-use fee due, and payment for the same, etc.), are then typically also exchanged between the Consumer and the Merchant device with the assistance of the Server and the long range wireless network. Upon confirmation of the

necessary transaction information, the Server sends a message to the Merchant device to unlock the vehicle requested (which may be sent over the second long range wireless network or a yet another network, such as a satellite network).

Example of a Mobile Device and a Broadcast Device.

Figure 9 shows a message flow diagram for an embodiment where an individual is in the presence of a broadcast device, such as for the museum example of Figure 2. As with Figure 2, the individual device 202 and the broadcast device 204 are present and enabled. In this example, an individual 902 is in a grocery store and their device 902 (Device 1) performs a scan for identifiers in step 904, as described previously. DI2 is detected having been transmitted from device 2 (903). Device 1 (902) sends a message to server 901 inquiring if DI2 is relevant to the entity associated with Device 1 and if the information associated with that device identifier (DI2) is available to be returned. In step 906, the server retrieves the accounts associated with both DI2 and Device 1 (EI1). The server detects that the entity associated with DI2 is an advertisement company, and that this device is a broadcast device only, and that there is an electronic coupon available for download to Device 1, and multimedia content available to be played if desired. Additionally, the account settings associated with EI1 allow for the notification of broadcast devices in proximity.

Server 901 then transmits a Response message 907 indicated the presence of the detected device and the content available. The device 902 requests input from the entity associated with the device 901 for permission to download the coupon, and the availability to play content such as video about how to prepare a recipe using the vendors product. In this case the individual associated with Device 1 accepts the content, and a message 909 is sent to the server accepting the content. Response message 910 begins the delivery of the content.

As previously mentioned, several key distinctions of this embodiment include that the user of device 902 may walk away out of range form the broadcast device 903 and continue to receive the content using their cellular link, or may choose to play the content at a later

time having stored the detected like in a favorites list. Additionally, the content stored in the account associated with the broadcast device 2 (903) is relevant to the placement of the device and the products near it. Further, as the content is stored in the server 901 rather than in the broadcast device 903, the content may be updated, modified, or deleted at anytime. For example the server 901 knowing that the consumer has never been detected previously, may customize the electronic coupon to provide a deeper discount than a regularly detected consumer. In the case where the devices are used for electronic commerce as in Figure 8, knowledge of the user's past purchases may be used to induce the consumer to try a new product. Alternatively if the consumer is a regular purchaser a loyalty program may provide a coupon upon a particular number of repeated purchases.

Figure 10 is a processing flow chart performed by the server receiving a request from a device inquiring about the relevant and availability of information associated with detected device identifiers. In step 1001 the server is waiting for a request from a device. When a request is received in decision 1002, step 1003 is performed. In this step the account information associated with the requesting device is retrieved. In step 1004 the information associated with the accounts for each of the detected device identifiers is retrieved. In step 1005 the server performs a matching process between the policies of the requesting account and each of the policies for each account associated with each detected device identifier. In step 1006 the information related to the matched policies for the associated entities will be sent to the requesting mobile device.

Just as in the previous example of an identifier being deemed relevant to a user based on a friends list, permission for disclosing a device's presence may require being on a friends list as well. For example, when a server receives an inquiry from a device with a list of identifiers, it may only respond with information for users associated with the identifiers that are on that device's friends list, and on each of the individual's friend lists as well. These friends' lists and policies can be stored within a user account which allows for disclosure of a user's presence only to individuals on this list, such as described in Figure 11 (to be described below.)

It is contemplated that the permissions not be an "all or nothing" decision, but that different classes of information may be assigned different permissions and mechanisms. An example of this might be a user's presence, identity, and cart services being made available to only one set of other accounts (or users), while the presence of an anonymous individual being made available to anyone, but with other classes services available such as multi-player games being treated differently. Additionally multiple contacts may be included in the account, each given customized permissions. An example can be that any user may be notified of an anonymous user or other information based on additional policies.

As only the server contains personal information, and performs the association of an account with a particular identifier, it can inherently enforce the security of the policies as a distinct advantage relative to true peer to peer services. In this way, the central server controls the process of passing information related to an account to a particular requesting device.

Figure 11 shows an example account record to be associated with an entity and at least one device. The columns of the account record can consist of a Record Index which will be used to described the account, a Field which is a descriptive name for the contents stored in the record, and a Field Information Group Disclosure Policy Assignment List (PAL). The PAL provides rules for the disclosure of the information in the associated row in the Field column. The following list are possible PAL entries:

ALL:	may be disclosed to any requesting entity
EXPLICIT APPROVAL:	the Entity associated with the account must provide input approving the disclosure of the information
NONE:	Do not disclose this information to any other entity

M:	where M is a integer from 1 to N indicating a Information Group Disclosure Policy which may consist of a list of contacts, friends, groups, characteristics, and the like.

Most of the fields in Figure 11 are self explanatory and typical in the industry such as the account number, however a few fields are worth a clarifying discussion. The Device identifier is in record index 2, with a Identifier type in record 4. The identifier type can define what type of identifier the device associated with this account would use. Record index 10 is the Entity Type Field. This describes is the entity is a Merchant, Individual, or if the device associated with this account is a broadcast only device.

Referring now to Figure 12 a timing map reference for scanning times and dormant times for devices is shown. In one embodiment, it is desired that the power consumption and scan timing for the devices in a cellular network be reduced. Since the server and the WWAN is involved with all mobile devices, coordination of the broadcasting periods and the searching periods for the short range radios is possible. This can be based on a common reference time such as that provided by most cellular systems, any the time of day clocks inherently within mobile devices. This allows for reduced power consumption and other resource consumption in the devices. If no coordination is achieved, then the short range receivers in each device must be scanning for transmitted identifiers much more often and for longer durations. Utilizing a common timing base, and the central server to notify the devices of a coordination approach for "active times" and "non-active times" and will allow for the devices to minimize the power consumption in the transmission of and scanning for identifiers. This approach also allows for synchronizing the update of each device's identifier (as described previously) to enhance anonymity and security, coordinated with the central server. The "non-active times" may be used as "boundaries" over which the changing identifiers may be updated. This update may be based on either direct communication with the server, or rule and algorithm based updates previously coordinated with the central server so as to minimize server messaging, but allowing the updates to remain synchronized to the

server such that the device and the server are always associating the same identifier between them.

As will be recognized by an individual skilled in the area of information technology, the concept of a central server may well be implemented as a collection of servers to allow for load balancing, redundancy, and the like in a manor common to the information technology industry.

Figure 13 shows a diagram of functional blocks associated with the management of dynamically assigned device identifiers. The Server 1301 has an application agent called an Identifier Manager (1303) which has access to a pool of device identifiers (1302). The Identifier Manager monitors timing information and determines when it is time to update a particular device's identifier. This time may be a regular interval, or a random generated time period by an algorithm such as a pseudo-random sequence generator, or a combination of both. When it is time to update a device identifier, Manager 1303 retrieves a new identifier form the pool 1302. The pool of identifiers may be a list or range of identifiers, or generated algorithmically. The new identifier is stored in the account associated with the entity determined to require updating and a message sent to the device 1305 associated with that account commanding it to update its device identifier with the new one. This messge is sent over the WWAN Data network 1304 such as IS-2000, HSPA, GPRS, IS-95, Edge, Wi-Max, and the like. All devices 1305 to 1307 will eventually all be updated in a similar manner. This update process does not disrupt ongoing communication and interaction between devices despite the update as the communications are preformed based on the identity of the entities following the detection of the device identifiers which are no longer utilized. This unique capability allows for the updating process to be implemented and not impact the applications being utilized concurrently.

Other example applications utilizing still other embodiments follow below.

Requiring the brokering of the communication via a central server can also allow a mobile device to receive information associated with a "broadcast only" device, such as in

the museum example discussed previously. This is important, as such broadcast devices can enable a vast set of new applications built upon the infrastructure developed in this application, beyond the museum application. Some of these applications may involve an electronic commerce aspect, for example.

Electronic Commerce Applications

Ecommerce between a fixed broadcast device and a mobile device

Football stadium example

An embodiment of a transaction model, enabled by the infrastructure described above can be an event such as a concert, or sporting event (particularly when it is an indoor venue where no GPS is available). A number of the broadcast only devices are placed through out the seating areas. The devices are very short range, and only transmit intermittently and as a result may be battery powered and to remain active over a very long time period. Each device can be placed in a known location, in a predicable manner.

An attendee at the event has his or her device enabled with the identifier protocol and other embodiments described above. The device detects a broadcast device, and interacts over the internet with the server via the WWAN connection (as already described above). The server receives an indication of the broadcast device's identifier and the identifier of the account associated with the device which detected the broadcast device. The server retrieves content associated with the service provider's account and provide that content to the application on the requesting mobile device. The content may indicate that the venue has a product delivery service. The user may then press an indication on their device that they would like to see a menu or list of items for sale from the merchant(s) in the venue. The application on the user's device would then allow them to see a menu, for instance, and select items to purchase. The user then would be asked to confirm the purchase. The server would then indicate to the merchant that a user located near a specific broadcast device has ordered something. In this case, it is expected that a delivery fee could also be charged for the

enhanced service. The server would facilitate the purchasing of the goods or services from the merchant and payment from customer's account, and provide confirmation to each. Such confirmation can include an electronic receipt provided to the customer, for user upon arrival of the delivery person of the good or service. The customer can then select an indication on their device confirming receipt of the good or service via the mobile device, thereby completing the transfer of funds and the transition. Optionally, the delivery person of the good or service may have an enabled mobile device as well. In this case the identifiers may be detected by the customer's device and reported to the server to confirm that the provider's delivery person was present. Further, the delivery person's device can be able to detect the broadcast device's identifier and reported to the server confirming the delivery person was in the correct area independently. Even further proximity confirmation may be achieved by the customer's device's transmitted identifier being detected by the delivery person's device and reported to the central server further confirming the physical proximity of the parties involved in the transaction. Upon arrival of the delivery person, the customer may be notified that the delivery person is looking for them, and has arrived. These cross confirmations can allow for the central server evidence to justify payments both in completed transactions and in disputed or failed transactions. Further, the delivery person may receive a picture of the requesting customer assisting to identify the customer to whom the food is to be delivered. Once the customer is found, the delivery person can confirm the delivery of the good or service to the customer via the user input on their mobile device, and that confirmation being reported to the central server. The customer can have the option to report confirmation or denial of the reception of the product or service as well, as in the last example.

In another embodiment, the merchant device may be fixed, but have an internet connection (wireless or otherwise). Further, in some embodiments, the merchant may be an automated device such as a vending machine. In such a model, a customer may use their enabled cell phone to purchase an item such as a beverage from the machine without the need to insert currency into the machine. This can be accomplished by the customer's cell phone detecting the vending machine transmission of the identifier or visa-versa. Following the

detection of either the customer's identifier by the vending machine, or the customer detecting the vending machine identifier, the respective device notifies the server, which in turn provides notification (assuming the account settings allow for notification) to the potential customer via their device. Assuming the customer selects to purchase an item from the vending machine using their account associated with their device, the customer may be presented a menu as in the example above. The customer may further be presented information to ensure the identity of the vending machine, such as a description of the machine, a machine identification number, or a (most likely) a picture of the machine where it is located. The customer can then confirm this is the machine they are interfacing with, and select to pay via their account. The customer may in one model select the item to dispense by input to their phone, or they may simply select to provide payment to the machine allowing them to make the selection manually as is the typical mode of operation today. The vending machine can then interact with the server via its own internet connection, and participate in the transaction in a manner similar to the mode described above allowing for step by step confirmation as previously described.

Electronic opinion polling, tied to a known location.

In a much simpler example, such a capability might be used to tie a survey to a known location in such a way as to provide an e-coupon to the survey taker on their device in return for completion of the survey. Alternatively, this type of interaction can enable a very large crowd to interact with a Jumbo-Tron like display to provide input to polls or to participate in group activities. Users at different locations in a audience may form teams and interact with other teams for group activities.

Feature Summary of Preferred Embodiments

1. In a first embodiment:

One device is transmitting a wireless identifier using a wireless protocol capable of peer to peer communication;

The wireless identifier being associated with a specific account on a server connected to the internet;

A second device receiving the wireless identifier

The second device capable of communicating with the server over an internet connection;

The second device requesting information from the service associated with the first identifier

- The second device having a second identifier associated with a second account on the server; and/or
- The server providing different amounts of information related to the first account based on the parameters associated with one or both of the first and second accounts

The identifiers associated with the accounts being updated such that the identifiers would no longer be recognized as being associated with specific accounts without past or current interaction with the server;

Using one or more of Cellular network timing information, and information form the central server to coordinate the broadcast and search times amongst the devices. (to reduce power and resource consumption); and/or

Data necessary to engage in an E-commerce transaction may be exchanged as well such as the identity verification such as via a picture and/or mutual identifier detection.

2. In a second embodiment,

A device is capable of operating two wireless protocols simultaneously, utilizing a first wireless protocol in the device to detect the proximity of another wireless device and using the second wireless protocol to communicate with a remote server, where:

a. One or more of the devices are mobile devices;
b. Where the first wireless protocol is a local, or personal area network wireless protocol such as 802.11, Bluetooth, UWB or other local connectivity protocol;
c. Where the first wireless capability used for detecting the presence of another device, or advertising the presence or a device;
d. Utilizing a wireless wide area data link from one or more of the wireless devices to, optionally:
    i. Connect to a central server;
    ii. Perform user authorization functions;
    iii. Perform download of information associated with account identifiers utilizing the short range wireless capability;
    iv. Request forwarding of messages / packets to the other active account;
e. Utilizing the messaging with a mobile proximity based social networking capability; and optionally,
    i. The messaging being performed via the WWAN; and/or
f. The server providing a centrally assigned user identity, with relationship brokering or identification capability.

3. In another embodiment,

A central serving capability is provided to mobile devices utilizing a wireless WAN connection to provide and exchange information between one or more application on one or more wireless devices and the central server where

- the information passed to the central server is collected by one wireless device from another wireless device via a separate local wireless reception from the other wireless device;

- the separate local wireless reception from the second wireless device contains information directly assigned by, derived from, or known to the central server associated with the identity of the second wireless device;
- this identity is related to certain information and preferences of an account holder associated with an application operating on the second wireless device;
- the application is operating on both wireless devices;
- the application operating on the first device also provides its own identifying information to the central server as well as detected identifiers from devices with applications on them;
- The central server contains account information registered to the applications running on each wireless device;
- The preferences associated with the account information also contain policies related to the disclosure of one account's stored information to other accounts and hence to their application on their devices;
- These policies including a classification of other accounts each classification having different policies some of these policies being one of:
    - no not allow notification of my presence
    - allow notification of my presence
    - disclose my name/ do not disclose my name
    - disclose age / do not disclose age
    - disclose personal details;
- Where an application running on each device can optionally perform point of sale transitions coordinated via the central server, over the WWAN, utilizing user input on each device as confirmation of successive steps in the transition;
- Further, where at least one of the confirmation steps additionally involves displaying an identifying picture related to one of the devices, on the other device;
- Additionally the server performing an authorization for the transition to a third party;

- Or, optionally, a device is interacting with a point of sale device to associate an itemized list of items with a detected second device;
- The service performing a confirmation with the application on the second device requiring user input that the bill of goods list is correct; and/or
- The server storing the information related to the second devices detected account identity and inventory in a database for later use

4. In still other embodiments, a device in the present invention has a wireless capability with no WWAN capability, but only with the ability to broadcast a unique identifier, and

- A central server stores having the broadcast device's details;
- And when the first device provides these detail to the server, authorized and current information about the broadcast device are provided to the first wireless device;
- Where this information optionally includes advertising information or information related to "e-coupons" for special offers for products or services; and/or
    - Where the content of the e-coupons might be customized based on the identity of the requesting device or account holder;
        - Where the content is further customized based on other information known by the server related to the user's account ; or
        - Where the other information is related to the user's past purchasing practices or previous requests; and/or
- A mobile device, upon detecting a broadcast device and if enabled to do so, will report that broadcast Id to the server over a WWAN, and retrieve the current content from the server associated with that device and:
    - Display it to the user on their device; or

- Execute instructions associated with the information retrieved from the server.

5. In still further embodiments, a good or service delivery model utilizing the above described broadcast device, is placed in a known location, and further

a. A mobile device is for detecting the fixed device's identifier via the WPAM/WLAN;
b. The mobile device reporting this identifier and passing an identifier associated with itself, or the account associated with the user utilizing the device;
c. The server determining that the detected broadcast device is associated with the broadcast device with a known location;
d. The server further determining that the identifier is associated with a service, and further associated with an account or that service;
e. The server retrieving content associated with the service provider's account and providing that content to the application on the requesting mobile device;
f. Where that content may be a list of items for sale, services for sale, a opinion pole, food menu, or other menu style content which allows for user selection of items, which can be implemented in java code, xml, simple text, or other for example optionally including active code elements;
g. The application on the mobile device displaying the content to the user display with the itemized list of goods, services, or other selection items;
h. A user providing selection of one or more of the items, and confirming they wish to purchase said items, and take delivery at or near the location of the fixed broadcast device;
i. The server facilitating the purchasing of the goods or services from the merchant's account and the customer's account, and providing confirmation to each. Such confirmation including an electronic receipt provided to the customer, for user upon arrival of the deliverer of the good to or service;

j. The customer confirming receipt of the good or service via the mobile device, thereby completing the transfer of funds and the transition; and/or

k. The deliverer of the good or service optionally having a mobile device and optionally:

   i. such that identifiers from that device may be detected by the customers device and reported to the server to confirm that the provider's delivery person was present;

   ii. such that the broadcast devices identifier is detected by the delivery person's mobile device and reported to the server confirming the deliver person was in the correct area

   iii. such that the customer's device's transmitted identifier is detected by the delivery persons device and reported to the central server further confirming the physical proximity of the parties involved in the transaction; and/or

   iv. The delivery person confirming the delivery of the good or service to the customer via the user input on their mobile device, and that confirmation being reported to the central server.

6. In another embodiment, a software program is arranged to operate at the application layer on a mobile device, which interfaces to a device driver interface:

- Using wi-fi 802.11 to perform a WLAN local connection protocol; or
- Using Bluetooth to perform the WLAN local connection;
- Where the device driver interface is an NDIS driver or the like;
- Using 1xEVDO, HSDPA, GPRS, EDGE or the like for a wide area WWAN interface;
- The application then providing the reported identifiers to a server, which will make decisions regarding a users interest in these detected identifiers, and policy regard privacy other identifiers;

- The decision process optionally based on priority of the identifier, the class an identifier belongs to, a list the identifier is, or is not included on;

- Based on the result of the action function,
- Sending at least one detected identifier to the network, potentially with additional information from the action function, and retrieving information back from the server related to that identifiers' account information stored on that server;
- The server then receiving a request from a device's application, with a detected identifier
  - The server examining both the requesting and the requested identifier's identity and making a policy decision regarding the release of the requested identifiers information related to their account;
  - The server in some cases providing a continuously or periodically changing account or device identifier to a specific application on a device to enhance the privacy of the identity of that device;
    - The changing of the identifier may be effected by a rule based generation local to the application, or may be downloaded from the server directly; and/or
    - The update of the identifier being synchronized to such that it is coordinated with predetermined scanning and broadcasting periods allowing for a known update boundary;

7. In still another embodiment, a method uses the mobile device's time of day derived from the network or other reference for

synchronizing a PAN/WLAN discovery and advertisement times to save battery life; doing the same in a synchronized way among multiple devices;

while coordinating the timing information utilizing the WWAN and a central server available commonly to the devices, such as by

- Synchronizing identifier transmission timing to save power from WWAN network parameters obtained for the server;
- Coordinating any identifier updates to this same timing source; and/or
- Using a pool of identifiers available to the central server to assign identifiers to devices changing the identifiers at some time interval derived for the common time reference

8. In another embodiment,

A central server uses an identity manager to assign identifiers to devices using a WWAN cellular data link, and wherein

identifiers are occasionally changed

identifiers are assigned from a pool of identifiers available to the servers;

identifiers are used as 48 bit media access control (MAC) addresses of the short range wireless network adapter

identifiers are optionally used as

an SSID in a IBSS in IEEE-802.11 network beacons

a BSSID of the IEEE802.11 network adapter;

in a IEEE802.15.1 Inquiry Response Message as the BD_ADDR

a device name in a Bluetooth name response packet ; or

listed in a services list as provided in a LMP_features_req message or LMP_features_req_ext message for a Bluetooth device

While this invention has been particularly shown and described with references to example embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the scope of the invention encompassed by the appended claims.

CLAIMS

What is claimed is:

1. A mobile wireless device for facilitating the use of proximity beacons comprising:

a first radio for communicating with one or more servers and receiving identifier related information;

a second radio for receiving proximity beacon transmissions from a plurality of beacon transmitter devices and for providing proximity beacon information derived from the proximity beacon transmissions; and

a data processor for determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information;

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and proximity beacon identification information;

wherein the proximity beacon identification information indicates the proximity beacon transmissions are associated with a proximity beacon service; and

wherein the proximity beacon identification information is the same for all proximity beacon transmissions from the plurality of beacon transmitter devices and identifies of each of the plurality of proximity beacon transmitter devices as being enabled with the proximity beacon service.

2. The mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit number matching the format of a MAC address.

3. The mobile wireless device of Claim 2, wherein the MAC address is a Bluetooth BD_ADDR.

4. The wireless device of claim 3 wherein both the MAC address and the unique identifier received by the second radio occasionally change, for security reasons.

5. The wireless device of claim 2 wherein both the MAC address and the unique identifier change from time to time, making one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more central server to access the identifier information.

6. The mobile wireless device of Claim 1, wherein at least the portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices.

7. The mobile wireless device of Claim 6, wherein the data processor determines the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object.

8. The mobile wireless device of Claim 1, wherein the data processor determines the proximity utilizing an action function including one or more previously downloaded unique identifiers.

9. The mobile wireless device of Claim 1, wherein the data processor determines the proximity by comparing the proximity beacon information with the identifier related information.

10. The mobile wireless device of Claim 1, wherein the data processor determines the proximity by sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radio, and receives at least a portion of the identifier related information usable to make the proximity determination.

11. The mobile wireless device of Claim 10, wherein the unique identifier associated with the at least one beacon transmitter is associated at the at least one of the one or more servers with being a broadcast device having a known location.

12. The mobile wireless device of Claim 1, wherein the data processor further determines, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a known location.

13. The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device, downloaded in reaction to the sending of a unique identifier by the mobile wireless device to the at least one server, wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information.

14. The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device.

15. The mobile wireless device of Claim 1 wherein

the identifier related information comprises a list of contact information, and the data processor performs the proximity determination of a beacon transmitter device associated with an entity included within the list of contact information based upon comparing a contact information related unique identifier with at least the portion of the proximity beacon information, and wherein the mobile wireless device, upon determining there is a match, engages in further steps to allow further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, and further

wherein the both the MAC address and the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information change from time to time, but remains

identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification.

16. The wireless device of claim 1 wherein the changing of the MAC address and the unique identifier associated with the at least one beacon transmitter is coordinated with the at least one of the one or more remote central servers.

17. The wireless device of claim 1 wherein the unique identifier of at least the portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one server of the one or more remote central servers.

18. The wireless device of claim 1 wherein the unique identifier associated with at least one beacon transmitter is associated with a single beacon transmitter and is generated algorithmically and only known to at least one the central servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval within the beacon transmitter, and further

wherein the MAC address associated with the beacon transmitter is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices.

19. The mobile wireless device of Claim 1, wherein the second radio is a Bluetooth based radio.

20. The mobile wireless device of Claim 1, wherein the second radio is a Wi-Fi based radio.

21. The mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit BD_ADDR, wherein both the MAC address and the unique identifier change from time to time, making one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous

over time to other devices or entities not having permissions at the one or more central server to access the identifier related information, and wherein at least the portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices, wherein the data processor determines the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object.

22. The mobile wireless device of Claim 21, wherein the data processor determines the proximity utilizing an action function including one or more previously downloaded unique identifiers.

23. The mobile wireless device of Claim 1, wherein the proximity beacon service utilizes a standards based protocol derived from Bluetooth and including unsolicited automatically repetitive advertisements, and wherein the proximity beacon transmissions are transmitted within the format of the unsolicited automatically repetitive advertisements, and wherein the proximity beacon identification information is included within a configurable field of the unsolicited automatically repetitive advertisements while conforming to the standards based protocol and, wherein no connection is made between the mobile wireless device and the plurality of beacon transmitted receiving when receiving the unique identifier.

24. A wireless device for facilitating the use of proximity beacons comprising:

a short range radio for transmitting proximity beacon advertisements and receiving proximity beacon advertisement information; and

a data processor for providing the proximity beacon advertisement information to the short range radio,

wherein the data processor generates the proximity beacon advertisement information based, at least in part, upon configuration information provided by one or more remote central servers.

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and proximity beacon identification information;

wherein the proximity beacon identification information indicates the proximity beacon transmissions are associated with a proximity beacon service; and

wherein the proximity beacon identification information is the same for all proximity beacon transmissions from the plurality of beacon transmitter devices and identifies of each of the plurality of proximity beacon transmitter devices as being enabled with the proximity beacon service.

25. A system for facilitating the use of proximity beacons comprising:

one or more central servers for communicating with a plurality of wireless devices;

software residing on a wireless device of the plurality of wireless devices for:

utilizing a first radio of the wireless device to communicate with at least one of the one or more servers and for receiving identifier related information; and for,

utilizing a respective second radio of the wireless device for receiving proximity beacon transmissions from a plurality of beacon transmitter devices and for providing received proximity beacon information derived from the proximity beacon transmissions; and for,

determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information;

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and proximity beacon identification information;

wherein the proximity beacon identification information indicates the proximity beacon transmissions are associated with a proximity beacon service; and

wherein the proximity beacon identification information is the same for all proximity beacon transmissions from the plurality of beacon transmitter devices and

identifies of each of the plurality of proximity beacon transmitter devices as being enabled with the proximity beacon service.

26. The system of Claim 25, wherein the identifier related information comprises application software for execution upon the mobile wireless device.

27. The system of Claim 25, wherein the identifier related information is received in response to the software residing on the wireless device sending at least one unique identifier determined from the proximity beacon information.

28. The system of Claim 27 wherein after determining the at least one beacon transmitter device is in proximity, at least one server of the plurality of servers provides an identifying picture of a consumer to at least one device for use by an operator of the device for confirming the picture matches an individual in proximity as a step in a multi-step electronic commerce transaction.

29. The system of Claim 28, wherein the MAC address and unique identifier of the proximity beacon transmissions from each of the at least one beacon transmitter devices change from time to time, and wherein at least the unique identifiers of the at least one of beacon transmitter devices remain associated with an account associated with the consumer.

30. The system of Claim 25, wherein the second radio is a Bluetooth compliant radio.

ABSTRACT OF THE DISCLOSURE

A server exchanges information between one or more wireless devices to complete a transaction. The server receives second device identifier information from a first wireless device using a wide area network. The second device identifier information was previously provided to the first wireless device using short range wireless communication. The server then uses the second device identifier information to determine additional information concerning an entity or object located in proximity to the second device, and then the server delivers information to the first wireless device based at least in part upon both (a) the second device identifier and (b) a current step in a multiple step process for an ongoing electronic commerce transaction.

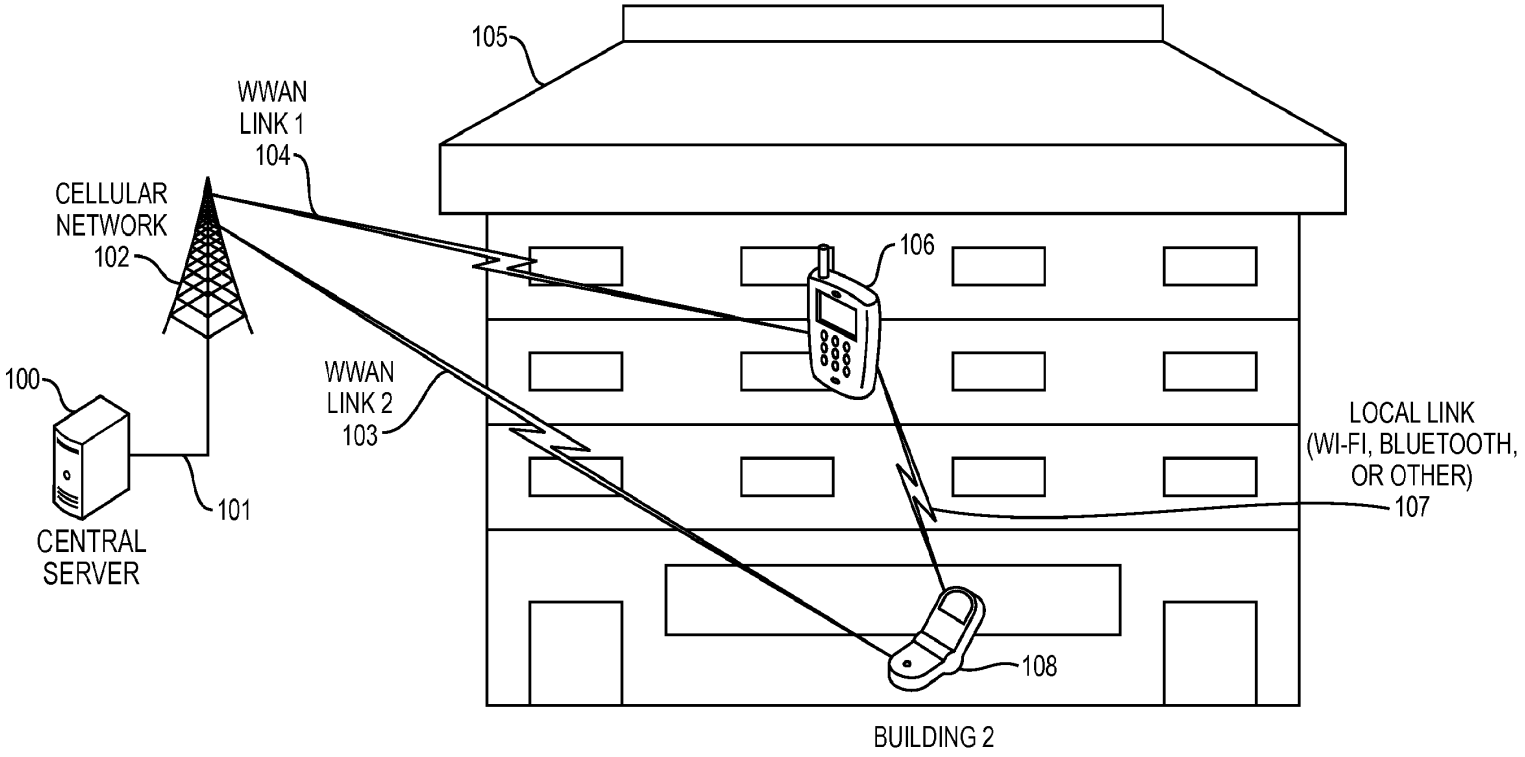

105
WWAN
LINK 1
104
CELLULAR
NETWORK
102
106
100
WWAN
LINK 2
103
LOCAL LINK
(WI-FI, BLUETOOTH,
OR OTHER)
107
101
CENTRAL
SERVER
108
BUILDING 2

Figure 1

Figure 2

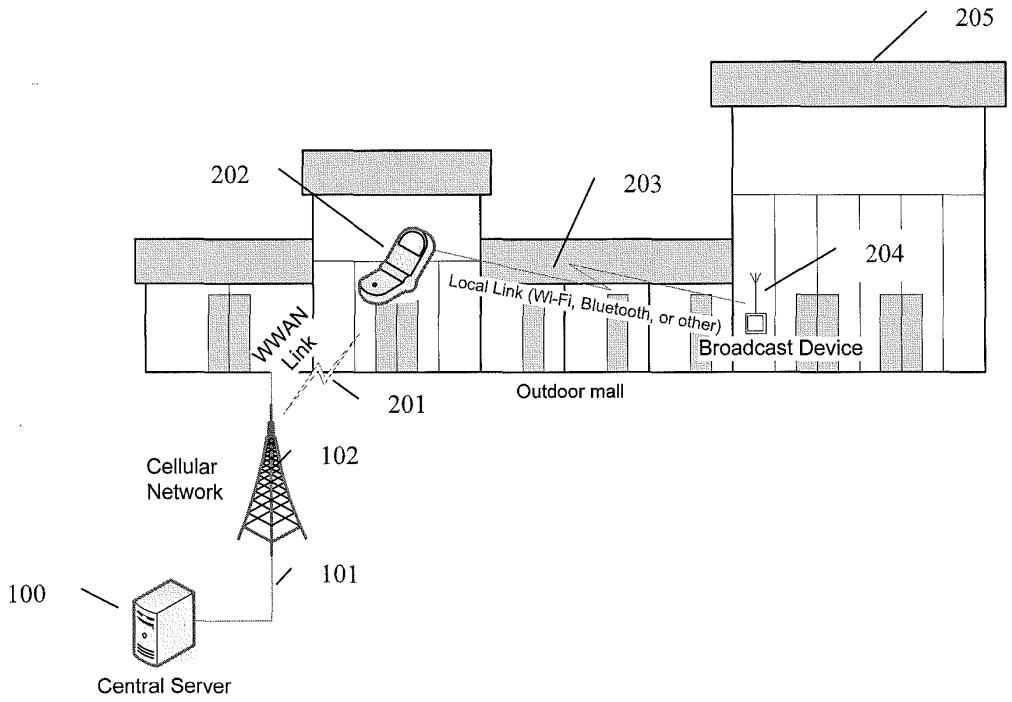
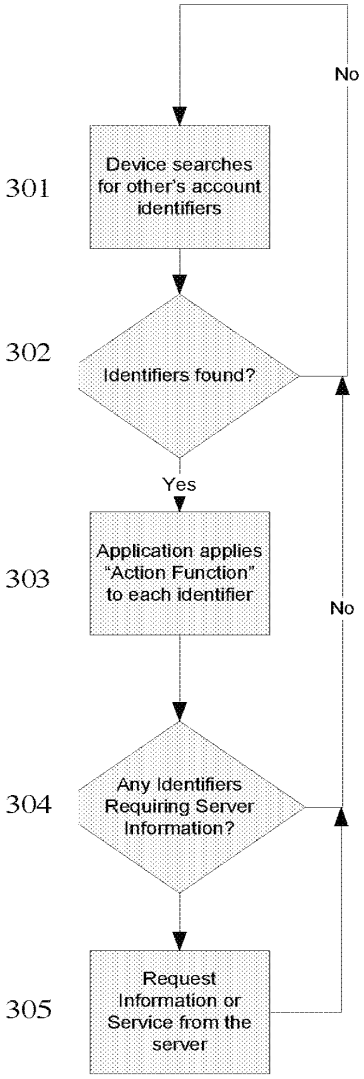

205
202
203
204
Local Link (Wi-Fi, Bluetooth, or other)
WWAN Link
Broadcast Device
Outdoor mall
201
Cellular Network
102
101
100
Central Server

Figure 3


No
301
Device searches for other's account identifiers
302
Identifiers found?
Yes
303
Application applies "Action Function" to each identifier
No
304
Any Identifiers Requiring Server Information?
305
Request Information or Service from the server

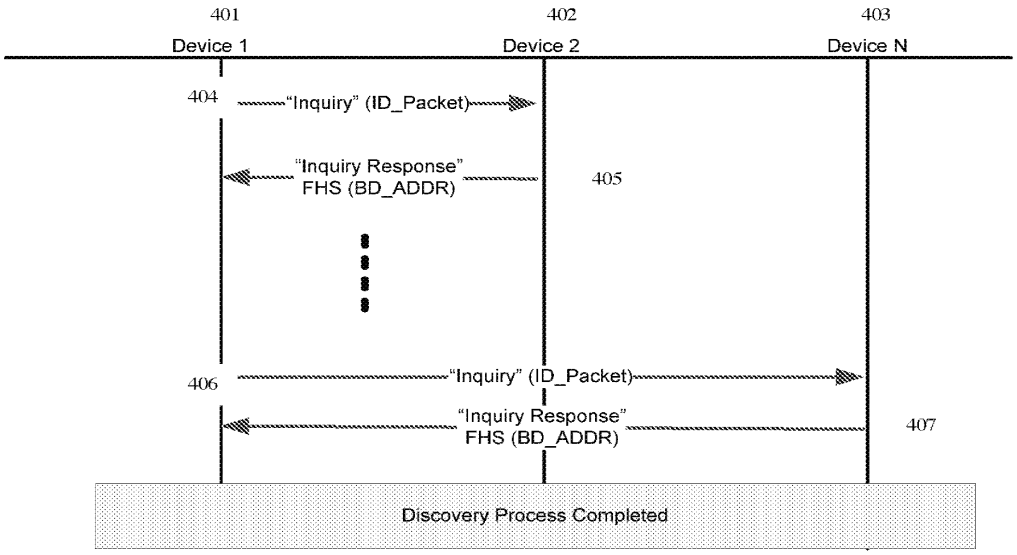


Figure 4 – 802.15.1-2002 (Bluetooth V1.2) Device Discovery

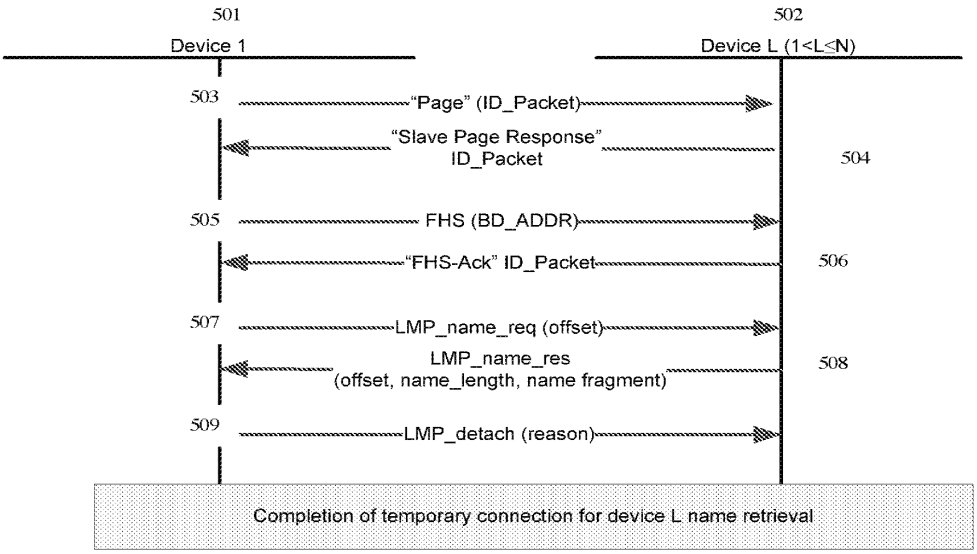


Figure 5 – 802.15.1-2002 (Bluetooth V1.2) Remote Name Request

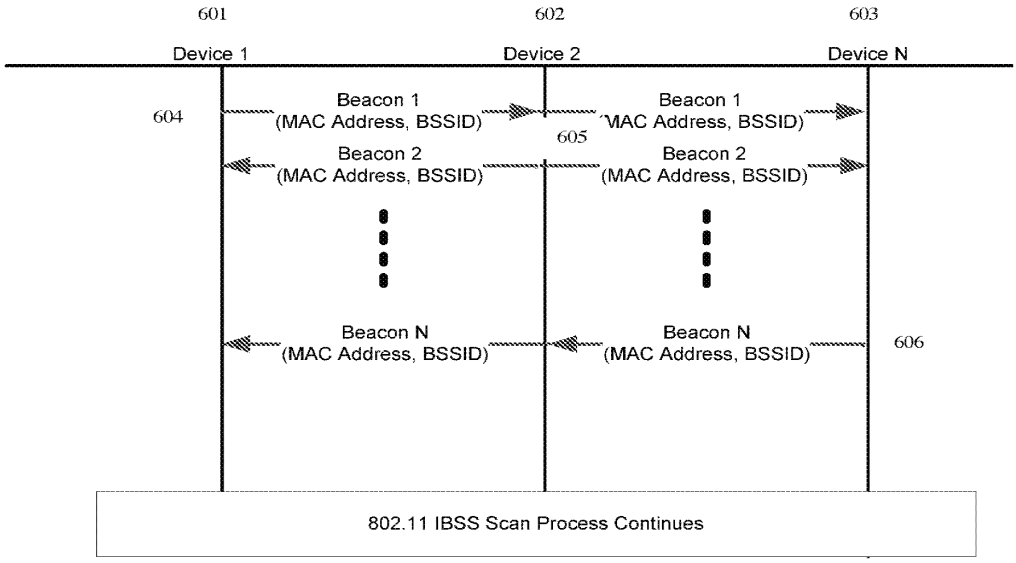


Figure 6 - 802.11 IBSS Beacon Process

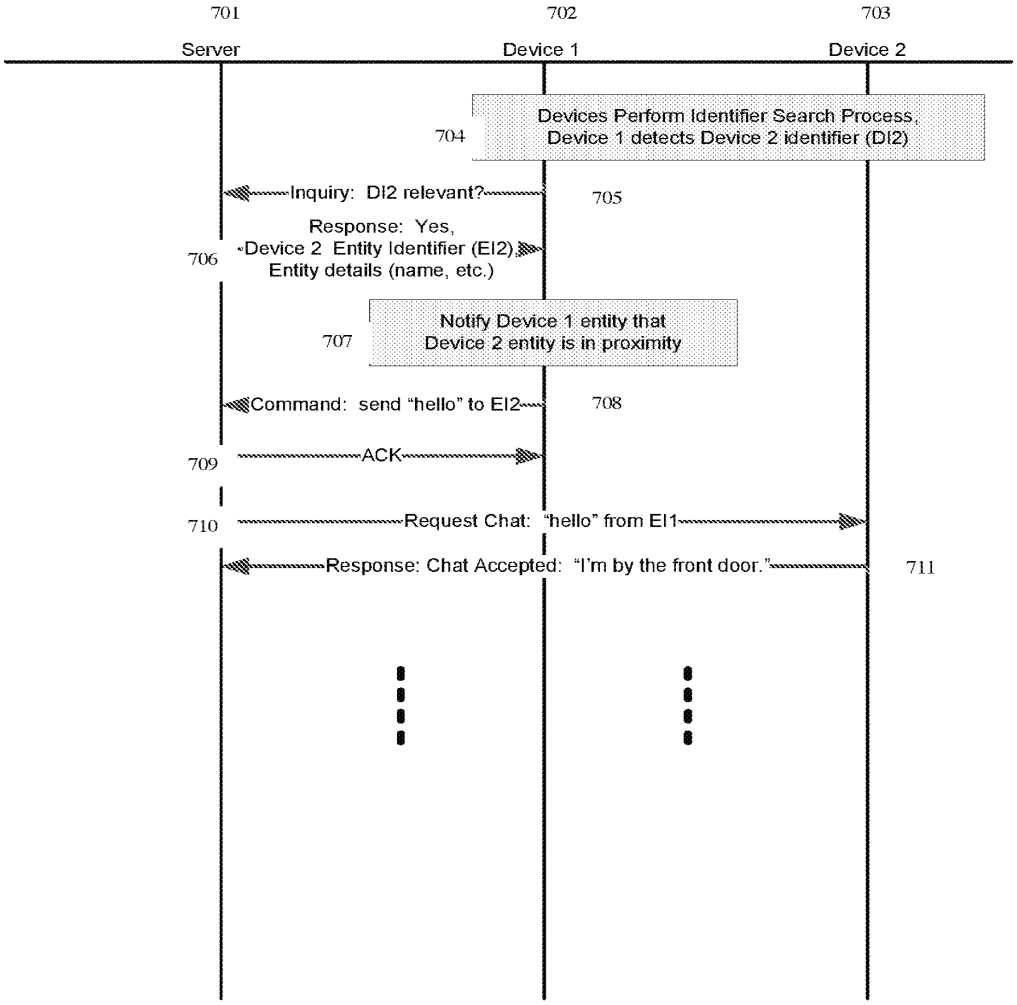


Figure 7 – Process of Detection and entering a Chat Session

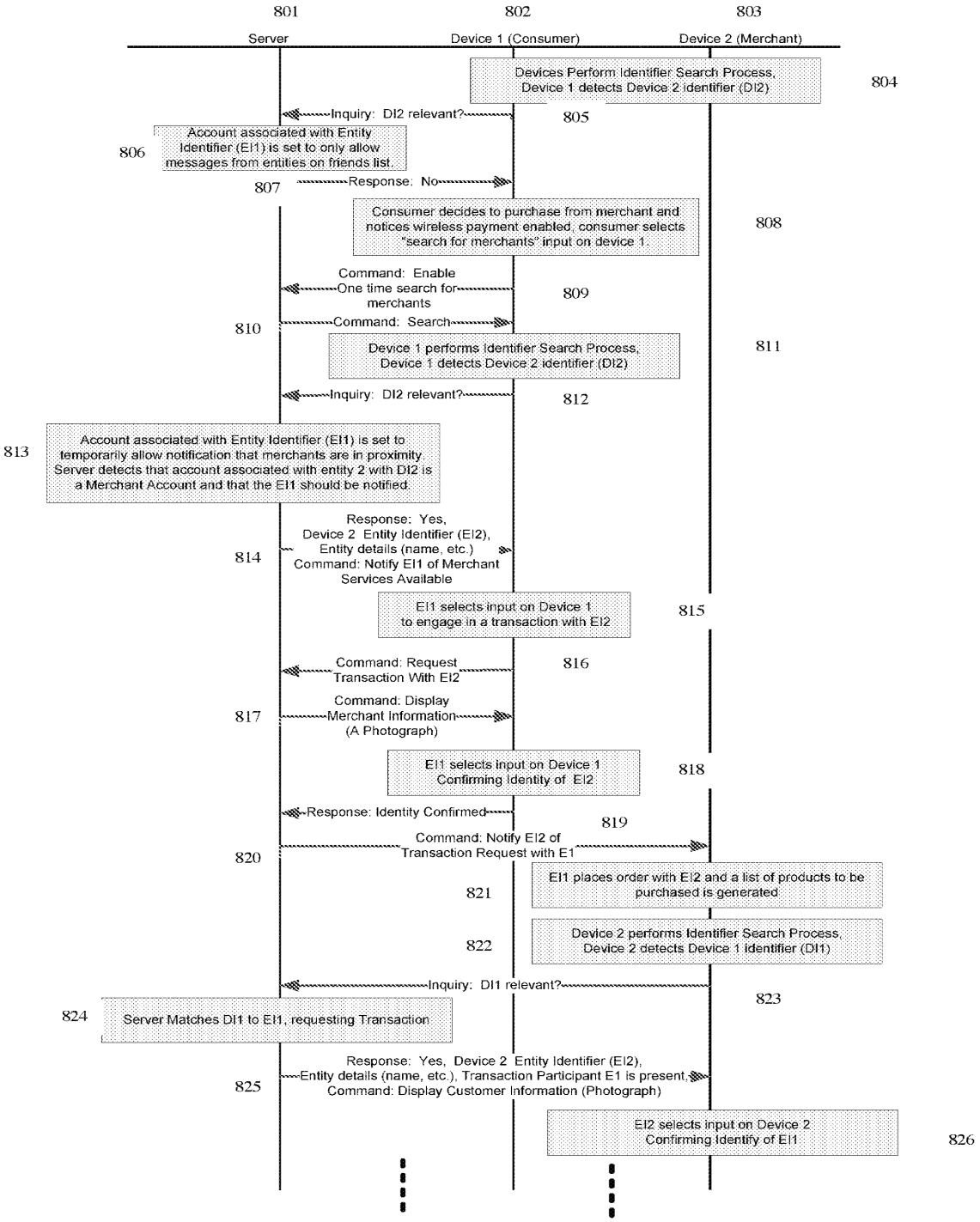
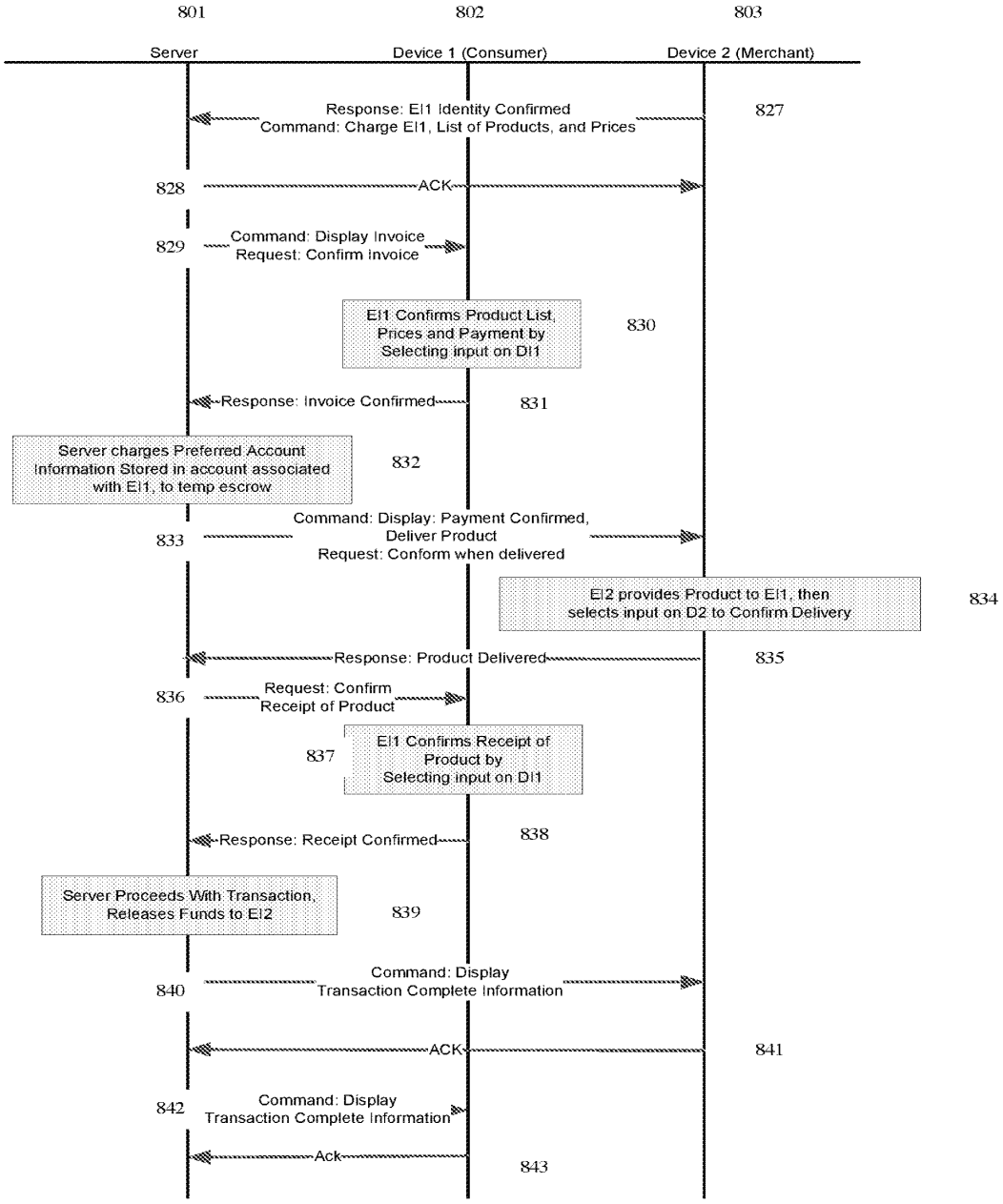


Figure 8A – E Commerce Process

Figure 8B – E Commerce Process Continued



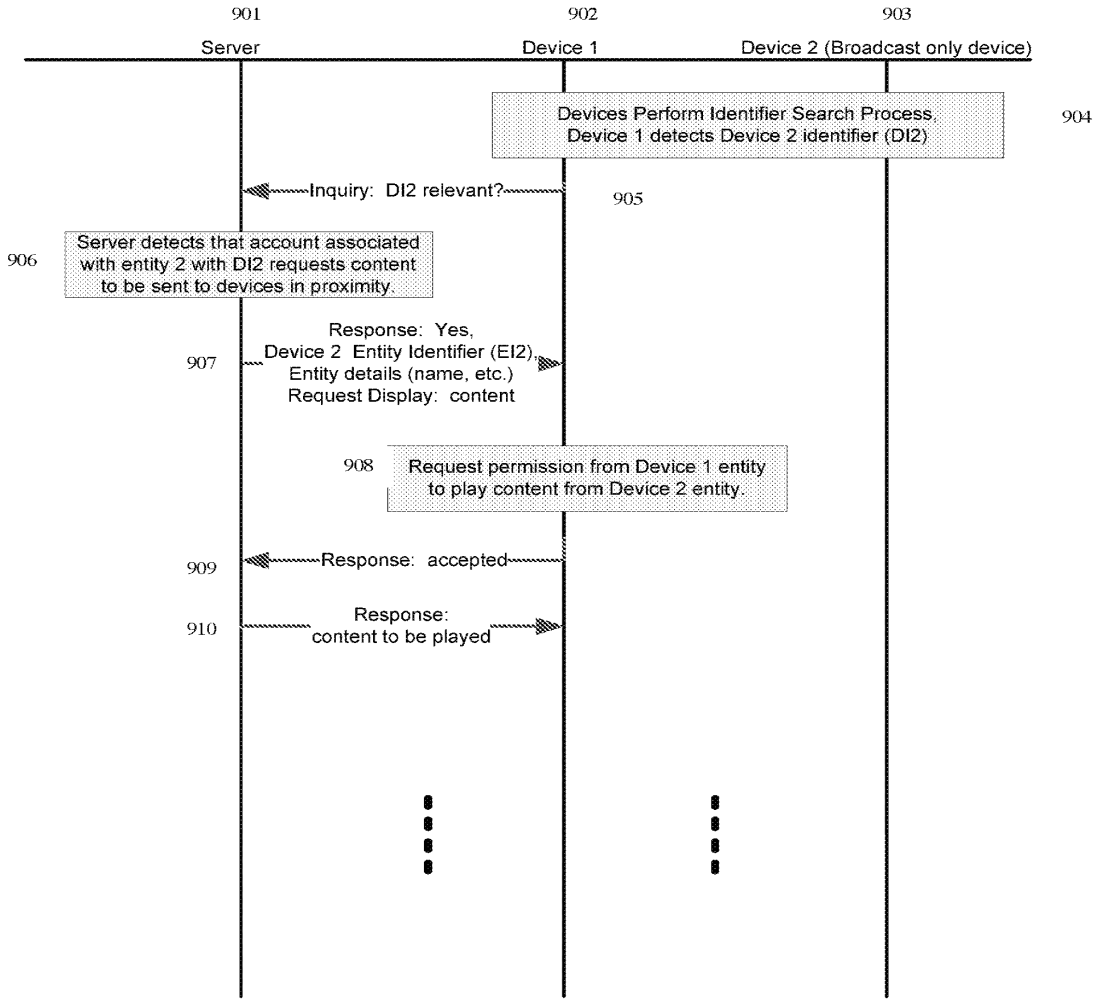


Figure 9 Broadcast and mobile device interaction

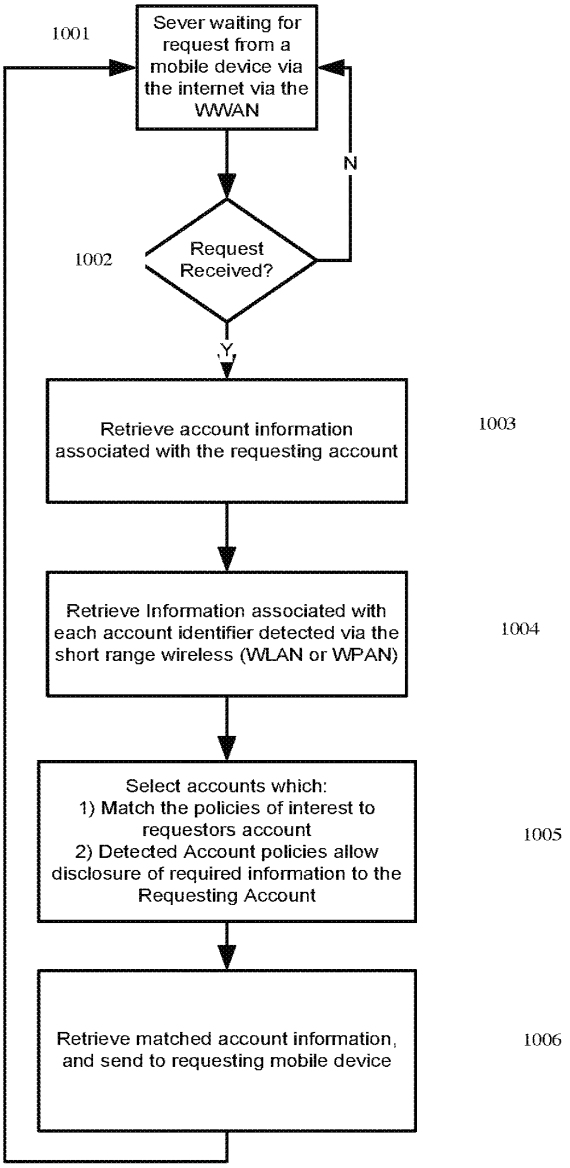


Figure 10 – Server Processing Example for Detected Device

Figure 11 – Example Individual Account Record associated with an Entity Stored in the Server

Record Index	Field	Field Information Group Disclosure Policy Assignments List
1	Account Number	[All, Explicit Approval, NONE, 1..N]
2	Identifier	
3	Identifier Type [Fixed MAC Address, Dynamic MAC Address, BSSID, Device Name]	
4	Number of Fields	
5	Field List	
6	Account User Name	NONE
7	Account Password	NONE
8	Entity Name	
9	Entity Address	
10	Entity Type [Individual, Merchant, Broadcast Entity]	
11	Billing Information	
12	Device Type	
13	Device IP Address	
14	Device SMS Phone Number	
15	Device Capabilities	
16	Entity AutoPlay Script 1	
17	Entity AutoPlay Script 2	
18	Detected AutoPlay Script 1	
19	Detected AutoPlay Script 2	
20	Entity Instant Message Address List	
21	Information Group Disclosure Policy 1 (IGDP#) [Characteristic 1 (C1), C2,.. CN, Friend List 1 (FL1), FL2, .. FLN, etc]	
22	Information Group Disclosure Policy 2	
23	Information Group Disclosure Policy 3	
24	Information Group Disclosure Policy 4	
25	Additional Personal Information Field 1 (APIF#) [Content Type/Content] (Picture, mp3, xml/AJAX, Text, Contact List, URL (MySpace, Facebook, Loopt), Login Credentials (MySpace, Facebook, Loopt, Itunes, etc.), Payment Information (Credit Card Information, PayPal Information, etc.), IM Credentials List (Username/Password))	
26	Additional Personal Information Field 2	
27	Additional Personal Information Field 3	
...		

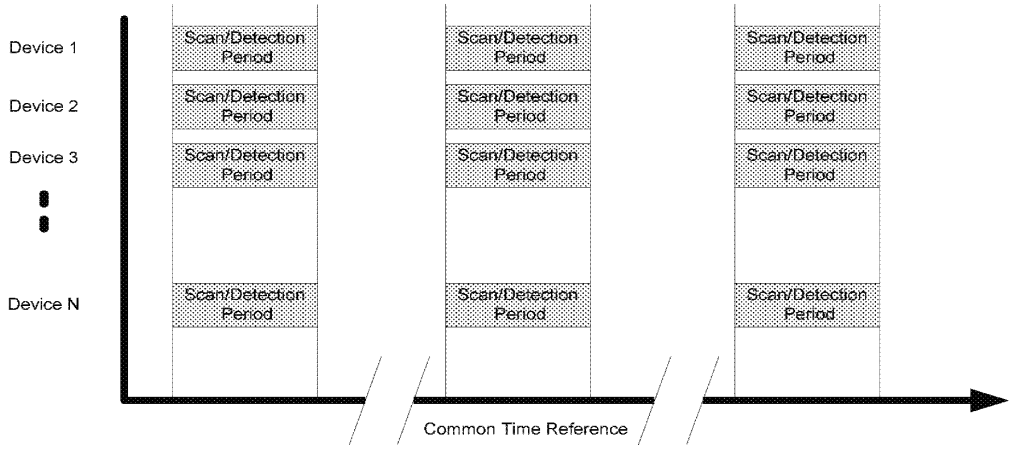


Figure 12 Use of common time reference for intermittent detection intervals

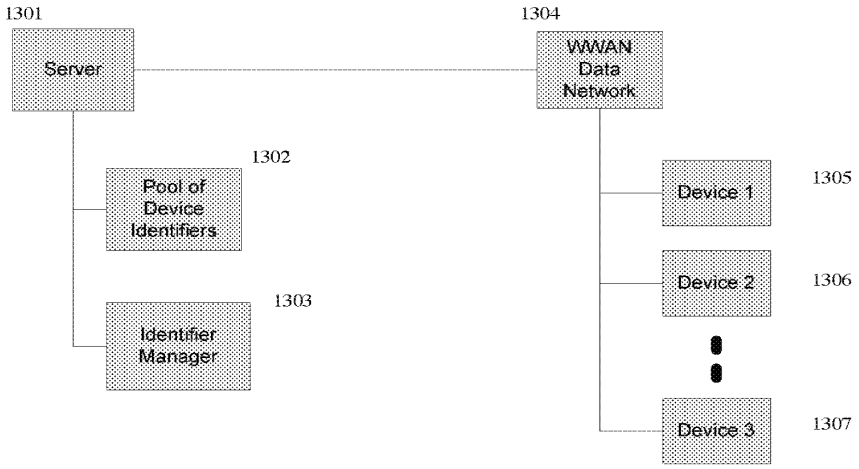


Figure 13 - Management of Device Identifiers by Identifier Manager in the Server

PATENTS
111054–0001U4C7

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of:
James A. Proctor, Jr., et al.

Serial No.: Not yet assigned

Examiner: Not yet assigned

Filed: Herewith

Art Unit: Not yet assigned

For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Confirmation No.: Not yet assigned

Cesari and McKenna, LLP
88 Black Falcon Avenue
Boston, MA 02210
September 21, 2016

CERTIFICATE OF TRANSMISSION

I hereby certify that the following paper is being electronically transmitted to the Patent and Trademark Office by EFS-Web on September 21, 2016.

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INFORMATION DISCLOSURE STATEMENT

In keeping with the duty of candor and good faith owed to the Patent and Trademark Office, Applicant wishes to bring to the Examiner's attention the references listed on the accompanying form PTO-1449. Copies of cited art are not enclosed

pursuant to 37 C.F.R. §1.98(d)(1) because they were submitted in the parent U.S. Patent Application Serial No. 14/861,563, filed September 22, 2015.

To the extent required by 37 C.F.R. §1.98(a)(3), Applicant has described what they consider to be the relevance, and/or provided an English translation, of any non-English-language documents, or portion thereof.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

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OR

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Assignee Name and Address: Proxicom Wireless, LLC
258 Seaview Street
Melbourne Beach, FL 32951

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SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	5-31-2013
Name	James A. Proctor, Jr.	Telephone	321-252-8411
Title	Managing Director, Proxicom Wireless, LLC		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	24267
Filer:	David J. Thibodeau/stephany deblois
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	21-SEP-2016
Filing Date:	
Time Stamp:	12:11:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	2A43156.PDF	118495 1e0cb5521a65b513ba66fb9f02723425f4abd0ef	no	3

Warnings:

Information:					
2	Power of Attorney	2A43187.PDF	234587 e9af1650ae068460095db564e05ec056fd470469	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	353082	

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Proxicom Wireless, LLC

Application No./Patent No.: Not Yet Assigned Filed/Issue Date: Herewith

Titled: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Proxicom Wireless, LLC, a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 033637, Frame 0378, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

   1. From: _____ To: _____

      The document was recorded in the United States Patent and Trademark Office at

      Reel _____, Frame _____, or for which a copy thereof is attached.

   2. From: _____ To: _____

      The document was recorded in the United States Patent and Trademark Office at

      Reel _____, Frame _____, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

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5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

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6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/David J Thibodeau Jr Reg No 31671/	2016-09-21
Signature	Date
David J. Thibodeau, Jr.	Attorney of Record, Reg No 31671
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 9

Complete if Known	
Application Number	**Not Yet Assigned**
Filing Date	**September 22, 2015**
First Named Inventor	**James A. Proctor, Jr.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C6**

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)		Publication Date MM/DD/YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	6,487,601		11/26/2002	Hubacher et al.	
	2	6,629,149		9/30/2003	Fraser et al.	
	3	6,675,153		1/6/2004	Cook et al.	
	4	6,700,535		3/2/2004	Gilkes et al.	
	5	6,929,149		8/6/2005	Selfridge et al.	
	6	6,978,165		12/20/2005	Martinez et al.	
	7	7,177,594		2/13/2007	Burr	
	8	7,185,204		2/27/2007	Narayanaswami et al.	
	9	7,207,480		4/24/2007	Geddes	
	10	7,213,742		5/8/2007	Birch et al.	
	11	7,213,743		5/8/2007	Carlson et al.	
	12	7,233,960		6/19/2007	Boris et al.	
	13	7,254,406		8/7/2007	Beros et al.	
	14	7,280,847		10/9/2007	Goldthwaite et al.	
	15	7,289,810		10/30/2007	Jagadeesan et al.	
	16	7,305,245		12/4/2007	Alizadeh-Shabdiz et al.	
	17	7,315,944		1/1/2008	Dutta et al.	
	18	7,330,112		2/12/2008	Emigh et al.	
	19	7,349,871		3/25/2008	Labrou et al.	
	20	7,359,674		4/15/2008	Markki et al.	
	21	7,363,494		4/22/2008	Brainard et al.	
	22	7,379,920		5/27/2008	Leung et al.	
	23	7,403,762		7/22/2008	Morgan et al.	
	24	7,414,988		8/19/2008	Jones et al.	
	25	7,433,649		10/7/2008	Toulis et al.	
	26	7,433,694		10/7/2008	Morgan et al.	
	27	7,434,723		10/14/2008	White et al.	

Examiner Signature		Date Considered	

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Sheet	2	of	9

Complete if Known	
Application Number	**Not Yet Assigned**
Filing Date	**September 22, 2015**
First Named Inventor	**James A. Proctor, Jr.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C6**

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	28	7,471,954		12/30/2008	Brach et al.	
	29	7,502,933		3/10/2009	Jakobsson et al.	
	30	7,522,058		4/21/2009	Light et al.	
	31	7,546,141		6/9/2009	Leon et al.	
	32	7,580,699		8/25/2009	Shaw et al.	
	33	7,620,026		11/17/2009	Anschutz et al.	
	34	7,711,620		5/4/2010	Abifaker	
	35	7,714,712		5/11/2010	Emigh et al.	
	36	7,716,484		5/11/2010	Kaliski, Jr.	
	37	7,876,701		1/25/2011	Li et al.	
	38	7,936,736		5/3/2011	Proctor, Jr. et al.	
	39	7,991,664		8/2/2011	Stone	
	40	8,024,272		9/20/2011	Doran et al.	
	41	2001/0036200		11/01/2001	Nelson et al.	
	42	2002/0073027		06/13/2002	Hui et al.	
	43	2002/0128932		09/12/2002	Yung et al.	
	44	2002/0188565		12/12/2002	Nakamura et al.	
	45	2003/0045272		03/06/2003	Burr, Jeremy	
	46	2003/0074259		04/17/2003	Slyman et al.	
	47	2003/0195808		10/16/2003	Brown et al.	
	48	2004/0030601		02/12/2004	Pond et al.	
	49	2004/0167837		08/26/2004	Reel et al.	
	50	2004/0186768		09/23/2004	Wakim et al.	
	51	2004/0190468		09/30/2004	Saijonmaa, Jaakko	
	52	2004/0203895		10/14/2004	Balasuriya, Senaka	
	53	2004/0245332		12/09/2004	Silverbrook et al.	
	54	2004/0264466		12/30/2004	Huang, Leping	

Examiner Signature		Date Considered	

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Sheet 3 of 9

Complete if Known	
Application Number	**Not Yet Assigned**
Filing Date	**September 22, 2015**
First Named Inventor	**James A. Proctor, Jr.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C6**

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	55	2005/0165667		7/28/2005	Cox, George Chester	
	56	2005/0174975		8/11/2005	Mgrdechian et al.	
	57	2005/0188062		8/25/2005	Li et al.	
	58	2006/0069922		3/30/2006	Jelinek et al.	
	59	2006/0079284		4/13/2006	Lu et al.	
	60	2006/0085419		4/20/2006	Rosen, James S	
	61	2007/0060130		3/15/2007	Gogic et al.	
	62	2007/0078851		4/5/2007	Grell et al.	
	63	2007/0096909		5/3/2007	Lally, Matthew	
	64	2007/0106612		5/10/2007	O'Brien et al.	
	65	2007/0121534		5/31/2007	James et al.	
	66	2007/0178886		8/2/2007	Wang et al.	
	67	2007/0187491		8/16/2007	Godwin et al.	
	68	2007/0242765		10/18/2007	Parizhisky et al.	
	69	2007/0255653		11/1/2007	Tumminaro et al.	
	70	2007/0280269		12/6/2007	Rosenberg, Louis B.	
	71	2008/0010190		1/10/2008	Rackley, III et al.	
	72	2008/0037487		2/14/2008	Li et al.	
	73	2008/0051059		2/28/2008	Fisher, Michelle	
	74	2008/0097851		4/24/2008	Bemmel et al.	
	75	2008/0097879		4/24/2008	Sadowski et al.	
	76	2008/0109741		5/8/2008	Messing et al.	
	77	2008/0114647		5/15/2008	Singer et al.	
	78	2008/0114699		5/15/2008	Yuan et al.	
	79	2008/0133403		6/5/2008	Hamzeh, Mehrak	
	80	2008/0167961		7/10/2008	Wentker et al.	
	81	2008/0181154		7/31/2008	Sherman, Itay	

Examiner Signature		Date Considered	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet	4	of	9

Complete if Known	
Application Number	**Not Yet Assigned**
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First Named Inventor	**James A. Proctor, Jr.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C6**

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	82	2008/0182591		7/31/2008	Krikorian, Raffi	
	83	2008/0182592		7/31/2008	Cha et al.	
	84	2008/0189394		8/7/2008	Ross et al.	
	85	2008/0214166		9/4/2008	Ramer et al.	
	86	2008/0222711		9/11/2008	Michaelis, Oliver	
	87	2008/0261564		10/23/2008	Logan, James D.	
	88	2008/0262928		10/23/2008	MICHAELIS, Oliver	
	89	2008/0288408		11/20/2008	Jacobsen, Jeffrey J.	
	90	2008/0306825		12/11/2008	Schick et al.	
	91	2008/0313079		12/18/2008	VAN BOSCH et al.	
	92	2008/0313082		12/18/2008	VAN BOSCH et al.	
	93	2009/0016248		1/15/2009	Li et al.	
	94	2009/0016250		1/15/2009	Li et al.	
	95	2009/0016255		1/15/2009	Park, Vincent D.	
	96	2009/0016315		1/15/2009	Laroia et al.	
	97	2009/0016353		1/15/2009	Li et al.	
	98	2009/0016524		1/15/2009	Park et al.	
	99	2009/0019168		1/15/2009	Wu et al.	
	100	2009/0022096		1/22/2009	Walley et al.	
	101	2009/0037286		2/5/2009	Foster, Brian Edward	
	102	2009/0061901		3/5/2009	Arrasvuori et al.	
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	107	2009/0270120		10/29/2009	Park, Vincent	
	108	2009/0271211		10/29/2009	Hammad, Ayman	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 5 of 9

Complete if Known	
Application Number	**Not Yet Assigned**
Filing Date	**September 22, 2015**
First Named Inventor	**James A. Proctor, Jr.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C6**

U.S. PATENT DOCUMENTS

Examiner Initials'	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	109	2009/0281904		11/12/2009	PHARRIS, DENNIS J.	
	110	2009/0282130		11/12/2009	ANTONIOU et al.	
	111	2009/0285119		11/19/2009	Horn et al.	
	112	2009/0287827		11/19/2009	Horn et al .	
	113	2009/0303250		12/10/2009	Phillips, Simon	
	114	2009/0303926		12/10/2009	Den Hartog et al.	
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	117	2009/0310517		12/17/2009	Narayanan et al.	
	118	2009/0313105		12/17/2009	Magnusson, Stefan	
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	134	7,213,742		05-2007	Birch et al.	
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Substitute for form 1449A/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	**Not Yet Assigned**
				Filing Date	**September 22, 2015**
				First Named Inventor	**James A. Proctor, Jr.**
(use as many sheets as necessary)				Art Unit	**Not Yet Assigned**
				Examiner Name	**Not Yet Assigned**
Sheet	6	of	9	Attorney Docket Number	**111054–0001U4C6**

U.S. PATENT DOCUMENTS

Examiner Initials'	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	136	7,711,100		05-04-2010	Dennis	
	137	8,275,359		09-25-2012	Drennan	
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FOREIGN PATENT DOCUMENTS

Examiner Initials'	Cite No.[1]	Foreign Patent Document Country Code[3]–Number[4]–Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	1	SG 134837	10/29/2007	SKYHOOK WIRELESS, INC.		
	2	SE 0702686-7	12/4/2007	Accumulate AB		
	3	WO 2007/081356	7/19/2007	SKYHOOK WIRELESS, INC.		

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				Filing Date	**September 22, 2015**
				First Named Inventor	**James A. Proctor, Jr.**
(use as many sheets as necessary)				Group Art Unit	**Not Yet Assigned**
				Examiner Name	**Not Yet Assigned**
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NON PATENT LITERATURE DOCUMENTS

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	1	Heeger, David, "Signal Detection Theory Handout," University of Stanford, 1998, www.psych.stanford.edu/~lera/psych115s/notes/signal/, 7 pages.	
	2	Wauters, R., "TC50: Gift Card Auction Site Rackup Aims To Shake Up Market" [online], September 14, 2009. Retrieved from the Internet URL: http://techcrunch.com/2009/09/14/tc50-gift-card-auction-site-rackup-aims-to-shake-up-market/, one page.	
	3	Rusli, E., "Gift card marketplace Cardpool Introduces Instand Redemption, Attracts Super Angels" [online], September 7, 2010. Retrieved from the Internet URL: http://techcrunch.com/2010/09/07/gift-card-marketplace-cardpool-plasticjungle/, one page.	
	4	Office Action, U.S. Application No. 12/364,823, mail date December 28, 2010.	
	5	Office Action, U.S. Application No. 12/364,828, mail date September 15, 2010.	
	6	Notice of Allowance, U.S. Application No. 12/364,828, mail date July 1, 2010.	
	7	Office Action, U.S. Application No. 12/364,938, mail date September 14, 2010.	
	8	Office Action, U.S. Application No. 12/364,938, mail date July 21, 2011.	
	9	Office Action, U.S. Application No. 12/364,819, mail date November 15, 2010.	
	10	Final Office Action, U.S. Application No. 12/364,819, mail date June 28, 2011.	
	11	U.S. Provisional Application No. 60/758,010 filed on January 11, 2006 by Rajiv Laroia for Methods and apparatus for facilitating identification, synchronization or acquisition using beacon signals, 30 pages.	
	12	U.S. Provisional Application No. 60/758,011 filed on January 11, 2006 by Rajiv Laroia for Methods and apparatus for using beacon signals for identification, synchronization or acquisition in an ad hoc wireless network, 26 pages.	
	13	U.S. Provisional Application No. 60/758,012 filed on January 11, 2006 by Rajiv Laroia for Methods and apparatus for using beacon signals in a cognitive radio network, 24 pages.	
	14	U.S. Provisional Application No. 60/845,051 filed on September 15, 2006 by Junyi Li for Beacons in a mixed wireless communication system, 30 pages.	
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Examiner Signature		Date Considered	

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Substitute for form 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ***(use as many sheets as necessary)***				***Complete if Known***	
				Application Number	**Not Yet Assigned**
				Filing Date	**September 22, 2015**
				First Named Inventor	**James A. Proctor, Jr.**
				Group Art Unit	**Not Yet Assigned**
				Examiner Name	**Not Yet Assigned**
Sheet	8	of	9	Attorney Docket Number	**111054–0001U4C6**

NON PATENT LITERATURE DOCUMENTS

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	16	U.S. Provisional Application No. 60/863,304 filed on October 27, 2006 by Rajiv Laroia for POWER ALLOCATION SCHEME, 15 pages.	
	17	Ortiz-Yepes, "Enhancing Authentication in eBanking with NFC enabled mobile phones;" Masters Thesis, Department of Mathematics and Computer Science, Eihdhoven University of Technology; August 11, 2008.	
	18	Office Action, U.S. Application No. 12/364,819, mail date April 16, 2012.	
	19	Office Action, U.S. Application No. 13/212,766, mail date April 26, 2012.	
	20	Office Action, U.S. Application No. 13/213,028, mail date May 5, 2012.	
	21	http://www.smartcardalliance.org/resources/lib/Proximity_Mobile_Payments_200709.pdf; "Smart Card Alliance" 39 pages, September 2007, retrieved from Internet March 21, 2012.	
	22	http://www.ietf.org/rfc/rfc4793.txt; "The EAP Protected One-Time Password Protocol (EAP-POTP); 77 pages, February 2007; retrieved from Internet March 21, 2012.	
	23	Office Action, U.S. Application No. 12/364,819, mail date August 26, 2010.	
	24	Office Action, U.S. Application No. 12/364,823, mail date June 16, 2010.	
	25	Office Action, U.S. Application No. 12/364,828, mail date May 14, 2010.	
	26	Office Action, U.S. Application No. 12/364,938, mail date May 13, 2010.	
	27	Office Action, U.S. Application 13/015,306 mail date June 17, 2011.	
	28	Office Action, U.S. Application 13/015,306 mail date July 17, 2012.	
	29	Notice of Allowance, U.S. Application 13/015,306 mail date November 8, 2012.	
	30	Office Action, U.S. Application 13/015,306 mail date January 9, 2012.	
	31	Notice of Allowance, U.S. Application 13/212,723 mail date January 16, 2013.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet	9	of	9

Complete if Known	
Application Number	**Not Yet Assigned**
Filing Date	**September 22, 2015**
First Named Inventor	**James A. Proctor, Jr.**
Group Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C6**

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	32	S. S. (Peter) Wang et al., E-911 LOCATION STANDARDS AND LOCATION COMMERCIAL SERVICES, Nokia Research Center (2000) 5 pages.	
	33	Jonathan P. Munson & Vineet K. Gupta, Location-Based Notification as a General-Purpose Service, Proceedings of the 2nd International Workshop on Mobile Commerce (2002) 5 pages.	
	34	File History of U.S. Provisional Patent Application No. 60/814,254, filed on June 16, 2006, 44 pages.	

Examiner Signature		Date Considered	

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Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James A. Proctor, Jr.
Filer:	David J. Thibodeau/stephany deblois
Attorney Docket Number:	111054-0001U4C7

Filed as Small Entity

Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	70	70
UTILITY SEARCH FEE	2111	1	300	300
UTILITY EXAMINATION FEE	2311	1	360	360
REQUEST FOR PRIORITIZED EXAMINATION	2817	1	2000	2000
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	2202	10	40	400
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	2830	1	70	70
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**3200**

Electronic Acknowledgement Receipt	
EFS ID:	26988746
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James A. Proctor, Jr.
Customer Number:	24267
Filer:	David J. Thibodeau/stephany deblois
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	21-SEP-2016
Filing Date:	
Time Stamp:	12:03:31
Application Type:	Utility under 35 USC 111(a)

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Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$3200
RAM confirmation Number	092116INTEFSW00009449031237
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1	Transmittal of New Application	2A43299.PDF	33802 276c5ef15dec6c784e7e51fb1ce77d45ac11d69b	no	1
Warnings:					
Information:					
2	TrackOne Request	2A43197.PDF	114292 928e769114ffb45f6a309d8073ad00d455245cc3	no	2
Warnings:					
Information:					
3	Application Data Sheet	2A43163.PDF	1561795 01709b004b4e14793af99504961ba7d506d08228	no	7
Warnings:					
Information:					
4		2A43297.PDF	196389 20b21ebb8c16a387324e5bdc10cd24896b1fbbac	yes	47

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	39
	Claims	40	46
	Abstract	47	47

Warnings:					
Information:					
5	Drawings-only black and white line drawings	2A43150.PDF	342980 09c9b88017935340c624887d59331e0541ab1d54	no	14

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Warnings:					
Information:					
7	Information Disclosure Statement (IDS) Form (SB08)	2A43301.PDF	118251 01ce600262746319 42bca6c3ecf762905da2e6fe	no	9
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New Applications Under 35 U.S.C. 111

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National Stage of an International Application under 35 U.S.C. 371

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Application Number: 15271410 Document Date: 09/21/2016

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 2

Complete if Known	
Application Number	**15/271,410**
Filing Date	**September 21, 2016**
First Named Inventor	**James A. Proctor, Jr., et al.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C7**

U.S. PATENT DOCUMENTS

Examiner Initials'	Cite No.[1]	Document Number Number-Kind Code[2] (if known)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		2002/0101993		08-01-2002	Eskin	
		6,629,149		09-30-2003	Fraser et al.	
		6,934,535		08-23-2005	Phyalammi	
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Examiner Initials'	Cite No.[1]	Foreign Patent Document Country Code[3]–Number[4]–Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
		CA 2 766 024	08-08-2002	ACK Ventures Holdings, LLC		
		CA 2 766 184	08-08-2002	ACK Ventures Holdings, LLC		
		WO 2009050322	04-23-2009	Nokia Corporation		
		WO 2009063272	05-22-2009	Nokia Corporation		

Examiner Signature		Date Considered	

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Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	**15/271,410**
				Filing Date	**September 21, 2016**
(use as many sheets as necessary)				First Named Inventor	**James A. Proctor, Jr., et al.**
				Group Art Unit	**Not Yet Assigned**
				Examiner Name	**Not Yet Assigned**
Sheet	2	of	2	Attorney Docket Number	**111054–0001U4C7**

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
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Examiner Signature			Date Considered		

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Electronic Acknowledgement Receipt

EFS ID:	27075078
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	24267
Filer:	David J. Thibodeau/stephany deblois
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Attorney Docket Number:	111054-0001U4C7
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Application Type:	Utility under 35 USC 111(a)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	2A49317.PDF	370817 068dd4f69ddaa9f87b6125ac1f7026b0be3ede9f	no	4

Warnings:

Information:					
2	Non Patent Literature	2A49237.PDF	384010 47617e828a01676e02b5983b1be786b254c90e76	no	10
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3	Non Patent Literature	2A49244.PDF	215622 7595108a5c6932a423c189531190531891fb55e7	no	29
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Information:					
4	Non Patent Literature	2A49309.PDF	178295 defa90f4cc65e74981fbd8933a56ea95a152c54e	no	15
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5	Non Patent Literature	2A49321.PDF	192562 070209fefc3a4c0564aeebd13154ff77144db7bd	no	16
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6	Non Patent Literature	2A49325.PDF	204074 c3deeedc8a138482b7a03576da2eee2a2418ca34	no	22
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7	Non Patent Literature	2A49327.PDF	204028 82b0cefb8cf47dab2ef6e35a6c7e6b804c0cc3e4	no	19
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8	Non Patent Literature	2A49326.pdf	2379219 b30c8f85b02400ce46f99fe96d7da5c934eb9299	no	15
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9	Non Patent Literature	2A49328.PDF	432076 5405260a051796ab837691a353401194336fa98c	no	16
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15	Non Patent Literature	2A49340.PDF	2993012 41f17313e4d8e7669eae7a7d0868b0ecd6e42354	no	59
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16	Foreign Reference	2A49318.PDF	2021664 57a446d5651bfb5029acd7f9e246565060fb ba82	no	59
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Information:					
17	Foreign Reference	2A49319.PDF	2064207 76112a63b09122c7db26c7857fc12b8600d 96a25	no	61
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<u>National Stage of an International Application under 35 U.S.C. 371</u>
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<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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CA 2766024 A1 2002/08/08

(21) 2 766 024

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

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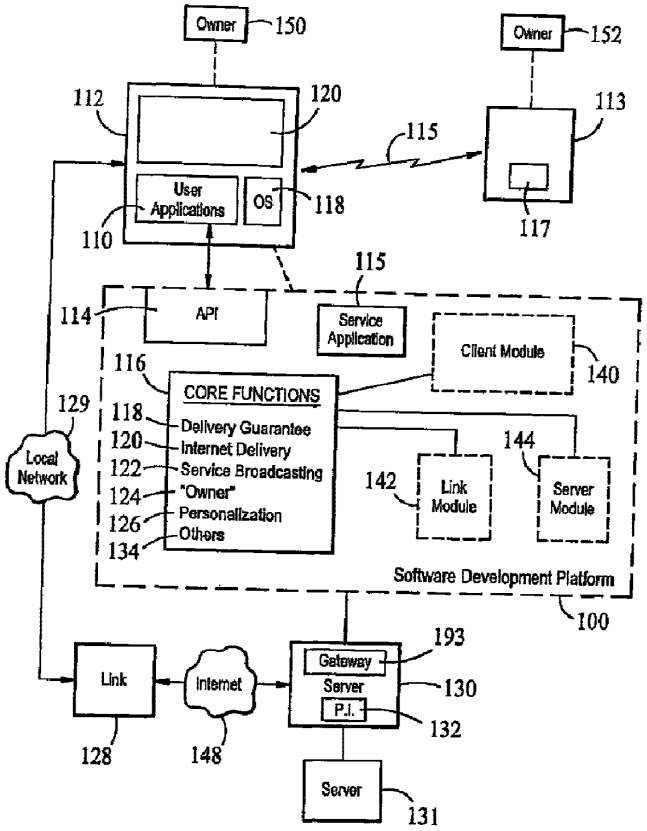
(51) Cl.Int./Int.Cl. *H04W 8/18* (2009.01), *H04W 4/02* (2009.01), *H04W 4/12* (2009.01)

(71) Demandeur/Applicant:
ACK VENTURES HOLDINGS, LLC, US

(72) Inventeur/Inventor:
ESKIN, ELEAZAR, US

(74) Agent: SMART & BIGGAR

(54) Titre : INFORMATIQUE ET COMMUNICATION MOBILES
(54) Title: MOBILE COMPUTING AND COMMUNICATION



(57) Abrégé/Abstract:
An application development platform enables applications to be created easily for, e.g., mobile devices that have short-range wireless communication capability. The development platform exposes a carefully chosen core set of services through an API.

(21) 2 766 024

(13) A1

(57) **Abrégé(suite)/Abstract(continued)**:
Each of the applications can broadcast its services to local and remote devices. Message delivery between devices is guaranteed even for messages than cannot be delivered directly by local short-range wireless transmission. Message delivery through other channels, including the Internet, can occur transparently to the user. Each device can be associated with an "owner", which can be a person or an entity. Services can be customized to the owner based on stored information that maps owners to devices. Information associated with each of the owners of devices can be stored centrally and used in connection with providing the services at each of the mobile devices. Virtual GPS capabilities can be provided for mobile devices that do not have GPS chips.

70850-146E

ABSTRACT

An application development platform enables applications to be created easily for, e.g., mobile devices that have short-range wireless communication capability. The development platform exposes a carefully chosen core set of services through an API. Each of the applications can broadcast its services to local and remote devices. Message delivery between devices is guaranteed even for messages than cannot be delivered directly by local short-range wireless transmission. Message delivery through other channels, including the Internet, can occur transparently to the user. Each device can be associated with an "owner", which can be a person or an entity. Services can be customized to the owner based on stored information that maps owners to devices. Information associated with each of the owners of devices can be stored centrally and used in connection with providing the services at each of the mobile devices. Virtual GPS capabilities can be provided for mobile devices that do not have GPS chips.

70850-146E

MOBILE COMPUTING AND COMMUNICATION

BACKGROUND

This application is a divisional of Canadian Patent Application Serial No. 2,437,706, filed on February 1, 2002.

This invention relates to mobile computing and communication.

Personal digital assistants, mobile telephones, and other mobile devices offer a wide range of computing and communication capabilities. To provide these capabilities, mobile devices have hardware complements that may include microprocessors, memories, displays that are in some cases touch sensitive, microphones, speakers, keys, and other user input and output mechanisms.

A variety of specific functions are often provided on mobile devices, including data entry, handwriting recognition, speech recognition, voice and data communication, memo writing, calendars, word processors, spreadsheets, to-do lists, and address books. These functions are implemented in software or firmware applications that are stored on the devices and use the features of an operating system such as Microsoft Windows CE or Palm OS that runs on and controls the hardware components of the mobile devices.

Mobile devices that are capable of wireless communication typically comply with one or more of the standard wireless communications protocols such as Bluetooth and the Wireless Application Protocol (WAP).

Bluetooth, for example, uses radio frequency transmission for relatively short-range communication. Bluetooth capabilities may be implemented in a small microchip that is incorporated into the mobile or other device.

To create an application for Bluetooth-capable devices, a developer typically writes custom software that implements the particular features of the application. A piece of custom software must be written for each of the devices that

are involved in performing functions of the application on either end of each Bluetooth communication link. Each piece of custom software is written to conform to the peculiar hardware and operating system characteristics of the device on which it will run.

SUMMARY

Some embodiments of the invention enable a fundamental shift in the way developers can enable users of mobile devices to interact with users of other mobile devices and users of stationary devices that have wireless capability.

In general, in one aspect, the invention features a method that includes running client modules on mobile devices, running a server module on a server that is accessible through a communication network, and running link modules on link devices that have communication channels to the mobile devices and are capable of accessing the server through the communication network. The client, server, and link modules provide core services through application programming interfaces to applications running on the mobile devices, the server, and the link devices.

Implementations of the invention may include one or more of the following features.

Service applications also run on the client modules to enable users of the mobile devices to manage the core services. The core services include interaction with short-range wireless transceivers in the mobile devices. A mobile device operating system is also running on the mobile devices and the client modules use services of the operating system. The mobile devices include personal digital assistants or mobile phones. The core services include at least one of the following: broadcast of information about real-world services; interaction with a wireless transceiver in the mobile device; guaranteed message delivery; and encryption.

In general, in another aspect, the invention features a method that includes running client modules on wireless devices, the client modules providing core services through application programming interfaces to applications running on the devices, at least some of

the applications being associated with real-world services that are provided by individuals or enterprises,

Implementations of the invention may include one or more of the following features. Information is maintained identifying relationships between each of the real- world services and at least one of the devices through which the service is provided, the core services providing a sharing among the devices of the information identifying the relationships between the real-world services and the devices. Information about the services available through each of the devices is broadcast by the core services to the other devices. The real-world services associated with the devices are registered by the core services. The real-world services include at least one of communication services, computational services, commercial services, or governmental services.

In general, in another aspect, the invention features maintaining in a wireless device a list of real- world services that are available from a user of the device through an application running on the device; and through a wireless communication channel, broadcasting information from the device indicative of the available real- world services.

Implementations of the invention may include one or more of the following features. The information is broadcast periodically. Another wireless device that receives the broadcast information accesses one of the available real-world services.

In general, in another aspect, the invention features a method that includes running client modules on mobile devices that are associated with identified users, running a server module on a server that is accessible on a communication network, and running link modules on link devices that have communication links to the mobile devices and are capable of accessing the server through the communication network,

Implementations of the invention may include one or more of the following features. A message is received from a user of one of the mobile devices through one of the applications running on the device, the message being directed to another user of an application running on another one of the mobile devices, and the message is delivered to the other user through the Internet. The message is sent through the links and the server. The client module running on the device from which the message is sent determines whether the target mobile device is within short-range wireless distance, and, if not, the client module forwards the message to one of the link modules. The link module forwards the message to the server through the Internet. The server module determines the location of the target mobile device and identifies a communication channel through which to forward the message to the other user.

In general, in another aspect, the invention features a method that includes maintaining a list of short-range wireless devices within range of a first short-range wireless device; and transmitting a message from an identified user of the first device to a second identified user of a second wireless device over a communication medium, the communication medium being selected based at least in part on whether the second device is included on the list, the selection being transparent to the user of the first device.

Implementations of the invention may include one or more of the following features. If the second device is included on the list, the message is transmitted to the second device over a short-range radio link, and if the second device is not included on the list, the message is transmitted to the second device using another communication medium. If the second device is not included on the list, the message is transmitted to the second device over either the Internet or by mobile telephony.

In general, in another aspect, the invention features a method that includes transmitting a

message from an identified user of a short-range wireless device to an identified user of another device; and automatically confirming to the identified user of the first device whether the transmitted message was received by the identified user of the other device.

Implementations of the invention may include one or more of the following features. Information is stored about the transmitted message in the first device after transmission; and a match is made between received confirmations and the transmitted message stored in the device. The transmitted message is resent if a confirmation for the transmitted message is not received within a specified period. A communications manager is notified in the first device if the transmitted message is undeliverable. The notifying includes providing an explanation of why the transmitted message was undeliverable. The transmitted message is removed from the device after it is confirmed that the transmitted message was received by the identified user of the other device. The device from which the message is transmitted is responsible for guaranteeing the delivery.

In general, in another aspect, the invention features a method that includes running applications on devices that are associated with respective owning entities, sending a message from an initiating owning entity to a target owning entity using one of the applications running on one of the devices associated with the initiating owning entity, identifying one of the devices as being associated with the target owning entity and as being accessible by a communication link, and forwarding the message to the device that is associated with the target owning entity through the communication link.

Implementations of the invention may include one or more of the following features. Each of the devices runs a client module that encrypts and decrypts the message using a public key associated with the owning entity of the device. The public key is stored in the device and in a server through which the message passes. The device comprises a mobile device. The owning entity

comprises a person. The owning entity comprises an enterprise and the device comprises a stationary device.

In general, in another aspect, the invention features a method that includes (a) storing information that identifies real- world entities and defines modes of interaction by the real-world entities through distributed devices, each of the real-world entities providing services to other real-world entities and using services of other real- world entities, (b) enabling any of the real- world entities using any arbitrary one or more of the distributed devices to log into the server, (c) loading portions of the stored information from the server to the device being used, and (d) regulating the interaction of the real- world entity using the device with other real-world entities based on the stored information, the interaction including the use of the services of the other real- world entities.

Implementations of the invention may include one or more of the following features. Client modules are run on the device, a server module is run on a server that is accessible on a communication network, the client and server modules provide core services through application programming interfaces to applications running on the devices, and the core services include access to the information that is stored on the server and relates to real-world entities. The stored information includes at least one of identification information, demographic information, and preference information.

In general, in another aspect, the invention features a method that includes associating with each one of a number of different mobile devices that have a short-range wireless communication capability, a person who is a user of the device; storing information about the association of devices and users and information about each of the users at a publicly accessible server; and providing services at each of the mobile devices that depend on the information about the user of the device that is stored at the server.

Implementations of the invention may include one or more of the following features. The information about the users is communicated to the devices from the server for use in providing the functions. The information about the users includes at least one of: demographic information, identification information, preference information, or location information. At least some of the information about the users is stored on the mobile devices associated with the users.

In general, in another aspect, the invention features a method that includes recognizing automatically that an entity in possession of a short-range wireless device is within a particular geographic area; obtaining data about the entity from a commonly accessible database; and sending information to the short-range wireless device, the information sent to the device depending on the data obtained from the database.

Implementations of the invention may include one or more of the following features. Access to the data about the entity in the commonly accessible database is contingent on permission of the entity. The entity can access and modify its data in the commonly accessible database using the wireless device. A second short-range wireless device recognizes that the entity is within the particular geographic area, obtains the data, and sends the information. The information sent to the first device includes promotional material for facilitating a transaction with an entity associated with the second device. The entity obtains information about an entity associated with the second device from the commonly accessible database using the first device. Recognition that the entity is within a particular geographic area is based on receipt of a message from the first device, the message including an identification code mapped to the entity.

In general, in another aspect, the invention features a method that includes (a) electronically storing, in a publicly accessible location, information about real-world entities that are users of devices that have short-range wireless

communication capability, (b) providing client modules on the devices and a server module at the publicly accessible location, the client modules and the server module cooperating to provide guaranteed messaging between users of any of the devices and to enable commercial transactions between users of the devices based on the electronically stored information.

Implementations of the invention may include one or more of the following features. One of the two wireless devices is fixed and one of the two wireless devices is mobile. The user of one of the devices comprises a commercial entity. The user of one of the devices comprises a consumer. The transaction comprises delivery of marketing information from one of the two devices to the other. The transaction comprises the use by one of the two devices of a service provided by means of the other of the two devices. The transaction comprises electronic messaging. The transaction occurs when the two devices are out of range of each other. Access to the stored information is under the control of the user to which it pertains. The stored information comprises the location of the user. The stored information comprises consumption preferences of a consumer. Each of the users is associated with more than one of the devices. The transaction is effected between the two users through the server that is located out of range of the two devices. The two devices are in range of each other and the transaction is effected between two users carrying the two devices. The transaction comprises sending an electronic business card from one of the devices to another one of the devices and displaying the card on the other one of the devices. The transaction comprises an electronic message communicated from one of the users to the other through at least one of the two devices and by a route that includes a mode of communication that is selected from among the Internet, mobile telephony, and short-range wireless communication, the selection being made without the user's awareness.

In general, in another aspect, the invention features a method that includes, at a first device, receiving information from a second device through a short-

range wireless communication channel, the information identifying an actual geographic location of the second device based on signals received from GPS sources, and updating a derived geographic location stored at the first device based on the information received from second device.

Implementations of the invention may include one or more of the following features. The derived geographic location is updated to be the same as the actual geographic location of the second device. The first device receives information over time from multiple other devices, the information representing the actual GPS geographic locations of the other devices, and the derived geographic location is updated from time to time based on the information received over time from the other devices. The first device is mobile and the second device is stationary.

Other features and advantages will become apparent from the following description and the claims.

DESCRIPTION

Figure 1 shows a communication system.

Figure 2 shows a wireless mobile device.

Figures 3A, 3B, and 3C show data structures.

Figures. 4A through 41 show functions that can be used by a wireless device.

Figure 5 shows communication paths.

Figure 6 shows a server.

Figure 7 shows a client.

Figures 8A and 8B show a method for wireless communication.

Figure 9 through 14 show uses of the system.

OVERVIEW

One general aspect of the invention is an application development platform that includes client, link, and server modules that expose core services through an application programming interface (API). Applications can be easily built on the API. The core services are selected to enable unique and widely useful applications to be created.

Each of the applications can make services available to local and remote devices on which the client modules run. The availability of services is broadcast and known to the mobile devices, links, and services so that devices throughout the system can take advantage of them.

One core service is message delivery. The client, link, and server modules coordinate their activities to guarantee at a high level the delivery of messages initiated by applications running on the mobile devices. Messages may be sent directly by a short-range wireless channel from a mobile device to another mobile device that is in the vicinity. If the target device is not in the vicinity, the message may be sent through other channels, including the Internet, to the target device. The communication channel can be chosen transparently to the user of the originating device.

Each device in the system can be associated with an "owner", which can be a person or an entity, such as a retail establishment. Information can be stored that links devices to owners so that messages, for example, can be directed to an owner. The system will determine the identity and location of a device associated

with the owner. The message will then be sent to the identified device wherever it is located using whatever communication channel is appropriate.

Information associated with each of the owners of devices can be stored centrally and used in providing the services at each of the mobile devices. For example, information about the owner's preferences or characteristics can be used to govern the manner in which services are provided, information is made available and communications are effected.

The system can be used to provide virtual GPS capabilities for mobile devices that do not include GPS chips. Such a mobile device can obtain actual GPS information from other devices in the vicinity using short-range wireless communication. The mobile device can maintain a virtual GPS location that is nearly as accurate as if it had the GPS chip on-bard.

As shown in figure 1, the invention provides a common software development platform 100 that enables developers to easily, quickly, and effectively build a wide range of user applications 110 for devices 112, including mobile devices, that have short-range wireless communication capabilities, such as those provided by the Bluetooth standard. The common software development platform provides core functions and features 116 that can be invoked by the user applications through an API 114.

This architecture enables the developer to provide functions and features that are especially suited to mobile devices and short-range wireless communication and that have extremely broad appeal to users of the mobile devices. The developer need not re-invent, for each type of device and each communication protocol, the manner in which the applications interact with the operating system 118 running on the device, the device hardware 120, and the communications protocols.

The core functions include

providing a high-level guarantee of message delivery from one device to another 119

a delivery service that transparently arranges for the delivery of messages from one user to another through, e.g., the Internet 148, if the two devices are not within short-range wireless communication distance of each other 120

broadcasting of available services by a device and use of information that is broadcast from other devices 122

associating an "owner" with each device 124, and

integration with information associated with the owner 126.

The applications may enable both person-to-person interaction and person-to-location interaction, which involves a person interacting with an institution or real- world location or enterprise such as a store or airport.

The devices need not be mobile, but may include stationary devices that are to be part of the communication, including personal computers, cash registers, servers, and parking meters, to name a few. The platform extends to the hardware and software that provides a link 128 between the mobile devices and other devices, including a central servers 130, that are not within direct reach of the short-range wireless communication capabilities of the mobile device.

Based on the common development platform and the API that it presents to developers, any developer can easily create applications that change the way individuals interact with one another and with their environments.

The platform enables a developer to easily create applications that do virtually any job that requires local communication between devices (including mobile devices) 112, 113, or longer-distance communication between local devices and central servers. Because the platform encompasses servers, it also enables a developer to use personalization information 132 that is stored on a server to personalize the operation of applications that are running on local devices.

The core functions exposed by the API include functions that are expected to be used by a large proportion of applications that are built on Bluetooth. The application developer can build other features and functions 134 into his application and can supplement and expand the core functions.

In addition to the initial ease of creating the applications, the use of a common development platform leads to applications that are inter-compatible, more uniform, and more standardized.

The common development platform includes a client module 140, a server module 144, and a link module 142. The client module runs on a client device 112, such as a mobile device or a stationary local device owned by a merchant or a consumer. The server module runs on a server 130 that is typically not within short-range communication distance of the client devices, and the link module runs on a device 128 that provides a link between one or more client devices and the servers.

"Owner" of a device

Conceptually, each client device has an "owner" 150, 152. In a simple example, the owner is a person who owns and uses the device, say the owner of a Palm Pilot with Bluetooth capability. Another example of an owner would be a restaurant operator

with respect to a Bluetooth-capable client cash register at a restaurant. The owner of a device is known to the client, server, and link modules. An owner may change, for example, when a person lends his mobile telephone to another person.

The system stores information about the owners of the devices in a centralized database 132 to which one or more servers 130, 131 have access. The information could include names, addresses, and billing information, and other information such as the current location of the person and his current telephone number. The information could also include demographic information and user-entered preferences about products, services, and user interfaces.

One benefit of having the information accessible to the servers and clients is that it becomes possible for one party at one location to communicate with an owner located anywhere in the world even if, on one occasion, the communication is by Bluetooth, on another occasion by mobile telephony, and on another occasion through the Internet 148. The initiating party need not know where the owner is located or how to reach him; the server is aware of that information and can forward the message through the link to a server and from the server through an appropriate medium to the owner.

By combining the features of centrally stored information with easy-to-develop applications for mobile devices, it is possible to create a broad range of portable, standardized applications that make fundamental changes in the way people interact with the world around them.

Broadcast of services

The development platform 100 includes a function that enables an application 110 running on a mobile device to broadcast information about services that it provides to other devices running applications. Conversely, an application is able to identify and learn about services that are made available by applications

running on other devices, for example, devices that are within short-range wireless communication and devices that are accessible through the link module. The service-broadcasting capability enables the creation of a fabric of millions of devices (mobile devices, central servers, links, and others) that provide and use services, where a person's mobile device can be kept aware of available services as it moves through a world populated by the other devices.

Personalization

Because the client, link, and server provide the basic core capability of finding, storing, and editing personalization information in a central database 132, the applications built on the modules can provide functions that are dependent on the personalization information for the "owner" of the device.

Guaranteed delivery

Another of the key core functions provided by the application development platform is so-called high-level guaranteed delivery of messages. When an application running on a device such as a mobile PDA initiates a message to another device anywhere in the world, the modules guarantee delivery of the message even if the other device is not within short-range communication and even if the other device is not in use at the moment. To do this, the modules determine the location of the target device, determine an appropriate mode of communication (e.g., a Bluetooth communication to a local device followed by a link to the Internet and then a telephony link to the target device) and track the message until delivery has occurred.

The Internet can be used as a transparent alternative to Bluetooth for message delivery. When a user of an application on a device takes a step that requires a message to be sent to another device, the message can be sent through the Internet at the election of the modules, without the user being aware that Bluetooth is not being used.

THE WIRELESS DEVICE

As shown in figure 2, the client device 112 can be a wireless device that has a Bluetooth chip 11 enabling it to communicate over short-range radio links (such as link 115, figure 1) with another chip 117 (figure 1) in another device in accordance with the Bluetooth protocol. The device 112 could be, for example, a mobile telephone, personal data assistant (PDAs), handheld computer or organizer, personal computer, cash register, parking meter, or other device. The device can include a touch-sensitive display 123 to allow the user to view information and interact with the device, a keypad 170, a keyboard 172, a mouse 174, or other means for allowing the user to interact with the device.

The chip 11 has a unique identification code 180 that is mapped in the personalization database 132 to the user or owner of the device. The user of the device may be an individual, vehicle, or other mobile entity, or may be an entity whose location is fixed such as a store or restaurant.

Generally, the device 112 also has a memory or memories 190 that store an operating system 118, applications 110, and the client module 140, a processor or processors 192, and one or more internal system communication buses 194 interconnecting these hardware components (the hardware components are together identified by the numeral 120 on figure 1).

Interaction between the Bluetooth chip, on one hand, and the operating system, the client module, and the applications, on the other hand conforms to a Bluetooth API that is exposed by the chip to the devices that interact with it. By making calls to the chip 11 through the client module, application programs 16 created by a variety of parties and running on the device 112 can achieve a broad range of functions. By interacting with the operating system 118 of the device 112, the client module 140 can take advantage of the communication, processing, display and user interaction features provided by the operating system.

TRACKING AVAILABLE SERVICES

The client module 140 keeps a registry 141 of services that are available from the applications running on the local device 112 and services that are available from applications running on other devices, including devices that are within short-range wireless distance of the local device 112.

An entry in the registry related to a service may have the format shown in figure 3 A for a locally available service and the format shown in figure 3B for a service available on another device. Other formats could be used.

Exemplary services that could be made available by applications running on devices include a WML server or an instant messaging client.

The platform exposes "AddService" and "RemoveService" functions (see figures 4E and 4F) that can be used by applications to add (register) or remove (unregister) services from the list in the registry 141.

The client module makes information about the user (owner) of a device and the services available from that device by a periodic broadcast ping to all devices within range of a local device. The broadcast function allows numerous devices constantly to be aware of a range of services offered by other devices. Each device can take advantage of and use a wide range of services for the user's benefit. The client module uses the information stored in the registry 141 by the applications to provide other devices with descriptions of services and instructions on how to access them.

The applications running on the device can include core service applications that enable user interaction with and control of functions provided by the client module.

One service application, for example, may enable a user of the device to modify the contents of the registry and to specify preferences with respect to the services available on the device. For example, the user may choose whether or not to be notified when a message is received for a particular service.

MESSAGE PASSING THROUGH THE LINK

In addition to communicating with nearby wireless devices, the client module can access the Internet or other public network through a link 128 (figure 1) that is running a link module 142. Any device having local network capabilities 129 and an Internet 148 connection can serve as the link. The link could be a mobile device or a stationary device.

As shown in figure 5, in some implementations, the link 128 includes a device with a Bluetooth chip 11 that provides local network capabilities (as defined in the Bluetooth standard), a copy of the link module 142, and an Internet connection through an Internet interface 15, such as a dialup or dedicated connection to the Internet 148.

Some communications can be sent over the Internet as a transparent alternative to sending the messages using Bluetooth technology. The link 128 allows users within short-range wireless distance to send and receive data through the Internet to and from, for example, server 130 running a copy of the server module 144. Other technologies such as infrared could also provide the local network capabilities for the link 129.

The client module tracks whether there are any links 128 in range of the device based on information stored in the service registry 18, because the links broadcast their available services in the manner described earlier. Messages destined for devices that are not within range are stored by the client module in a queue until the device is within range of a link 128

In one example, messages (called Kmessages) stored in the client's message queue have the format shown in figure 3C. Once the device is within range of a link 128, the messages are transmitted through the link to a server 130. The server 23 can then transmit the messages to another link 131 (figure 3) that is close to the target device 133. A registry in the target device stores messages waiting to be retrieved by specific services on the device.

The "getMessages" and "getMessage" functions (shown in figures 4B and 4C) are exposed by the client module and enable an application running on the client device to be used to retrieve messages sent from other devices. The stored messages are communicated from the client to an application using the Kmessage structure shown in figure 3C.

The core services of the modules support the Transport Control Protocol/Internet Protocol (TCP/IP) to allow for Internet connectivity through what amounts to an ad hoc network of the devices that are within the vicinity of the links. IP masquerading is used by the link module to assign an IP address to each device in range of the link, thereby enabling the devices to communicate using TCP/IP.

THE SERVER

The server module 144 running on the server 130 allows users of devices anywhere in the world to send messages to one another without knowing where the recipient is located or which device the recipient is using.

As shown in figure 6, the server system 130 serves as a global router 60 that exposes services to server applications to enable messages to be stored and passed, for example, between a device 12 on which a client module 14 resides and another device 54 on which another client module 56 resides.

In general, a given user may be an owner of multiple devices and may log on to some or all of them at one time. The server module includes a database 62 that tracks the devices associated with each user. The server module can support the HyperText Transfer Protocol (HTTP) and WAP, as well as other technologies, to send and receive messages.

In one implementation, the server module includes software written in the Java computer language that can run, for example, on a Windows, Solaris or Linux system. The server module also can store information about the services that are made available by each of the user's devices in a registry of services 66 so that other devices can locate and access the services. A "getSurrounding Services" function (shown in figure 4D) is exposed by the client module to applications running on a device to enable the devices to obtain from the server module an array of mappings of users of other devices and services available on their devices.

PERSONALIZATION

The server module also provides an interface service to the personalization system 132 and a gateway service 173 to other technologies such as the Internet 148. A web server 58 using, for example, a Generalized Markup

Language, allows messages to be served to any mobile device that has an Internet connection. In addition, any client device can access resources and information from the server through the Internet.

The user can log on to the server, for example, to access the personalization system 26 and to enter or edit personalized information.

On of the service applications 115 (figure 1) provided with the client module 14 allows the user to modify personal information and preferences stored by the personalization system. A "changepersonalizationdata" function (shown in figure 4G) can be used for that purpose. The user also can set indicators to permit or deny access by other users to various pieces of data stored in the personalization system and associated with that user.

For example, user information stored in the personalization system may be designated as shared or public using the "Changepersonalizationpermissions" function (shown in figure 41).

One of the service applications running on one user's device can access other users' profiles from the personalization system using a "Getpersonahzationdata" function (shown in figure 4H). Access is denied if a particular user does not have permission to access another user's profile. All relevant data from the personalization system is loaded dynamically through a link when the user logs on to the server. Thus, user information stored at the client device can be updated regularly to keep it synchronized with the data stored in the personalization system.

An administrative graphical user interface (GUI) is associated with the server to allow an administrator to change configurations for users manually. The administrative GUI also allows an administrator to analyze the load on resources

used by the server, test and debug the server, and access user information stored in the personalization system if the user permits such access.

GUARANTEED DELIVERY

In general, the client module exposes a service that is responsible for ensuring delivery of messages from one device to another. Upon receipt of a message from an application, the client module returns a confirmation including a unique identification number for each transmission of data. If the client module is not able to guarantee that a message was delivered, the text of the message is returned to the sender, with a message indicating that the text was undeliverable. If a message including data is received by a device that does not have the necessary application to operate on the data, then the message is returned to the sender. On the other hand, if the required application is listed in the registry of the recipient's device, but the recipient's device is not currently running the application, the client module stores the message and notifies the user that the message has been received.

When a message is sent to a particular user from the server through the links, the message is sent to all devices that the user "owns" and on which he is logged on. If the user is not logged on to any of his devices, the server module stores the message in a mailbox database 64. When the user subsequently logs on, he is notified of the message. Therefore, when a message is to be sent to a particular device, the sender of the message need not determine which device the recipient is closest to or on which device the recipient prefers to receive messages. The server transparently routes the message to the proper device. Because encryption technology is integrated with the client module, the user automatically digitally signs communications using a global key stored in the personalization system and in a personalization module 143 stored on the client device (see figure 2).

As shown in figure 7, the client module includes a transfer module 30

that provides an interface to communications media, including the Bluetooth chip 32, a wireless modem 34 that permits mobile telephone communications, an infrared port 36, or other communications channels 38.

The transfer module 30 references a socket or equivalent layer of each communications media available to the device and manages the communications media. The transfer module 30 passes received messages to a confirmation manager 40 and provides information to the communications manager about the available communications media. The transfer module 30 can be requested by the confirmation manager 40 to send messages over a particular communication medium.

The confirmation manager 40 is the portion of the client module that is responsible for guaranteeing delivery of messages. It maintains a queue of outgoing messages, as well as a queue of messages awaiting confirmation. The confirmation manager 40 tracks messages that have been sent and matches received confirmations with the original outgoing messages. If confirmation is not received within a specified period, the message is re-sent.

The confirmation manager 40 can be called upon by a communications manager 42 to send messages and notifies the communications manager if a message is undeliverable. A message explaining why a message is undeliverable can accompany the notification to the communications manager 42.

The communications manager 42 is responsible checks for other devices entering or leaving the range of the device and decides which communication medium to use when a service application 16 requests that a message be sent. Messages can be sent to a security module 46 for encryption and receipt of a digital signature.

The communications manager 42 is notified by the confirmation manager 40 of received messages and passes the received messages to the security module 46 for authentication of digital signatures. User name and security information is received from the personalization system through a personalization module 48. The communications manager 42 notifies the service applications 16, through an applications manager 44, of received messages based on settings in the local registry 18. The service applications 16 then can retrieve messages in a message queue through the applications manager 44.

The communications manager 42 also receives and acts upon registry request messages and broadcasts and retrieves local service application settings from the registry 18. Additionally, the communications manager updates the information about other devices in the registry 18 based on server messages and registry broadcasts.

The applications manager 44 provides an interface between the service applications 16 and the communications manager 42, the registry 18 and the personalization module 48 of the client. The applications manager 44 can retrieve or modify local service application settings stored in the registry 18. It also can access or modify the registry's list of other devices within range of the device 12, and information about services available on those users' devices. The applications manager 44 also can send and receive messages through the communications manager 42. Information stored in the personalization system 132 can be accessed or modified (assuming permission is granted) through the personalization module 48.

The personalization module 48 serves as an interface to the personalization system 132 and provides access to user information, user preferences, and user permissions stored in the personalization system. The personalization module 48 is capable of caching information and synchronizing information with the personalization system 132. It can access information stored in

the personalization system 132 in a manner that is transparent to the entity requesting the information. The personalization module 48 provides the user name for message headers and provides public or private encryption keys to the security module 46 through the communications manager 42.

The security module 46 is responsible for providing secure communications between the device 12 and other devices and executes a cryptographic algorithm. The security module 46 obtains security information from the communications manager 42. It encrypts and decrypts messages, digitally signs outgoing messages and verifies the digital signatures of incoming messages.

A "sendMessage" instruction (see figure 4A) in an application can call a client module routine that allows messages to be sent to other wireless devices through the facilities of the chip.

MESSAGE COMMUNICATION AND ENCRYPTION

Figures 8 A and 8B show how a message initiated by a service application 16 can be sent from the device 12. The particular service application 16 passes 1100 a message with an identification of the intended recipient to the applications manager 44. In this example, it is assumed that the application service requests that the transmission of the message be secure and guaranteed. The applications manager 44 passes 1102 the message and the recipient's identification to the communications manager 42 and requests that the message be transmitted in a secure and guaranteed manner. The communications manager 40 passes 1104 the message and security information to the security module 46. The security module 46 executes the cryptographic algorithm on the message and returns 1106 the encrypted message to the communications manager 42. The communications manager 42 then passes 1108 the encrypted message to the confirmation manager 40 and specifies the channel of communication.

The confirmation manager 40 generates 1110 a message identification number and attaches it to the message header. The confirmation manager 40 also adds 1112 the encrypted message to its queue of non-confirmed messages. The confirmation manager 40 passes 1114 the encrypted message and an identification of the specified channel to the transfer module 30. The transfer module 30 then sends 1116 the encrypted message over the specified communication channel. If the confirmation manager 40 does not receive a confirmation within a specified time frame, it re-sends the message.

The transfer module in the recipient device receives 1118 the encrypted message and passes it to the recipient device's confirmation manager. The confirmation manager in the receiving device passes 1120 the message to the communications manager. In addition, the confirmation manager in the recipient device adds the message identification number to its list of received messages and generates 1122 a confirmation message that is passed to the transfer module in the recipient device. The transfer module sends 1124 the confirmation message over the same communication channel over which the original message arrived. The transfer module 30 in the sending device 12 receives the confirmation message and passes 1126 it to the confirmation manager 40. The confirmation manager 40 then removes 1128 the original message from its queue of messages that are awaiting confirmation.

After receiving the encrypted message, the communications manager in the recipient device removes 1130 the header and passes 1132 the encrypted, digitally signed message to the security module. The security module responds 1134 to the communications manager with the sender's identity. The communications manager in the recipient device then adds 1136 the decrypted message to its

message queue and notifies 1138 the user and service application, according to the settings in the registry of the recipient device.

To receive the decrypted message, the service application requests 1140 the message from the communications manager through the applications manager in the recipient device. The communications manager passes 1142 the next message marked for the intended application from the message queue to the service application. The communications manager then deletes 1144 the message from its message queue.

In addition to sending and receiving messages, a service application 16 can retrieve or modify data and permissions stored in the personalization system 132 by calling functions of the personalization module's API through the applications manager 44. Additionally, a service application 16 can view information about users and devices within range of the device 12 by calling functions of the registry's API through the applications manager 44. Similarly, a service application 16 can retrieve or modify service application settings on the local device 12 by calling functions of the registry's API through the applications manager 44.

USES

As shown in figure 9, in one use of the system described above, a clothing store 70 at a fixed location provides electronic coupons to potential customers. A device 17 with a Bluetooth chip 15 is mounted in the store 70. If a user carrying a mobile device comes within range of the chip 15, the device 17 detects and stores that information in its client's service registry. The device 17 can obtain information 74 about the user from the personalization system 132. Such information 74 may include, for example, the clothing size and clothing purchase history of the user. Access to such information can be subject to the grant of permission by the user.

The device 17 can send one or more electronic coupons to the user's device 12 by incorporating the coupons into one or more messages sent directly through the Bluetooth link or indirectly through a local area network (LAN). The messages containing the coupons can inform the user of sales and items that may be of special interest to the user based on the information obtained from the personalization system. The electronic coupons can be turned in and used to purchase items from the store 70 by communicating directly with the device 17 over the LAN.

The user need not wait for coupons to be sent to his device 12. For example, once the user is within range of the store 70, the registry associated with the client module residing on the user's device 12 would store the identification code for the store 70. The user can use the device 12 to view the various coupons offered by the store 70.

Another application can provide a service that acts as a shopping assistant to match user preferences to available store inventory. In one scenario, the user may want information about a particular product from stores in a specified area such as a commercial street or shopping mall. Stores would update information stored in the personalization system about their product inventory. The user would use the device 12 to request information from the personalization system regarding the availability of various models, sizes, costs, of the particular product from stores in the specified area. A list of the available products and related information then would be provided to the user's device. An identification code can be associated with each store that can be used as discussed below.

After reviewing the information obtained from the personalization system, the user can get additional information from the personalization system, for example, about promotions or coupons that the listed stores may be offering. After selecting a particular store, the user enters the store identification code into the

device 12 to access a link to the selected store, for example, over the Internet 22. Once the user's device 12 is within range of the store's Bluetooth-enabled device, the two devices would recognize one another. Communications then would take place directly or over the local network. The user would be able to purchase items from the store using the device 12. Personnel at the store may gather the purchased items and send a message to the user when the items are ready to be picked up.

As shown in figure 10, another application allows the user to place an order, for example, at a restaurant 76 and pay for the order without having to wait in line. The user orders and pays while sitting at a table or walking in the vicinity of the restaurant. When the user arrives at the restaurant 76, the restaurant's Bluetooth-enabled device 17 recognizes the presence of the user's device and retrieves the user's personal information from the personalization system. The personal information may include the customer's food preferences or the usual order that the customer places at the restaurant 76. The restaurant's device 17 sends a message to the customer's device asking, for example, if the customer wishes to place his usual order. The customer can place an order and pay using the device. The customer also can access the personalization system to obtain information about the restaurant 76. The restaurant information 80 can include, for example, a menu, a list of specials, and available coupons. Such information can be obtained directly from the restaurant as well using the restaurant's local network.

The information regarding the user's preferences retrieved by the restaurant's device 17 from the personalization system may include information that can facilitate transactions between different commercial entities with respect to the identified customer. For example, when the user passes within the vicinity of the restaurant, the restaurant's Bluetooth-enabled device 17 recognizes the presence of the user's device and retrieves the user's personal information 78 from the personalization system. The personal information 78 may indicate that the user

enjoys movies. The restaurant's device would exchange information with a local theater 77 that also is in possession of a Bluetooth-enabled device 79, and the local theater 77 would post an electronic movie discount on the user's device.

Another application can facilitate travel. For example, assume the user is scheduled to depart on an airline flight. As shown in figure 11, upon arrival at the airport 82, a Bluetooth-enabled device 17 would detect the presence of the user's device. The airport's device 17 obtains the user's scheduled flight number and time of departure from the personalization system. The device 17 then sends flight, airport and ground transportation information tailored to the traveler's itinerary to the user's device. Similar applications can be used in connection with other means of travel such as trains or buses.

Other applications can be used in connection with parking meters to facilitate payment through use of a Bluetooth-enabled device. In one scenario, users would purchase pre-paid units of time. As shown in figure 12, when a user in possession of the device parks a car near a parking meter 86, a Bluetooth-enabled device 17 in the parking meter senses the presence of the user's device 12. The device 17 checks the user's account identification number 88 by accessing the personalization system 26 and sends a message to the user's device requesting an indication of how much time the user plans to park at the location. Once the user responds, payment automatically can be deducted from the user's account. The application program can consistently show how much time is left on the meter 86, and can allow the user to add time to the meter from distant locations.

A wireless credit card application program can allow the user to make purchases with the device from a merchant 90. For example, as shown in figure 13, a merchant's Bluetooth-enabled device 17 would sense the presence of the user's device and, if permission is granted, would obtain the user's credit card information 92, including the user's name, account number and account expiration date, from the personalization system 26.

Furthermore, the application program can store a personal budget set by the user. If the user exceeds his personal budget, a message is sent to the device indicating that the personal budget has been exceeded.

A network of strategically placed Bluetooth-enabled devices in parking meters, city streets lamps, and other locations can provide a virtual global positioning system (GPS) that allows a user's device to know its precise location without requiring that the user's device carry a global positioning chip. As illustrated in figure 14, a number of Bluetooth-enabled devices 200 carry a Bluetooth chip 204 as well as a global positioning chip 206 that allows the device 200 to determine its GPS location by receiving global positioning information from a satellite 202. Each device 200 can periodically broadcast its global positioning location. Other Bluetooth-enabled devices that are within range of one of the devices 100 can receive the broadcast and thereby determine their own location. A variety of location-based applications 16, such as an electronic map identifying the user's location, can be implemented without requiring a costly GPS chip on the device 14.

Yet another application program that can run on the client 14 allows users to post information that can be retrieved and read by other parties. A virtual information board can be implemented by storing the information on a local device or on the server. For example, a restaurant can post its daily specials using such an application to help reduce the cost of menus.

A public information booth can have a Bluetooth-enabled device that provides information about museums, historical sites, statues and other sites of interest within a particular geographical location. An application can be run on the client residing on the user's device. The devices interact according to the Bluetooth protocol, and the device sends out a brief history or summary of the area to the user's

device. The application also allows a user to view a list and summary of the various sites in the area. Self-guided tours can be tailored so that the user only receives information about specific aspects of the area based on the user's interest.

Another application can serve as a wireless identity tool. This tool can facilitate the user's navigating through a hospital or other bureaucracy. For example, in a hospital, the user can sign in or pick up medical prescriptions without completing written forms. The application can provide the appropriate information.

Other application programs can provide communications with another device associated with an entity such as an individual who is free to roam from one location to another. Exemplary application programs include instant messaging, buddy lists, and personal contact cards.

Instant messaging, for example, allows messages to be passed between Bluetooth-enabled devices regardless of whether or not the devices are within local range of one another. The location of the parties may impact which means of communication is used to send a particular message. However, the sender of the message need not be concerned with the means of communication or device compatibility issues because the incoming message will be tailored to the recipient's device. If an instant message cannot reach its destination, for example, because the intended recipient has set his permissions so as not to allow instant messaging or because the recipient device does not have the proper software, the sender can be notified that the message cannot be delivered.

Other applications that can run on the device facilitate the use of buddy lists. Thus, a user of the device can be notified automatically when a buddy enters or leaves the local area network. The user can add or remove persons on the buddy list. For more privacy, the user can select an option in the application to prevent other persons on the buddy list from being informed of the user's entering or leaving

particular networks. A list can be stored in the personalization system to specify information and communication access permissions. The list can be used across multiple applications and can be updated dynamically through the personalization system. Different members of the buddy list can have different permissions.

Another application program allows the user to send a virtual business card from the device. In some situations, the electronic business card can include graphical images of an actual business card.

Other implementations are within the scope of the claims.

CLAIMS:

1. A method comprising

associating with each one of a number of different mobile devices that have a short-range wireless communication capability, a person who is a user of the device,

storing information about the association of devices and users and information about each of the users at a publicly accessible server, and

providing services at each of the mobile devices that depend on the information about the user of the device that is stored at the server.

2. The method of claim 1 in which the information about the users is communicated to the devices from the server for use in providing the functions.

3. The method of claim 1 in which the information about the users includes at least one of: demographic information, identification information, preference information, or location information.

4. The method of claim 1 in which at least some of the information about the users is stored on the mobile devices associated with the users.

5. A method comprising:

recognizing automatically that an entity in possession of a short-range wireless device is within a particular geographic area;

obtaining data about the entity from a commonly accessible database; and

sending information to the short-range wireless device, the information sent to the device depending on the data obtained from the database.

6. The method of claim 5 in which access to the data about the entity in the commonly accessible database is contingent on permission of the entity.

7. The method of claim 5 in which the entity can access and modify its data in the commonly accessible database using the wireless device.

8. The method of 5 in which a second short-range wireless device recognizes that the entity is within the particular geographic area, obtains the data, and sends the information.

9. The method of claim 7 in which the information sent to the first device includes promotional material for facilitating a transaction with an entity associated with the second device.

10. The method of claim 7 in which the entity obtains information about an entity associated with the second device from the commonly accessible database using the first device.

11. The method of claim 7 in which recognizing that the entity is within a particular geographic area is based on receipt of a message from the first device, the message including an identification code mapped to the entity.

12. A method comprising:

electronically storing, in a publicly accessible location, information about real-world entities that are users of devices that have short-range wireless communication capability,

providing client modules on the devices and a server module at the publicly accessible location, the client modules and the server module cooperating to provide guaranteed messaging between users of any of the devices and to enable commercial transactions between users of the devices based on the electronically stored information.

13. The method of claim 12 in which

one of the two wireless devices is fixed and one of the two wireless devices is mobile.

14. The method of claim 12 in which

the user of one of the devices comprises a commercial entity.

15. The method of claim 12 in which

the user of one of the devices comprises a consumer.

16. The method of claim 12 in which

the transaction comprises delivery of marketing information from one of the two devices to the other.

17. The method of claim 12 in which the transaction comprises the use by one of the two devices of a service provided by means of the other of the two devices.

18. The method of claim 12 in which

the transaction comprises electronic messaging.

19. The method of claim 12 in which

the transaction occurs when the two devices are out of range of each other.

20. The method of claim 12 in which access to the stored information is under the control of the user to which it pertains.

21. The method of claim 12 in which the stored information comprises the location of the user.

22. The method of claim 12 in which the stored information comprises consumption preferences of a consumer.

23. The method of claim 12 in which each of the users is associated with more than one of the devices.

24. The method of claim 12 in which the transaction is effected between the two users through the server that is located out of range of the two devices.

25. The method of claim 12 in which the two devices are in range of each other and the transaction is effected between two users carrying the two devices.

26. The method of claim 12 in which the transaction comprises sending an electronic business card from one of the devices to another one of the devices and displaying the card on the other one of the devices.

27. The method of claim 12 in which the transaction comprises an electronic message communicated from one of the users to the other through at least one of the two devices and by a route that includes a mode of communication that is selected from among the Internet, mobile telephony, and short-range wireless communication, the selection being made without the user's awareness.

28. Embodiments as described herein and/or shown in the drawings.

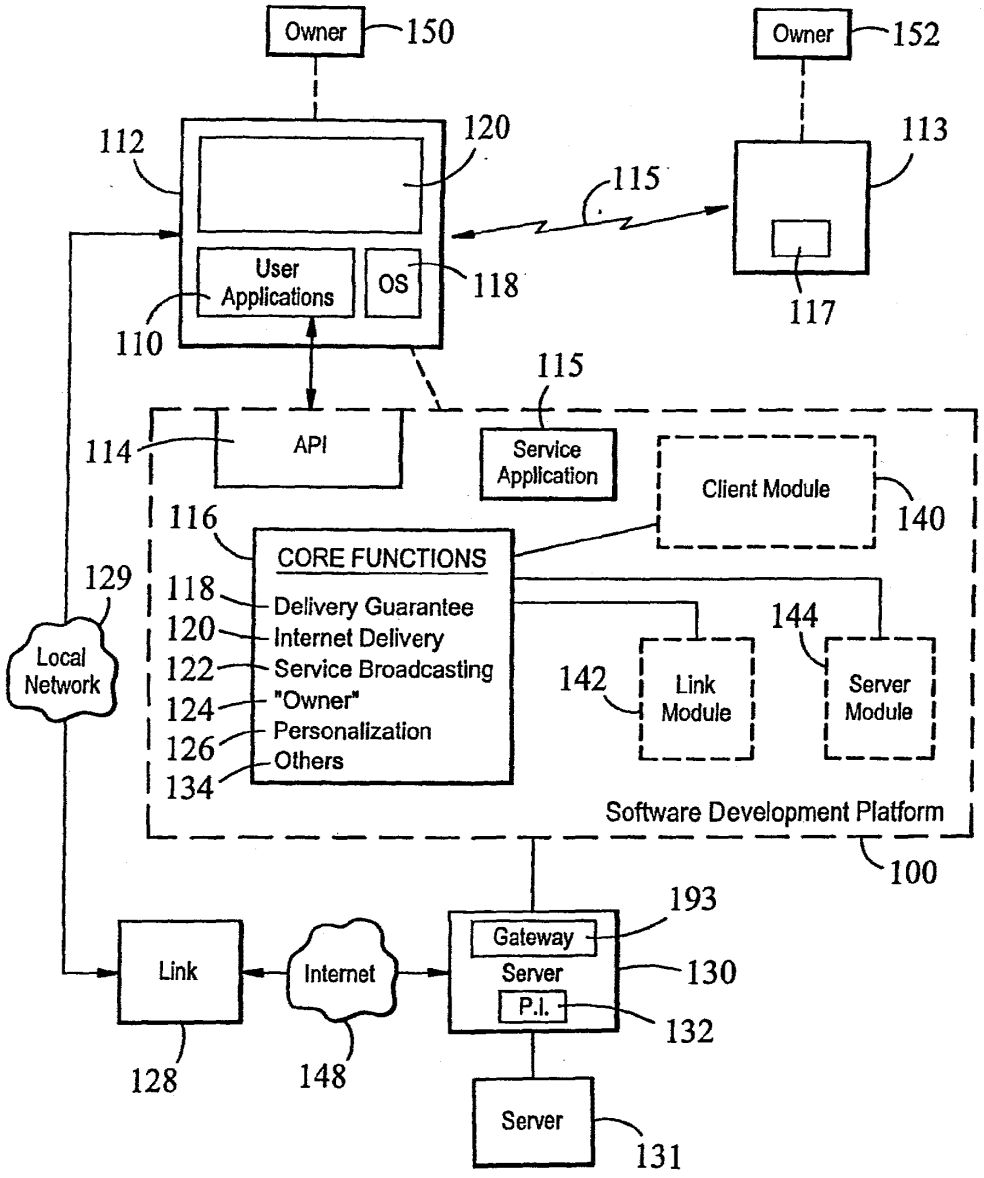

Owner
150
Owner
152
112
120
115
113
User Applications
OS
118
110
117
115
114
API
Service Application
Client Module
140
116
CORE FUNCTIONS
129
118 Delivery Guarantee
120 Internet Delivery
122 Service Broadcasting
124 "Owner"
126 Personalization
134 Others
144
142
Link Module
Server Module
Local Network
Software Development Platform
100
193
Gateway
Server
130
P.I.
132
Link
Internet
128
148
Server
131

FIG. 1

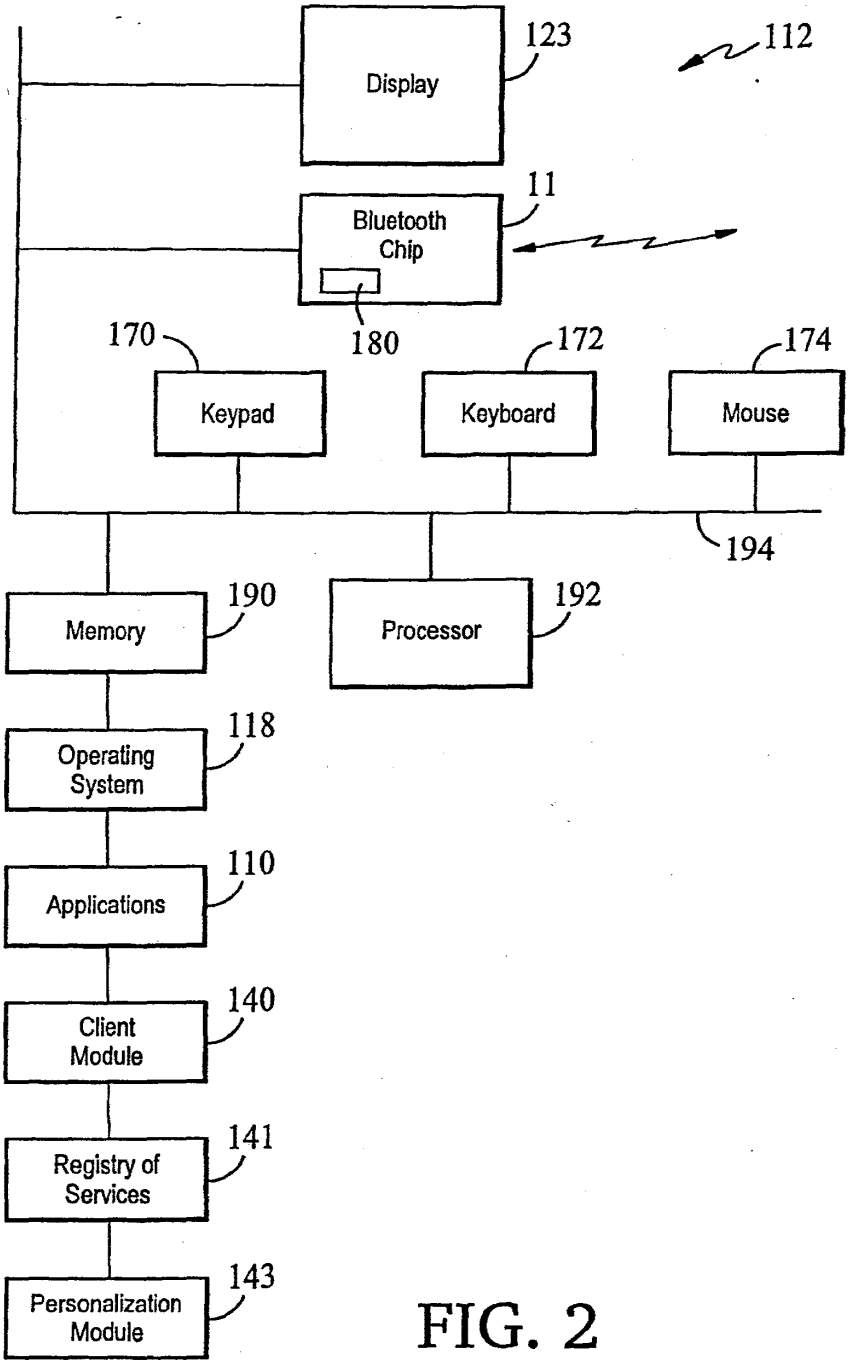

Display
123
112
Bluetooth Chip
11
180
170
Keypad
172
Keyboard
174
Mouse
194
Memory
190
Processor
192
Operating System
118
Applications
110
Client Module
140
Registry of Services
141
Personalization Module
143

FIG. 2

FIG. 3A

```
• LocalService {
    char * serviceName;
    int receive WhenRunning;
    int receive WhenNotRunning;
    int running;
    int maxNumOfMessagesToStore;
    char * exp_fld1;
    char * exp_fld2;
    char * exp_fld3;
    char * exp_fld4;
    char * exp_fld5;
  };
```

FIG. 3B

```
• RemoteService {
    char * serviceName;
    char * userName;
  };
```

FIG. 3C

```
• KMessage {
    char * serviceName;
    char * date;
    char * recipient;
    char * sender;
    char * messageBody;
  };
```

Name	sendMessage
Arguments	char * to, char * serviceName, char * data
Return Values	int err
Description	This function provides sending capabilities so that messages or any kind of unformatted text can be sent between Bluetooth devices. Reception of the text is guaranteed, because even when the devices are not within range, the text is stored and communicated via an Internet connection. If a user is logged in to more than one device simultaneously, the message/text will be sent to both devices at the same time.

FIG. 4A

Name	getMessages
Arguments	struct KMessage * message
Return Values	int err
Description	The getMessages function retrieves all messages or any other formatted text sent from another Bluetooth device. It returns the data in the KMessage data structure.If a user is logged in to more than one device simultaneously, the message/text will be received from both devices at the same time.

FIG. 4B

Name	getMessage
Arguments	struct KMessage * message
Return Values	int err
Description	The getMessage function retrieves just one message or any other unformatted text sent from another Bluetooth device. It returns the data in the KMessage data structure.If a user is logged in to more than one device simultaneously, the message/text will be received from both devices at the same time.

FIG. 4C

Name	getSurroundingServices
Arguments	struct RemoteService areaServices []
Return Values	int err
Description	This function returns an array of mappings of users and services available on that user's device. This information was previously stored in a database termed the registry, which is a list of devices within range of a Bluetooth device.

FIG. 4D

Name	AddService
Arguments	char * serviceName
Return Values	int err
Description	This function adds a service entry to the registry.

FIG. 4E

Name	RemoveService
Arguments	char * serviceName
Return Values	int err
Description	This function removes a service entry from the registry.

FIG. 4F

Name	changePMTdata
Arguments	<<waiting to hear about PMT API>>
Return Values	int err
Description	A function that allows users to update their personal PMT data and preferences using their particular devices. If the device is not within Bluetooth range of an Internet connection, it will restore these update preferences, and make changes within the permanent PMT upon coming into contact with an Internet connection.

FIG. 4G

Name	GetPMTdata
Arguments	char * user
Return Values	int err
Description	Allows a service to get the PMT data of a particular user from the PMT database. If the service cannot reach the PMT database, the information comes from the local storage on the device of the user. Only information that is designated as shared for public data will be retrieved.

FIG. 4H

Name	ChangePMTpermissions
Arguments	<<waiting to hear about PMT API>>
Return Values	int err
Description	This function allows a user to change his PMT permissions from his device.

FIG. 4I

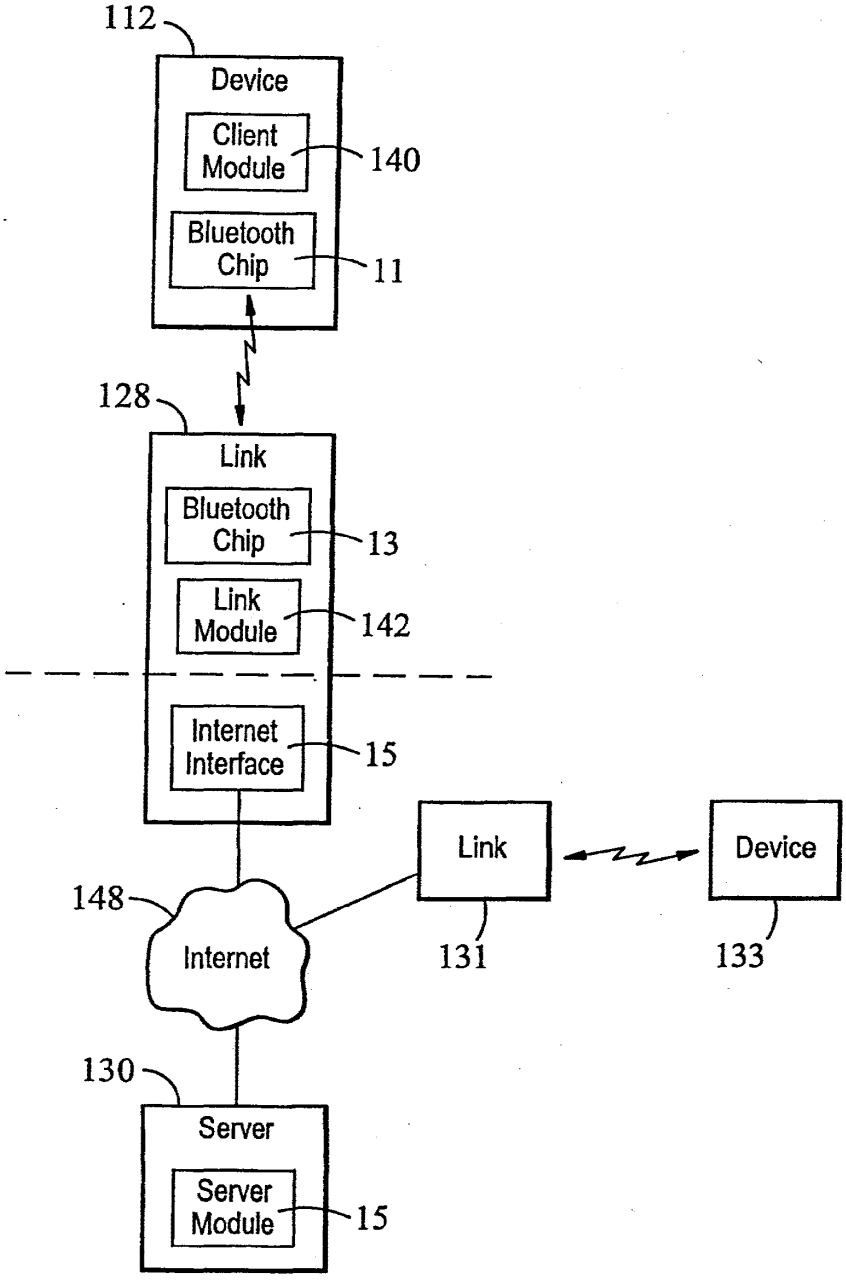

112
Device
Client Module
140
Bluetooth Chip
11
128
Link
Bluetooth Chip
13
Link Module
142
Internet Interface
15
Link
Device
148
Internet
131
133
130
Server
Server Module
15

FIG. 5

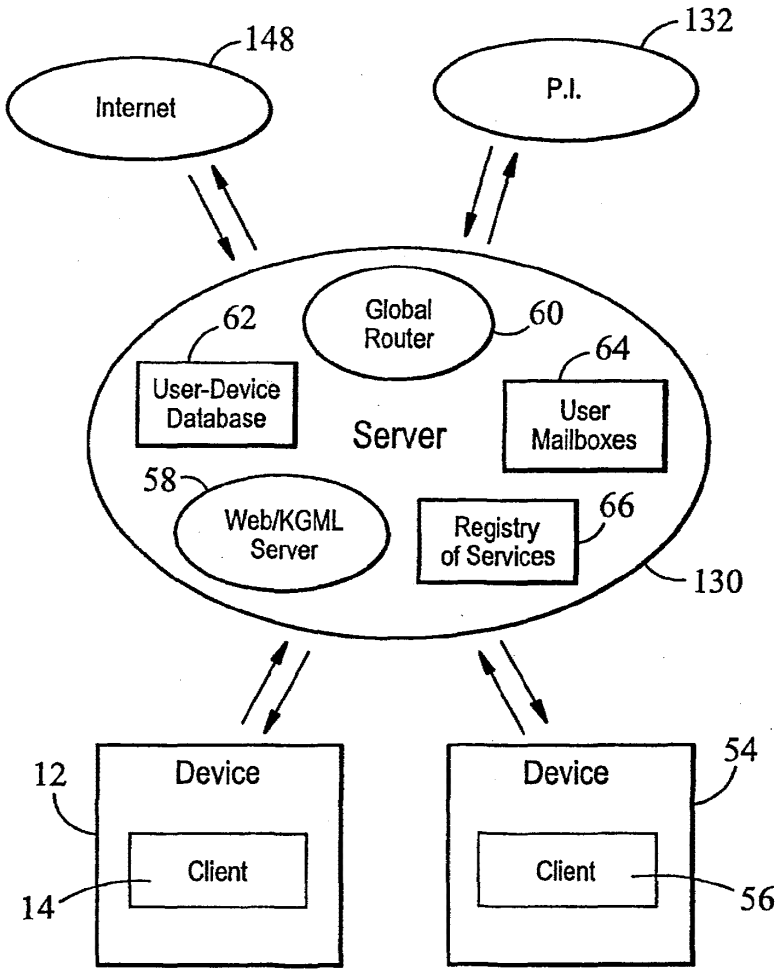
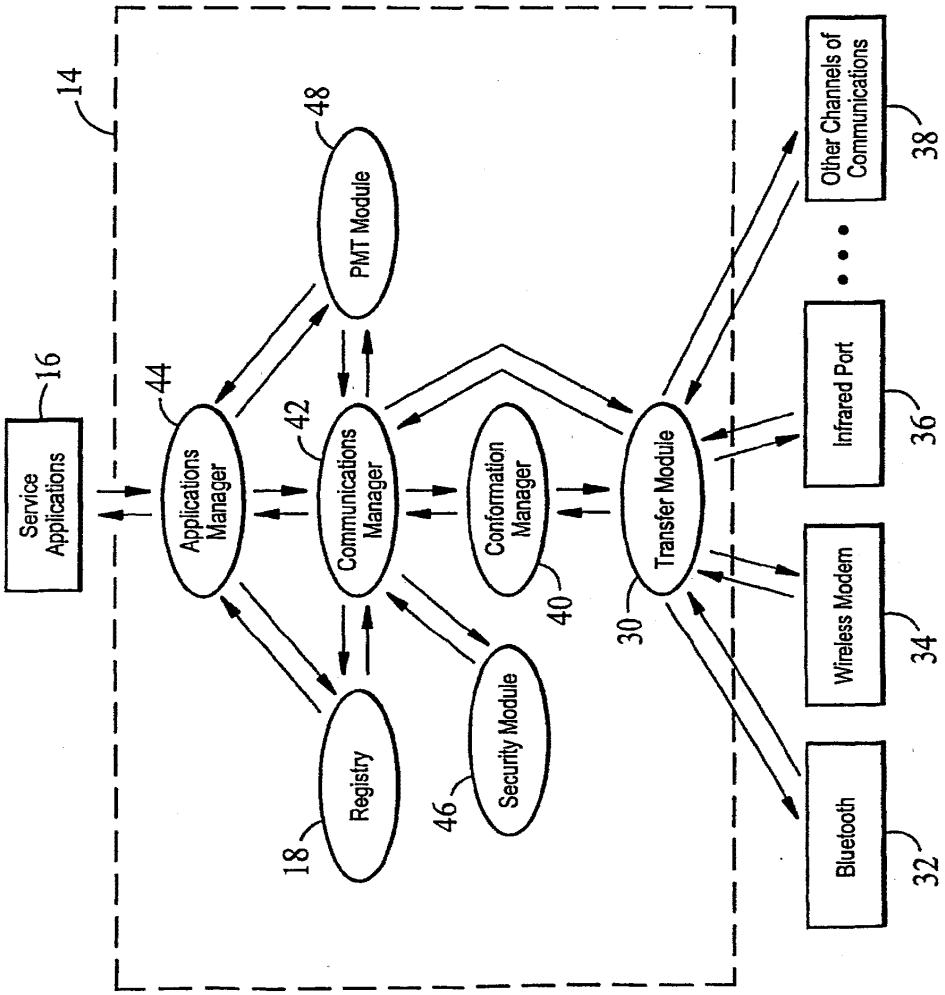

148
Internet
132
P.I.
62
User-Device Database
Global Router
60
64
User Mailboxes
Server
58
Web/KGML Server
66
Registry of Services
130
12
Device
Client
14
Device
54
Client
56

FIG. 6

FIG. 7



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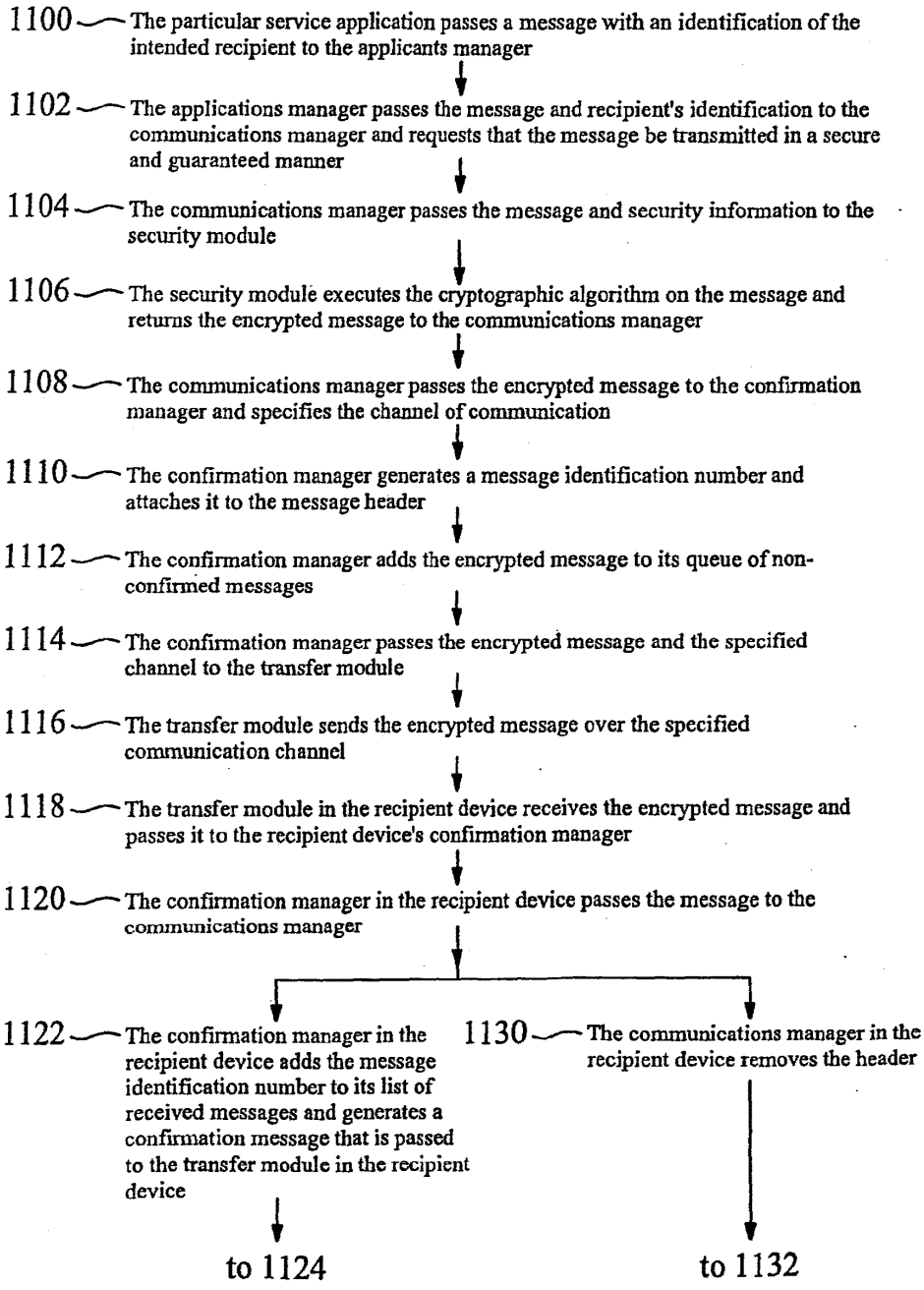

1100 The particular service application passes a message with an identification of the intended recipient to the applicants manager
1102 The applications manager passes the message and recipient's identification to the communications manager and requests that the message be transmitted in a secure and guaranteed manner
1104 The communications manager passes the message and security information to the security module
1106 The security module executes the cryptographic algorithm on the message and returns the encrypted message to the communications manager
1108 The communications manager passes the encrypted message to the confirmation manager and specifies the channel of communication
1110 The confirmation manager generates a message identification number and attaches it to the message header
1112 The confirmation manager adds the encrypted message to its queue of non-confirmed messages
1114 The confirmation manager passes the encrypted message and the specified channel to the transfer module
1116 The transfer module sends the encrypted message over the specified communication channel
1118 The transfer module in the recipient device receives the encrypted message and passes it to the recipient device's confirmation manager
1120 The confirmation manager in the recipient device passes the message to the communications manager
1122 The confirmation manager in the recipient device adds the message identification number to its list of received messages and generates a confirmation message that is passed to the transfer module in the recipient device
to 1124
1130 The communications manager in the recipient device removes the header
to 1132

FIG. 8A

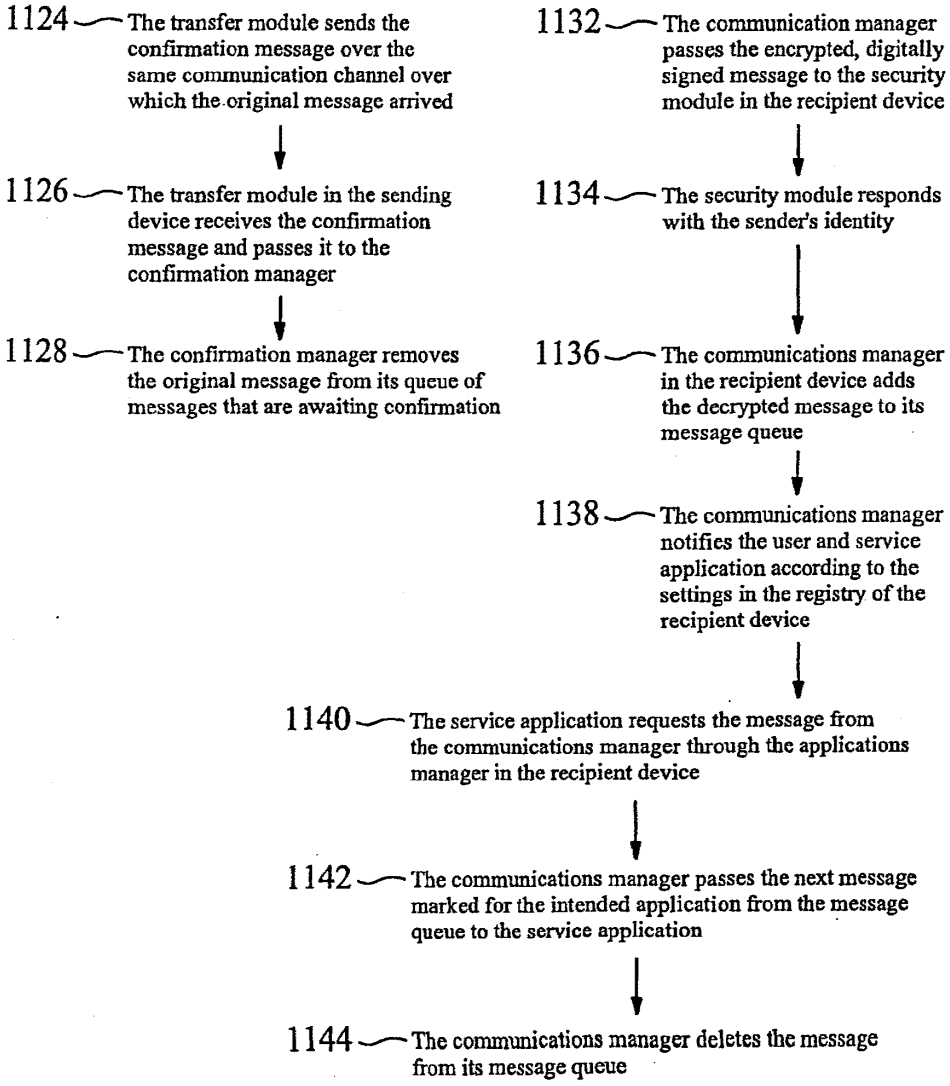

1124
The transfer module sends the confirmation message over the same communication channel over which the original message arrived
1126
The transfer module in the sending device receives the confirmation message and passes it to the confirmation manager
1128
The confirmation manager removes the original message from its queue of messages that are awaiting confirmation
1132
The communication manager passes the encrypted, digitally signed message to the security module in the recipient device
1134
The security module responds with the sender's identity
1136
The communications manager in the recipient device adds the decrypted message to its message queue
1138
The communications manager notifies the user and service application according to the settings in the registry of the recipient device
1140
The service application requests the message from the communications manager through the applications manager in the recipient device
1142
The communications manager passes the next message marked for the intended application from the message queue to the service application
1144
The communications manager deletes the message from its message queue

FIG. 8B

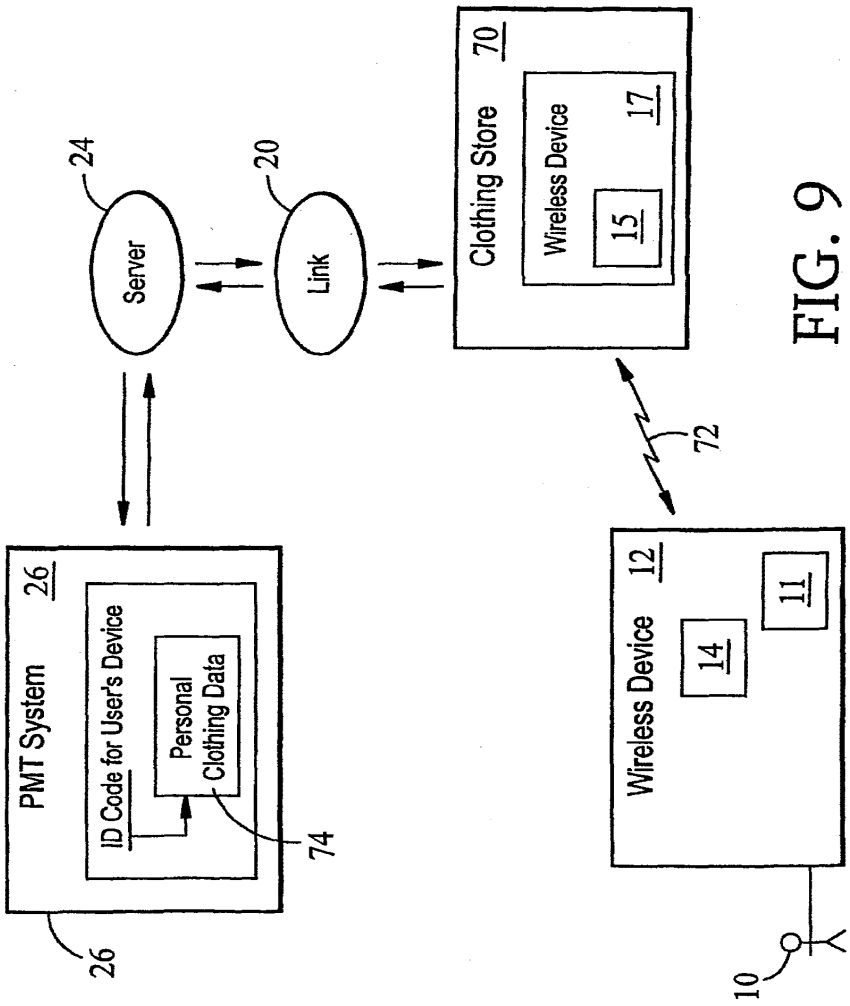


FIG. 9

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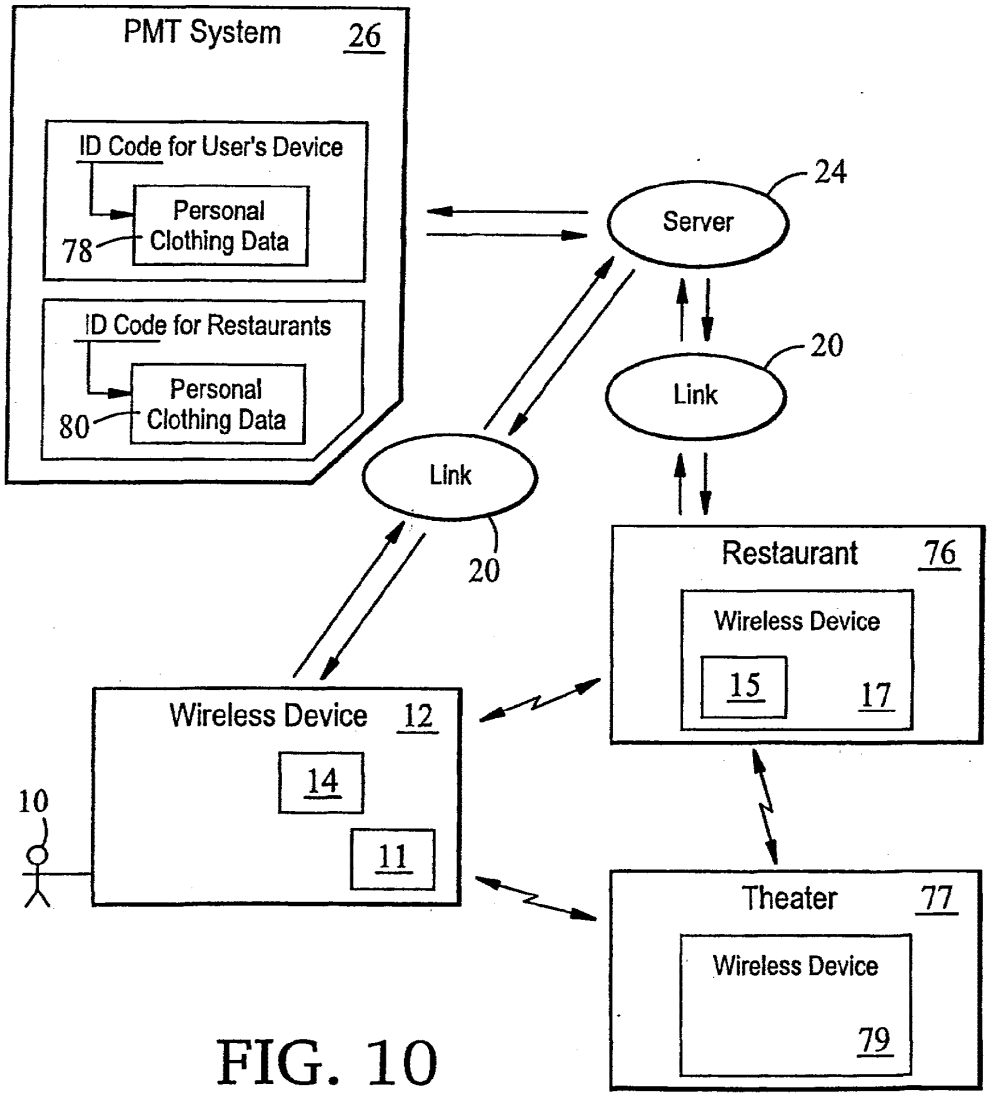

PMT System 26
ID Code for User's Device
Personal Clothing Data
78
ID Code for Restaurants
Personal Clothing Data
80
Server
24
Link
20
Link
20
Restaurant 76
Wireless Device
15
17
Wireless Device 12
14
11
10
Theater 77
Wireless Device
79

FIG. 10

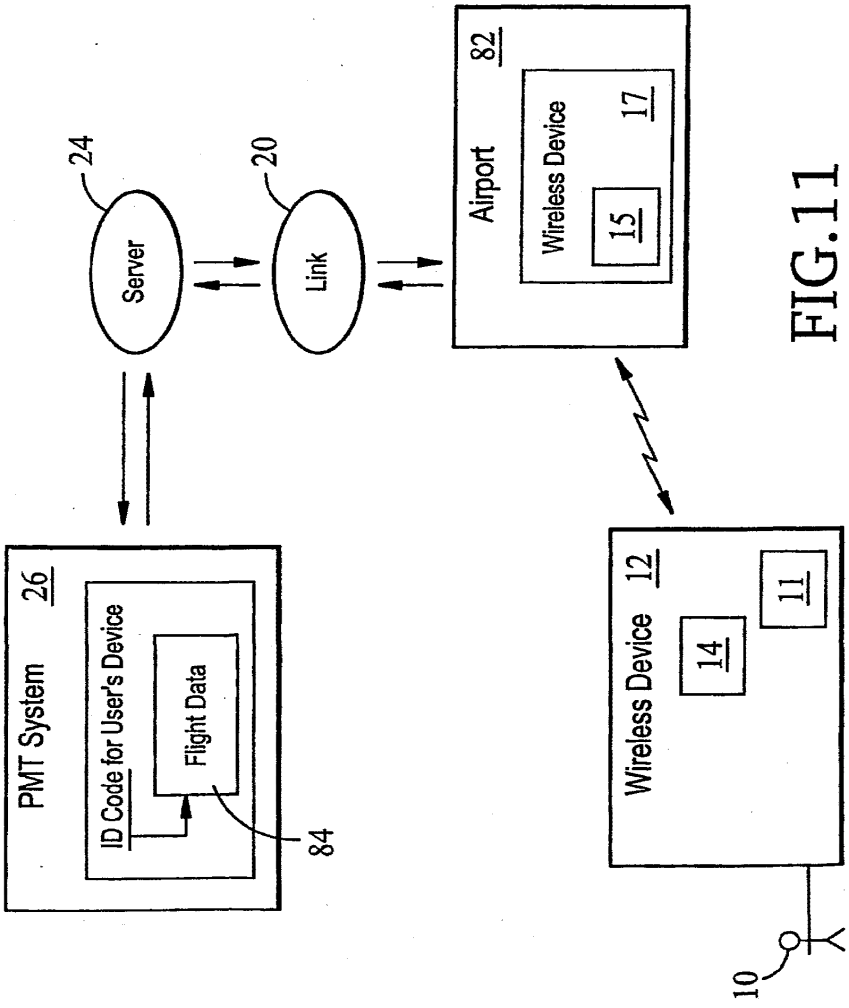


FIG.11

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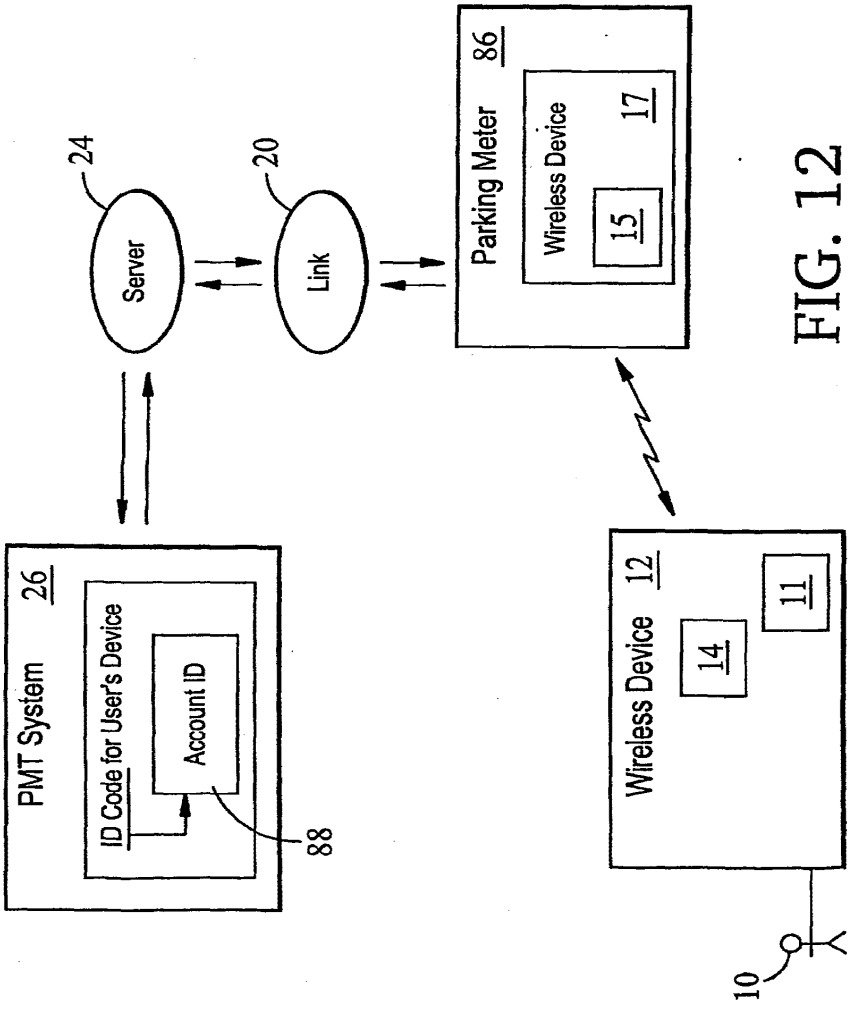


FIG. 12

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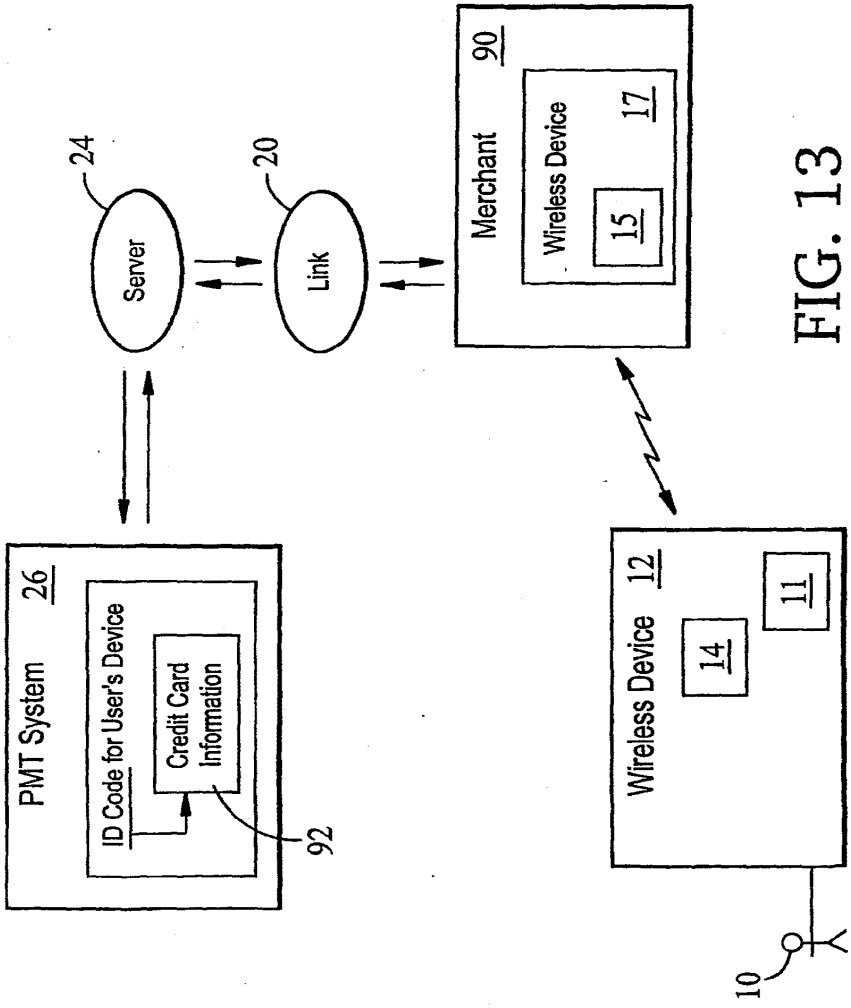


FIG. 13

EX1002 - Page 159

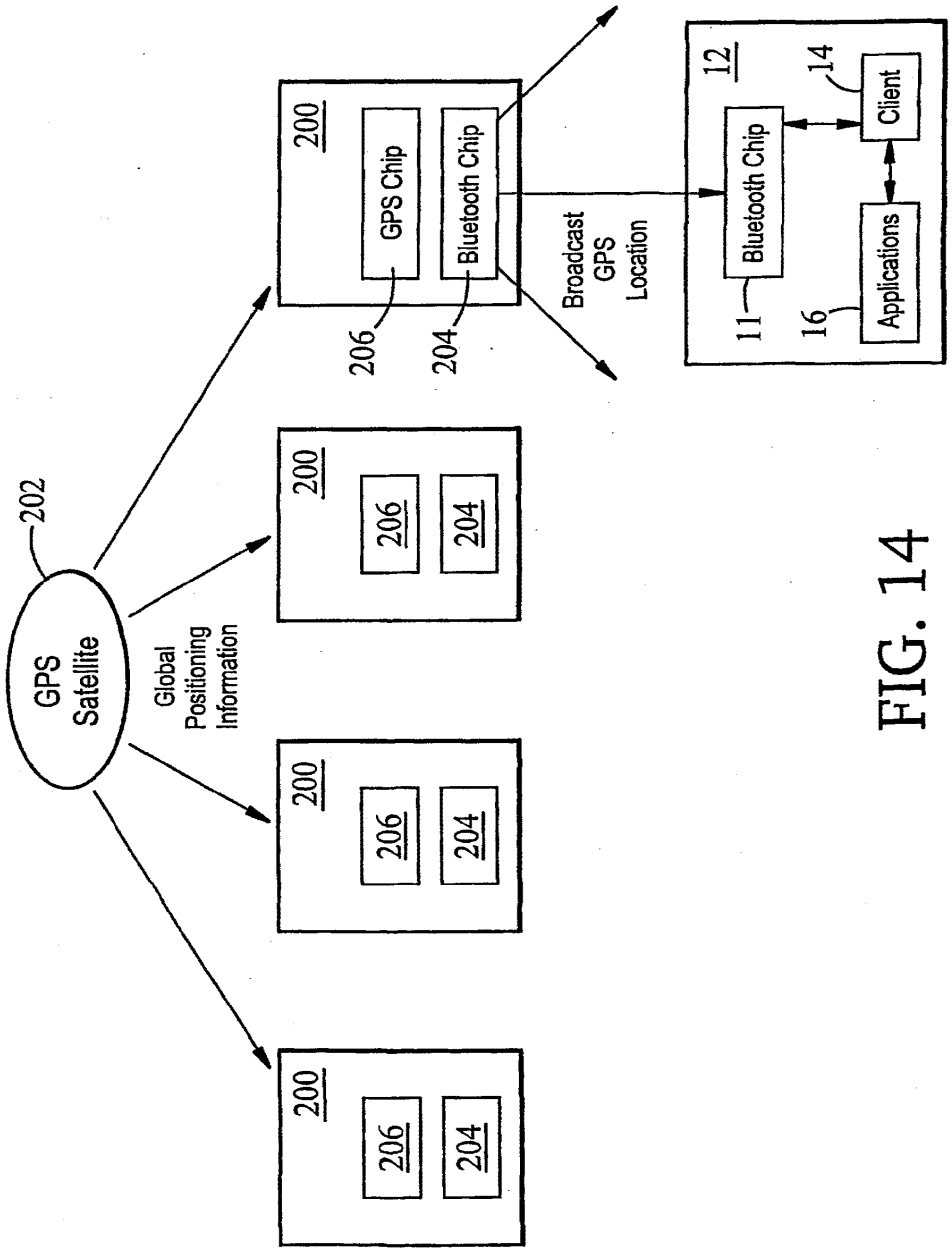
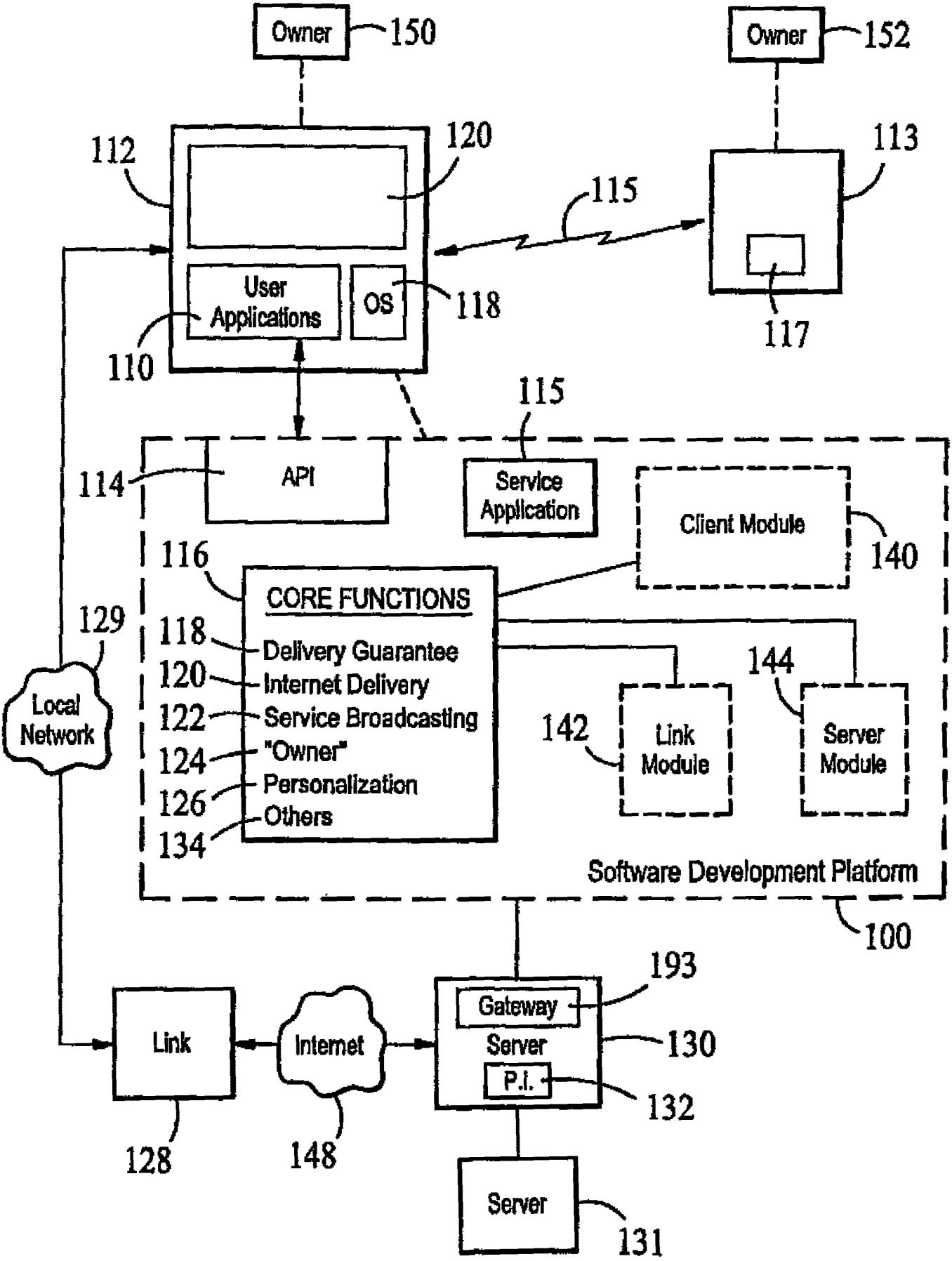

GPS Satellite
202
Global Positioning Information
200
206
204
GPS Chip
Bluetooth Chip
Broadcast GPS Location
12
Bluetooth Chip
Client
Applications
11
16
14

FIG. 14


Owner
150
Owner
152
112
120
113
115
User Applications
OS
118
110
117
115
114
API
Service Application
Client Module
140
116
CORE FUNCTIONS
129
118
Delivery Guarantee
120
Internet Delivery
122
Service Broadcasting
124
"Owner"
126
Personalization
134
Others
144
142
Link Module
Server Module
Local Network
Software Development Platform
100
193
Gateway
Server
130
P.I.
132
Link
Internet
128
148
Server
131

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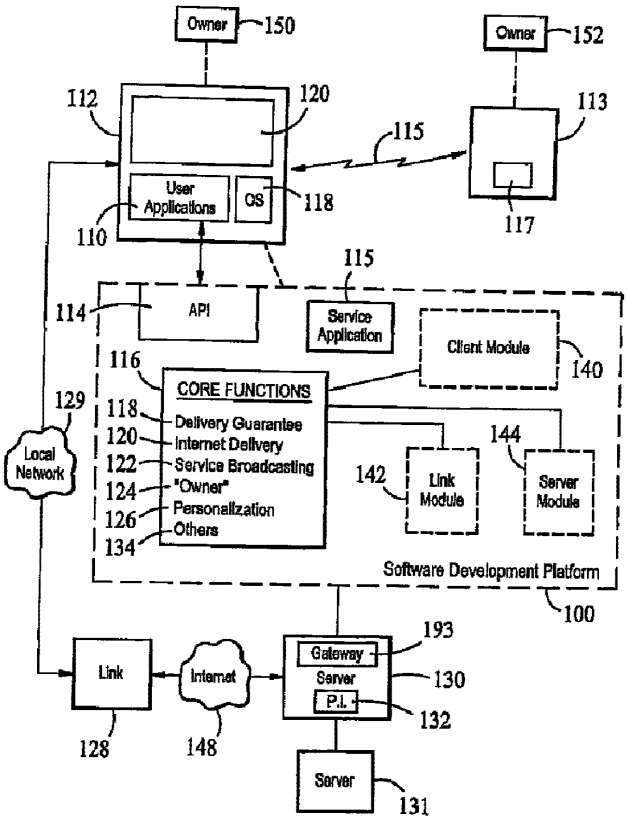
(51) Cl.Int./Int.Cl. *G06Q 30/06* (2012.01), *G06Q 20/40* (2012.01), *G07F 17/24* (2006.01), *H04W 4/00* (2009.01), *H04W 84/10* (2009.01), *H04W 88/06* (2009.01)

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(74) Agent: SMART & BIGGAR

(54) Titre : INFORMATIQUE ET COMMUNICATION MOBILES
(54) Title: MOBILE COMPUTING AND COMMUNICATION



(57) Abrégé/Abstract:
An application development platform enables applications to be created easily for, e.g., mobile devices that have short-range wireless communication capability. The development platform exposes a carefully chosen core set of services through an API.

(21) 2 766 184

(13) A1

(57) **Abrégé(suite)/Abstract(continued)**:
Each of the applications can broadcast its services to local and remote devices. Message delivery between devices is guaranteed even for messages than cannot be delivered directly by local short-range wireless transmission. Message delivery through other channels, including the Internet, can occur transparently to the user. Each device can be associated with an "owner", which can be a person or an entity. Services can be customized to the owner based on stored information that maps owners to devices. Information associated with each of the owners of devices can be stored centrally and used in connection with providing the services at each of the mobile devices. Virtual GPS capabilities can be provided for mobile devices that do not have GPS chips.

70850-146F

ABSTRACT

An application development platform enables applications to be created easily for, e.g., mobile devices that have short-range wireless communication capability. The development platform exposes a carefully chosen core set of services through an API. Each of the applications can broadcast its services to local and remote devices. Message delivery between devices is guaranteed even for messages than cannot be delivered directly by local short-range wireless transmission. Message delivery through other channels, including the Internet, can occur transparently to the user. Each device can be associated with an "owner", which can be a person or an entity. Services can be customized to the owner based on stored information that maps owners to devices. Information associated with each of the owners of devices can be stored centrally and used in connection with providing the services at each of the mobile devices. Virtual GPS capabilities can be provided for mobile devices that do not have GPS chips.

70850-146F

MOBILE COMPUTING AND COMMUNICATION

This application is a divisional of Canadian National Phase Patent Application Serial No. 2,437,706, filed on February 1, 2002.

BACKGROUND

This invention relates to mobile computing and communication.

Personal digital assistants, mobile telephones, and other mobile devices offer a wide range of computing and communication capabilities. To provide these capabilities, mobile devices have hardware complements that may include microprocessors, memories, displays that are in some cases touch sensitive, microphones, speakers, keys, and other user input and output mechanisms.

A variety of specific functions are often provided on mobile devices, including data entry, handwriting recognition, speech recognition, voice and data communication, memo writing, calendars, word processors, spreadsheets, to-do lists, and address books. These functions are implemented in software or firmware applications that are stored on the devices and use the features of an operating system such as Microsoft Windows CE or Palm OS that runs on and controls the hardware components of the mobile devices.

Mobile devices that are capable of wireless communication typically comply with one or more of the standard wireless communications protocols such as Bluetooth and the Wireless Application Protocol (WAP).

Bluetooth, for example, uses radio frequency transmission for relatively short-range communication. Bluetooth capabilities may be implemented in a small microchip that is incorporated into the mobile or other device.

To create an application for Bluetooth-capable devices, a developer typically writes custom software that implements the particular features of the application. A piece of custom software must be written for each of the devices that

are involved in performing functions of the application on either end of each Bluetooth communication link. Each piece of custom software is written to conform to the peculiar hardware and operating system characteristics of the device on which it will run.

SUMMARY

Some embodiments of the invention enable a fundamental shift in the way developers can enable users of mobile devices to interact with users of other mobile devices and users of stationary devices that have wireless capability.

According to an aspect of the invention, there is provided a method comprising: at a commonly accessible server: electronically storing information about a commercial transaction account of a user of a mobile device having short-range wireless communication capability, transmitting to a second device at a fixed location at least some of the information about the commercial transaction account of the user of the mobile device, and interacting with the mobile device and the second device, to enable a transaction between the user and a party associated with the second device based on the electronically stored information.

A further aspect of the invention provides an apparatus comprising: a mobile device having a short-range wireless communication capability and a first client module, the first client module being configured: to interact with a second client module on a second device at a fixed location and a commonly accessible database storing information about a commercial transaction account of a user of the mobile device, the second client module having received, from the commonly accessible database, at least some of the information about the commercial transaction account of the user of the mobile device, and to enable a transaction between the user and a party associated with the second client device based on the information.

There is also provided an apparatus comprising: an electronic device at a fixed location having a first client module, the first client module being configured: to interact with a second client module on a mobile device having a short-range wireless communication capability and a commonly accessible database including information about a commercial transaction account of a user of the mobile device, to receive, from the commonly accessible database, at least some of the information about the commercial transaction account of the user of the mobile device, and to enable a

transaction between the user and a party associated with the first client module based on the information.

In general, in one aspect, the invention features a method that includes running client modules on mobile devices, running a server module on a server that is accessible through a communication network, and running link modules on link devices that have communication channels to the mobile devices and are capable of accessing the server through the communication network. The client, server, and link modules provide core services through application programming interfaces to applications running on the mobile devices, the server, and the link devices.

Implementations of the invention may include one or more of the following features.

Service applications also run on the client modules to enable users of the mobile devices to manage the core services. The core services include interaction with short-range wireless transceivers in the mobile devices. A mobile device operating system is also running on the mobile devices and the client modules use services of the operating system. The mobile devices include personal digital assistants or mobile phones. The core services include at least one of the following: broadcast of information about real-world services; interaction with a wireless transceiver in the mobile device; guaranteed message delivery; and encryption.

In general, in another aspect, the invention features a method that includes running client modules on wireless devices, the client modules providing core services through application programming interfaces to applications running on the devices, at least some of

the applications being associated with real-world services that are provided by individuals or enterprises,

Implementations of the invention may include one or more of the following features. Information is maintained identifying relationships between each of the real- world services and at least one of the devices through which the service is provided, the core services providing a sharing among the devices of the information identifying the relationships between the real-world services and the devices. Information about the services available through each of the devices is broadcast by the core services to the other devices. The real-world services associated with the devices are registered by the core services. The real-world services include at least one of communication services, computational services, commercial services, or governmental services.

In general, in another aspect, the invention features maintaining in a wireless device a list of real- world services that are available from a user of the device through an application running on the device; and through a wireless communication channel, broadcasting information from the device indicative of the available real- world services.

Implementations of the invention may include one or more of the following features. The information is broadcast periodically. Another wireless device that receives the broadcast information accesses one of the available real-world services.

In general, in another aspect, the invention features a method that includes running client modules on mobile devices that are associated with identified users, running a server module on a server that is accessible on a communication network, and running link modules on link devices that have communication links to the mobile devices and are capable of accessing the server through the communication network,

Implementations of the invention may include one or more of the following features. A message is received from a user of one of the mobile devices through one of the applications running on the device, the message being directed to another user of an application running on another one of the mobile devices, and the message is delivered to the other user through the Internet. The message is sent through the links and the server. The client module running on the device from which the message is sent determines whether the target mobile device is within short-range wireless distance, and, if not, the client module forwards the message to one of the link modules. The link module forwards the message to the server through the Internet. The server module determines the location of the target mobile device and identifies a communication channel through which to forward the message to the other user.

In general, in another aspect, the invention features a method that includes maintaining a list of short-range wireless devices within range of a first short-range wireless device; and transmitting a message from an identified user of the first device to a second identified user of a second wireless device over a communication medium, the communication medium being selected based at least in part on whether the second device is included on the list, the selection being transparent to the user of the first device.

Implementations of the invention may include one or more of the following features. If the second device is included on the list, the message is transmitted to the second device over a short-range radio link, and if the second device is not included on the list, the message is transmitted to the second device using another communication medium. If the second device is not included on the list, the message is transmitted to the second device over either the Internet or by mobile telephony.

In general, in another aspect, the invention features a method that includes transmitting a message from an identified user of a short-range wireless

device to an identified user of another device; and automatically confirming to the identified user of the first device whether the transmitted message was received by the identified user of the other device.

Implementations of the invention may include one or more of the following features. Information is stored about the transmitted message in the first device after transmission; and a match is made between received confirmations and the transmitted message stored in the device. The transmitted message is resent if a confirmation for the transmitted message is not received within a specified period. A communications manager is notified in the first device if the transmitted message is undeliverable. The notifying includes providing an explanation of why the transmitted message was undeliverable. The transmitted message is removed from the device after it is confirmed that the transmitted message was received by the identified user of the other device. The device from which the message is transmitted is responsible for guaranteeing the delivery.

In general, in another aspect, the invention features a method that includes running applications on devices that are associated with respective owning entities, sending a message from an initiating owning entity to a target owning entity using one of the applications running on one of the devices associated with the initiating owning entity, identifying one of the devices as being associated with the target owning entity and as being accessible by a communication link, and forwarding the message to the device that is associated with the target owning entity through the communication link.

Implementations of the invention may include one or more of the following features. Each of the devices runs a client module that encrypts and decrypts the message using a public key associated with the owning entity of the device. The public key is stored in the device and in a server through which the message passes. The device comprises a mobile device. The owning entity comprises a person. The owning entity comprises an enterprise and the device comprises a stationary device.

In general, in another aspect, the invention features a method that includes (a) storing information that identifies real- world entities and defines modes of interaction by the real-world entities through distributed devices, each of the real-world entities providing services to other real-world entities and using services of other real- world entities, (b) enabling any of the real- world entities using any arbitrary one or more of the distributed devices to log into the server, (c) loading portions of the stored information from the server to the device being used, and (d) regulating the interaction of the real- world entity using the device with other real-world entities based on the stored information, the interaction including the use of the services of the other real- world entities.

Implementations of the invention may include one or more of the following features. Client modules are run on the device, a server module is run on a server that is accessible on a communication network, the client and server modules provide core services through application programming interfaces to applications running on the devices, and the core services include access to the information that is stored on the server and relates to real-world entities. The stored information includes at least one of identification information, demographic information, and preference information.

In general, in another aspect, the invention features a method that includes associating with each one of a number of different mobile devices that have a short-range wireless communication capability, a person who is a user of the device; storing information about the association of devices and users and information about each of the users at a publicly accessible server; and providing services at each of the mobile devices that depend on the information about the user of the device that is stored at the server.

Implementations of the invention may include one or more of the following features. The information about the users is communicated to the devices from the server for use in providing the functions. The information about the users includes at least one of: demographic information, identification information, preference information, or location information. At least some of the information about the users is stored on the mobile devices associated with the users.

In general, in another aspect, the invention features a method that includes recognizing automatically that an entity in possession of a short-range wireless device is within a particular geographic area; obtaining data about the entity from a commonly accessible database; and sending information to the short-range wireless device, the information sent to the device depending on the data obtained from the database.

Implementations of the invention may include one or more of the following features. Access to the data about the entity in the commonly accessible database is contingent on permission of the entity. The entity can access and modify its data in the commonly accessible database using the wireless device. A second short-range wireless device recognizes that the entity is within the particular geographic area, obtains the data, and sends the information. The information sent to the first device includes promotional material for facilitating a transaction with an entity associated with the second device. The entity obtains information about an entity associated with the second device from the commonly accessible database using the first device. Recognition that the entity is within a particular geographic area is based on receipt of a message from the first device, the message including an identification code mapped to the entity.

In general, in another aspect, the invention features a method that includes (a) electronically storing, in a publicly accessible location, information about real-world entities that are users of devices that have short-range wireless

communication capability, (b) providing client modules on the devices and a server module at the publicly accessible location, the client modules and the server module cooperating to provide guaranteed messaging between users of any of the devices and to enable commercial transactions between users of the devices based on the electronically stored information.

Implementations of the invention may include one or more of the following features. One of the two wireless devices is fixed and one of the two wireless devices is mobile. The user of one of the devices comprises a commercial entity. The user of one of the devices comprises a consumer. The transaction comprises delivery of marketing information from one of the two devices to the other. The transaction comprises the use by one of the two devices of a service provided by means of the other of the two devices. The transaction comprises electronic messaging. The transaction occurs when the two devices are out of range of each other. Access to the stored information is under the control of the user to which it pertains. The stored information comprises the location of the user. The stored information comprises consumption preferences of a consumer. Each of the users is associated with more than one of the devices. The transaction is effected between the two users through the server that is located out of range of the two devices. The two devices are in range of each other and the transaction is effected between two users carrying the two devices. The transaction comprises sending an electronic business card from one of the devices to another one of the devices and displaying the card on the other one of the devices. The transaction comprises an electronic message communicated from one of the users to the other through at least one of the two devices and by a route that includes a mode of communication that is selected from among the Internet, mobile telephony, and short-range wireless communication, the selection being made without the user's awareness.

In general, in another aspect, the invention features a method that includes, at a first device, receiving information from a second device through a short-

range wireless communication channel, the information identifying an actual geographic location of the second device based on signals received from GPS sources, and updating a derived geographic location stored at the first device based on the information received from second device.

Implementations of the invention may include one or more of the following features. The derived geographic location is updated to be the same as the actual geographic location of the second device. The first device receives information over time from multiple other devices, the information representing the actual GPS geographic locations of the other devices, and the derived geographic location is updated from time to time based on the information received over time from the other devices. The first device is mobile and the second device is stationary.

Other features and advantages will become apparent from the following description and the claims.

DESCRIPTION

Figure 1 shows a communication system.

Figure 2 shows a wireless mobile device.

Figures 3A, 3B, and 3C show data structures.

Figures. 4A through 41 show functions that can be used by a wireless device.

Figure 5 shows communication paths.

Figure 6 shows a server.

Figure 7 shows a client.

Figures 8A and 8B show a method for wireless communication.

Figure 9 through 14 show uses of the system.

OVERVIEW

One general aspect of the invention is an application development platform that includes client, link, and server modules that expose core services through an application programming interface (API). Applications can be easily built on the API. The core services are selected to enable unique and widely useful applications to be created.

Each of the applications can make services available to local and remote devices on which the client modules run. The availability of services is broadcast and known to the mobile devices, links, and services so that devices throughout the system can take advantage of them.

One core service is message delivery. The client, link, and server modules coordinate their activities to guarantee at a high level the delivery of messages initiated by applications running on the mobile devices. Messages may be sent directly by a short-range wireless channel from a mobile device to another mobile device that is in the vicinity. If the target device is not in the vicinity, the message may be sent through other channels, including the Internet, to the target device. The communication channel can be chosen transparently to the user of the originating device.

Each device in the system can be associated with an "owner", which can be a person or an entity, such as a retail establishment. Information can be stored that links devices to owners so that messages, for example, can be directed to an owner. The system will determine the identity and location of a device associated

with the owner. The message will then be sent to the identified device wherever it is located using whatever communication channel is appropriate.

Information associated with each of the owners of devices can be stored centrally and used in providing the services at each of the mobile devices. For example, information about the owner's preferences or characteristics can be used to govern the manner in which services are provided, information is made available and communications are effected.

The system can be used to provide virtual GPS capabilities for mobile devices that do not include GPS chips. Such a mobile device can obtain actual GPS information from other devices in the vicinity using short-range wireless communication. The mobile device can maintain a virtual GPS location that is nearly as accurate as if it had the GPS chip on-bard.

As shown in figure 1, the invention provides a common software development platform 100 that enables developers to easily, quickly, and effectively build a wide range of user applications 110 for devices 112, including mobile devices, that have short-range wireless communication capabilities, such as those provided by the Bluetooth standard. The common software development platform provides core functions and features 116 that can be invoked by the user applications through an API 114.

This architecture enables the developer to provide functions and features that are especially suited to mobile devices and short-range wireless communication and that have extremely broad appeal to users of the mobile devices. The developer need not re-invent, for each type of device and each communication protocol, the manner in which the applications interact with the operating system 118 running on the device, the device hardware 120, and the communications protocols.

The core functions include

providing a high-level guarantee of message delivery from one device to another 119

a delivery service that transparently arranges for the delivery of messages from one user to another through, e.g., the Internet 148, if the two devices are not within short-range wireless communication distance of each other 120

broadcasting of available services by a device and use of information that is broadcast from other devices 122

associating an "owner" with each device 124, and

integration with information associated with the owner 126.

The applications may enable both person-to-person interaction and person-to-location interaction, which involves a person interacting with an institution or real- world location or enterprise such as a store or airport.

The devices need not be mobile, but may include stationary devices that are to be part of the communication, including personal computers, cash registers, servers, and parking meters, to name a few. The platform extends to the hardware and software that provides a link 128 between the mobile devices and other devices, including a central servers 130, that are not within direct reach of the short-range wireless communication capabilities of the mobile device.

Based on the common development platform and the API that it presents to developers, any developer can easily create applications that change the way individuals interact with one another and with their environments.

The platform enables a developer to easily create applications that do virtually any job that requires local communication between devices (including mobile devices) 112, 113, or longer-distance communication between local devices and central servers. Because the platform encompasses servers, it also enables a developer to use personalization information 132 that is stored on a server to personalize the operation of applications that are running on local devices.

The core functions exposed by the API include functions that are expected to be used by a large proportion of applications that are built on Bluetooth. The application developer can build other features and functions 134 into his application and can supplement and expand the core functions.

In addition to the initial ease of creating the applications, the use of a common development platform leads to applications that are inter-compatible, more uniform, and more standardized.

The common development platform includes a client module 140, a server module 144, and a link module 142. The client module runs on a client device 112, such as a mobile device or a stationary local device owned by a merchant or a consumer. The server module runs on a server 130 that is typically not within short-range communication distance of the client devices, and the link module runs on a device 128 that provides a link between one or more client devices and the servers.

"Owner" of a device

Conceptually, each client device has an "owner" 150, 152. In a simple example, the owner is a person who owns and uses the device, say the owner of a Palm Pilot with Bluetooth capability. Another example of an owner would be a restaurant operator

with respect to a Bluetooth-capable client cash register at a restaurant. The owner of a device is known to the client, server, and link modules. An owner may change, for example, when a person lends his mobile telephone to another person.

The system stores information about the owners of the devices in a centralized database 132 to which one or more servers 130, 131 have access. The information could include names, addresses, and billing information, and other information such as the current location of the person and his current telephone number. The information could also include demographic information and user-entered preferences about products, services, and user interfaces.

One benefit of having the information accessible to the servers and clients is that it becomes possible for one party at one location to communicate with an owner located anywhere in the world even if, on one occasion, the communication is by Bluetooth, on another occasion by mobile telephony, and on another occasion through the Internet 148. The initiating party need not know where the owner is located or how to reach him; the server is aware of that information and can forward the message through the link to a server and from the server through an appropriate medium to the owner.

By combining the features of centrally stored information with easy-to-develop applications for mobile devices, it is possible to create a broad range of portable, standardized applications that make fundamental changes in the way people interact with the world around them.

Broadcast of services

The development platform 100 includes a function that enables an application 110 running on a mobile device to broadcast information about services that it provides to other devices running applications. Conversely, an application is able to identify and learn about services that are made available by applications

running on other devices, for example, devices that are within short-range wireless communication and devices that are accessible through the link module. The service-broadcasting capability enables the creation of a fabric of millions of devices (mobile devices, central servers, links, and others) that provide and use services, where a person's mobile device can be kept aware of available services as it moves through a world populated by the other devices.

Personalization

Because the client, link, and server provide the basic core capability of finding, storing, and editing personalization information in a central database 132, the applications built on the modules can provide functions that are dependent on the personalization information for the "owner" of the device.

Guaranteed delivery

Another of the key core functions provided by the application development platform is so-called high-level guaranteed delivery of messages. When an application running on a device such as a mobile PDA initiates a message to another device anywhere in the world, the modules guarantee delivery of the message even if the other device is not within short-range communication and even if the other device is not in use at the moment. To do this, the modules determine the location of the target device, determine an appropriate mode of communication (e.g., a Bluetooth communication to a local device followed by a link to the Internet and then a telephony link to the target device) and track the message until delivery has occurred.

The Internet can be used as a transparent alternative to Bluetooth for message delivery. When a user of an application on a device takes a step that requires a message to be sent to another device, the message can be sent through the Internet at the election of the modules, without the user being aware that Bluetooth is not being used.

THE WIRELESS DEVICE

As shown in figure 2, the client device 112 can be a wireless device that has a Bluetooth chip 11 enabling it to communicate over short-range radio links (such as link 115, figure 1) with another chip 117 (figure 1) in another device in accordance with the Bluetooth protocol. The device 112 could be, for example, a mobile telephone, personal data assistant (PDAs), handheld computer or organizer, personal computer, cash register, parking meter, or other device. The device can include a touch-sensitive display 123 to allow the user to view information and interact with the device, a keypad 170, a keyboard 172, a mouse 174, or other means for allowing the user to interact with the device.

The chip 11 has a unique identification code 180 that is mapped in the personalization database 132 to the user or owner of the device. The user of the device may be an individual, vehicle, or other mobile entity, or may be an entity whose location is fixed such as a store or restaurant.

Generally, the device 112 also has a memory or memories 190 that store an operating system 118, applications 110, and the client module 140, a processor or processors 192, and one or more internal system communication buses 194 interconnecting these hardware components (the hardware components are together identified by the numeral 120 on figure 1).

Interaction between the Bluetooth chip, on one hand, and the operating system, the client module, and the applications, on the other hand conforms to a Bluetooth API that is exposed by the chip to the devices that interact with it. By making calls to the chip 11 through the client module, application programs 16 created by a variety of parties and running on the device 112 can achieve a broad range of functions. By interacting with the operating system 118 of the device 112, the client module 140 can take advantage of the communication, processing, display and user interaction features provided by the operating system.

TRACKING AVAILABLE SERVICES

The client module 140 keeps a registry 141 of services that are available from the applications running on the local device 112 and services that are available from applications running on other devices, including devices that are within short-range wireless distance of the local device 112.

An entry in the registry related to a service may have the format shown in figure 3 A for a locally available service and the format shown in figure 3B for a service available on another device. Other formats could be used.

Exemplary services that could be made available by applications running on devices include a WML server or an instant messaging client.

The platform exposes "AddService" and "RemoveService" functions (see figures 4E and 4F) that can be used by applications to add (register) or remove (unregister) services from the list in the registry 141.

The client module makes information about the user (owner) of a device and the services available from that device by a periodic broadcast ping to all devices within range of a local device. The broadcast function allows numerous devices constantly to be aware of a range of services offered by other devices. Each device can take advantage of and use a wide range of services for the user's benefit. The client module uses the information stored in the registry 141 by the applications to provide other devices with descriptions of services and instructions on how to access them.

The applications running on the device can include core service applications that enable user interaction with and control of functions provided by the client module.

One service application, for example, may enable a user of the device to modify the contents of the registry and to specify preferences with respect to the services available on the device. For example, the user may choose whether or not to be notified when a message is received for a particular service.

MESSAGE PASSING THROUGH THE LINK

In addition to communicating with nearby wireless devices, the client module can access the Internet or other public network through a link 128 (figure 1) that is running a link module 142. Any device having local network capabilities 129 and an Internet 148 connection can serve as the link. The link could be a mobile device or a stationary device.

As shown in figure 5, in some implementations, the link 128 includes a device with a Bluetooth chip 11 that provides local network capabilities (as defined in the Bluetooth standard), a copy of the link module 142, and an Internet connection through an Internet interface 15, such as a dialup or dedicated connection to the Internet 148.

Some communications can be sent over the Internet as a transparent alternative to sending the messages using Bluetooth technology. The link 128 allows users within short-range wireless distance to send and receive data through the Internet to and from, for example, server 130 running a copy of the server module 144. Other technologies such as infrared could also provide the local network capabilities for the link 129.

The client module tracks whether there are any links 128 in range of the device based on information stored in the service registry 18, because the links broadcast their available services in the manner described earlier. Messages destined for devices that are not within range are stored by the client module in a queue until the device is within range of a link 128

In one example, messages (called Kmessages) stored in the client's message queue have the format shown in figure 3C. Once the device is within range of a link 128, the messages are transmitted through the link to a server 130. The server 23 can then transmit the messages to another link 131 (figure 3) that is close to the target device 133. A registry in the target device stores messages waiting to be retrieved by specific services on the device.

The "getMessages" and "getMessage" functions (shown in figures 4B and 4C) are exposed by the client module and enable an application running on the client device to be used to retrieve messages sent from other devices. The stored messages are communicated from the client to an application using the Kmessage structure shown in figure 3C.

The core services of the modules support the Transport Control Protocol/Internet Protocol (TCP/IP) to allow for Internet connectivity through what amounts to an ad hoc network of the devices that are within the vicinity of the links. IP masquerading is used by the link module to assign an IP address to each device in range of the link, thereby enabling the devices to communicate using TCP/IP.

THE SERVER

The server module 144 running on the server 130 allows users of devices anywhere in the world to send messages to one another without knowing where the recipient is located or which device the recipient is using.

As shown in figure 6, the server system 130 serves as a global router 60 that exposes services to server applications to enable messages to be stored and passed, for example, between a device 12 on which a client module 14 resides and another device 54 on which another client module 56 resides.

In general, a given user may be an owner of multiple devices and may log on to some or all of them at one time. The server module includes a database 62 that tracks the devices associated with each user. The server module can support the HyperText Transfer Protocol (HTTP) and WAP, as well as other technologies, to send and receive messages.

In one implementation, the server module includes software written in the Java computer language that can run, for example, on a Windows, Solaris or Linux system. The server module also can store information about the services that are made available by each of the user's devices in a registry of services 66 so that other devices can locate and access the services. A "getSurrounding Services" function (shown in figure 4D) is exposed by the client module to applications running on a device to enable the devices to obtain from the server module an array of mappings of users of other devices and services available on their devices.

PERSONALIZATION

The server module also provides an interface service to the personalization system 132 and a gateway service 173 to other technologies such as the Internet 148. A web server 58 using, for example, a Generalized Markup

Language, allows messages to be served to any mobile device that has an Internet connection. In addition, any client device can access resources and information from the server through the Internet.

The user can log on to the server, for example, to access the personalization system 26 and to enter or edit personalized information.

On of the service applications 115 (figure 1) provided with the client module 14 allows the user to modify personal information and preferences stored by the personalization system. A "changepersonalizationdata" function (shown in figure 4G) can be used for that purpose. The user also can set indicators to permit or deny access by other users to various pieces of data stored in the personalization system and associated with that user.

For example, user information stored in the personalization system may be designated as shared or public using the "Changepersonalizationpermissions" function (shown in figure 41).

One of the service applications running on one user's device can access other users' profiles from the personalization system using a "Getpersonahzationdata" function (shown in figure 4H). Access is denied if a particular user does not have permission to access another user's profile. All relevant data from the personalization system is loaded dynamically through a link when the user logs on to the server. Thus, user information stored at the client device can be updated regularly to keep it synchronized with the data stored in the personalization system.

An administrative graphical user interface (GUI) is associated with the server to allow an administrator to change configurations for users manually. The administrative GUI also allows an administrator to analyze the load on resources

used by the server, test and debug the server, and access user information stored in the personalization system if the user permits such access.

GUARANTEED DELIVERY

In general, the client module exposes a service that is responsible for ensuring delivery of messages from one device to another. Upon receipt of a message from an application, the client module returns a confirmation including a unique identification number for each transmission of data. If the client module is not able to guarantee that a message was delivered, the text of the message is returned to the sender, with a message indicating that the text was undeliverable. If a message including data is received by a device that does not have the necessary application to operate on the data, then the message is returned to the sender. On the other hand, if the required application is listed in the registry of the recipient's device, but the recipient's device is not currently running the application, the client module stores the message and notifies the user that the message has been received.

When a message is sent to a particular user from the server through the links, the message is sent to all devices that the user "owns" and on which he is logged on. If the user is not logged on to any of his devices, the server module stores the message in a mailbox database 64. When the user subsequently logs on, he is notified of the message. Therefore, when a message is to be sent to a particular device, the sender of the message need not determine which device the recipient is closest to or on which device the recipient prefers to receive messages. The server transparently routes the message to the proper device. Because encryption technology is integrated with the client module, the user automatically digitally signs communications using a global key stored in the personalization system and in a personalization module 143 stored on the client device (see figure 2).

As shown in figure 7, the client module includes a transfer module 30

that provides an interface to communications media, including the Bluetooth chip 32, a wireless modem 34 that permits mobile telephone communications, an infrared port 36, or other communications channels 38.

The transfer module 30 references a socket or equivalent layer of each communications media available to the device and manages the communications media. The transfer module 30 passes received messages to a confirmation manager 40 and provides information to the communications manager about the available communications media. The transfer module 30 can be requested by the confirmation manager 40 to send messages over a particular communication medium.

The confirmation manager 40 is the portion of the client module that is responsible for guaranteeing delivery of messages. It maintains a queue of outgoing messages, as well as a queue of messages awaiting confirmation. The confirmation manager 40 tracks messages that have been sent and matches received confirmations with the original outgoing messages. If confirmation is not received within a specified period, the message is re-sent.

The confirmation manager 40 can be called upon by a communications manager 42 to send messages and notifies the communications manager if a message is undeliverable. A message explaining why a message is undeliverable can accompany the notification to the communications manager 42.

The communications manager 42 is responsible checks for other devices entering or leaving the range of the device and decides which communication medium to use when a service application 16 requests that a message be sent. Messages can be sent to a security module 46 for encryption and receipt of a digital signature.

The communications manager 42 is notified by the confirmation manager 40 of received messages and passes the received messages to the security module 46 for authentication of digital signatures. User name and security information is received from the personalization system through a personalization module 48. The communications manager 42 notifies the service applications 16, through an applications manager 44, of received messages based on settings in the local registry 18. The service applications 16 then can retrieve messages in a message queue through the applications manager 44.

The communications manager 42 also receives and acts upon registry request messages and broadcasts and retrieves local service application settings from the registry 18. Additionally, the communications manager updates the information about other devices in the registry 18 based on server messages and registry broadcasts.

The applications manager 44 provides an interface between the service applications 16 and the communications manager 42, the registry 18 and the personalization module 48 of the client. The applications manager 44 can retrieve or modify local service application settings stored in the registry 18. It also can access or modify the registry's list of other devices within range of the device 12, and information about services available on those users' devices. The applications manager 44 also can send and receive messages through the communications manager 42. Information stored in the personalization system 132 can be accessed or modified (assuming permission is granted) through the personalization module 48.

The personalization module 48 serves as an interface to the personalization system 132 and provides access to user information, user preferences, and user permissions stored in the personalization system. The personalization module 48 is capable of caching information and synchronizing information with the personalization system 132. It can access information stored in

the personalization system 132 in a manner that is transparent to the entity requesting the information. The personalization module 48 provides the user name for message headers and provides public or private encryption keys to the security module 46 through the communications manager 42.

The security module 46 is responsible for providing secure communications between the device 12 and other devices and executes a cryptographic algorithm. The security module 46 obtains security information from the communications manager 42. It encrypts and decrypts messages, digitally signs outgoing messages and verifies the digital signatures of incoming messages.

A "sendMessage" instruction (see figure 4A) in an application can call a client module routine that allows messages to be sent to other wireless devices through the facilities of the chip.

MESSAGE COMMUNICATION AND ENCRYPTION

Figures 8 A and 8B show how a message initiated by a service application 16 can be sent from the device 12. The particular service application 16 passes 1100 a message with an identification of the intended recipient to the applications manager 44. In this example, it is assumed that the application service requests that the transmission of the message be secure and guaranteed. The applications manager 44 passes 1102 the message and the recipient's identification to the communications manager 42 and requests that the message be transmitted in a secure and guaranteed manner. The communications manager 40 passes 1104 the message and security information to the security module 46. The security module 46 executes the cryptographic algorithm on the message and returns 1106 the encrypted message to the communications manager 42. The communications manager 42 then passes 1108 the encrypted message to the confirmation manager 40 and specifies the channel of communication.

The confirmation manager 40 generates 1110 a message identification number and attaches it to the message header. The confirmation manager 40 also adds 1112 the encrypted message to its queue of non-confirmed messages. The confirmation manager 40 passes 1114 the encrypted message and an identification of the specified channel to the transfer module 30. The transfer module 30 then sends 1116 the encrypted message over the specified communication channel. If the confirmation manager 40 does not receive a confirmation within a specified time frame, it re-sends the message.

The transfer module in the recipient device receives 1118 the encrypted message and passes it to the recipient device's confirmation manager. The confirmation manager in the receiving device passes 1120 the message to the communications manager. In addition, the confirmation manager in the recipient device adds the message identification number to its list of received messages and generates 1122 a confirmation message that is passed to the transfer module in the recipient device. The transfer module sends 1124 the confirmation message over the same communication channel over which the original message arrived. The transfer module 30 in the sending device 12 receives the confirmation message and passes 1126 it to the confirmation manager 40. The confirmation manager 40 then removes 1128 the original message from its queue of messages that are awaiting confirmation.

After receiving the encrypted message, the communications manager in the recipient device removes 1130 the header and passes 1132 the encrypted, digitally signed message to the security module. The security module responds 1134 to the communications manager with the sender's identity. The communications manager in the recipient device then adds 1136 the decrypted message to its

message queue and notifies 1138 the user and service application, according to the settings in the registry of the recipient device.

To receive the decrypted message, the service application requests 1140 the message from the communications manager through the applications manager in the recipient device. The communications manager passes 1142 the next message marked for the intended application from the message queue to the service application. The communications manager then deletes 1144 the message from its message queue.

In addition to sending and receiving messages, a service application 16 can retrieve or modify data and permissions stored in the personalization system 132 by calling functions of the personalization module's API through the applications manager 44. Additionally, a service application 16 can view information about users and devices within range of the device 12 by calling functions of the registry's API through the applications manager 44. Similarly, a service application 16 can retrieve or modify service application settings on the local device 12 by calling functions of the registry's API through the applications manager 44.

USES

As shown in figure 9, in one use of the system described above, a clothing store 70 at a fixed location provides electronic coupons to potential customers. A device 17 with a Bluetooth chip 15 is mounted in the store 70. If a user carrying a mobile device comes within range of the chip 15, the device 17 detects and stores that information in its client's service registry. The device 17 can obtain information 74 about the user from the personalization system 132. Such information 74 may include, for example, the clothing size and clothing purchase history of the user. Access to such information can be subject to the grant of permission by the user.

The device 17 can send one or more electronic coupons to the user's device 12 by incorporating the coupons into one or more messages sent directly through the Bluetooth link or indirectly through a local area network (LAN). The messages containing the coupons can inform the user of sales and items that may be of special interest to the user based on the information obtained from the personalization system. The electronic coupons can be turned in and used to purchase items from the store 70 by communicating directly with the device 17 over the LAN.

The user need not wait for coupons to be sent to his device 12. For example, once the user is within range of the store 70, the registry associated with the client module residing on the user's device 12 would store the identification code for the store 70. The user can use the device 12 to view the various coupons offered by the store 70.

Another application can provide a service that acts as a shopping assistant to match user preferences to available store inventory. In one scenario, the user may want information about a particular product from stores in a specified area such as a commercial street or shopping mall. Stores would update information stored in the personalization system about their product inventory. The user would use the device 12 to request information from the personalization system regarding the availability of various models, sizes, costs, of the particular product from stores in the specified area. A list of the available products and related information then would be provided to the user's device. An identification code can be associated with each store that can be used as discussed below.

After reviewing the information obtained from the personalization system, the user can get additional information from the personalization system, for example, about promotions or coupons that the listed stores may be offering. After selecting a particular store, the user enters the store identification code into the

device 12 to access a link to the selected store, for example, over the Internet 22. Once the user's device 12 is within range of the store's Bluetooth-enabled device, the two devices would recognize one another. Communications then would take place directly or over the local network. The user would be able to purchase items from the store using the device 12. Personnel at the store may gather the purchased items and send a message to the user when the items are ready to be picked up.

As shown in figure 10, another application allows the user to place an order, for example, at a restaurant 76 and pay for the order without having to wait in line. The user orders and pays while sitting at a table or walking in the vicinity of the restaurant. When the user arrives at the restaurant 76, the restaurant's Bluetooth-enabled device 17 recognizes the presence of the user's device and retrieves the user's personal information from the personalization system. The personal information may include the customer's food preferences or the usual order that the customer places at the restaurant 76. The restaurant's device 17 sends a message to the customer's device asking, for example, if the customer wishes to place his usual order. The customer can place an order and pay using the device. The customer also can access the personalization system to obtain information about the restaurant 76. The restaurant information 80 can include, for example, a menu, a list of specials, and available coupons. Such information can be obtained directly from the restaurant as well using the restaurant's local network.

The information regarding the user's preferences retrieved by the restaurant's device 17 from the personalization system may include information that can facilitate transactions between different commercial entities with respect to the identified customer. For example, when the user passes within the vicinity of the restaurant, the restaurant's Bluetooth-enabled device 17 recognizes the presence of the user's device and retrieves the user's personal information 78 from the personalization system. The personal information 78 may indicate that the user

enjoys movies. The restaurant's device would exchange information with a local theater 77 that also is in possession of a Bluetooth-enabled device 79, and the local theater 77 would post an electronic movie discount on the user's device.

Another application can facilitate travel. For example, assume the user is scheduled to depart on an airline flight. As shown in figure 11, upon arrival at the airport 82, a Bluetooth-enabled device 17 would detect the presence of the user's device. The airport's device 17 obtains the user's scheduled flight number and time of departure from the personalization system. The device 17 then sends flight, airport and ground transportation information tailored to the traveler's itinerary to the user's device. Similar applications can be used in connection with other means of travel such as trains or buses.

Other applications can be used in connection with parking meters to facilitate payment through use of a Bluetooth-enabled device. In one scenario, users would purchase pre-paid units of time. As shown in figure 12, when a user in possession of the device parks a car near a parking meter 86, a Bluetooth-enabled device 17 in the parking meter senses the presence of the user's device 12. The device 17 checks the user's account identification number 88 by accessing the personalization system 26 and sends a message to the user's device requesting an indication of how much time the user plans to park at the location. Once the user 10 responds, payment automatically can be deducted from the user's account. The application program can consistently show how much time is left on the meter 86, and can allow the user to add time to the meter from distant locations.

A wireless credit card application program can allow the user to make purchases with the device from a merchant 90. For example, as shown in figure 13, a merchant's Bluetooth-enabled device 17 would sense the presence of the user's device and, if permission is granted, would obtain the user's credit card information 92, including the user's name, account number and account expiration date, from the personalization system 26.

Furthermore, the application program can store a personal budget set by the user. If the user exceeds his personal budget, a message is sent to the device indicating that the personal budget has been exceeded.

A network of strategically placed Bluetooth-enabled devices in parking meters, city streets lamps, and other locations can provide a virtual global positioning system (GPS) that allows a user's device to know its precise location without requiring that the user's device carry a global positioning chip. As illustrated in figure 14, a number of Bluetooth-enabled devices 200 carry a Bluetooth chip 204 as well as a global positioning chip 206 that allows the device 200 to determine its GPS location by receiving global positioning information from a satellite 202. Each device 200 can periodically broadcast its global positioning location. Other Bluetooth-enabled devices that are within range of one of the devices 100 can receive the broadcast and thereby determine their own location. A variety of location-based applications 16, such as an electronic map identifying the user's location, can be implemented without requiring a costly GPS chip on the device 14.

Yet another application program that can run on the client 14 allows users to post information that can be retrieved and read by other parties. A virtual information board can be implemented by storing the information on a local device or on the server. For example, a restaurant can post its daily specials using such an application to help reduce the cost of menus.

A public information booth can have a Bluetooth-enabled device that provides information about museums, historical sites, statues and other sites of interest within a particular geographical location. An application can be run on the client residing on the user's device. The devices interact according to the Bluetooth protocol, and the device sends out a brief history or summary of the area to the user's

device. The application also allows a user to view a list and summary of the various sites in the area. Self-guided tours can be tailored so that the user only receives information about specific aspects of the area based on the user's interest.

Another application can serve as a wireless identity tool. This tool can facilitate the user's navigating through a hospital or other bureaucracy. For example, in a hospital, the user can sign in or pick up medical prescriptions without completing written forms. The application can provide the appropriate information.

Other application programs can provide communications with another device associated with an entity such as an individual who is free to roam from one location to another. Exemplary application programs include instant messaging, buddy lists, and personal contact cards.

Instant messaging, for example, allows messages to be passed between Bluetooth-enabled devices regardless of whether or not the devices are within local range of one another. The location of the parties may impact which means of communication is used to send a particular message. However, the sender of the message need not be concerned with the means of communication or device compatibility issues because the incoming message will be tailored to the recipient's device. If an instant message cannot reach its destination, for example, because the intended recipient has set his permissions so as not to allow instant messaging or because the recipient device does not have the proper software, the sender can be notified that the message cannot be delivered.

Other applications that can run on the device facilitate the use of buddy lists. Thus, a user of the device can be notified automatically when a buddy enters or leaves the local area network. The user can add or remove persons on the buddy list. For more privacy, the user can select an option in the application to prevent other persons on the buddy list from being informed of the user's entering or leaving

particular networks. A list can be stored in the personalization system to specify information and communication access permissions. The list can be used across multiple applications and can be updated dynamically through the personalization system. Different members of the buddy list can have different permissions.

Another application program allows the user to send a virtual business card from the device. In some situations, the electronic business card can include graphical images of an actual business card.

Other implementations are within the scope of the claims.

CLAIMS:

1. A method comprising:

at a commonly accessible server:

electronically storing information about a commercial transaction account of a user of a mobile device having short-range wireless communication capability,

transmitting to a second device at a fixed location at least some of the information about the commercial transaction account of the user of the mobile device, and

interacting with the mobile device and the second device, to enable a transaction between the user and a party associated with the second device based on the electronically stored information.

2. The method of claim 1 further comprising:

at the second device,

detecting the mobile device,

receiving, from the mobile device, an identification of the user,

receiving, from the server, the information about the user, the information usable to pay for a service,

receiving authorization to pay for the service, and

transferring payment from the user to the party associated with the second device.

3. The method of claim 2 in which the authorization is received from a third device.

4. The method of claim 1 further comprising:

at the mobile device,

receiving, from the second device, a request for authorization to pay for a service,

prompting the user to indicate an amount of the service to pay for, and

transmitting the amount of the service to pay for to the second device.

5. The method of claim 1 further comprising:

at a third device,

receiving a request for authorization to pay for a service,

prompting a user of the third device to indicate an amount of the service to pay for, and

transmitting the indicated amount of the service to pay for to the second device.

6. The method of claim 1 further comprising:

at a third device,

transmitting an identification of the mobile device and an amount of a service to pay for to the second device; and

at the second device,

crediting the amount of service to the user of the mobile device.

7. The method of claim 1 in which the second device is a parking meter, and the electronically stored information comprises information usable to pay for parking.

8. The method of claim 7 further comprising:

at the mobile device,

informing the user about an amount of time remaining on the parking meter,

receiving, from the user, an instruction to pay for additional time, and

transmitting, to the parking meter, the instruction to pay for additional time.

9. The method of claim 8 in which the transmitting comprises direct communication from the mobile device to the parking meter using the short-range communication capability.

10. The method of claim 8 in which the transmitting comprises indirect communication from the mobile device to the parking meter through a third party using a long-range communication capability.

11. The method of claim 1 in which the second device requests from the server the information about the user, the request based on sensing the presence of the mobile device.

12. An apparatus comprising:

a mobile device having a short-range wireless communication capability and a first client module,

the first client module being configured:

to interact with a second client module on a second device at a fixed location and a commonly accessible database storing information about a commercial transaction account of a user of the mobile device, the second client module having received, from the commonly accessible database, at least some of the information about the commercial transaction account of the user of the mobile device, and

to enable a transaction between the user and a party associated with the second client device based on the information.

13. The apparatus of claim 12 in which the first client module is configured to transmit to the second client module by direct communication from the mobile device to the second device using the short-range communication capability.

14. The apparatus of claim 12 in which the second client module also requests information about the user from the commonly accessible database, the request based on sensing the presence of the mobile device.

15. An apparatus comprising:

an electronic device at a fixed location having a first client module,

the first client module being configured:

to interact with a second client module on a mobile device having a short-range wireless communication capability and a commonly accessible database including information about a commercial transaction account of a user of the mobile device,

to receive, from the commonly accessible database, at least some of the information about the commercial transaction account of the user of the mobile device, and

to enable a transaction between the user and a party associated with the first client module based on the information.

16. The apparatus of claim 15 in which the electronic device comprises a parking meter, and the information comprises information usable to pay for parking.

17. The apparatus of claim 15 in which the first client module is also configured to:

receive, from a third device, an identification of the mobile device and an amount of a service to pay for; and

credit the amount of service to the user of the mobile device.

18. The apparatus of claim 15 in which the first client module is also configured to request from the commonly accessible database the information about the user, the request based on sensing the presence of the mobile device.

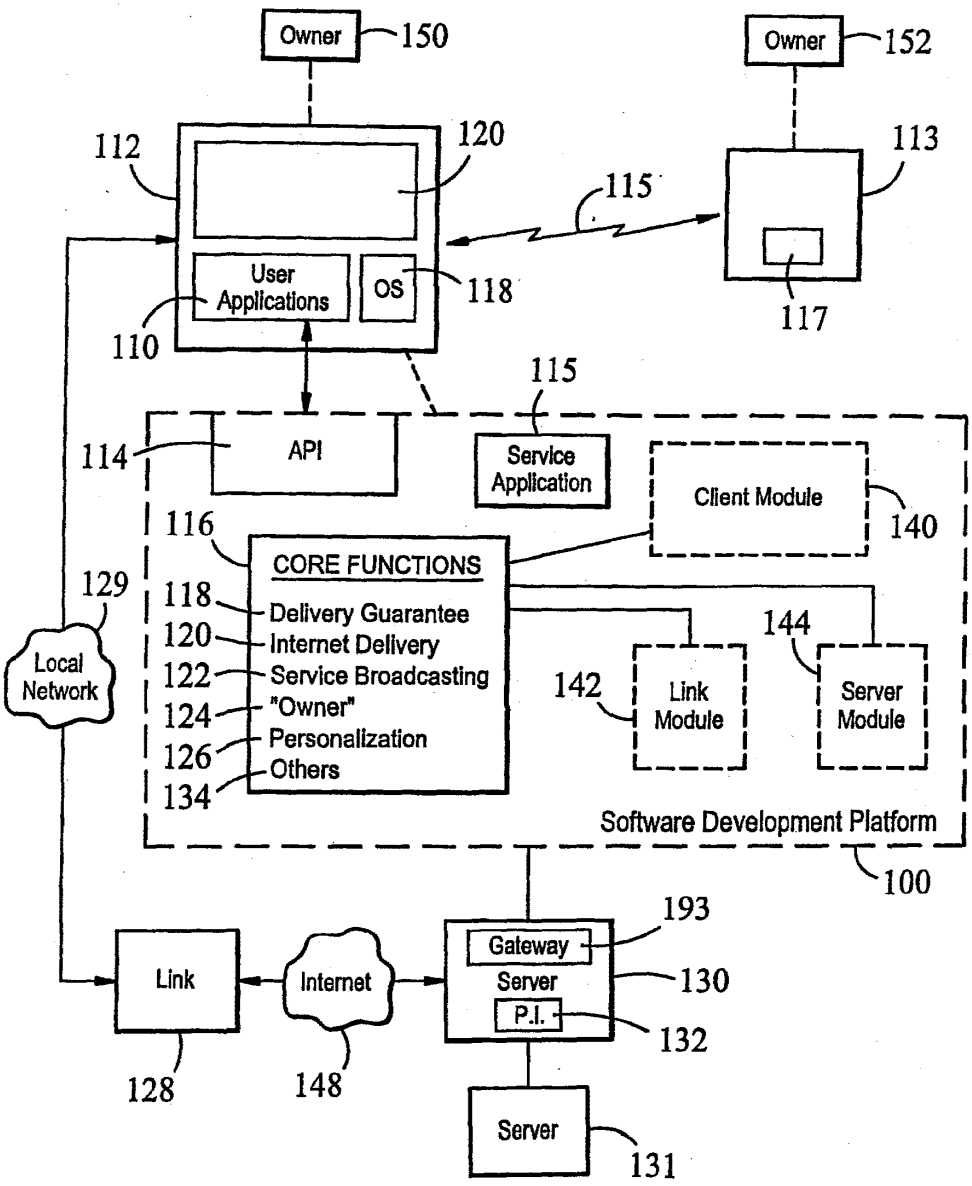

Owner
150
Owner
152
112
120
113
115
User Applications
OS
118
110
117
115
114
API
Service Application
Client Module
140
116
CORE FUNCTIONS
129
118 Delivery Guarantee
120 Internet Delivery
122 Service Broadcasting
124 "Owner"
126 Personalization
134 Others
144
142
Link Module
Server Module
Local Network
Software Development Platform
100
193
Gateway
Server
130
P.I.
132
Link
Internet
128
148
Server
131

FIG. 1

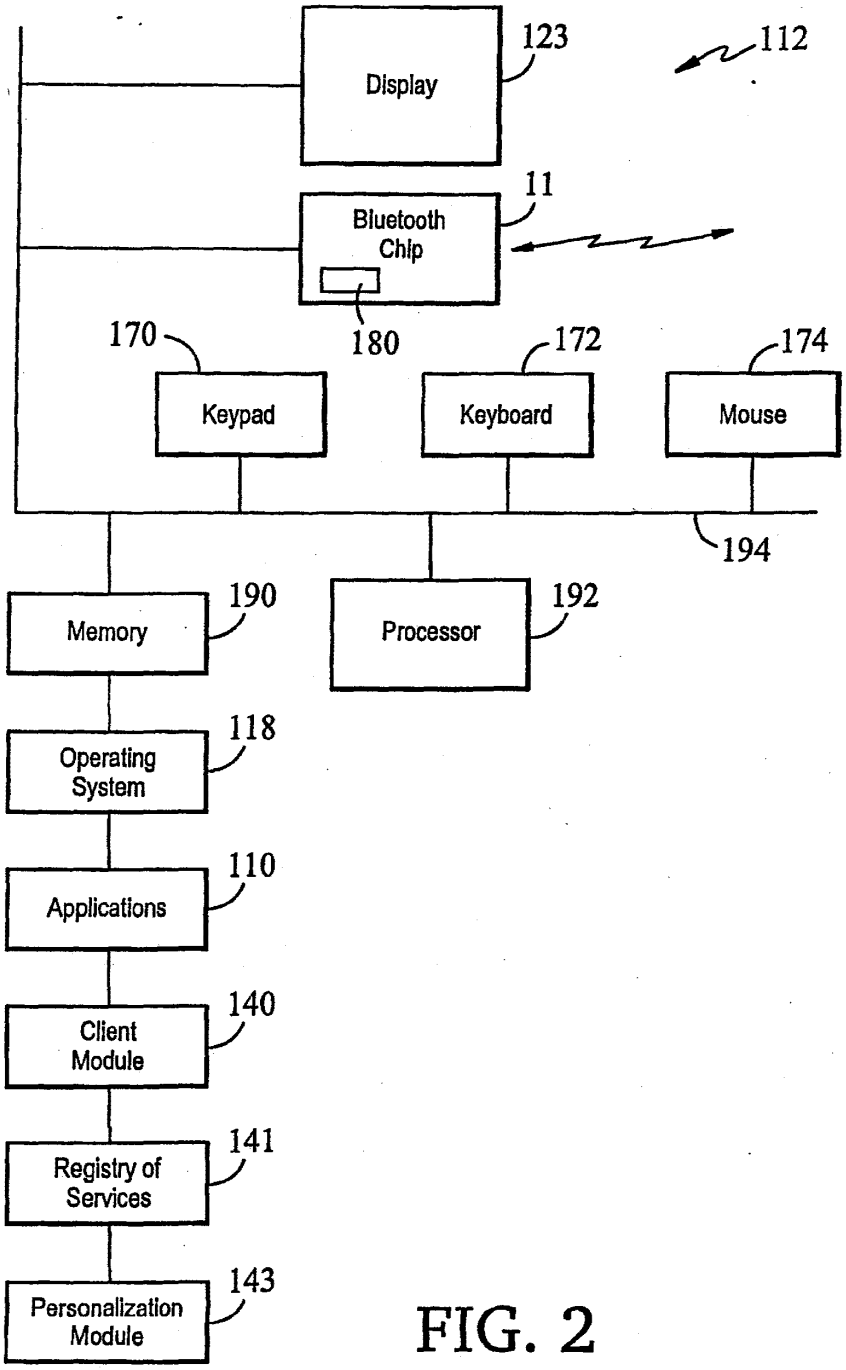

Display
123
112
Bluetooth Chip
11
180
170
Keypad
172
Keyboard
174
Mouse
194
Memory
190
Processor
192
Operating System
118
Applications
110
Client Module
140
Registry of Services
141
Personalization Module
143

FIG. 2

FIG. 3A

```
• LocalService {
    char * serviceName;
    int receive WhenRunning;
    int receive WhenNotRunning;
    int running;
    int maxNumOfMessagesToStore;
    char * exp_fld1;
    char * exp_fld2;
    char * exp_fld3;
    char * exp_fld4;
    char * exp_fld5;
  };
```

FIG. 3B

```
• RemoteService {
    char * serviceName;
    char * userName;
  };
```

FIG. 3C

```
• KMessage {
    char * serviceName;
    char * date;
    char * recipient;
    char * sender;
    char * messageBody;
  };
```

Name	sendMessage
Arguments	char * to, char * serviceName, char * data
Return Values	int err
Description	This function provides sending capabilities so that messages or any kind of unformatted text can be sent between Bluetooth devices. Reception of the text is guaranteed, because even when the devices are not within range, the text is stored and communicated via an Internet connection. If a user is logged in to more than one device simultaneously, the message/text will be sent to both devices at the same time.

FIG. 4A

Name	getMessages
Arguments	struct KMessage * message
Return Values	int err
Description	The getMessages function retrieves all messages or any other formatted text sent from another Bluetooth device. It returns the data in the KMessage data structure.If a user is logged in to more than one device simultaneously, the message/text will be received from both devices at the same time.

FIG. 4B

Name	getMessage
Arguments	struct KMessage * message
Return Values	int err
Description	The getMessage function retrieves just one message or any other unformatted text sent from another Bluetooth device. It returns the data in the KMessage data structure.If a user is logged in to more than one device simultaneously, the message/text will be received from both devices at the same time.

FIG. 4C

Name	getSurroundingServices
Arguments	struct RemoteService areaServices []
Return Values	int err
Description	This function returns an array of mappings of users and services available on that user's device. This information was previously stored in a database termed the registry, which is a list of devices within range of a Bluetooth device.

FIG. 4D

Name	AddService
Arguments	char * serviceName
Return Values	int err
Description	This function adds a service entry to the registry.

FIG. 4E

Name	RemoveService
Arguments	char * serviceName
Return Values	int err
Description	This function removes a service entry from the registry.

FIG. 4F

Name	changePMTdata
Arguments	<<waiting to hear about PMT API>>
Return Values	int err
Description	A function that allows users to update their personal PMT data and preferences using their particular devices. If the device is not within Bluetooth range of an Internet connection, it will restore these update preferences, and make changes within the permanent PMT upon coming into contact with an Internet connection.

FIG. 4G

Name	GetPMTdata
Arguments	char * user
Return Values	int err
Description	Allows a service to get the PMT data of a particular user from the PMT database. If the service cannot reach the PMT database, the information comes from the local storage on the device of the user. Only information that is designated as shared for public data will be retrieved.

FIG. 4H

Name	ChangePMTpermissions
Arguments	<<waiting to hear about PMT API>>
Return Values	int err
Description	This function allows a user to change his PMT permissions from his device.

FIG. 4I

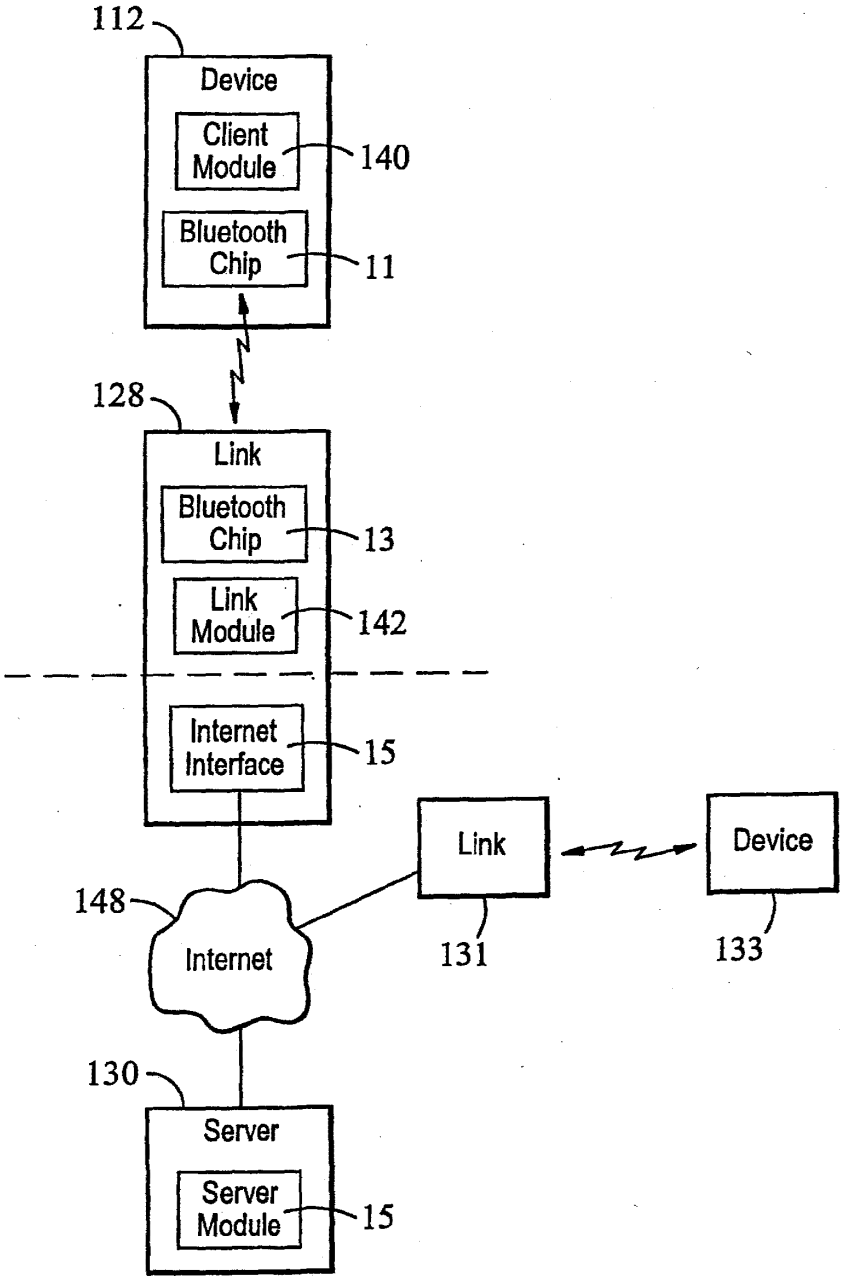

112
Device
Client Module
140
Bluetooth Chip
11
128
Link
Bluetooth Chip
13
Link Module
142
Internet Interface
15
Link
Device
148
Internet
131
133
130
Server
Server Module
15

FIG. 5

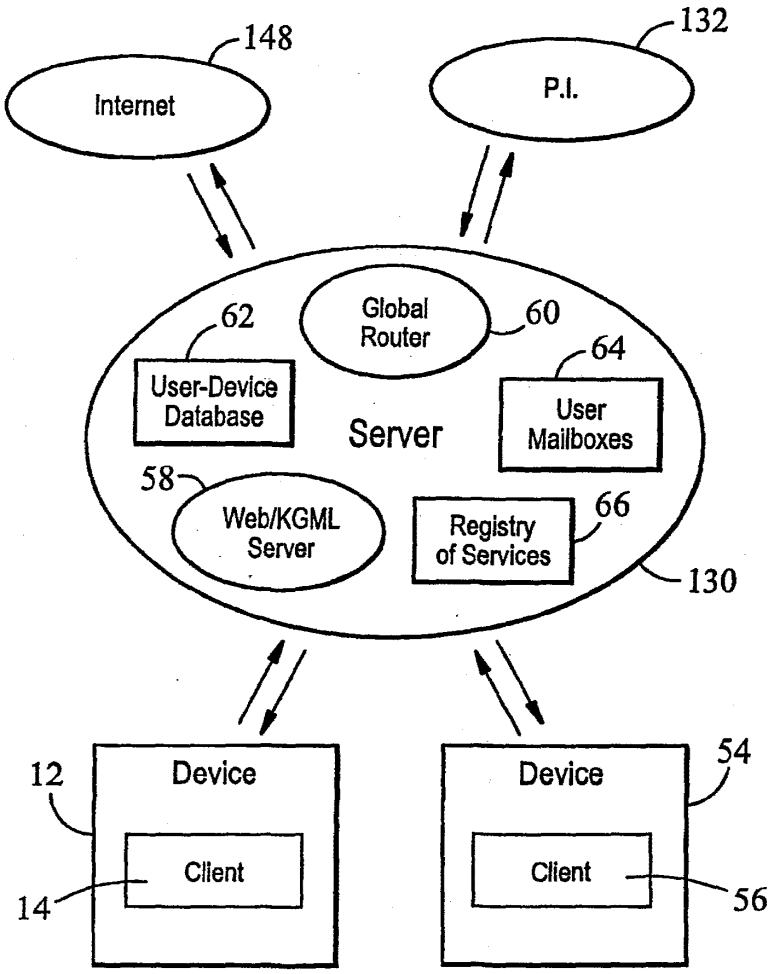

148
Internet
132
P.I.
62
User-Device Database
Global Router
60
64
User Mailboxes
Server
58
Web/KGML Server
66
Registry of Services
130
12
Device
Client
14
Device
54
Client
56

FIG. 6

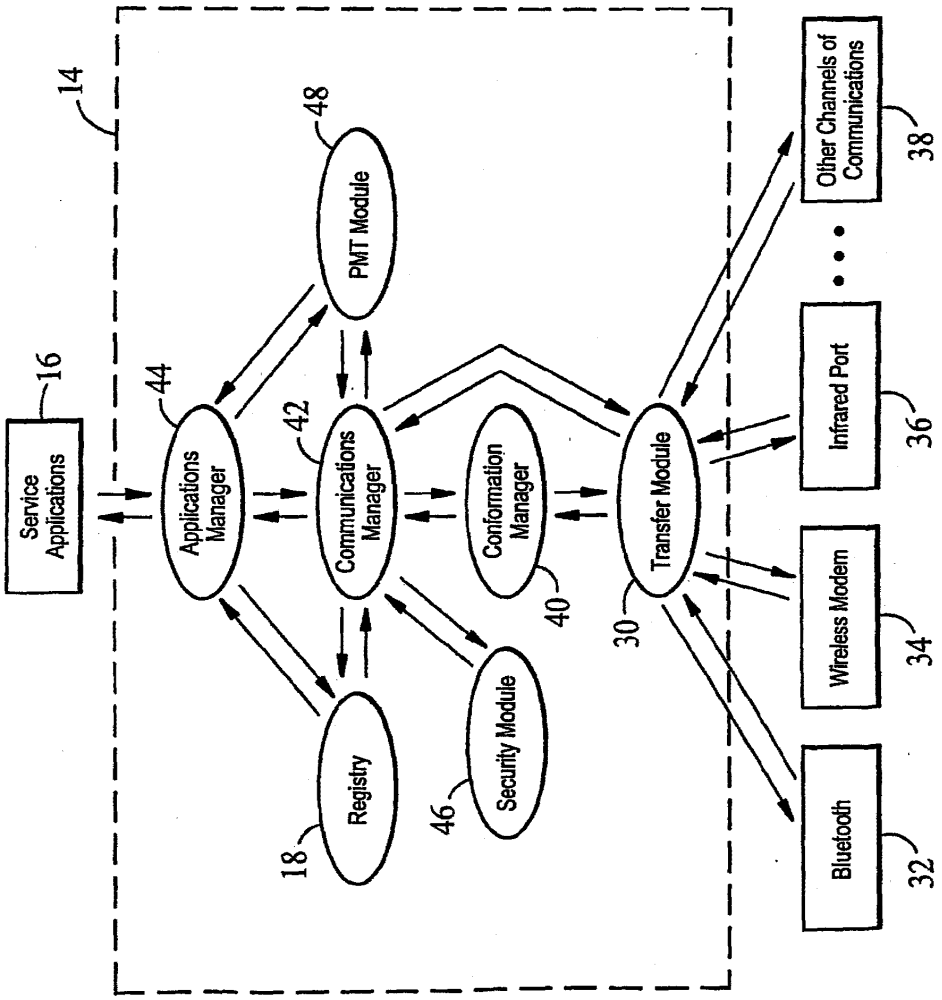


FIG. 7

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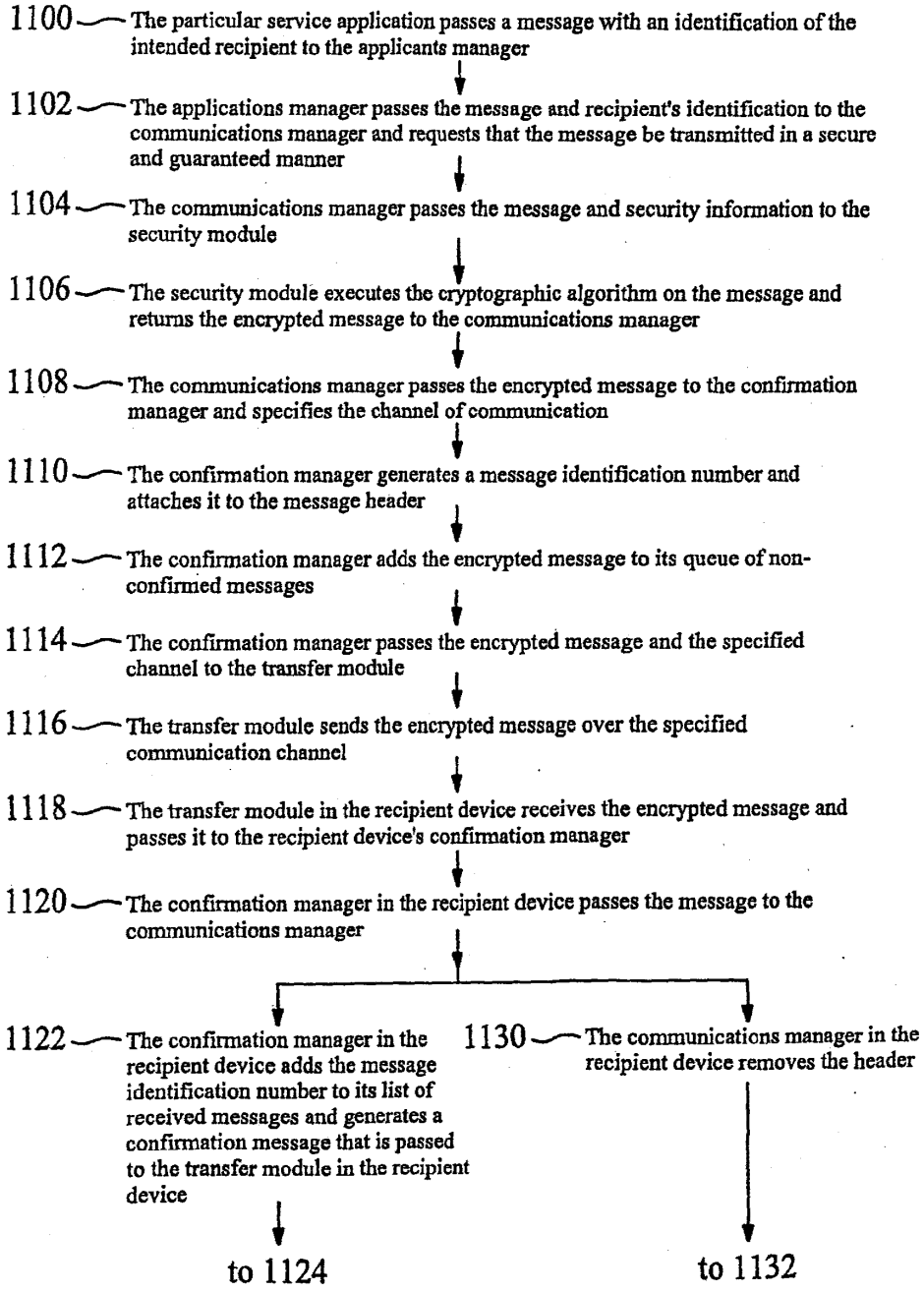

1100
The particular service application passes a message with an identification of the intended recipient to the applicants manager
1102
The applications manager passes the message and recipient's identification to the communications manager and requests that the message be transmitted in a secure and guaranteed manner
1104
The communications manager passes the message and security information to the security module
1106
The security module executes the cryptographic algorithm on the message and returns the encrypted message to the communications manager
1108
The communications manager passes the encrypted message to the confirmation manager and specifies the channel of communication
1110
The confirmation manager generates a message identification number and attaches it to the message header
1112
The confirmation manager adds the encrypted message to its queue of non-confirmed messages
1114
The confirmation manager passes the encrypted message and the specified channel to the transfer module
1116
The transfer module sends the encrypted message over the specified communication channel
1118
The transfer module in the recipient device receives the encrypted message and passes it to the recipient device's confirmation manager
1120
The confirmation manager in the recipient device passes the message to the communications manager
1122
The confirmation manager in the recipient device adds the message identification number to its list of received messages and generates a confirmation message that is passed to the transfer module in the recipient device
to 1124
1130
The communications manager in the recipient device removes the header
to 1132

FIG. 8A

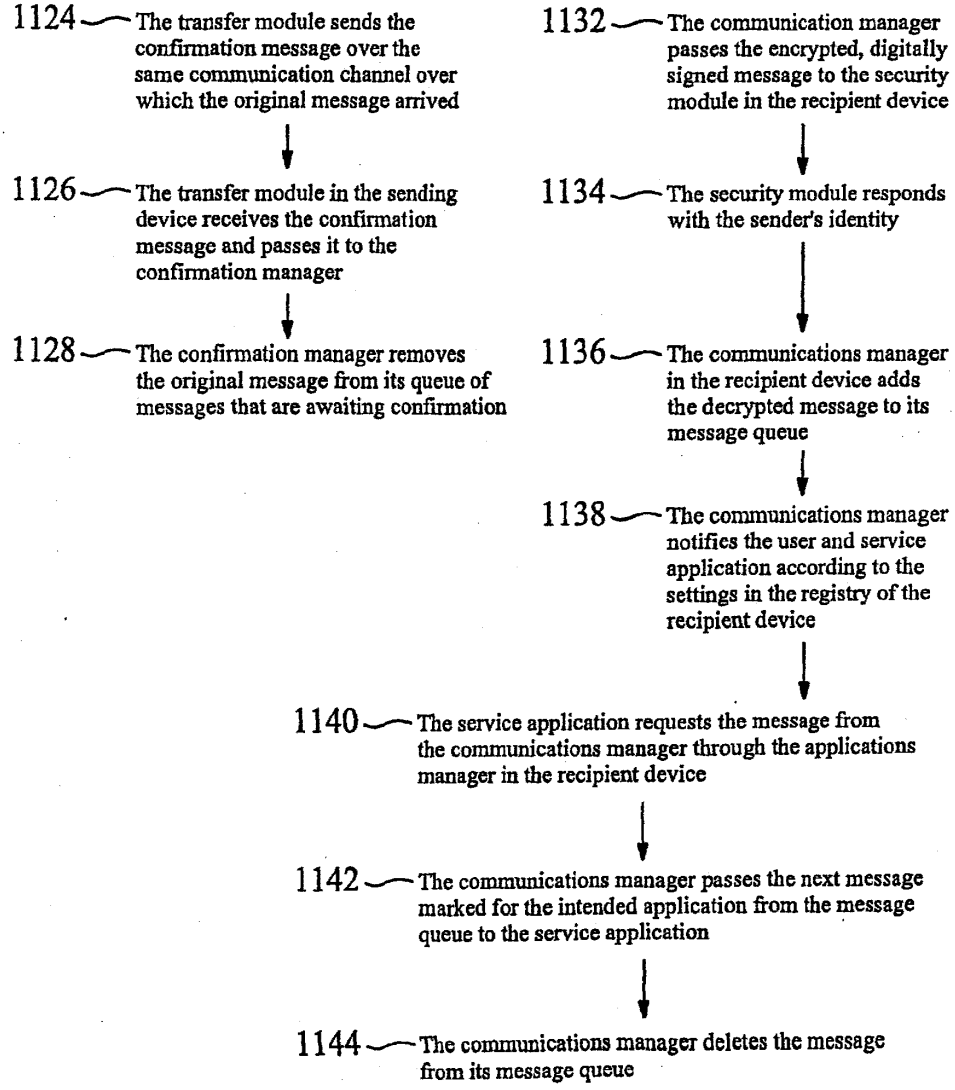

1124
The transfer module sends the confirmation message over the same communication channel over which the original message arrived
1126
The transfer module in the sending device receives the confirmation message and passes it to the confirmation manager
1128
The confirmation manager removes the original message from its queue of messages that are awaiting confirmation
1132
The communication manager passes the encrypted, digitally signed message to the security module in the recipient device
1134
The security module responds with the sender's identity
1136
The communications manager in the recipient device adds the decrypted message to its message queue
1138
The communications manager notifies the user and service application according to the settings in the registry of the recipient device
1140
The service application requests the message from the communications manager through the applications manager in the recipient device
1142
The communications manager passes the next message marked for the intended application from the message queue to the service application
1144
The communications manager deletes the message from its message queue

FIG. 8B

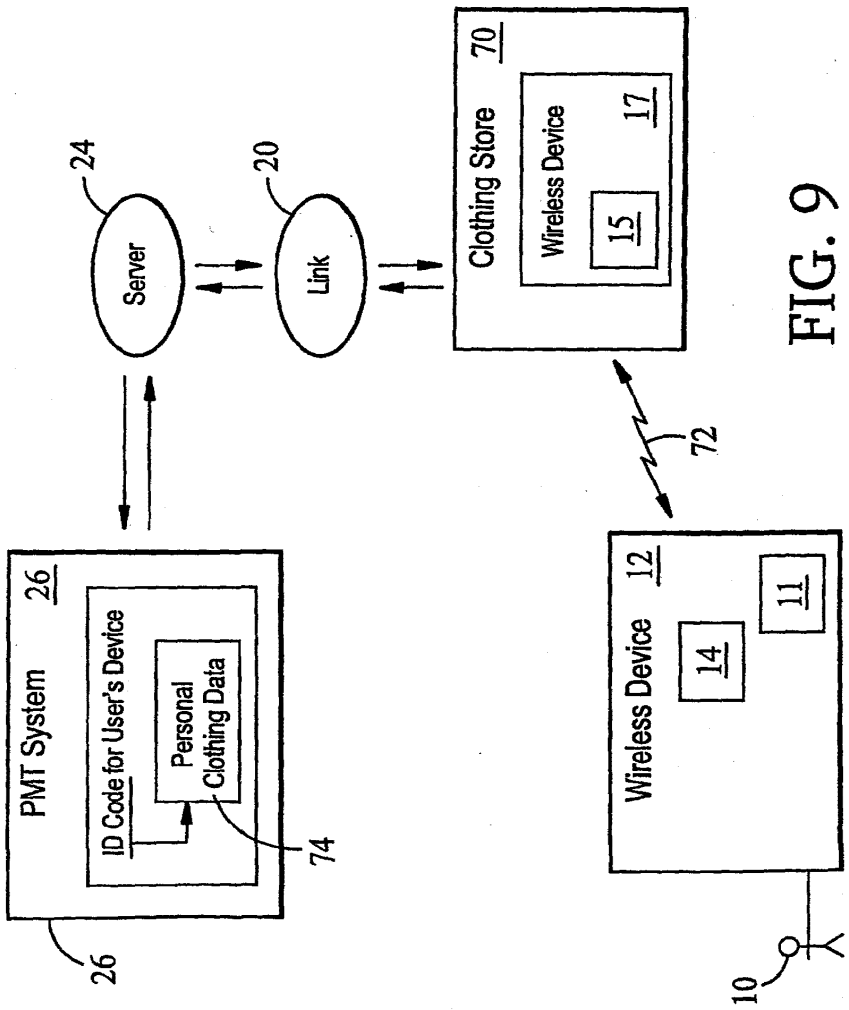


FIG. 9

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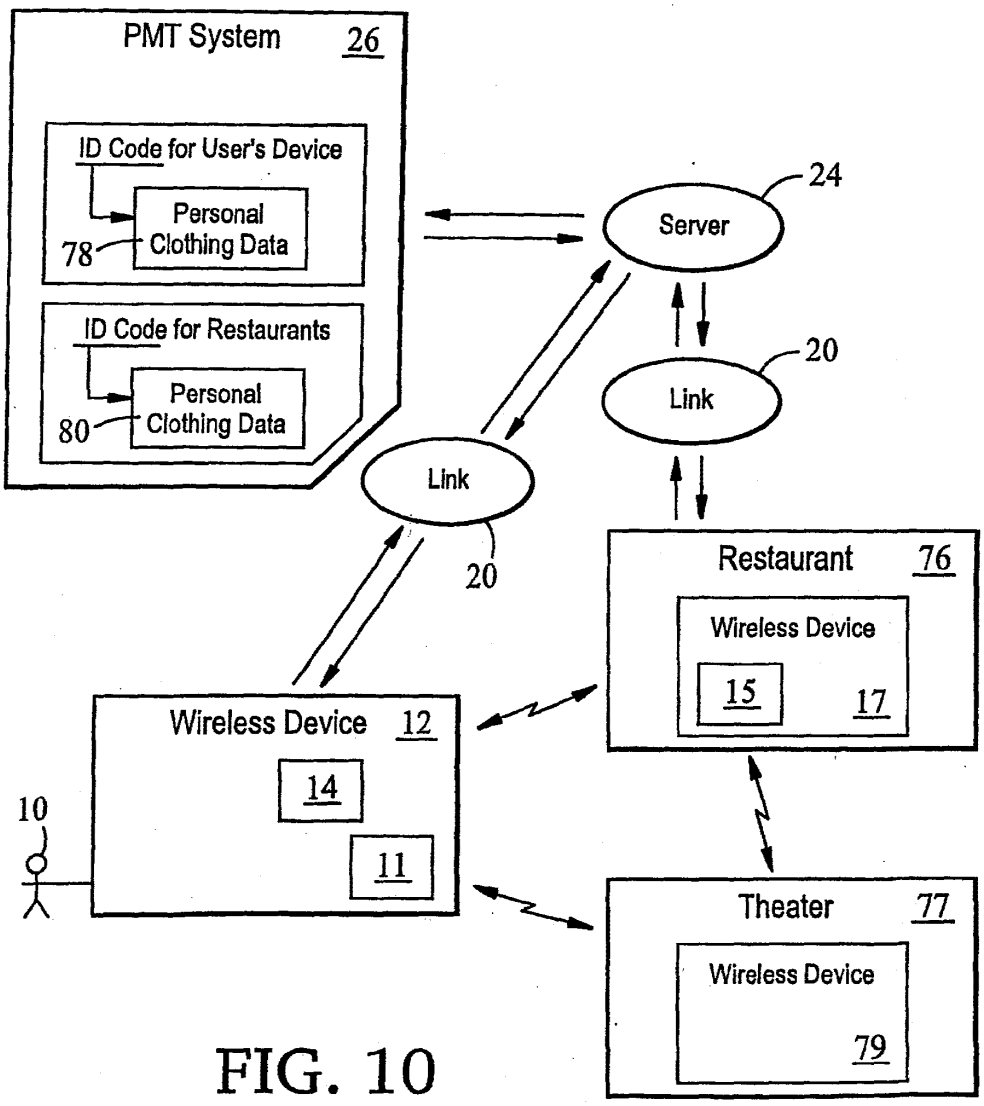

PMT System 26
ID Code for User's Device
Personal Clothing Data
78
ID Code for Restaurants
Personal Clothing Data
80
Server
24
Link
20
Link
20
Restaurant 76
Wireless Device
15
17
Wireless Device 12
14
11
10
Theater 77
Wireless Device
79

FIG. 10

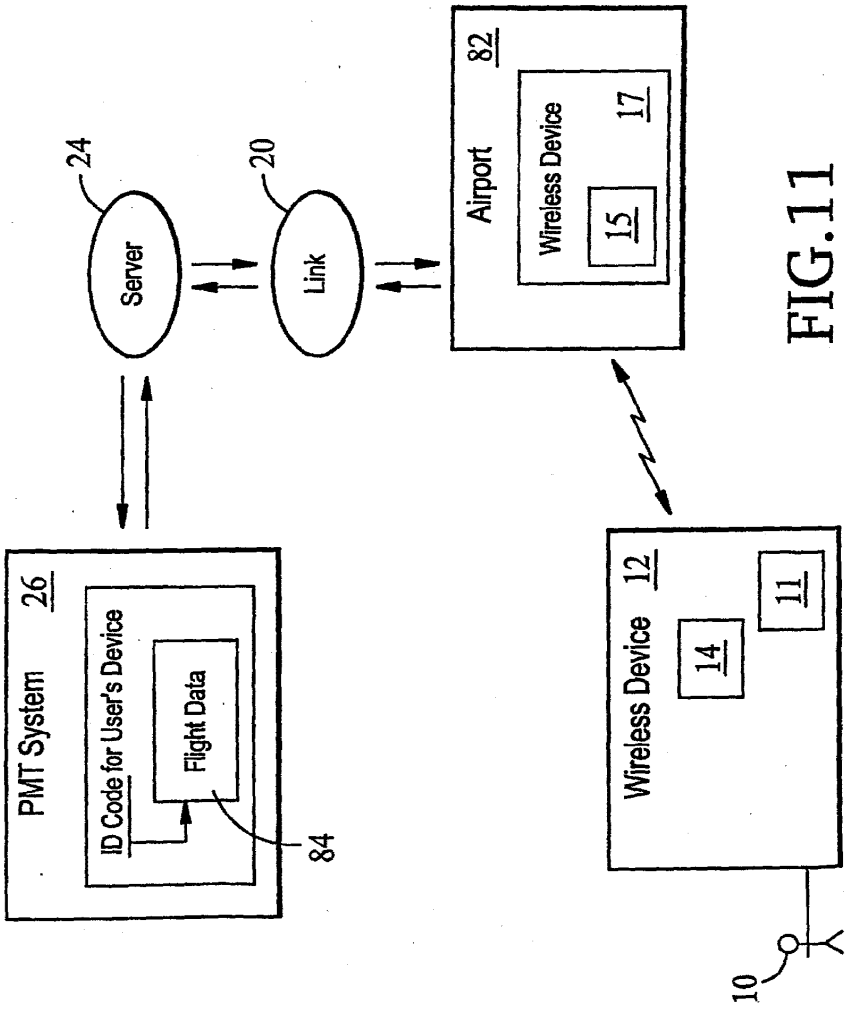


FIG.11

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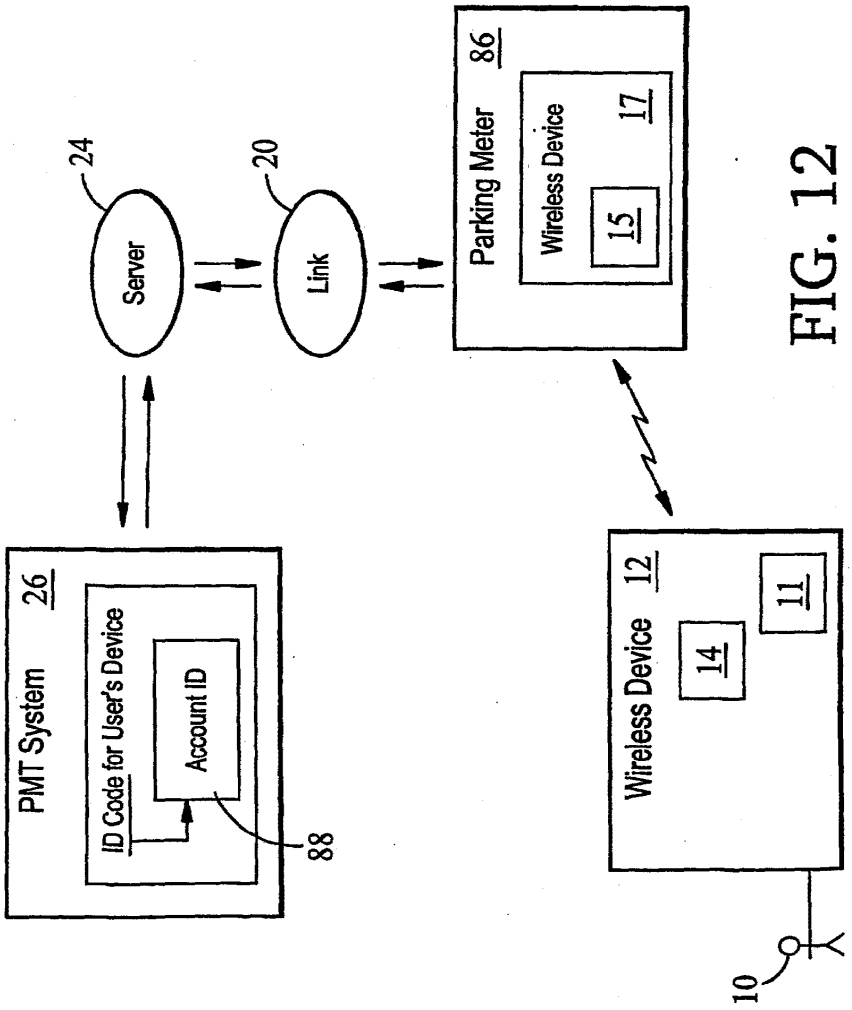


FIG. 12

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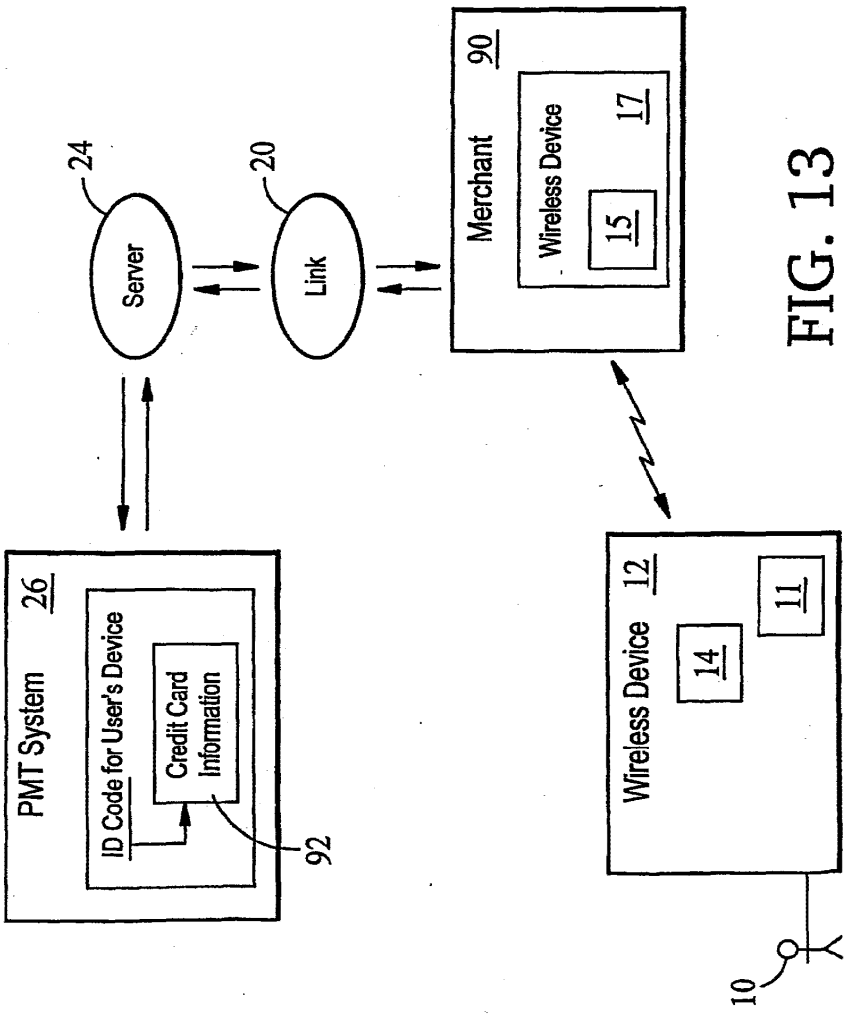


FIG. 13

EX1002 - Page 220

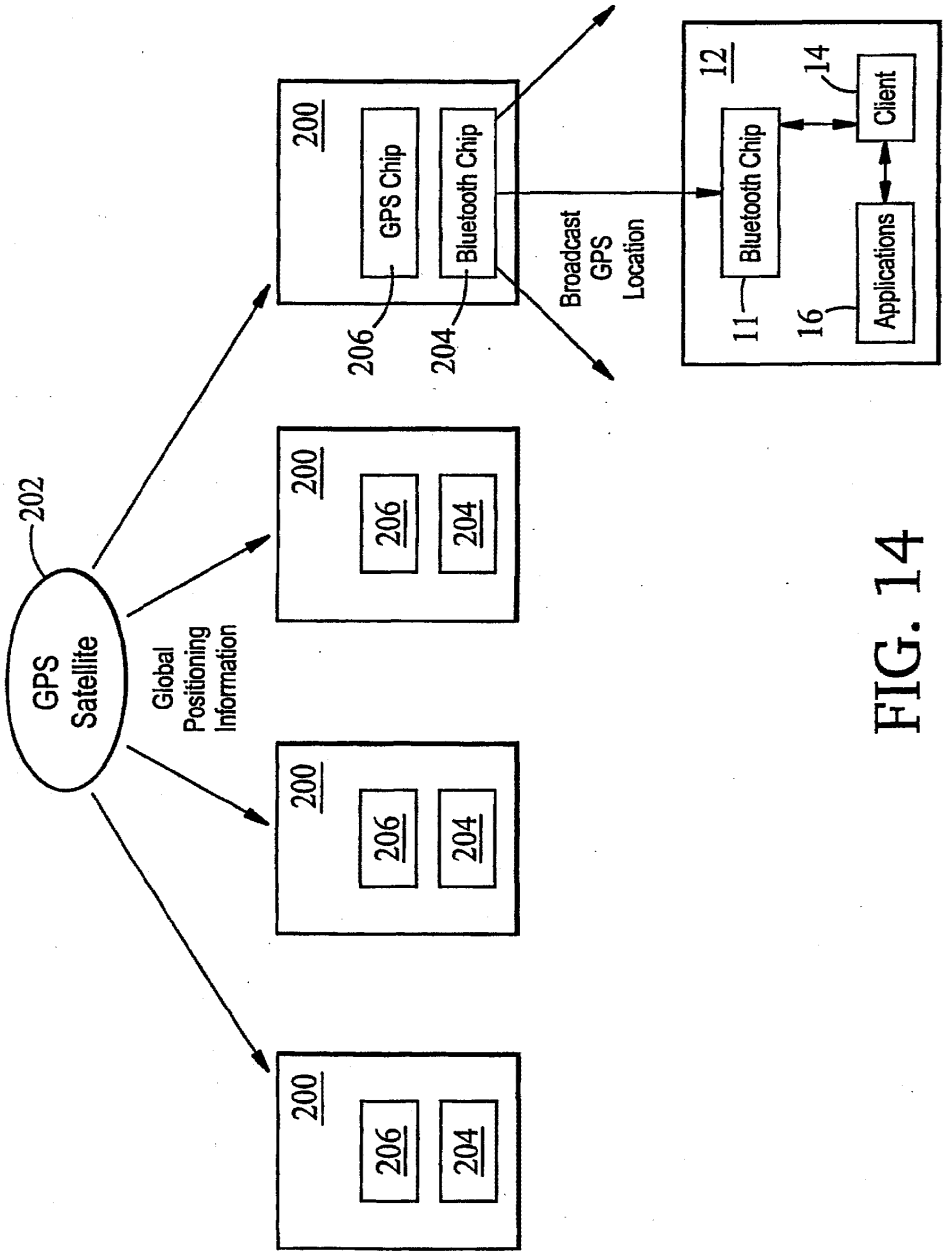
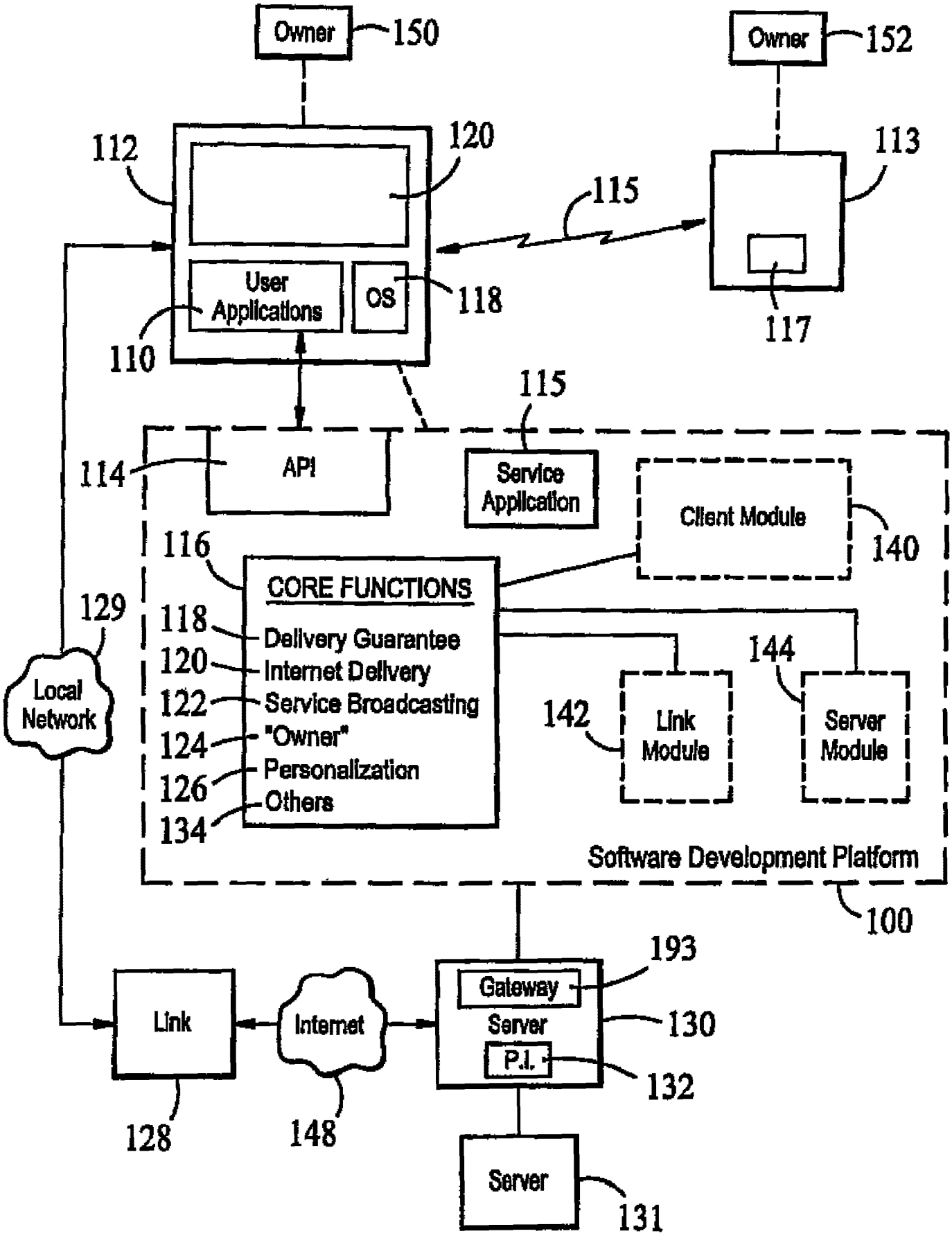

GPS Satellite
202
Global Positioning Information
200
206
204
GPS Chip
Bluetooth Chip
Broadcast GPS Location
12
Bluetooth Chip
11
Client
14
Applications
16

FIG. 14


Owner
150
Owner
152
112
120
113
115
User Applications
OS
118
110
117
115
API
114
Service Application
Client Module
140
116
CORE FUNCTIONS
129
118 Delivery Guarantee
120 Internet Delivery
122 Service Broadcasting
124 "Owner"
126 Personalization
134 Others
144
142
Link Module
Server Module
Local Network
Software Development Platform
100
193
Gateway
Server
130
P.I.
132
Link
Internet
128
148
Server
131

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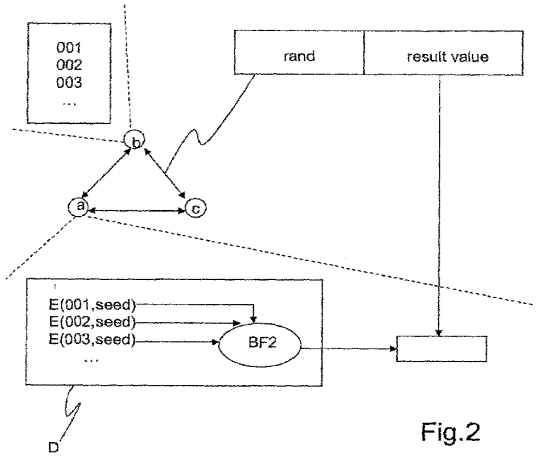


Fig.2

(57) Abstract: Various embodiments of the invention provide a contributory value (rand) (alternatively the contributory value is referred to as a random field or a rand), according to which a seed can be commonly created so that the seed is configured to be similar for all apparatuses. In the apparatus discovery phase this reduces the need for making several calculations to define whether an apparatus is known or not. A bloom filter can embody as an example of a data structure filter. If the values, e.g. the fields, are put together with a filter, it can be estimated by certain probability whether there are any known apparatuses or not. This estimation can be performed even by a single calculation or processing step. In various embodiments it should be noted that apparatuses may alternatively be referred to as devices as well.

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Privacy Seed with Data Structure Filter

TECHNICAL FIELD OF THE INVENTION

The invention concerns an apparatus configured to test whether another apparatus is a member of a known set. Furthermore the invention concerns an apparatus configured to generate a seed for the testing. Furthermore the invention concerns a wireless ad hoc network system comprising the apparatus. Even furthermore the invention concerns the use of the apparatuses or the system. Yet furthermore the invention concerns a computer program configured to operate the method.

BACKGROUND ART

Wireless communications has spread out widely. Wireless communication can be of ad hoc type, wherein the configuration and characteristics of the network may change dynamically due to uncoordinated behaviour of at least mobile apparatuses of the network. The communication distances may also vary being of a relatively short distance to even longer distance communications. Typically each apparatus comprises an address, typically used not only for addressing but also as an identity. The latter use makes it possible to gather and possibly mis-use the location information of the device (holder).

For groups of wireless apparatuses such as mobile personal area network (PAN) devices, address tracking and as a consequence involuntary positioning of the device holder is thus a possible nuisance, in some scenarios an outright threat. In view of the above, wireless ad hoc radio technologies have been subjected to various efforts to eliminate the mobile tracking threat. As an example Wibree radio that will be merged with the Bluetooth™ SIG for advancing Bluetooth™ wireless technology with ultra low power characteristics has introduced private addressing feature, where devices can have parallel identities that are not trackable to the unique addresses of the devices by an external source having no association with said devices. However a simple algorithmic construct falls short in known solutions where either multiple parallel identities need to be mapped to a single address. Also the construct fails in known solutions where there are numerous devices, needed to be found, (like members of a football club) rather than a limited set of devices that a user carries on his own person. This is mainly because the address resolving algorithm must be done for each target and address pair separately.

Thus the problem of known solutions relates to private address aspect that is introduced in short range ad hoc network such as Bluetooth ULP or a Wibree technology (www.wibree.com). In the private address concept, some messages such as advertisement message, including the private address that is derived from the actual unique address of the device, comprises a random field alternatively referred to as a challenge field, and a response fields. A device receiving the message can check with a keyed one-way function whether the device is a known device or not by calculating the result using the challenge. If it matches with the received result, the device can be identified. The problem with this kind of solution is that if there are lots of known devices, the device has to make the same calculation for each of the known devices to see whether the advertising device is a known device or not.

Further, in communication among groups, revocation and group management in general is a difficult problem to solve with simple mechanisms. An improved identity mechanism may enable more dynamism e.g. for pair wise identity contexts, bypassing the group management issues altogether.

SUMMARY

It is therefore the object of the invention to provide a lightweight mapping for encrypted private addresses of apparatuses within a network.

In accordance with an aspect of the invention there is provided an apparatus, comprising:

a communication module configured to communicate in a wireless ad hoc network, and

a data structure filter configured to test whether another apparatus is a member of a known set of apparatuses of said wireless ad hoc network based on at least one message received via said communication module.

In accordance with another aspect of the invention there is provided an apparatus, comprising:

a generator arranged to generate at least one contributory value corresponding to the apparatus,

a communication module configured to communicate in a wireless ad hoc network including other apparatuses, wherein the communication module is configured to

send and receive contributory values of one or more apparatuses within the wireless ad hoc network, and further configured to send the at least one contributory value corresponding to the apparatus, and

a data structure filter arranged to generate a seed on a basis of the at least one contributory value corresponding to the apparatus and the contributory values of the one or more apparatuses.

In accordance with yet another aspect of the invention there is provided a system, comprising:

a first apparatus, comprising:

a communication module configured to communicate in a wireless ad hoc network, and

a first data structure filter configured to test whether a second apparatus is a member of a known set of apparatuses of said wireless ad hoc network based on at least one message received via said communication module,

the second apparatus, comprising:

a generator arranged to generate at least one contributory value corresponding to the second apparatus,

a communication module configured to communicate in the wireless ad hoc network including one or more apparatuses, wherein the communication module is configured to send and receive contributory values of the one or more apparatuses within the wireless ad hoc network, and further configured to send the at least one contributory value corresponding to the apparatus, and

a second data structure filter arranged to generate a seed on a basis of the at least one contributory value corresponding to the apparatus and the contributory values of the one or more apparatuses.

In accordance with yet another aspect of the invention there is provided a method, comprising:

communicating by a communication module of a wireless ad hoc network,

receiving at least one message, and on a basis of the received message

testing, by a data structure filter, whether another apparatus is a member of a known set of apparatuses of said wireless ad hoc network.

In accordance with yet another aspect of the invention there is provided a computer program comprising computer code arranged to

communicating by a communication module of a wireless ad hoc network,

receiving at least one message, and on a basis of the received message

testing, by a data structure filter, whether another apparatus is a member of a known set of apparatuses of said wireless ad hoc network.

In accordance with yet another aspect of the invention there is provided A method comprising:

generating, by a generator, at least one contributory value corresponding to the apparatus,

communicating, by a communication module, in a wireless ad hoc network including other apparatuses,

sending and receiving, by the communication module, contributory values of one or more apparatuses within the wireless ad hoc network,

sending, by the communication module, the at least one contributory value corresponding to the apparatus, and

generating, by a data structure filter, a seed on a basis of the at least one contributory value corresponding to the apparatus and the contributory values of the one or more apparatuses.

In accordance with yet another aspect of the invention there is provided a computer program comprising computer code arranged to

generating, by a generator, at least one contributory value corresponding to the apparatus,

communicating, by a communication module, in a wireless ad hoc network including other apparatuses,

sending and receiving, by the communication module, contributory values of one or more apparatuses within the wireless ad hoc network,

sending, by the communication module, the at least one contributory value corresponding to the apparatus, and

generating, by a data structure filter, a seed on a basis of the at least one contributory value corresponding to the apparatus and the contributory values of the one or more apparatuses.

Various embodiments of the invention provide an efficient way to construct a contributory value to be used as an input for seed generation for the privacy mechanism of the network. Furthermore the discovery of the apparatuses within the network can be performed efficiently by the filter on a basis of the value. Various embodiments provide advantages, for example so that the filter is lightweight, further the closure result can be achieved relatively fast. Furthermore the filter saves significantly power at the discovery phase of the apparatus because the needed processing is significantly reduced. Thus the apparatus discovery can be significantly improved. The private address can be encrypted; however they can be efficiently discovered. Yet furthermore various embodiments can interact / co-exist with the earlier network systems.

BRIEF DESRIPTION OF THE DRAWINGS

Various embodiments of the invention will now be described, by way of examples only, with reference to the accompanying drawings, in which:

Figure 1 depicts an embodiment the invention relating to the generation for the seed,

Figure 2 depicts an embodiment of the invention relating to the discovery of the apparatuses,

Figure 3 depicts apparatuses each having a communication module of a wireless ad hoc network in accordance with various embodiments of the invention,

Figure 4 depicts an example of synchronizing the data structure filter according to an embodiment of the invention,

Figure 5 depicts a further example of adding supplementary value to increase diffusion of data structure filter in the group in accordance with a further embodiment of the invention,

Figure 6 depicts another further example of adding a least common denominator to further increase diffusion of data structure filter within the group in accordance with a further embodiment of the invention,

Figure 7 shows an example of simulation results about the creation of the common contributory value for the data structure filter,

Figure 8 shows an example of apparatus volatility within the network, and

Figure 9 depicts an example of the apparatus that can be used in various embodiments of the invention.

DESCRIPTION OF FURTHER EMBODIMENTS

Figure 1 depicts an embodiment the invention relating to the generation for the seed. In various further embodiments, apparatuses (e.g. a-c) are generating contributory values (rand). A generator (G) containing data structure filter (BF1 for example) receives the contributory value. The data structure filter outputs a seed, which is alternatively referred to as a beacon.

Figure 2 depicts an embodiment of the invention relating to the discovery of the apparatuses. Apparatuses (e.g. a-c) are communicating with each other by sending message containing at least the contributory value (rand) and possibly the result value. Each apparatus contains a list of known apparatuses (001,002,003,...). During device discovery operation, an apparatus (a,b,c) contains a discoverer module (D) that includes a data structure filter (for example BF2, the second filter). The filter receives as an input at least the common seed and identify value of one or more other devices. The filter, in response to the inputs, processes the inputs and outputs a result value, thereby a check for the correspondence between result values can be made so that the correspondence between the known set of apparatuses is performed.

Various embodiments of the invention provide a contributory value (rand) (alternatively the contributory value is referred to as 'random field' or 'rand'), according to which a seed can be commonly created so that the seed is configured to be similar for all apparatuses. In the device discovery phase this

reduces the need for making several calculations to define whether an apparatus in the network is known to the local device or not. A Bloom filter can serve as an example of a data structure filter. If the values, e.g. the fields, are put together with a filter, it can be estimated by a certain probability whether there are any known apparatuses or not in the environment. This estimation can be performed even by a single calculation or processing step. In various embodiments it should be noted that apparatuses may alternatively be referred to as devices as well.

In various embodiments of the invention, a plurality of apparatuses, or all apparatuses of a wireless ad hoc network, take part of the creation of the seed by contributory values so that the seed can be considered as a fresh value (i.e. the seed is dynamic that hinders potential eavesdroppers and other outside sources to track the apparatuses of the network). The creation of common seed by the contributory values can be reasonably fast. Accordingly, a relatively straightforward applicability of the value for discovering whether a certain apparatus is part of the known set of the apparatus can be performed, even by a single calculation step/process.

In various embodiments of the invention, the message to be communicated between the apparatuses comprises at least a contributory value, alternatively referred to as a rand, and possibly a result value as well. The result value can be used along with the seed for testing for the correspondence with the known set of apparatuses. It should be noted that the system comprises two different filters. The first one is used in the creation of the common seed, wherein the filter inputs the contributory values and outputs the seed. The second (alternatively referred to as a local) filter is used in the discovery so that the second filter inputs the common seed and result value and output the correspondence between the known set of apparatuses.

Referring to Figure 3, there is depicted apparatuses (a,b,c,d,e) each having a communication module (CM) of a wireless ad hoc network (N) in accordance with various embodiments of the invention. The network in the example of figure 3 comprises five apparatuses (a,b,c,d,e). It should be noted that the invention is by no means limited into these examples but the number of apparatuses may vary greatly. Each apparatus (a,b,c,d,e) comprises various operational modules, including a contributory value (rand) and a data structure filter (BF). Furthermore each apparatus (a,b,c,d,e) comprises a seed value generator (G), discoverer (D) arranged to search for peer apparatuses that are known in a set of known apparatuses of the wireless ad hoc network (N), a replay-protector (R-P), a replay-

discoverer (R-D), and a combiner (C) arranged to combine several identities into one address. The operation and functions of the operational modules that may comprise software and/or hardware are described in more detail in the various embodiments. In a further embodiment the network (N) can be a Wibree network, in another further embodiment the network (N) may be a Bluetooth™ network etc.

Data structure filters

Various embodiments of the invention embody Bloom filters. A Bloom filter, conceived by Burton H. Bloom in 1970, is an example of a space-efficient data structure filter (BF) that is used to test whether an element is a member of a set. The data structure filter can be a probabilistic data structure filter in a further embodiment. False positives are possible, but typically false negatives are not. Elements can be added to the set, but typically not removed (though this can be addressed with a counting filter). The more elements that are added to the set, the larger the probability of false positives. There are alternatives to the Bloom filter such as the one based on space efficient variants of cuckoo hashing.

As said various embodiments of the invention uses the data structure filters (BF) as accumulators for a variety of different purposes:

1. The data structure filters (BF) are used for seed, e.g. the logical beacon, generation (G) – the agreement of one (or a few) shared, contributory seed values (rand) among the apparatuses advertising their presence in local communication.

2. The data structure filters (BF) are used for optimizing the search (D) for peers that are known to the discoverer. This optimization is made possible based on the seed feature.

3. The data structure filters (BF) are used for replay-protection (R-P). The contributory algorithm may be attacked by an active adversary, and each apparatus (a...e) will see to it that a single private address is not re-used many times (this would allow apparatus tracking).

4. The data structure filters (BF) are used by initiating devices for replay-discovery (R-D). Adversaries may replay old addresses to trick incoming connections to be established, thereby possibly exposing the identity of the connecting apparatus.

5. The data structure filters (BF) can also potentially be used for combining several identities into one advertised address. This might be reasonable if a single

apparatus needs to advertise a large number of identities - so large that simply interleaving advertisements for unique identities becomes infeasible.

Wherever the input parameters (rand) to the filters (BF) are random data (or pseudo-random data like the image of an encryption function) the identity function can serve as the hash function for the filters. Typically, however not as a limiting option, for private addresses almost all input data is pseudo-random by nature.

Logical Beacon – the seed

The seed can be alternatively referred to as a logical beacon or the beacon. The reason for defining a beacon algorithm is to construct a common seed for private address generation. The common beacon in turn makes it possible to devise efficient algorithms for resolving identity presence. The property of a beacon in various further embodiments is that its value distribution should be close to a nonce (a non-repeating value) and that, either the origin of the beacon can be trusted, or that the non-repeating property can be asserted by all participants. The second requirement is in a distributed environment easiest achieved by making the beacon contributory in a way where all participants can assert their own (pseudo-random) contribution (rand) to the beacon.

As the reason for the beacon is to provide efficiency for resolving private addresses, it is not absolutely necessary that the beacon is unique. Savings are achieved with any system where the number of seeds for the random addresses can be narrowed down from the case where every apparatus has its own random address. Accordingly it is appropriate that a given environment has 2-3 seeds "active" at any given time.

The actual seed value, i.e. the logical beacon value, can be the value of any one-directional function with all input contributions considered. In a further embodiment of the invention a possible structure for seed construction is to calculate a CBC-MAC (Cipher Block Chaining - Message Authentication Code) over a symmetric cipher like AES (Advanced Encryption System), where the input is ordered according to byte values. The following formulae can keep and maintain the seed within certain bytes (for example 128 bits)

$$seed = E(M_x \oplus E(M_{x-1} \oplus E(...)))$$

Referring to an embodiment of Figure 4, every apparatus (a,b,c,d) is arranged to collect all input ($rand_{a,b,c,d}$) from all apparatuses (a,b,c,d). Furthermore all

apparatuses (a,b,c,d) are arranged to apply to the seed construction function, the data structure filter ($BF_{a,b,c,d}$) on the distributed values. As every apparatus' contribution ($rand_{a,b,c,d}$) is broadcast, one can, to a fair degree of accuracy, confirm that every apparatus sees the same input values by having every entity append to its random contribution a Bloom filter collecting all the inputs that the device has seen in the ether. Therefore any participant (a,b,c,d) can validate that its own contribution is present in the seed of any other apparatus - some advertisement messages may not reach all participants immediately, but even for those participants with a less-than complete picture of the environment any other participant with more information can calculate the seed used by the former participant.

The drawbacks of the embodiment of Figure 4 include problems caused by incomplete network topology (in a case not all advertisements reach all participants) and a high seed fluctuation probability at times where apparatuses enter or leave the network.

Referring now to Figure 5, the problems related to network topology and incomplete message diffusion can be remedied, for example by including supplemental information ($rand_{x,w,u,s..}rand_{y,v,r,t}$) in every broadcast - the contributions of other apparatuses (e.g. b,c,d). Thus even if a given apparatus (such as a) cannot hear some of the nodes, their contributions, i.e. the contributory values, will be forwarded by neighbours (b,c,d) that do hear the contribution. To add as supplemental information ($rand_{x,w,u,s..}rand_{y,v,r,t}$) all contributions that an apparatus knows about quickly become a significant transmission overhead, and force the advertisements to have dynamic length. Instead a fixed number of input value can be selected at random / in order. But even better, as everybody knows their own and their neighbours" Bloom filters (BF) indicating seed input but also knowledge of the values (rand), the operation

$$BF_a \oplus_{x\in(a,b,c,d)} \left(BF_a \oplus BF_x | \neg BF_x\right)$$

will in each apparatus (a,b,c,d) give a bit-vector, from which seed values present in this apparatus but missing in some apparatuses can be determined. Adding (at lest one or even a number of) these values as supplementary parameters ($rand_{x,w,u,s..}rand_{y,v,r,t}$) will speed up the diffusion of input values (rand). Thereby the process of creating the common operating filter can be speed-up.

In a further embodiment in order to make data aging relatively easy to implement, the supplemental input data broadcast by an apparatus will only be such data, which the apparatus has received first hand. Thus, when an apparatus leaves the neighbourhood, its contribution will also disappear shortly afterwards.

Referring to further embodiment of Figure 6, the question of seed fluctuation can be addressed by including only stable values as input parameters. Stable values would be such "inputs" that have diffused into the network, and on the other hand, apparatuses that leave should impact the whole network more or less simultaneously. Some examples for the system to stabilize for devices:

1. In a further embodiment of the invention, there is being calculated the seed based on an intersection ($BF_\$$) such as the least common denominator ($BF_\$$) between its own Bloom filter ($BF_{a,b,c,\text{ or }d}$) and the Bloom filters ($BF_{a,b,c,\text{and }d}$) seen during a small fresh time interval, and also advertise this filter for possible initiating apparatuses to use.

2. In a further embodiment of the invention, there isn't being contributed to beacon generation anymore if more than a limit of n apparatuses already are contributing to the beacon, and the resulting value is acceptable to the apparatus (it has not been used before).

With respect to the limit n in the context of seed generation, the seed will have entropy corresponding to the one-directional function deployed for its generation. It is advantageous to try to maximize the entropy of the seed, since it minimizes the probability for accidental replay. Thus, if e.g. every apparatus contributes 24 bits of input material, 6 apparatuses would already exceed entropy of 128 bits for the resulting value if the hash function produces 16 bytes of output. Thus, 6 could be a suitable value for n if combined with the AES-CBC construct above.

Referring back to the embodiment of Figure 6, the least common denominator can be represented as the difference to the broadcast, Bloom filter ($BF_\$$) indicating input value knowledge. In this manner this information should be sparsely populated with I-bits and thus efficiently compressable. If the Hamming distance between the two values is high, it is anyway an indication of the fact that the apparatus in question has not yet collected the information needed for the beacon, and the value can be left out altogether. Compressing Bloom filters can e.g. be done by encoding a maximum of 4 1-bits by the position indices of the respective bits, achieving a fixed 1-4/32 = 87% compression.

In various further embodiments, the aging of data in the network system is based on time. When apparatuses do not broadcast any more, the input data, which these apparatuses represent, will age in each apparatus with a predetermined speed. As the information is released from memories of the individual apparatuses there will be an intermediary period during which the beacon transforms into another value.

In the minimal case where an apparatus is broadcasting alone, it may indicate in its supplemental data ($rand_{x,w,u,s..}rand_{y,v,r,t}$) additional random values to artificially enlarge the entropy of the resulting seed. The same approach can be made for two or even three apparatuses, but apparatuses should soon stop this activity as the network grows, since these "imaginary peers" will not traverse the limits of the fully connected network.

Measures

In various further embodiments of the invention, a single advertisement with beacon generation, for example as described above comprises

1. A 3-byte random input

2. A 9-byte supplementary random field

3. A 32-byte Bloom filter

4. A 4-byte compressed representation of another Bloom filter

5. A checksum for identity validation (3 bytes in Wibree)

Mapped to the Wibree specification, the random contribution and the result value (alternatively referred to as the checksum) can constitute the address. However the remaining 45 bytes may sometimes be too high for inclusion in a single advertisement package - not only in terms of energy consumption but also since the payload size is limited to 32 bytes. Accordingly in yet another further embodiment, wherein there is not added any significant complexity, there is being defined the Bloom filters to be 128-bits in size. The Bloom filter hashing function cannot any more be the identity function, but an extension for the mapping of a byte for example using

$$H(a)=\begin{cases} a_{1...7} if a_0 = 0 \\ \neg a_{1...7} if a_0 = 1 \end{cases}$$

brings the Bloom filter size down to 16 bytes at the cost of requiring double the amount lookups when figuring out which addresses are part of a filter. With this extension, the payload size is decreased to 29 bytes which is within the acceptable limits of e.g. Wibree broadcasts. If the rule for typically including only 6 participants in the beacon, the false positive rate of the beacon filter remains acceptable, as the false positive rate is defined by

$$p = \left(1 - \left(1 - \frac{1}{m}\right)^{kn}\right)^{k}$$

where m is the 128 bits, k the number of hash functions (e.g. 3) and n the number of entries (e.g. 6), results in a false positive rate for the filter to be 2.2% compared with 0.3% for a 256-bit filter with the same parameters. Since the false positive rate is high, it must be circumvented in the beacon case. This can be achieved by constructing the local Bloom filter (BFI) in a way where the local contribution is added last. If the adding of the local contribution does not add a new 'l'-bit to the filter, the local contribution is changed. If all participants follow this precautionary algorithm, the false positives are soon eliminated.

Simulation results of further embodiments

Next there is being demonstrated some simulations with parameters that may be deployable e.g. with the Wibree radio technology. The random inputs are 24 bits each, and up to 3 supplementary random parameters are sent to improve diffusion. In the example every apparatus broadcasts in every timeslot, and a broadcast is received in a given device with 20 otherwise indicated. The bloom filters are 256 bits in width, and the hash function is trivially mapping each input byte to the Bloom filter.

Figure 7 shows the effect of lessening the probability of a broadcast being received according to at least one embodiment of the invention. A set of 70 apparatuses agreeing on a beacon is chosen to highlight the effect. The example graphs arc form four specific runs of the protocol, but the variation between runs is small. There can be seen that if a broadcast is received in an apparatus with 20% probability, the whole ad hoc network will close in on a common beacon in less than 10 time units. The algorithm works reasonably well with a 10% receiving rate, but around a broadcast throughput of 5% the network still has two clusters (seeds) after 40 time units, and the variation in the clustering rate is already evident from the graph.

The effects of apparatus volatility are relatively small for the network system as shown in an example of Figure 8. A network initially has 6 apparatuses. The network gets new incoming apparatuses from time to time, and some apparatuses will leave. The two graphs in the example show the total number of apparatuses in the network, as well as the number of clusters. The test run was made with the 20% broadcast receiving rate. From the test results, one can see that the seed value quickly stabilizes after a new entry or an exit.

Replay protection

Further embodiment of the invention employs replay protection (R-P). A local replay protection prevents producing addresses for the same beacon value twice. Anyway since the seed value may be, for example 128-bits the probability of an accidental re-occurrence is small. If a re-occurrence is found, the apparatus (a,b,c,d) may always contribute the beacon to move to another value. The concept of a contributory beacon ($BF_\$$) integrates well with the fact that also the replay protection Bloom filter will be triggered by false positives - now it does not really matter whether the "positive" is rightful or false, the consequence can in both cases be that the apparatus participates in the beacon generation and therefore re-adjusts it as long as a positive is not found.

The size of the replay protection (R-P) Bloom filter (BF) can be designed based on apparatus capabilities. If only limited memory is available, a rotation system of for example, 3-10 256- bit filters can be deployed (filled to "the limit" in rotating order). Around 50 seed values (increasing the false positive rate to around 2% for 50 values) can be stored per filter. The replay protection needs to be considered only when the apparatus is advertising.

An improvement to this concept is to store encountered positives in one (or several) separate longer-lived filter to identify "capture and replay" - attacks.

A memory efficient solution is for a device to always contribute to beacon construction. In that case no replay protection is needed.

Discovery

The value of the system is evident from the discovery phase. A network environment where the advertising apparatuses have agreed on a single beacon and thus the seed for the privacy system. The method trivially extends to the case where a few beacons are present too.

For each peer apparatus (a,b,c,d) for which the identity parameters are known, and to which one wants to make a connection, the result value (alternatively referred to as address checksum) is calculated based on the seed. The result values are added to a local Bloom filter ($BF_{a,b,c,d}$). Now, for each radio advertisement (i.e. the message), there is being checked for a match in the Bloom filter ($BF_{a,b,c,d}$). If a match is found the apparatus (e.g. a) knows that with a high probability one of the advertising apparatuses (e.g. b,c,d) is one of the apparatuses known. At this stage the apparatus (a) can resolve which of the identities matches the identity in advertisement, and initiate the connection.

The process of (re)generating the Bloom filter (BF) should be done every time the seed value changes, or if there are several seed values - for each value visible. This cryptographic operation is significantly smaller than to match every known identity to every seen address, which implies invocating the cryptographic algorithm at every intermediate step - the latter being the case in the current Wibree privacy system. Various embodiments of the invention are especially advantageous in high-density networks with low volatility (among the beacon participants) – resolving the privacy reduces to a simple match - equivalent to resolving public addresses without any privacy system at all.

Figure 9 depicts an example of the apparatus (any one of a,b,c,d,e etc.) that can be used in various embodiments of the invention. Apparatus has the communication module (CM) of a wireless ad hoc network (N). The apparatus (a) comprises the seed value and a data structure filter (BF). Furthermore the apparatus (a) comprises the seed value generator (G), discoverer (D) arranged to search for peers that are known in the set, a replay-protector (R-P), a replay-discoverer (R-D), and a combiner (C) arranged to combine several identities into one address. The operation and functions of the blocks are described in more detail with respect to the Figures. Thus the apparatus comprises blocks and functions arranged to carry out the operations described in these figures. For example the apparatus may contain software, middleware and/or hardware arranged to carry out the operations described in the Figures.

In various embodiments of the invention the computer program can be a computer program product. The product is an example of a tangible object. For example, it can be a medium such as a disc, a hard disk, an optical medium, CD-ROM, floppy disk, or the like storage etc. In another example the product may in a form of a signal such as an electromagnetic signal. The signal can be transmitted within the network for example. The product comprises computer program code or code

means arranged to perform the operations of various embodiments of the invention.

Ramifications and Scope

Although the description above contains many specifics, these are merely provided to illustrate the invention and should not be construed as limitations of the invention's scope. It should be also noted that the many specifics can be combined in various ways in a single or multiple embodiments. Thus it will be apparent to those skilled in the art that various modifications and variations can be made in the apparatuses and processes of the present invention without departing from the spirit or scope of the invention.

Claims

1. An apparatus, comprising:

a communication module configured to communicate in a wireless ad hoc network, and

a data structure filter configured to test whether another apparatus is a member of a known set of apparatuses of said wireless ad hoc network based on at least one message received via said communication module.

2. An apparatus according to claim 1, wherein the at least one message comprises at least a contributory value arranged to be used as an input for seed generation.

3. An apparatus according to claim 2, wherein a result value is arranged to be obtained on a basis of the generated seed, and wherein the filter is arranged to receive the result value and output whether the another apparatus is the member of the known set of apparatuses.

4. An apparatus according to any of the preceding claims, further comprising a memory configured to store identity values of the known set of apparatuses of said wireless ad hoc network.

5. An apparatus according to any of the preceding claims, wherein the data structure filter is further configured to check whether the obtained result value correlates with any identity values stored on the memory.

6. An apparatus according to any of the preceding claims, wherein the apparatus is further arranged to establish a connection to said another apparatus if an identity value corresponding to said another apparatus correlates with the obtained result value corresponding to said another apparatus.

7. An apparatus according to any of the preceding claims, wherein the filter is arranged to be regenerated every time a seed, according to which the filter is arranged to be created, changes.

8. An apparatus according to any of the preceding claims, wherein the result value comprises an encryption of the seed and the identity value.

9. An apparatus, comprising:

a generator arranged to generate at least one contributory value corresponding to the apparatus,

a communication module configured to communicate in a wireless ad hoc network including other apparatuses, wherein the communication module is configured to send and receive contributory values of one or more apparatuses within the wireless ad hoc network, and further configured to send the at least one contributory value corresponding to the apparatus, and

a data structure filter arranged to generate a seed on a basis of the at least one contributory value corresponding to the apparatus and the contributory values of the one or more apparatuses.

10. An apparatus according to claim 9, wherein the apparatus is arranged to validate its contribution present in the seed.

11. An apparatus according to claim 9, wherein the filter is further configured according to supplementary information in messages between the apparatuses.

12. An apparatus according to claim 11, wherein the supplementary information comprises contributory values of the one or more apparatuses.

13. An apparatus according to claim 12, wherein the supplementary information comprises aggregates of all contributory values known to the apparatus.

14. An apparatus according to claim 13, wherein the apparatus is arranged to send within the supplementary information, on a basis of an aggregate of one or more apparatuses, contributory values missing from the one or more apparatuses.

15. An apparatus according to claim 11, wherein the supplementary information further comprises parameters corresponding to the data structure filter.

16. An apparatus according to claim 9, wherein the data structure filter is further configured to determine an intersection between the contributory value of the apparatus and the contributory values of the one or more apparatuses.

17. An apparatus according to any of the preceding claims, wherein the data structure filter comprises a probabilistic data structure filter.

18. An apparatus according to any of the preceding claims, wherein said probabilistic data structure filter comprises a Bloom filter.

19. An apparatus according to any of the preceding claims, wherein said filter comprises a one-way algorithm.

20. An apparatus according to any of the preceding claims, wherein an identity of the apparatus of the ad hoc wireless network can be detected on a basis of the seed and the filter.

21. An apparatus according to any of the preceding claims, wherein the ad hoc wireless network comprises a Wibree network or a Bluetooth network.

22. A system, comprising:

a first apparatus, comprising:

a communication module configured to communicate in a wireless ad hoc network, and

a first data structure filter configured to test whether a second apparatus is a member of a known set of apparatuses of said wireless ad hoc network based on at least one message received via said communication module,

the second apparatus, comprising:

a generator arranged to generate at least one contributory value corresponding to the second apparatus,

a communication module configured to communicate in the wireless ad hoc network including one or more apparatuses, wherein the communication module is configured to send and receive contributory values of the one or more apparatuses within the wireless ad hoc network, and further configured to send the at least one contributory value corresponding to the apparatus, and

a second data structure filter arranged to generate a seed on a basis of the at least one contributory value corresponding to the apparatus and the contributory values of the one or more apparatuses.

23. A method, comprising:

communicating by a communication module of a wireless ad hoc network,

receiving at least one message, and on a basis of the received message

testing, by a data structure filter, whether another apparatus is a member of a known set of apparatuses of said wireless ad hoc network.

24. A computer program comprising computer code arranged to

communicating by a communication module of a wireless ad hoc network,

receiving at least one message, and on a basis of the received message

testing, by a data structure filter, whether another apparatus is a member of a known set of apparatuses of said wireless ad hoc network.

25. A method comprising:

generating, by a generator, at least one contributory value corresponding to the apparatus,

communicating, by a communication module, in a wireless ad hoc network including other apparatuses,

sending and receiving, by the communication module, contributory values of one or more apparatuses within the wireless ad hoc network,

sending, by the communication module, the at least one contributory value corresponding to the apparatus, and

generating, by a data structure filter, a seed on a basis of the at least one contributory value corresponding to the apparatus and the contributory values of the one or more apparatuses.

26. A computer program comprising computer code arranged to

generating, by a generator, at least one contributory value corresponding to the apparatus,

communicating, by a communication module, in a wireless ad hoc network including other apparatuses,

sending and receiving, by the communication module, contributory values of one or more apparatuses within the wireless ad hoc network,

sending, by the communication module, the at least one contributory value corresponding to the apparatus, and

generating, by a data structure filter, a seed on a basis of the at least one contributory value corresponding to the apparatus and the contributory values of the one or more apparatuses.

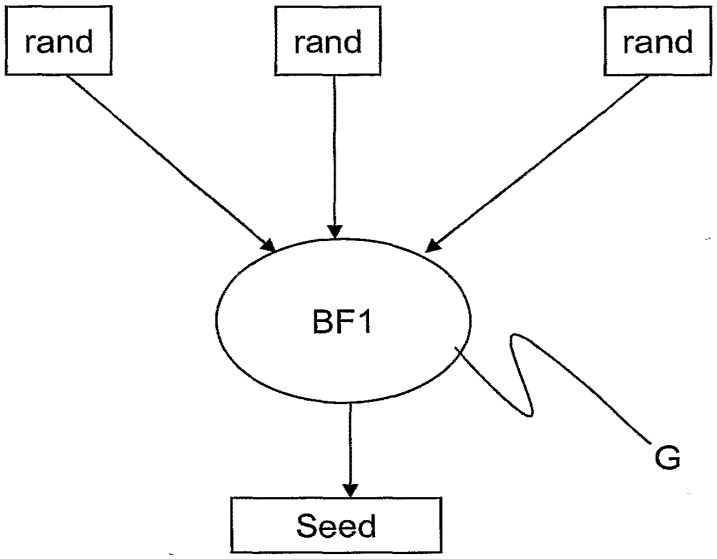


Fig.1

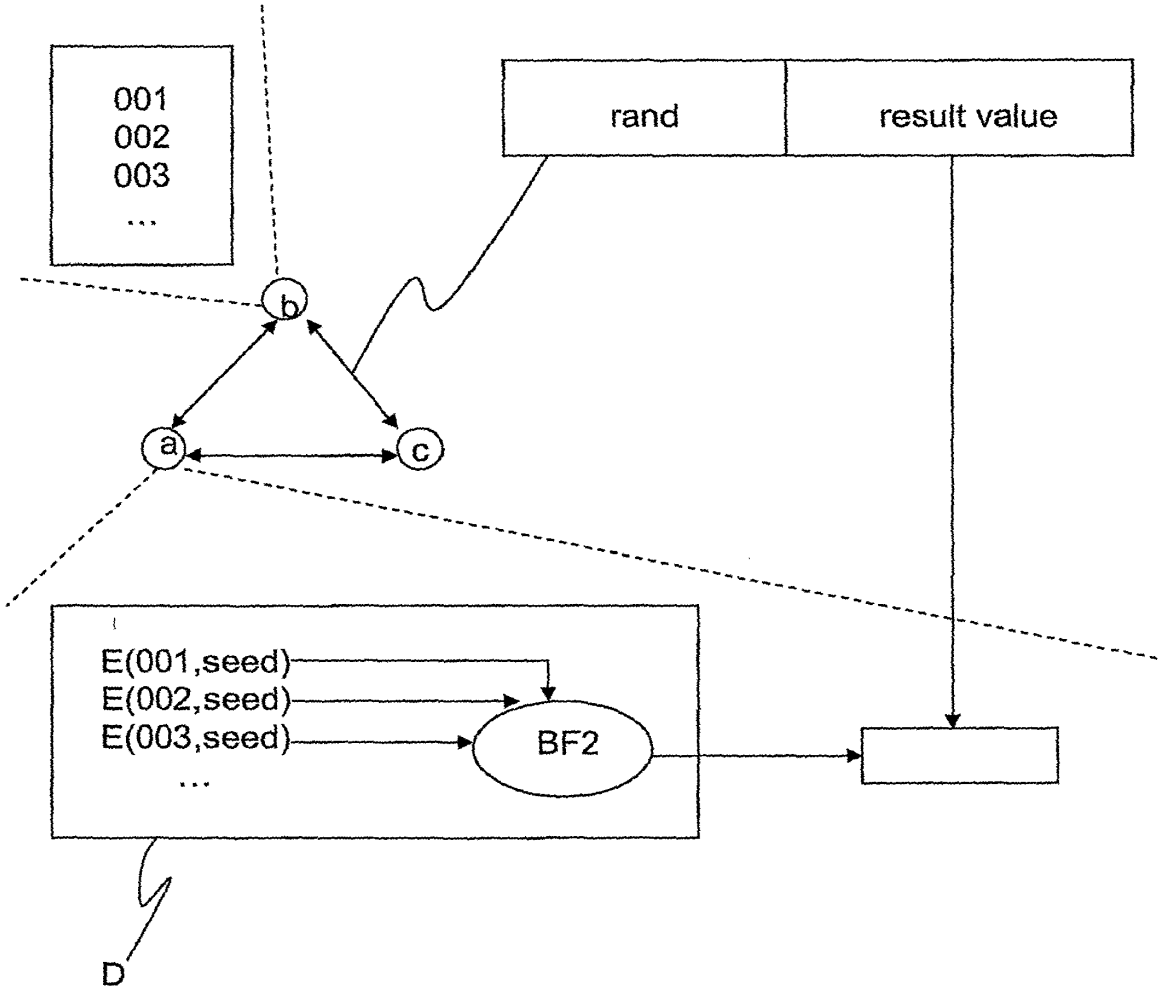

001
002
003
...
rand
result value
b
a
c
E(001,seed)
E(002,seed)
E(003,seed)
...
BF2
D

Fig.2

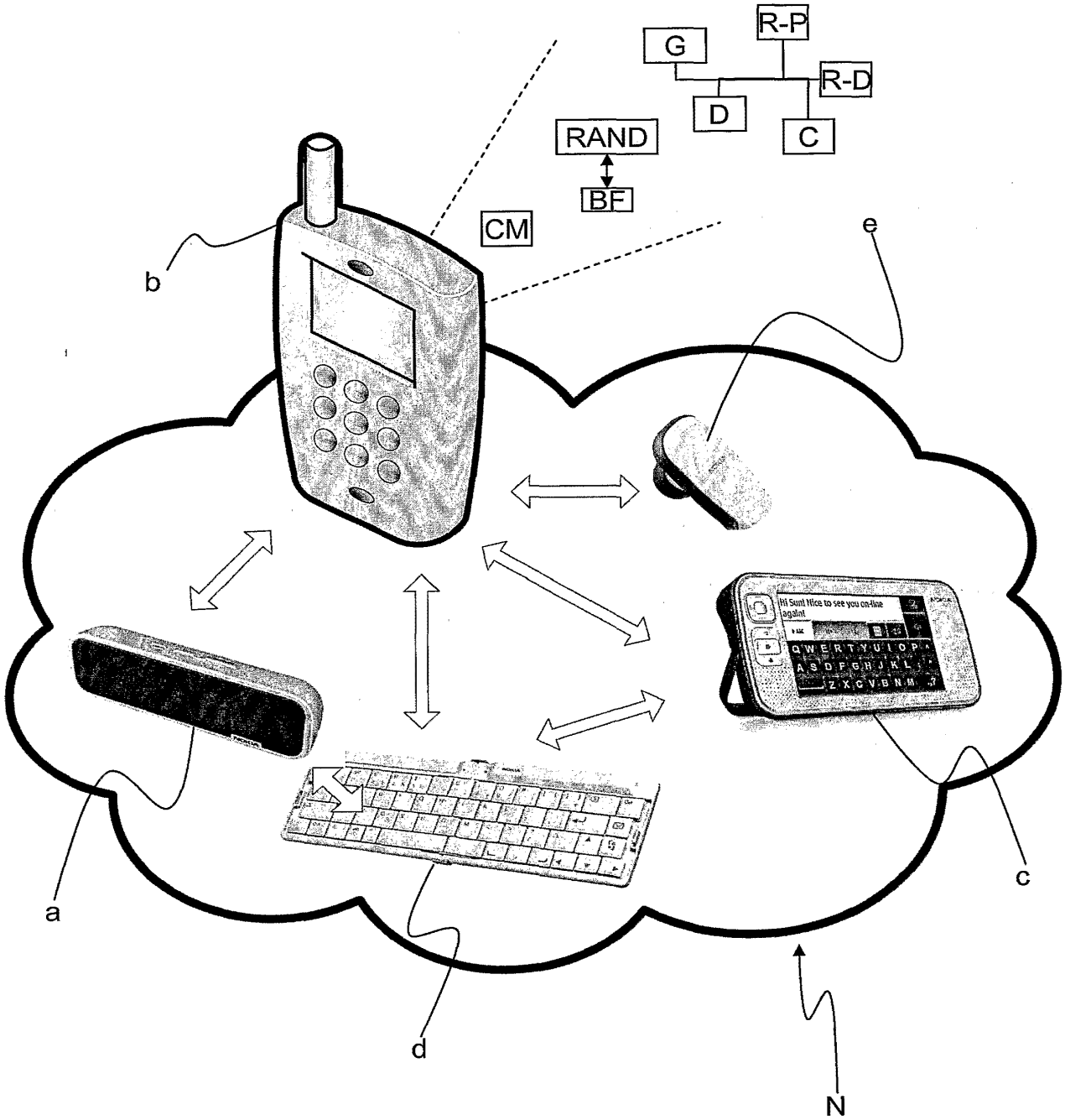

R-P
G
R-D
D
C
RAND
BF
CM
b
e
a
c
d
N
Hi Sunt Nice to see you on-line again!

Fig.3

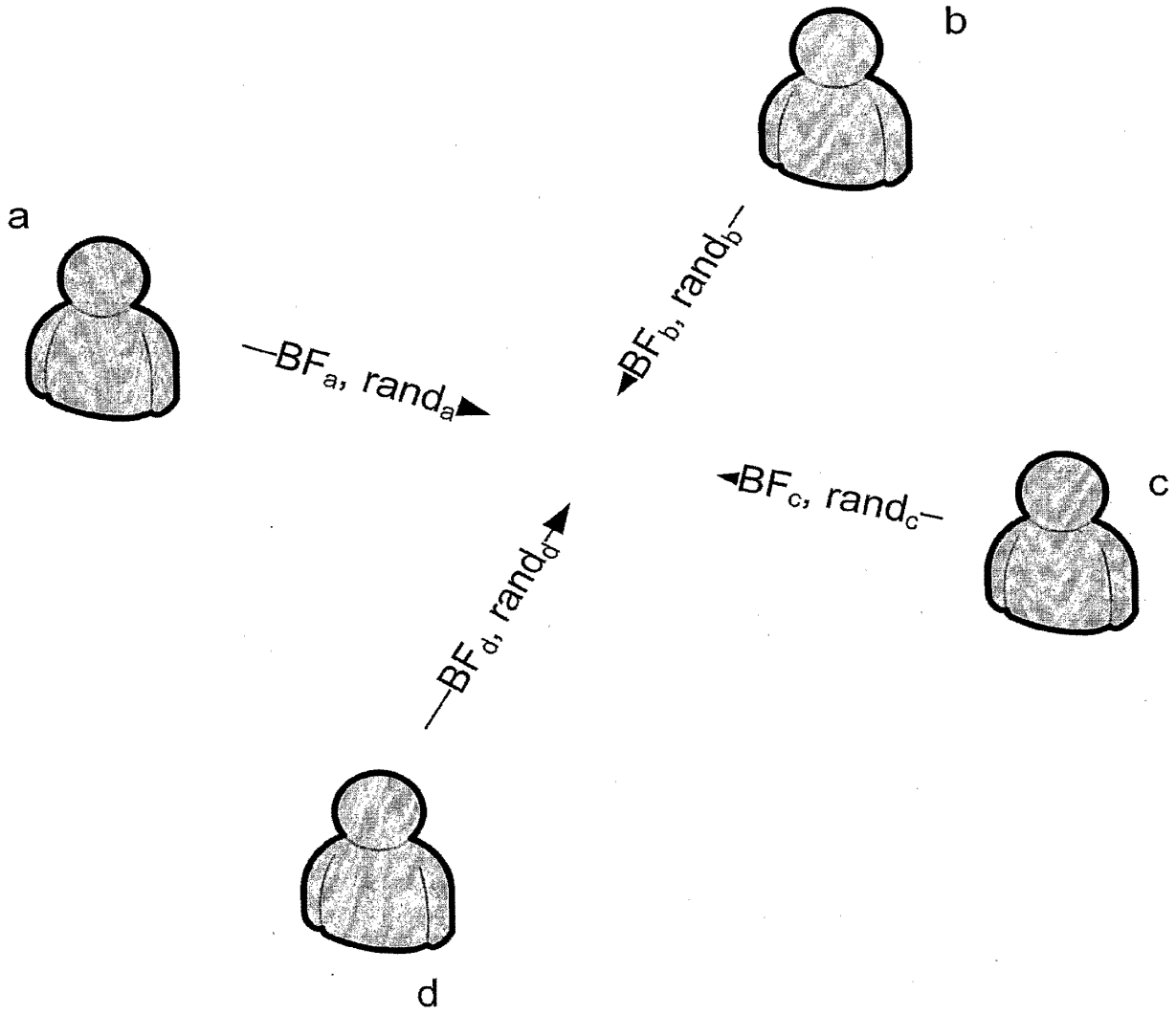


Fig.4

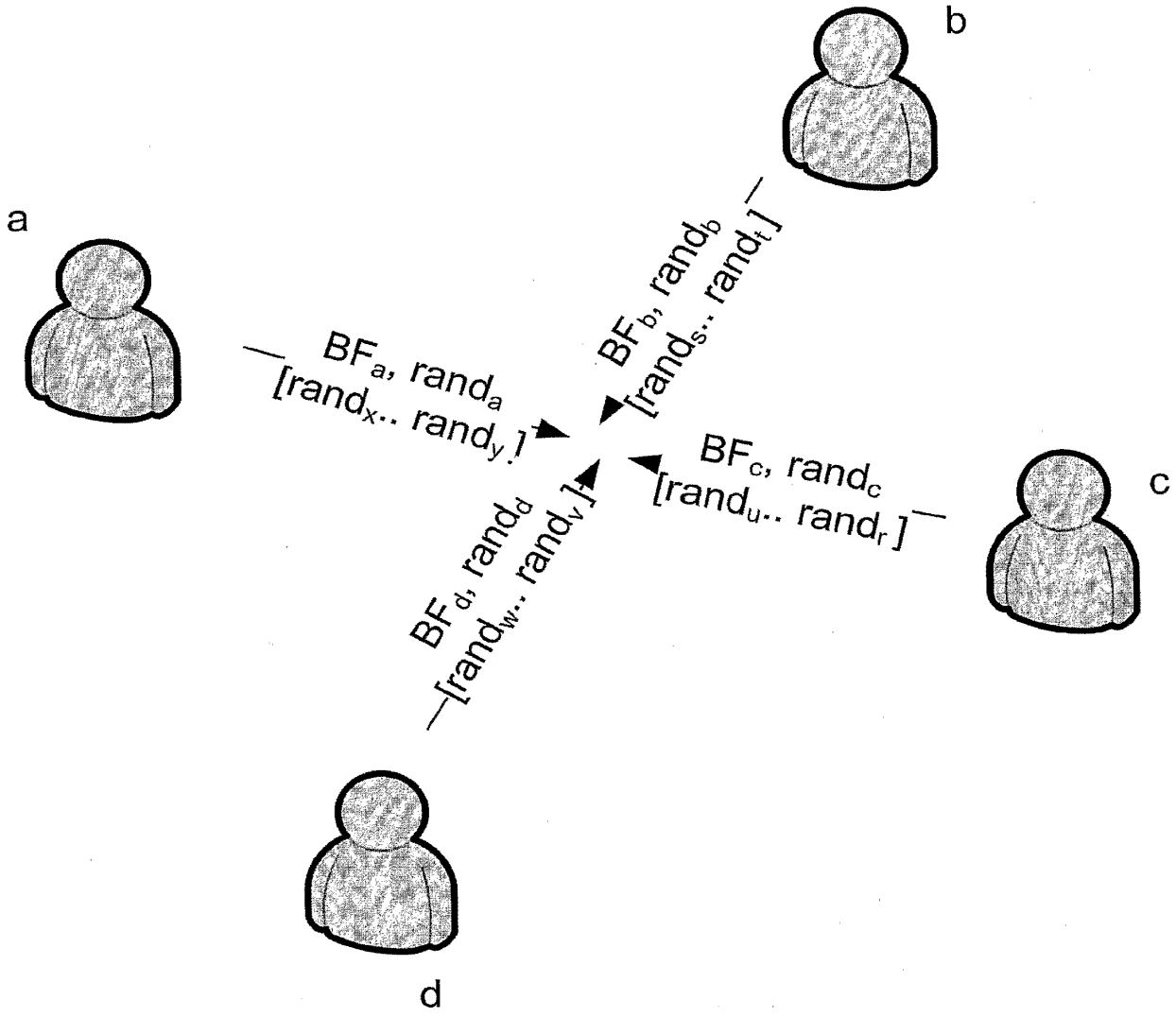

a
b
c
d
BF$_a$, rand$_a$ [rand$_x$.. rand$_y$]
BF$_b$, rand$_b$ [rand$_s$.. rand$_t$]
BF$_c$, rand$_c$ [rand$_u$.. rand$_r$]
BF$_d$, rand$_d$ [rand$_w$.. rand$_v$]

Fig.5

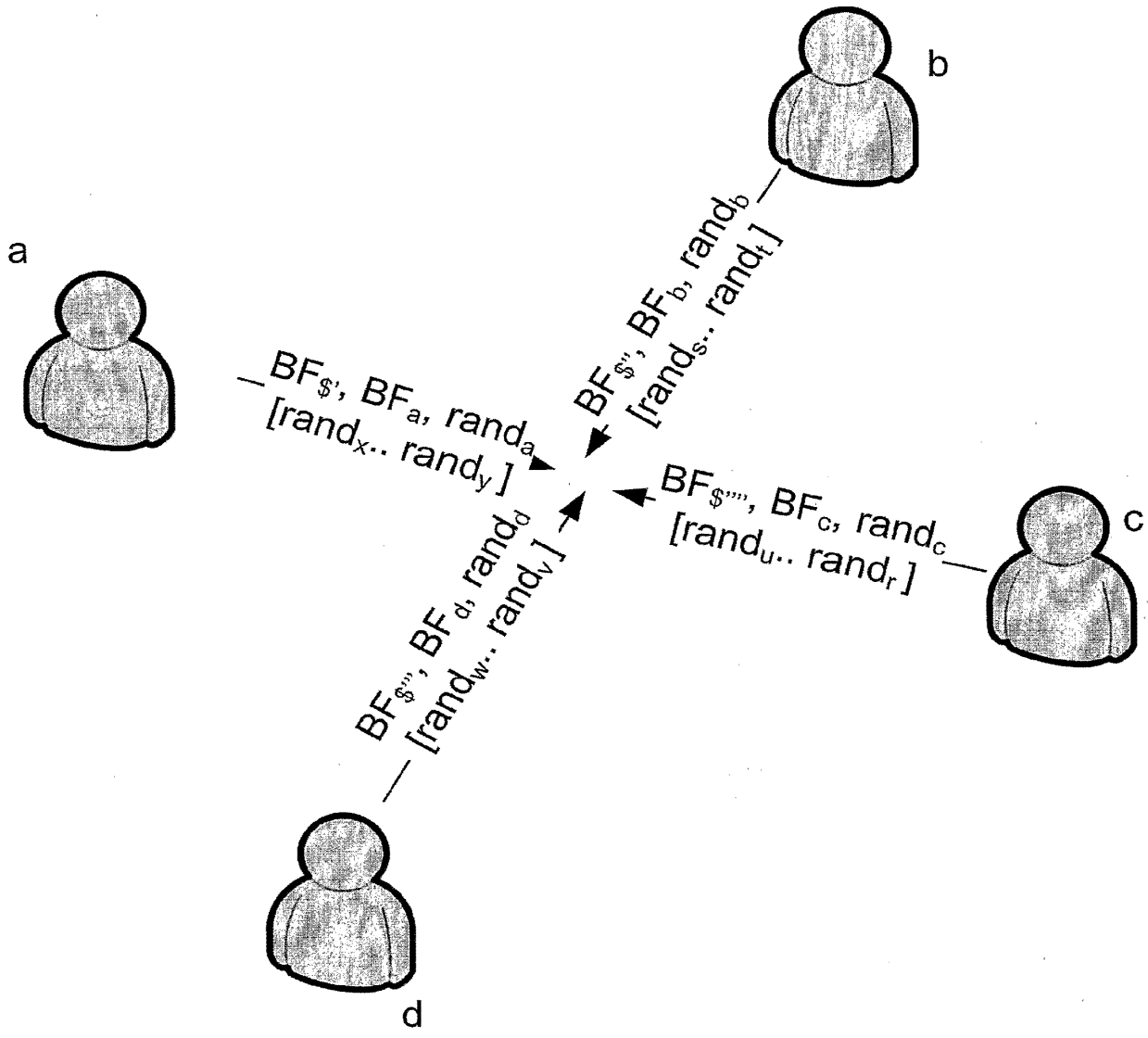

a
b
c
d
BF$', BFa, randa
[randx.. randy]
BF$'', BFb, randb
[rands.. randt]
BF$''', BFc, randc
[randu.. randr]
BF$'''', BFd, randd
[randw.. randv]

Fig.6

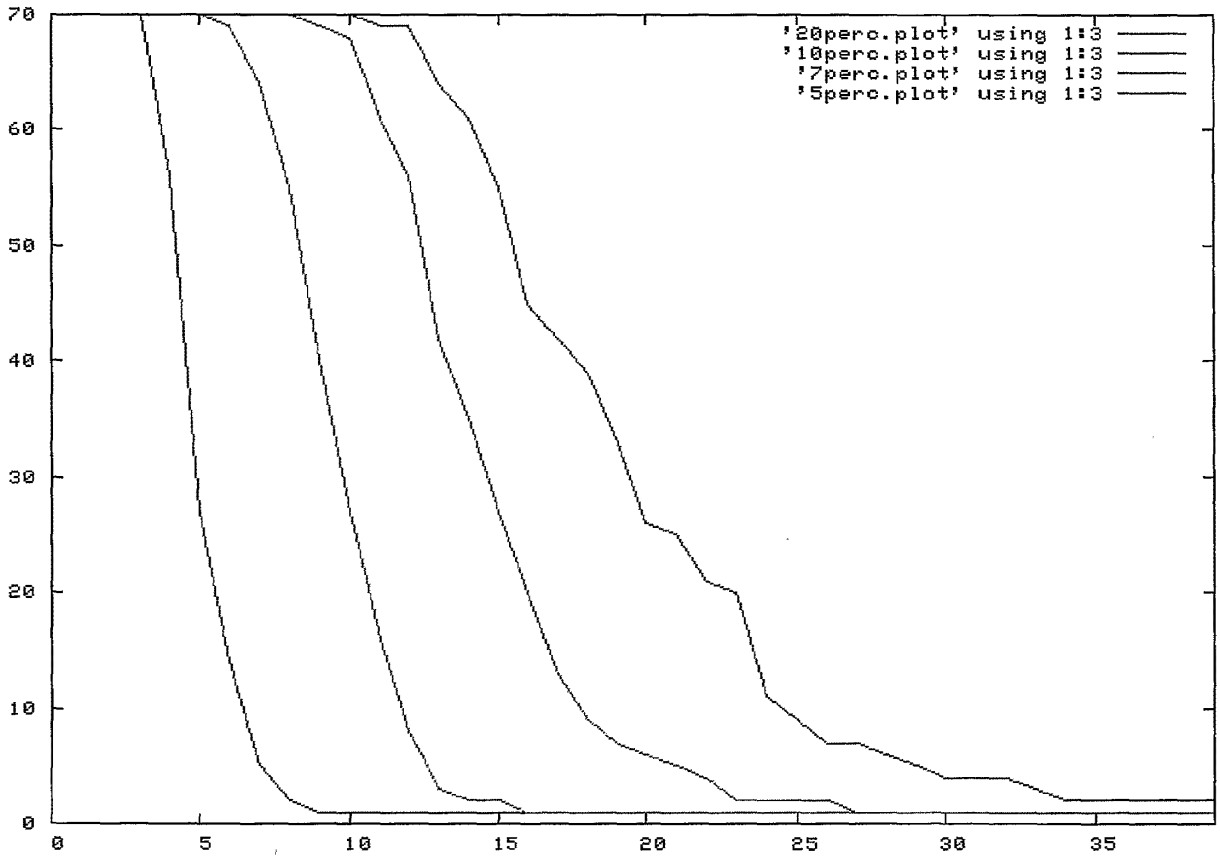

'20perc.plot' using 1:3
'10perc.plot' using 1:3
'7perc.plot' using 1:3
'5perc.plot' using 1:3
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50
40
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5
10
15
20
25
30
35

Fig.7

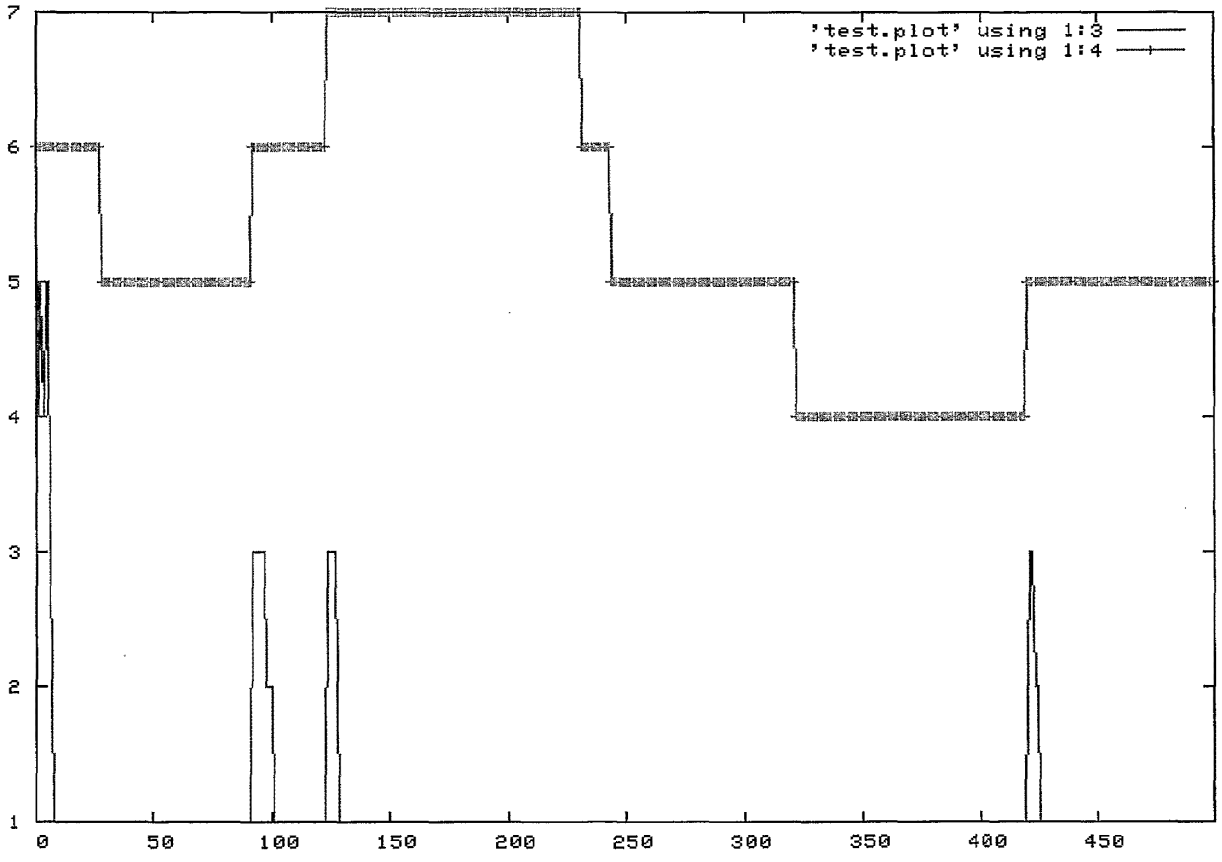

'test.plot' using 1:3
'test.plot' using 1:4
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6
5
4
3
2
1
0
50
100
150
200
250
300
350
400
450

Fig.8

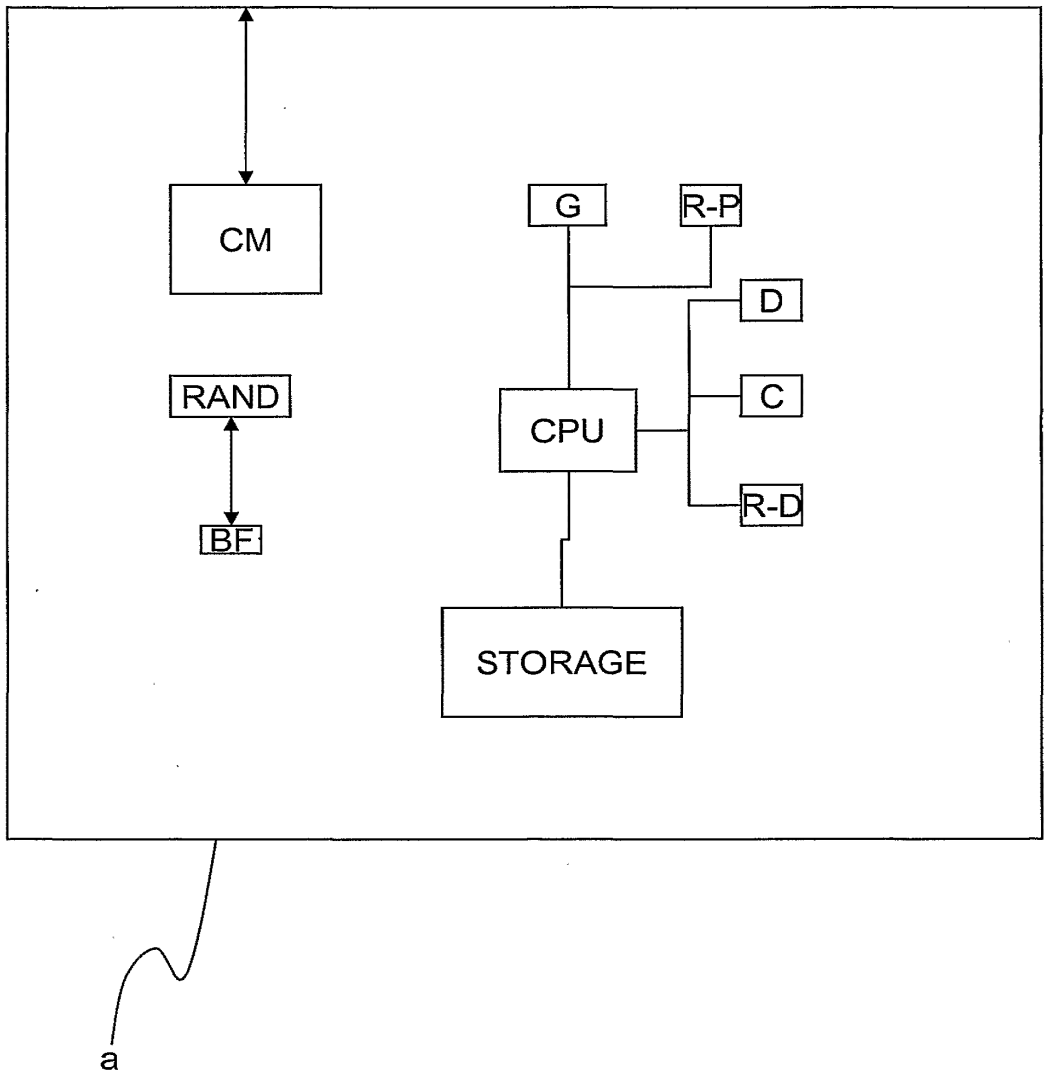


Fig.9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2007/000246

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC8: H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

FI, SE, NO, DK

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI, XPESP, XPIEE, XPI3E, INSPEC, IEEE Explore

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007/0177554 A1 (YANG FAN et al.) 02 August 2007 (02.08.2007), Figures 2, 3, and 7, [0017], [0019], [0023], [0024], [0027]-[0029], [0030], [0034]-[0039]	1-26
X	REN, K., et al. 'Multi-user Broadcast Authentication in Wireless Sensor Networks'. Proceedings of the 4th Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks, pp. 223-232, June 2007, Section III, page 227 column 1 line 1 - page 228 column 1 line 6	1, 4-6, 17-19, 21, 23, 24
X	MACCARI, L., et al. 'Mesh network firewalling with Bloom Filters'. Proceedings of the IEEE International Conference on Communications, pp. 1546-1551, June 2007 [retrieved on 2008-06-12]. Retrieved from Internet: <URL: http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=4288930>, Figure 4, Sections III and IV	1, 4-6, 17-19, 21, 23, 24

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2007/000246

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ZHANG, L., et al. 'Integrated location management and location-aided routing system for mobile ad hoc networks'. Journal of parallel and distributed computing, vol. 66, no. 3, p. 367-378, March 2006, Abstract, figures 1-3, sections 1, 3.1, 3.2, 3.3, and 3.4	1, 4-6, 17-19, 21, 23, 24
X	PAPAPETROU, E., et al. 'Speeding-up Cache Lookups in Wireless Ad-Hoc Routing using Bloom Filters'. IEEE 16th International Symposium on Personal, Indoor and Mobile Radio Communications, vol.3, pp.1419-1423, September 2005, Abstract, section I A.	1, 4-6, 17-19, 21, 23, 24
A	EKBERG, J.-E. 'Implementing Wibree Address Privacy'. First International Workshop on Security for Spontaneous Interaction (IWSSI 2007), September 2007 [retrieved on 2008-06-12]. Retrieved from Internet: <URL: http://www.comp.lancs.ac.uk/iwssi2007/papers/iwssi2007-07.pdf>, Sections 6 and 7	1-26
A	WO 2006/119281 A2 (PACKETHOP INC et al.) 09 November 2006 (09.11.2006), Whole document	1-26

Form PCT/ISA/210 (continuation of second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/FI2007/000246

Patent document cited in search report	Publication date	Patent family members(s)	Publication date
US 2007/0177554 A1	02/08/2007	None	
WO 2006/119281 A2	09/11/2006	US 2007189249 A1	16/08/2007

INTERNATIONAL SEARCH REPORT

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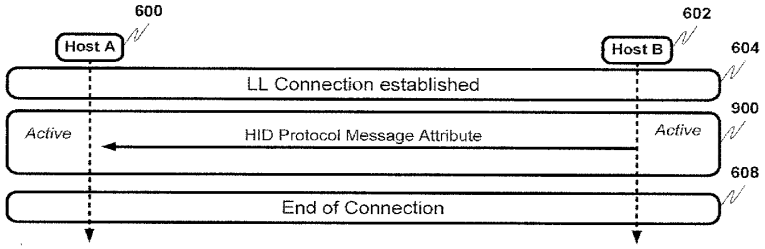
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(54) Title: HID ADAPTATION TO ATTRIBUTE PROTOCOL

FIG. 9



(57) Abstract: A system for conveying one or more message packets utilizing a wireless communication medium. The wireless communication medium may be utilized to convey message packets between a human interface device (HID) and a host device based on a HID profile. Fragmentation may be done at the HID profile level, and the resulting message packets may be conveyed without the requirement of first establishing lower level messaging channels in a PAL or L2CAP layer by utilizing an attribute protocol that is enabled to convey packet type.

WO 2009/063272 A1

HID ADAPTATION TO ATTRIBUTE PROTOCOL

BACKGROUND OF INVENTION

1. Field of Invention:

[0001] The present invention relates to a system for expediting communication in a wireless communication protocol, and more specifically, to increasing the transmission efficiency of human interface device (HID) profile communication by removing the need to establish lower level messaging channels before sending message packets.

2. Background:

[0002] This section is intended to provide a background or context to the invention that is recited in the claims. The description herein may include concepts that could be pursued, but are not necessarily ones that have been previously conceived or pursued. Therefore, unless otherwise indicated herein, what is described in this section is not prior art to the description and claims in this application and is not admitted to be prior art by inclusion in this section.

[0003] More and more, the ability to communicate wirelessly is emerging as a popular feature to include in many devices where wireless communication was previously not contemplated. This popularity may, at least in part, be fueled by rapid technological development in the area of multifunction wireless communication devices (WCD). Consumers may now replace common standalone productivity devices like computers, laptops, facsimile machines, personal digital assistants, etc. with a single device capable of performing all of these functions. Devices including one or more of these exemplary abilities have been embraced by professionals who often find that work can be completed during times that were previously wasted (commutes to and from work, home, etc.)

[0004] However, while a WCD may be empowered with many beneficial features, the small size and power constraints of these devices may also create a hindrance for the user. For example, the operator interfaces installed in these devices are often small, and not conducive to high throughput. As a result, users must rely on peripheral input devices such as keyboards, mice, headsets, etc. in order to perform their work. Further, the small size and power limitations of many devices today also limits the number of physical ports

to which wired devices may be connected. Therefore, a WCD must not only be able to support wireless communications with a peripheral device, it must also be able to support connections with multiple peripheral devices being operated concurrently.

[0005] As more and more common devices now include electronic control, there may also be a benefit realized by coupling these devices to a WCD, or possibly another "intelligent" mechanism. In an exemplary scenario, it may be desirable to wirelessly link two or more low power devices in a beneficial relationship, such as linking a wristwatch including health-monitoring intelligence to various wireless sensors placed on a user's body. Simpler communication protocols with reduced power requirements are now being developed so that even devices that have not historically been "computerized" may now provide wireless information to, and in some cases receive wireless information from, a another device. These devices must often run on battery power, and as a result, must rely on simple, power efficient communications in order to be functional.

[0006] Most of the existing wireless communication protocols are either too simple or too complex to make these newly computerized applications workable. For example, radio frequency (RF) communication is efficient and may be powered by a scanning device, however, currently available RF transponder chips are space-limited and usually only provide information. On the other hand, IEEE 802.11x WLAN or "WiFi" is a commonly available and widely accepted wireless solution, but the power requirements for WLAN may not make it efficient enough for small device installations. Bluetooth™ is another short-range wireless protocol that is often used for linking peripheral devices to a WCD. The Bluetooth™ standard was originally designed to replace wires with a wireless medium for simple peripheral input devices. While, Bluetooth™ has now evolved much further than linking headsets and mice, it still may not be the best solution for extremely resource constrained wireless devices, as will be explored further below.

[0007] At least one problem inherent in the Bluetooth™ wireless protocol with respect to wirelessly-coupled peripheral devices is the required initial channel setup and repeated wireless channel establishment steps that must be completed before messages may be conveyed between a peripheral device and the host (e.g., device to which a user interface device may be coupled). For example, messaging for devices classified as user interface peripheral devices may be controlled by a human interface device (HID) profile in Bluetooth™. The formalities that must be followed in order to convey these messages

includes multiple steps to establish identified channels for sending messages of certain types, such as control messages and interrupt messages, and the repeated connection of these channels. The steps necessary to establish and utilize these channels may be acceptable for more substantial wireless devices, but may place an extreme burden on simpler devices where processing capability and stored energy may be extremely limited resources.

SUMMARY OF INVENTION

[0008] The present invention includes at least a method, computer program, module, device and system for conveying wireless messages. In at least one embodiment of the present invention, a wireless communication medium may be utilized to convey message packets between a human interface device (HID) and a host device without the requirement of first establishing and connecting lower level messaging channels.

[0009] In at least one embodiment of the present invention, a HID profile in a wireless communication medium protocol stack may create one or more message packets. These message packets may, for example, be created in response to activity that occurs in a peripheral human interface device or in a host device. The message packets created by the HID profile may include at least an HID header and a data payload. The message packets may further be one of two types, either control or interrupt message packets. Control message packets may be utilized for bi-directional data requests transmitted between the devices, while interrupt message packets usually contain data that was not requested and that is usually the result of activities or evcnts in one of the devices.

[0010] The Bluetooth™ HID profile currently specifies that HID message packets be sent using a connection protocol that establishes at least two L2CAP wireless channels for control and interrupt messages, respectively. With respect to at least the Wibree™ wireless protocol, the protocol adaptation layer (PAL) defines three transport types for conveying message packets including an attribute protocol. In at least one embodiment of the present invention, the attribute protocol may be utilized to send HID message packets without having to first establish PAL messaging channels. Utilizing attribute packets, a universally unique identifier (UUID) or an attribute handle may identify the type of one or more HID message packets that have been embedded within attribute message packets.

[0011] Further, various embodiments of the present invention may use different transmission strategies for conveying HID message packets. For example, HID message packets may be conveyed using a continuous link layer connection, which may be more appropriate for frequent device communication. For more spontaneous communication, a discontinuous link layer connection, or even a broadcast strategy, may be employed to transmit data while conserving energy in a device. In the scenario where broadcasts are utilized, a repeat pattern may be employed to ensure that message packets are received.

DESCRIPTION OF DRAWINGS

[0012] The present invention will be further understood from the following detailed description of various exemplary embodiments, taken in conjunction with appended drawings, in which:

[0013] FIG. 1A discloses a modular description of an exemplary wireless communication device usable with at least one embodiment of the present invention.

[0014] FIG. 1B discloses an exemplary structural description of the wireless communication device previously described with respect to FIG. 1A.

[0015] FIG. 2 discloses exemplary Bluetooth™ and Wibree™ protocol stacks usable in accordance with at least one embodiment of the present invention.

[0016] FIG. 3A discloses an example of multiple wireless peripheral devices attempting to communicate concurrently with a dual-mode radio modem in accordance with at least one embodiment of the present invention.

[0017] FIG. 3B discloses further detail pertaining to the example of FIG. 3A regarding operational enhancements for managing the operation of a dual-mode modem in accordance with at least one embodiment of the present invention.

[0018] FIG. 4 discloses a more detailed example of a Wibree™ protocol stack in accordance with at least one embodiment of the present invention.

[0019] FIG. 5A discloses an exemplary HID header and a table of HID packet type codes in accordance with at least one embodiment of the present invention.

[0020] FIG. 5B discloses an example of communication packet growth as a part of routing in a typical communication protocol.

[0021] FIG. 5C discloses an example of HID communication packet growth as a part of routing in a typical communication protocol when packet fragmentation is performed at the HID protocol level.

[0022] FIG. 6 discloses an example of the steps required to send HID message packets utilizing a connection oriented protocol.

[0023] FIG. 7 discloses examples of HID packets formulated as attribute protocol message packets in accordance with at least one embodiment of the present invention.

[0024] FIG. 8 discloses exemplary communication strategies for attribute protocol message packets in accordance with at least one embodiment of the present invention.

[0025] FIG. 9 discloses an example of the steps required to send HID message packets utilizing an attribute protocol in accordance with at least one embodiment of the present invention.

[0026] FIG. 10 discloses a flowchart of an exemplary process for formulating an HID message packet utilizing an attribute protocol in accordance with at least one embodiment of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENT

[0027] While the invention has been described in terms of a number of exemplary embodiments, various changes can be made therein without departing from the spirit and scope of the invention, as described in the appended claims.

I. Wireless communication device

[0028] As previously described, the present invention may be implemented using a variety of wireless communication equipment. Therefore, it is important to understand the communication tools available to a user before exploring the various embodiments of the present invention. For example, in the case of a cellular handset or other handheld wireless devices, the integrated data handling capabilities of the device play an important role in facilitating transactions between the transmitting and receiving devices.

[0029] FIG. 1A discloses an exemplary modular layout for a device usable with the present invention. WCD 100 is broken down into modules representing the functional

aspects of the device. These functions may be performed by the various combinations of software and/or hardware components discussed below.

[0030] Control module 110 may regulate the overall operation of the device. Inputs may be received from various other modules included within WCD 100. For example, interference sensing module 120 may utilize various techniques known in the art to sense sources of environmental interference within the effective transmission range of the wireless communication device. Control module 110 interprets these data inputs, and in response, may issue control commands to the other modules in WCD 100.

[0031] Communications module 130 may incorporate all of the communication aspects of WCD 100. As shown in FIG. 1A, communications module 130 may include, for example, long-range communications module 132, short-range communications module 134 and machine-readable data module 136 (e.g., for NFC). Communications module 130 utilizes at least these sub-modules to receive a multitude of different types of communication from both local and long distance sources, and to transmit data to recipient devices within the transmission range of WCD 100. Communications module 130 may be triggered by control module 110, or by control resources local to the module responding to sensed messages, environmental influences and/or other devices in proximity to WCD 100.

[0032] User interface module 140 may include visual, audible and tactile elements that allow a user to receive data from, and enter data into, the device. The data entered by a user may be interpreted by control module 110 to affect the behavior of WCD 100. User-inputted data may also be transmitted by communications module 130 to other devices within transmission range. Other devices in transmission range may further send information to WCD 100 via communications module 130, and control module 110 may cause this information to be transferred to user interface module 140 to display for a user.

[0033] Applications module 180 may incorporate all other hardware and/or software applications on WCD 100. These applications may include sensors, interfaces, utilities, interpreters, data applications productivity and/or entertainment applications, etc. These applications may be invoked by control module 210 to read information provided by various modules, and may in turn supply data to requesting modules in WCD 100.

[0034] FIG. 1B discloses an exemplary structural layout of WCD 100, in accordance with at least one embodiment of the present invention, that may be used to implement the functionality of the modular system previously described with respect to FIG. 1A. Processor 150 may control the overall device operation of WCD 100. As shown in FIG. 1B, processor 150 may be coupled to at least communications sections 154, 158 and 166. Processor 150 may be implemented with one or more microprocessors that are each capable of executing software instructions stored in memory 152.

[0035] Memory 152 may include random access memory (RAM), read only memory (ROM), and/or flash memory, and stores information in the form of data and software components (also referred to herein as modules). The data stored by memory 152 may be associated with various software components or applications. In addition, this data may be associated with databases, such as a bookmark database, a productivity software database including business databases for scheduling, email, contacts, etc.

[0036] The software components stored by memory 152 include instructions that can be executed by processor 150. Various types of software components may be stored in memory 152. For instance, memory 152 may store software components that control the operation of communication sections 154, 158 and 166. Memory 152 may also store software components including a firewall, a service guide manager, a bookmark database, user interface manager, and any communication utilities modules or applications required to support WCD 100.

[0037] Long-range communications 154 may perform functions related to the exchange of information over large geographic areas (such as cellular networks) via an antenna. These communication methods may include technologies from the previously described 1G to 3G. In addition to basic voice communication (e.g., via GSM), long-range communications 154 may operate to establish data communication sessions, such as General Packet Radio Service (GPRS) sessions and/or Universal Mobile Telecommunications System (UMTS) sessions. Also, long-range communications 154 may operate to transmit and receive messages, such as short messaging service (SMS) messages and/or multimedia messaging service (MMS) messages.

[0038] As a subset of long-range communications 154, or alternatively operating as an independent module separately connected to processor 150, transmission receiver 156 allows WCD 100 to receive transmission messages via mediums such as Digital

Video Broadcast for Handheld Devices (DVB-H). These transmissions may be encoded so that only certain designated receiving devices may access the transmission content, and may contain text, audio or video information. In at least one example, WCD 100 may receive these transmissions and use information contained within the transmission signal to determine if the device is permitted to view the received content.

[0039] Short-range communications 158 is responsible for functions involving the exchange of information across short-range wireless networks. As described above and depicted in FIG. 1B, examples of such short-range communications 158 are not limited to Bluetooth™, Wibree™, WLAN, UWB and Wireless USB connections. Accordingly, short-range communications 158 performs functions related to the establishment of short-range connections, as well as processing related to the transmission and reception of information via such connections.

[0040] Short-range input device 166, also depicted in FIG. 1B, may provide functionality related to the short-range scanning of machine-readable data (e.g., NFC). For example, processor 150 may control short-range input device 166 to generate RF signals for activating an RFID transponder, and may in turn control the reception of signals from an RFID transponder. Other short-range scanning methods for reading machine-readable data that may be supported by short-range input device 166 are not limited to IR communication, linear and 2-D (e.g., QR) bar code readers (including processes related to interpreting UPC labels), and optical character recognition devices for reading magnetic, UV, conductive or other types of coded data that may be provided in a tag using suitable ink. In order for short-range input device 166 to scan the aforementioned types of machine-readable data, the input device may include optical detectors, magnetic detectors, CCDs or other sensors known in the art for interpreting machine-readable information.

[0041] As further shown in FIG. 1B, user interface 160 may also be coupled to processor 150. User interface 160 may facilitate the exchange of information with a user. FIG. 1B shows that user interface 160 includes a user input 162 and a user output 164. User input 162 may include one or more components that allow a user to input information. Examples of such components include keypads, touch screens, and microphones. User output 164 allows a user to receive information from the device. Thus, user output portion 164 may include various components, such as a display, light

emitting diodes (LED), tactile emitters and one or more audio speakers. Exemplary displays include liquid crystal displays (LCDs), and other video displays.

[0042] WCD 100 may also include one or more transponders 168. This is essentially a passive device that may be programmed by processor 150 with information to be delivered in response to a scan from an outside source. For example, an RFID reader mounted in an entryway may continuously emit radio frequency waves. When a person with a device containing transponder 168 walks through the door, the transponder is energized and may respond with information identifying the device, the person, etc. In addition, a reader may be mounted (e.g., as discussed above with regard to examples of short-range input device 166) in WCD 100 so that it can read information from other transponders in the vicinity.

[0043] Hardware corresponding to communications sections 154, 156, 158 and 166 provide for the transmission and reception of signals. Accordingly, these portions may include components (e.g., electronics) that perform functions, such as modulation, demodulation, amplification, and filtering. These portions may be locally controlled, or controlled by processor 150 in accordance with software communication components stored in memory 152.

[0044] The elements shown in FIG. 1B may be constituted and coupled according to various techniques in order to produce the functionality described in FIG. 1A. One such technique involves coupling separate hardware components corresponding to processor 150, communications sections 154, 156 and 158, memory 152, short-range input device 166, user interface 160, transponder 168, etc. through one or more bus interfaces (which may be wired or wireless bus interfaces). Alternatively, any and/or all of the individual components may be replaced by an integrated circuit in the form of a programmable logic device, gate array, ASIC, multi-chip module, etc. programmed to replicate the functions of the stand-alone devices. Each of these components may also be coupled to a power source, such as a removable and/or rechargeable battery (not shown).

[0045] User interface 160 may interact with a communication utilities software component, also contained in memory 152, which may provide for the establishment of service sessions using long-range communications 154 and/or short-range communications 158. The communication utilities component may include various routines that allow the reception of services from remote devices according to mediums

such as the Wireless Application Medium (WAP), Hypertext Markup Language (HTML) variants like Compact HTML (CHTML), etc.

II. Wireless communication mediums

[0046] The present invention may be implemented with, but is not limited to, short-range wireless communication mediums. Bluetooth™ is an example of a short-range wireless technology quickly gaining acceptance in the marketplace. A Bluetooth™ enabled WCD may transmit and receives data, for example, at a rate of 720 Kbps within a range of 10 meters, and may transmit up to 100 meters with additional power boosting. Current systems may run at a nominal rate of 1 Mbps. A user does not actively instigate a Bluetooth™ network. Instead, a plurality of devices within operating range of each other will automatically form a network group called a "piconet". Any device may promote itself to the master of the piconet, allowing it to control data exchanges with up to seven "active" slaves and 255 "parked" slaves. Active slaves exchange data based on the clock timing of the master. Parked slaves monitor a beacon signal in order to stay synchronized with the master, and wait for an active slot to become available. These devices continually switch between various active communication and power saving modes in order to transmit data to other piconet members. In addition to Bluetooth™ other popular short-range wireless networks include WLAN (of which "Wi-Fi" local access points communicating in accordance with the IEEE 802.11 standard, is an example), WUSB, UWB, ZigBee (802.15.4, 802.15.4a), Wibree™ and UHF RFID. All of these mediums have features and advantages that make them appropriate for various applications.

[0047] Wibree™ is an open standard industry initiative that has been adopted by the Bluetooth™ special interest group (SIG) as an ultra low power (ULP) extension of Bluetooth™ that may enable local connectivity in small devices with technology that increases the growth potential in these market segments. Wibree™ technology may complement close range communication with Bluetooth™-like performance in the 0-10 m range with a data rate of 1 Mbps. Wibree™ is optimized for applications requiring extremely low power consumption, small size and low cost. Wibree™ may be implemented either as stand-alone chip or as Bluetooth™-Wibree™ dual-mode chip. More information can be found on the Wibree™ website: www.wibree.com.

[0048] Now referring to FIG. 2, an exemplary Bluetooth™ protocol stack and an exemplary Wibree™ protocol stack are disclosed. Bluetooth™ stack 200 includes

elements that may convey information from a system level to a physical layer where it may be transmitted wireless to another device. At the top level, BT Profiles 202 include at least a description of a known peripheral device which may be connected wirelessly to WCD 100 (e.g., in a HID profile), or an application that may utilize Bluetooth™ in order to engage in wireless communication with a peripheral device. The use of the phrase "peripheral devices" is not intended to limit the present invention, and is used only to represent any device external to WCD 100 also capable of wirelessly communicating with WCD 100. Bluetooth™ profiles of other devices may be established through a pairing procedure wherein identification and connection information for a peripheral device may be received by WCD 100 through a polling process and then saved in order to expedite the connection to the device at a later time. After the application and/or target peripheral device (or devices) is established, any information to be sent must be prepared for transmission. L2CAP level 204 includes at least a logical link controller and adaptation protocol. This protocol supports higher level protocol multiplexing packet segmentation and reassembly, and the conveying of quality of service information. The information prepared by L2CAP level 204 may then be passed to an application-optional host controller interface (HCI) 206. This layer may provide a command interface to the lower link manager protocol (LMP) layers, link manager (LM) 208 and link controller (LC) 210. LM 208 may establish the link setup, authentication, link configuration and other protocols related to establishing a wireless link between two or more devices. Further, LC 210 may manage active links between two or more devices by handling low-level baseband protocols. Wireless communication may then be established and conducted using the hardware (modem, antenna, etc.) making up physical layer (PHY) 212. Of course, the above identified layers of Bluetooth™ stack 200 may also be utilized in an order reversed from that disclosed above in order to receive a wireless transmission into WCD 100 from a peripheral device.

[0049] The layers in the standalone Wibree™ stack 220 are similar to the elements previously described. However, due to the relative simplicity of Wibree™ when compared to Bluetooth™, there are actually less layers utilized to achieve wireless communication. W Profiles 222, similar to the profiles used in Bluetooth™, are used to specify applications that may use Wibree™ for communication and peripheral devices with which a Wibree™ modem may wirelessly communicate (e.g., in a HID profile). The

profile adoption layer (PAL) 224 may be used to prepare the information for transmission via wireless communication. Host interface (e.g., HIF and also sometimes referred to as host control interface, HCI, as in Bluetooth™) 226 may provide an interface between the upper layers communicating with applications and schedulers in WCD 100, and the lower layers of the Wibree™ stack 220 which establish and maintain the links to peripheral devices. Lower layers of the Wibree™ stack 220 may further include at least link layer (LL) 228. LL 228 may both establish and maintain wireless communications with other wireless enabled devices through the use of Physical Layer (PHY) 230. Wibree™ LL 228, however, differs significantly from LM 208 and LC 210 in Bluetooth™.

III. Dual-mode modem

[0050] FIG. 3A includes an alternative exemplary implementation of at least one embodiment of the present invention. Again, in this example the three human interface devices (302, 304 and 306) are attempting concurrent communication with WCD 100 through dual-mode radio modem 300. Radio modem 300 may include local control resources for managing both "radios" (e.g., Bluetooth™ and Wibree™ software based radio control stacks) attempting to use the physical layer (PHY) resources of dual-mode radio modem 300. In this example, dual-mode radio modem 300 includes at least two radio stacks or radio protocols (labeled "Bluetooth" and "Wibree") that may share the PHY layer resources (e.g., hardware resources, antenna, etc.) of dual-mode radio modem 300. The local control resources may include an admission controller ("Adm Ctrl") and a dual-mode controller ("DuMo Manager"). These local control resources may be embodied as a software program and/or in a hardware form (e.g., logic device, gate array, MCM, ASIC, etc.) in a dual-mode radio modem interface, and the radio modem interface may be coupled to, or alternatively, embedded in dual-mode radio modem 300. The interaction of these control resources with the radio protocols utilizing dual-mode radio modem 300 is explained in reference to FIG. 3B.

[0051] With respect to FIG. 3B, an exemplary combination of the two separate radio protocol stacks (previously discussed with respect to FIG. 2) into a single combined entity controlled locally by at least an admission control 304 and a DuMo manager 316 is now disclosed. The two previously described standalone stacks are shown to establish the individual elements that may be incorporated into an integrated dual-mode entity 312. For a more specific discussion of the functioning of admission control 314 and a DuMo

manager 316 in terms of managing the operations of dual-mode modem 300, please refer to Application No. 11/538,310, filed October 3, 2006, which is hereby incorporated by reference. Briefly, admission control 314 may act as a gateway for the dual-mode radio modem 300 by filtering out both Bluetooth™ and Wibree™ requests from the operating system of WCD 100 that may result in conflicts. Scheduling information may also be provided by Multiradio controller (MRC) 170, wherein certain periods of operation are allocated to dual-mode radio modem 300 in view of the other active radio modems operating in WCD 100. This scheduling information may be passed down to both the HCI + Extension level of the combined protocol stacks and also to DuMo manager 1228 for further processing. However, if scheduling information from MRC 600 is critical (delay-sensitive), it may be sent through MCS 700 via a direct connection to DuMo Manager 1228. The information received by DuMo manager may 316 then be used to create an interleaved schedule for dual-mode radio modem 300 allowing both the Bluetooth™ and Wibree™ protocols to operate concurrently.

IV. Protocol stacks and packet routing

[0052] FIG. 4 includes a more detailed description of the upper layers of the Wibree™ communication protocol. The Wibree™ system includes two parts: the Wibree™ Radio 408 and the Wibree™ Host 402. Connection between radio 408 and host 402 goes through the HIF (also known as HCI). Further, PAL 224 includes at least General Access Profile (GAP) 406.

[0053] Application layer 400 may include various software applications that may be executed on computing devices. For example, an application may be a communication utility or productivity program running on WCD 100. An application may use W Profiles 222 in Wibree™ (e.g. Profile 1, Profile 2, HID profile, etc.) in order to formulate message packets for conveyance utilizing Wibree™ protocol stack 220. This wireless transaction may be supervised by Host Manager 404. The information may then be prepared by PAL 224 and GAP 406 for routing to Wibree™ radio 408, wherein LL 228 may both establish new wireless connections and manage existing connections with peripheral devices through the various resources (modem, antenna, etc.) that make up PHY layer 230.

V. Problems with packet routing in existing devices

[0054] Fig. 5A discloses an example of a HID message packet header 500 in accordance with at least one embodiment of the present invention. The HID header 500 may be one byte, including 8 bits that may specify two message packet characteristics. Bits 4-7 may express a HID packet type, and bits 0-3 may express any necessary parameters required by the particular header type. The various packet types that may be indicated in HID header 500 are shown further in table 502. The disclosed packet types may indicate, for example, whether the packet is a handshake, report, protocol or data packet. Further, the DataC type may be utilized to indicate that a message packet has been broken down into to smaller message packets due to the original packet being too large, and that the following packet is the continuation of the data in the DataC packet. The DataC functionality allows fragmentation of packets to occur at the HID profile level instead of delegating fragmentation to PAL 224 or below, reducing the reliance of the on lower level message packet handling and fragmentation when wirelessly conveying data.

[0055] Fig. 5B discloses a routing example for HID packets being created in a wireless communication protocol stack in accordance with methods currently known in the art. The wireless communication protocol in this example is Bluetooth™. A basic information frame packet (B-frame packet) is disclosed in layer 510. The packet in layer 510 may include at least a header portion and a payload portion. The header includes routing destination information for the packet, and the payload includes information such as general data, commands with corresponding parameters, etc. The header information in this example is a basic L2CAP header 512 including at least a length and a channel ID. The header for exemplary packet 510 further includes HID header 514. Information included in the header may then be used in routing the packet to the next layer.

[0056] The process of header creation repeats in the next protocol layer 516 , and the new header information may be inserted in front of the packet (as received) before being forwarded to the next layer. Packets may become so large that, in the case of some networks, the packet will exceed the maximum allowed length and will have to be split (e.g., fragmented). An example of packet fragmentation is shown in FIG. 5B wherein the packet from layer 510 is separated in layer 516 into packets 518 and 520. These two packets may then be forwarded to PHY layer 522 where additional header information may be added to each packet to form packets 524 and 526. These packets may then be transmitted via wireless communication and subsequently reassembled by a receiving

device. In a receiving device the process shown may work in reverse, wherein each level from PHY to L2CAP (in the case of Bluetooth™) may remove the packet information added by the corresponding layer until the original packet manifests at the top level.

[0057] Another example of packet fragmentation is disclosed in FIG. 5C. In this example, HID data 550 may be created at the HID application level. The creation of this information may be triggered, for example, in response to an HID event in an HID device. In some instances, HID data 550 may yield a message packet that must first be segmented before being passed down through the protocol stack. For example, the size of a message packet created from HID data 550 may exceed a maximum transfer unit (MTU) size setting defined for the L2CAP layer. More specifically, the MTU setting may specify a maximum message packet size permitted for transmission by the L2CAP layer. The HID protocol includes, among other things, the ability to fragment message packets, and as a result, exemplary HID packets 552 and 554 may be created from original HID data 550.

[0058] Similar to the previous example, message packets 552 and 554 may then be passed to the L2CAP layer to form message packets 556 and 558. Since fragmentation has already occurred at the HID profile level, no further fragmentation is necessary in the L2CAP layer. The L2CAP may then pass message packets 556 and 558 to the link level layer where additional header information may be added to yield message packets 560 and 562. Finally, link level layer message packets 560 and 562 may be passed to PHY layer, where additional routing information may be added to the header to form message packets 564 and 566. The message packets may then be sent via wireless communication.

[0059] In many wireless systems this packet size enlargement may not be a problem. Systems with more processing resources and unlimited power may be designed to handle higher packet traffic with larger packets. However, moving large packets may present a problem in restricted resource systems. Each transferred byte takes additional power, so systems that run under tight power constraints, for example battery-powered systems in small electronic devices, may experience operational difficulties due to the energy wasted in moving large packets. Further, buffer size limitations in some devices, for example simple wireless devices, may be limited in the lower protocol stack layers. As a result, there may not be adequate space to reassemble packets if the overall packet size has grown so substantially that a single message packet becomes highly fragmented.

[0060] Bluetooth™ currently specifies that HID message packets be sent utilizing a connection oriented protocol in L2CAP 204. A connection oriented protocol requires that messaging channels first be established before message packets may be sent. FIG. 6 discloses and example of the steps involved in this communication. Host A 600 and Host B 602 may first establish a link layer connection as shown at 604. After this initial low level connection, the connection channel must first be opened before message packets may be sent. At 606, a PAL_Channel_Connect_Request may be issued from Host A 600. This initial message may convey the channel ID information for the control and interrupt channels to Host B 602. After this message is received, Host B 602 may save the channel ID information and may respond with a PAL_Channel_Connect_Response message.

[0061] Once channels are established, message packets transmitted on a channel may be identified by the channel ID. More specifically, the transmitting device sets the channel ID of the receiving device to the HID packet it is transmitting. This way, the receiving device may not only distinguish between HID control and interrupt messages, but may also distinguish HID message packets from packets created by another profile. After the HID protocol messages are sent as shown at 606 in FIG. 6, the channels that were opened between Host A 600 and Host B 602 must be closed. However, in some cases this termination may be problematic. For example, a Bluetooth™ mouse may not immediately terminate connection because there may be continuous data exchange (e.g., as the mouse is moved) requiring a continuous LL and L2CAP (e.g., or PAL) channel connections. For devices that transmit data very infrequently, such as a remote control, there is no benefit in maintaining these continuous connections. More importantly, these continuous connections may negatively impact resource-constrained devices since each time a device sends messages it must first create a LL connection, L2CAP channels, send the data, close the L2CAP connection and then the LL connection. This is shown where PAL_Channel_Disconnect_Request is followed by PAL_Channel_Disconnect_Response. The link level connection may then terminate communication between the devices at 608.

[0062] While the aforementioned HID message packet conveyance process may be acceptable for WCD 100, it may be overly burdensome for less sophisticated devices. For example, the necessity to establish one or more wireless channels for particular types of messaging, and then the requirement to connect and disconnect these channels before sending message packets would require both processing and power resources. In many

simple devices both these resources are constrained, and therefore, the aforementioned PID message process, as set forth under Bluetooth™, is not optimized for these devices. Further, communication delays may become detrimental in the operation of devices that do not communicate on a regular or periodic basis, like a remote control. The duration of time needed for devices to establish lower level links and messaging channels every time a message is sent, and then subsequently closing these connections, may be prohibitive to spontaneous communication scenarios where immediate response is desired or required.

VI. Sending HID message packets utilizing attribute protocol

[0063] The present invention, in at least one embodiment, reduces the number of steps involved in conveying HID message packets, and as a result, may be more suitable for devices that, for example, are simple and/or resource-constrained, as well as devices that may require fast response to sporadic messaging. While Wibree™ will be described for the sake of explanation, the present invention is not limited to using in this wireless communication medium, and may also utilize Bluetooth™ or any other similar protocol.

[0064] Various embodiments of the present invention propose a fundamental change from the strategy utilized in the Bluetooth™ HID profile when implementing an HID profile in Wibree™. As previously described, the Bluetooth™ HID profile utilizes messaging controlled in L2CAP layer 204 that first requires the establishment of control and interrupt channels before conveying HID message packets. However, Wibree™ includes an attribute protocol that doesn't require the initial establishment of channels in PAL 224 before conveying a message. Therefore, using the attribute protocol may reduce overall communication burden, making it more appropriate for resource limited devices.

[0065] FIG. 7 discloses a variety of exemplary HID message packet structures in accordance with at least one embodiment of the present invention. A generic attribute packet created, for example by Wibree™ PAL 224, is shown at 700-704. Data payload 704 may be 28 bytes in length. The header portion of the exemplary attribute packet may include an attribute handle or a universally unique identifier (UUID) 702 that may be two bytes in length, as well as an operational code, or opcode 700, that is one byte in length. Opcode 700 relates to commands that may be interpreted by a receiving device. More specifically, opcode 700 may specify operations to be performed, the specification and format of which may be defined within the instruction set architecture (ISA) of the

receiving device. WCD 100 may utilize this information to process message packets without having to first establish messaging channels for different HID message types.

[0066] An exemplary embodiment of the present invention utilizing attribute handles is shown in FIG. 7 at 710-716. A packet utilizing attribute handle-value indication may include a data payload 716 of 27 bytes, a HID header 714 of one byte, an attribute handle 712 of two bytes and a one byte opcode 710. Attribute Handle 712 may utilize reserved values for control and interrupt message packets that may be exchanged and stored when two devices first encounter each other. After this initial exchange, HID message packets may be sent without having to first establish a control and interrupt channel. Instead, a receiving device may identify the type of HID message packet from the previously stored attribute handle 712 and then process the packet accordingly.

[0067] Alternatively, another configuration of HID packet usable with the exemplary proposed Wibree™ HID architecture is shown in FIG. 7 at 720-726. UUID 722 may replace attribute handle 712 in the attribute packet header. Otherwise, data payload 726, HID header 724 and opcode 720 may be similar to the examples disclosed above. In this approach, only a UUID 722 of the pipe (e.g., control or interrupt) is required. UUID 722 may include a universally defined reserved value (e.g., 0x0011 or 0x0013) each specifying a control and an interrupt message types. Devices using this exemplary packet configuration do not need to define attribute handles 712 for UUID 722, exchange attribute handles 712 with each other, or store attribute handles 712 of encountered devices. As a result, using UUID 722 directly may be especially beneficial for HID devices and/or hosts that may be connected to multiple HID devices, because the universal definition of UUID 722 removes the requirement of storing multiple attribute handles 712 specific to each encountered HID device. Further, as described with respect to the attribute handle packet configuration, no preconfigured PAL-level messaging channels are required since the packet type is determinable from UUID 722 alone.

VII. Communication strategy

[0068] The attribute handle and UUID packet configurations of FIG. 7 may result in more compact and efficient communication between devices. This, in turn, may allow for alternative device communication strategies customizable to different scenarios. FIG. 8 discloses three exemplary communication strategies in accordance with at least one embodiment of the present invention. The first strategy utilizes a continuous link layer

connection between devices. For example, a peripheral device may be wirelessly coupled to WCD 100 utilizing Wibree™. In this scenario, Master/HID host 800 may transmit packets at regular intervals. Slave/HID slave 802, aware this regular interval, may respond accordingly to each interval, or may skip some connection events if connection parameters enable a sleep mode. This strategy may be suitable where quick message response is required or devices are communicating constantly, and therefore, maintaining a continuous connection will help to maintain optimized communication performance.

[0069] The second example is a discontinuous link layer connection only when needed. HID host (initiator and master) 810 may request a connection by scanning for advertising information from HID device (advertiser and slave) 812. When the HID device has information to transmit, the HID may began to send advertising data which may be scanned by HID host 810. A connection may then be established by the initiator 810 in order to convey message packets between the devices. This type of link may be more appropriate for devices that communicate regularly, but not frequently enough to warrant the power expended in maintaining a continuous connection between the devices.

[0070] A third communication strategy may be most suitable for devices that communicate infrequently and/or spontaneously. For example, a remote control utilizing Wibree™ may fall within this category. HID host (scanner) 820 may scan at regular intervals for signals from HID device (advertiser) 822. HID device (advertiser) 822 may then transmit a broadcast signal whenever message packets are pending for transmission (e.g., in response to an action or event in HID device 822). One possible drawback to this strategy is that there is no acknowledgement that the broadcast has been received by HID host (scanner) 820. In at least one embodiment of the present invention, HID device 822 may repeat the broadcast message packets in a predetermined pattern in order to help ensure that the message packets being broadcast will be received by host (scanner) 822.

[0071] Now referring to FIG. 9, an exemplary activity flow for HID messages sent utilizing an attribute protocol in Wibree™ is disclosed in accordance with at least one embodiment of the present invention. As described with respect to FIG. 6, Host A 600 and Host B 602 may be coupled wirelessly via link level connection 604. However, in this example no channels are needed since an attribute protocol is being employed to communicate HID message packets instead of the previously described L2CAP controlled messaging as dictated by the Bluetooth™ HID profile. As disclosed at 900, only an HID

protocol message attribute is transmitted before the connection is terminated at 608. As a result, the communication of HID message packets may require fewer steps, conserving processing and energy resources, which may be beneficial in resource limited devices. A reduction in steps needed to send messages may also yield faster message processing, and therefore, faster response in a receiving device that increases overall system performance.

[0072] An exemplary flowchart in accordance with at least one embodiment of the present invention is disclosed in FIG. 10. Initially, a link level connection may be established in step 1000 via a wireless communication medium (e.g., Wibree™). The process may then wait in step 1002 to until an HID event is detected. An HID event may include, for example, a user interaction with a human interface device (e.g., typing on a keyboard, moving a mouse, activating a headset, etc.) It is important to note that while a connection is shown as being established before an HID event in the present example, it is also possible for the HID event to occur before the link, which may in turn trigger the establishment of a wireless connection in order to send HID message packets. At least one scenario wherein the HID event may occur first is an instance where the HID device is acting in a remote control mode. Irregular use may be more suitable for a broadcast-type connection such as discussed in FIG. 8, part C. When communication is sporadic, device resources may be conserved by only maintaining a wireless link when necessary.

[0073] Regardless of the step in the process during which a wireless connection may be established, an HID message packet may be formulated in response to the detected event as disclosed in step 1004. More specifically, the type and content of packet (e.g., control or interface) may be determined by the nature of the event. A determination may then be made in step 1006 as to whether packet fragmentation is required in view of the HID packet size, the limitations of the wireless communication medium being used, etc. If fragmentation is required, then in step 1008 fragmentation may occur at the HID profile level. Adjusting packet size at this high level allows the present invention, in accordance with at least one embodiment, to avoid reliance on the L2CAP 204 or PAL 224 protocol levels for packet resizing. Regardless of whether packet fragmentation is required, the exemplary process may then proceed to step 1010, wherein the one or more HID message packets may be prepared for transmission using an attribute protocol by attaching header data usable for identification and routing purposes.

[0074] In step 1010 a determination may be made as to whether the one or more message packets are associated with HID control messages or interrupt messages. If the one or more message packets are part of an HID interrupt message, then in step 1012 a UUID 722 or attribute handle 712 may be added to the one or more message packets identifying them as interrupt packets. Alternatively, if the one or more message packets are part of a HID control message, then in step 1014 a UUID 722 or attribute handle 712 header may be added to the one or more message packets idcntifying thcm as part of control message. In either case, steps 1012 or 1014 may proceed to step 1016 so that an opcode (e.g., 710) may be added to each header of the one or more message packets.

[0075] If the one or more message packets are being sent as part of a broadcast message (e.g., no acknowledgement will be received), then it may be appropriate to execute a repeat pattern in order to increase the likelihood that the one or more message packets will be received. A determination as to the message strategy to be employed may be made in step 1018. If the message is not a broadcast message (e.g., the one or more message packets are being conveyed utilizing a continuous link layer or discontinuous link layer connection), the process may send the message (including the transmission of the one or more message packets and the receipt of corresponding acknowledgements from the receiving device) in step 1020 and then resume again at step 1000 awaiting the detection of new HID events requiring the generation of HID message packets. However, if in step 1018 the one or more message packets are determined to be part of a broadcast message, then in step 1022 the one or more message packets may be sent in accordance with a predetermined repeat pattern, after which the process may return to step 1000 to await the detection of new HID events requiring the generation of HID message packets.

[0076] Accordingly, it will be apparent to persons skilled in the relcvant art that various changes in forma and detail can be made therein without departing from the spirit and scope of the invention. The breadth and scope of the present invention should not be limited by any of the above-described exemplary embodiments, but should be defined only in accordance with the following claims and their equivalents.

WHAT IS CLAIMED:

1. A method, comprising:

establishing a link level connection over a wireless communication medium;

detecting an event requiring human interface device (HID) profile based communication;

determining a type for one or more HID message packets based on the event;

creating the one or more message packets at the HID profile level of a protocol stack for the wireless communication medium, each of the one or more message packets comprising a HID header field and a data payload field;

adding an attribute header corresponding to the determined type to each of the one or more message packets; and

sending the one or more message packets via the wireless communication medium.

2. The method of claim 1, wherein creating the one or more message packets includes a determination as to whether the one or more message packet requires fragmentation.

3. The method of claim 1, wherein determining a type includes determining whether the one or more message packets are control message packets or interrupt message packets.

4. The method of claim 1, wherein the attribute header includes at least opcode information.

5. The method of claim 4, wherein the attribute header further includes either attribute handle information or universally unique identifier (UUID) information.

6. The method of claim 5, wherein adding an attribute header comprises including the opcode information and either the attribute handle information or the UUID

information in each attribute header, the attribute handle information and the UUID information identifying each message packet as a control message packet or an interrupt message packet.

7. The method of claim 1, wherein sending the one or more message packets does not require any pre-established profile adaptation layer (PAL) communication channels.

8. The method of claim 1, wherein sending the one or more message packets further comprises receiving an acknowledgement for the one or more message packets.

9. The method of claim 1, wherein sending the one or more packets further comprises broadcasting the one or more packets without receiving acknowledgement.

10. The method of claim 9, wherein broadcasting the one or more message packets includes repeating the one or more message packets in a predetermined pattern.

11. A computer program product comprising a computer usable medium having computer readable program code embodied in said medium, comprising:

a computer-readable program code configured to establish a link level connection over a wireless communication medium;

a computer-readable program code configured to detect an event requiring human interface device (HID) profile based communication;

a computer-readable program code configured to determine a type for one or more HID message packets based on the event;

a computer-readable program code configured to create the one or more message packets at the HID profile level of a protocol stack for the wireless communication medium, each of the one or more message packets comprising a HID header field and a data payload field;

a computer-readable program code configured to add an attribute header corresponding to the determined type to each of the one or more message packets; and

a computer-readable program code configured to send the one or more message packets via the wireless communication medium.

12. The computer program product of claim 11, wherein creating the one or more message packets includes a determination as to whether the one or more message packet requires fragmentation.

13. The computer program product of claim 11, wherein determining a type includes determining whether the one or more message packets are control message packets or interrupt message packets.

14. The computer program product of claim 11, wherein the attribute header includes at least opcode information.

15. The computer program product of claim 14, wherein the attribute header further includes either attribute handle information or universally unique identifier (UUID) information.

16. The computer program product of claim 15, wherein adding an attribute header comprises including the opcode information and either the attribute handle information or the UUID information in each attribute header, the attribute handle information and the UUID information identifying each message packet as a control message packet or an interrupt message packet.

17. The computer program product of claim 11, wherein sending the one or more message packets does not require any pre-established profile adaptation layer (PAL) communication channels.

18. The computer program product of claim 11, wherein sending the one or more message packets further comprises receiving an acknowledgement for the one or more message packets.

19. The computer program product of claim 11, wherein sending the one or more packets further comprises broadcasting the one or more packets without receiving acknowledgement.

20. The computer program product of claim 19, wherein broadcasting the one or more message packets includes repeating the one or more message packets in a predetermined pattern.

21. A module, comprising:

at least one communication component coupled to an antenna array, and

at least one processing component coupled to the communication component, the at least one processing component being configured to:

establish a link level connection over a wireless communication medium;

detect an event requiring human interface device (HID) profile based communication;

determine a type for one or more HID message packets based on the event;

create the one or more message packets at the HID profile level of a protocol stack for the wireless communication medium, each of the one or more message packets comprising a HID header field and a data payload field;

add an attribute header corresponding to the determined type to each of the one or more message packets; and

send the one or more message packet via the wireless communication medium.

22. A device, comprising:

at least one communication module; and

at least one processor coupled to the communication module, the at least one processor being configured to:

establish a link level connection over a wireless communication medium;

detect an event requiring human interface device (HID) profile based communication;

determine a type for one or more HID message packets based on the event;

create the one or more message packets at the HID profile level of a protocol stack for the wireless communication medium, each of the one or more message packets comprising a HID header field and a data payload field;

add an attribute header corresponding to the determined type to each of the one or more message packets; and

send the one or more message packet via the wireless communication medium.

23. The device of claim 22, wherein determining a type includes determining whether the one or more message packets are control message packets or interrupt message packets.

24. A device, comprising:

means for establishing a link level connection over a wireless communication medium;

means for detecting an event requiring human interface device (HID) profile based communication;

means for determining a type for one or more HID message packets based on the event;

means for creating the one or more message packets at the HID profile level of a protocol stack for the wireless communication medium, each of the one or more message packets comprising a HID header field and a data payload field;

means for adding an attribute header corresponding to the determined type to each of the one or more message packets; and

means for sending the one or more message packets via the wireless communication medium.

25. The device of claim 24, wherein determining a type includes determining whether the one or more message packets are control message packets or interrupt message packets.

26. A system comprising:

at least one host device; and

at least one human interface device (HID);

the at least one HID device establishing a link level connection with the at least one host device over a wireless communication medium;

the at least one HID device detecting an event requiring human interface device (HID) profile based communication;

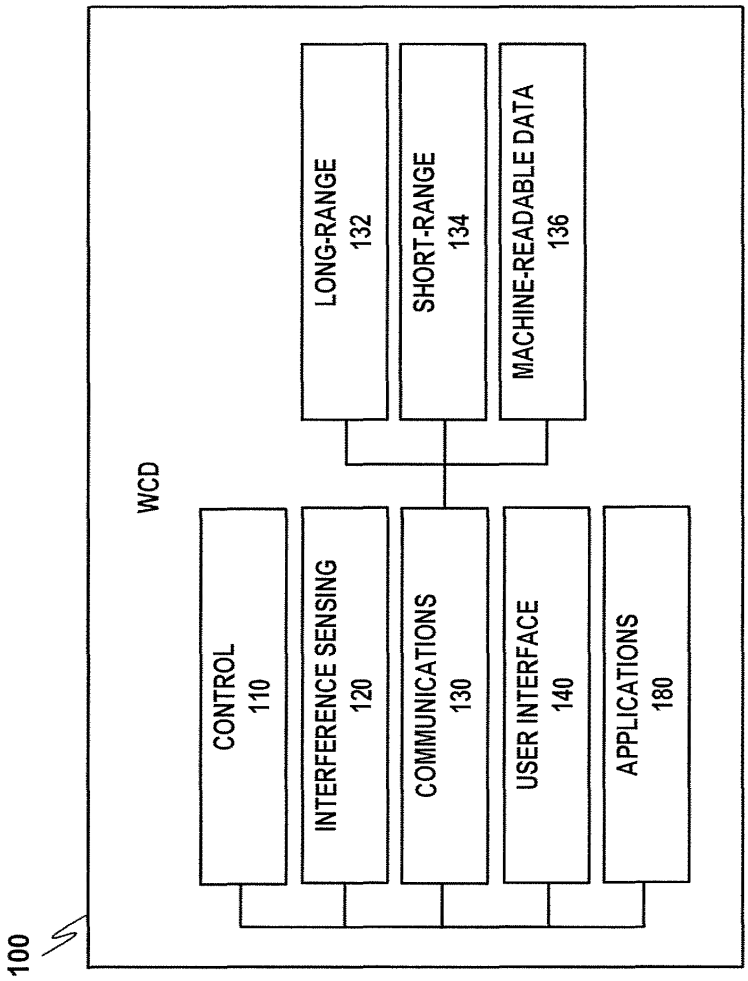
the at least one HID device determining a type for one or more HID message packets based on the event;

the at least one HID device creating the one or more message packets at the HID profile level of a protocol stack for the wireless communication medium, each of the one or more message packets comprising a HID header field and a data payload field;

the at least one HID device adding an attribute header corresponding to the determined type to each of the one or more message packets; and

the at least one HID device sending the one or more message packets to the at least one host device via the wireless communication medium.

FIG. 1A



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FIG. 1B

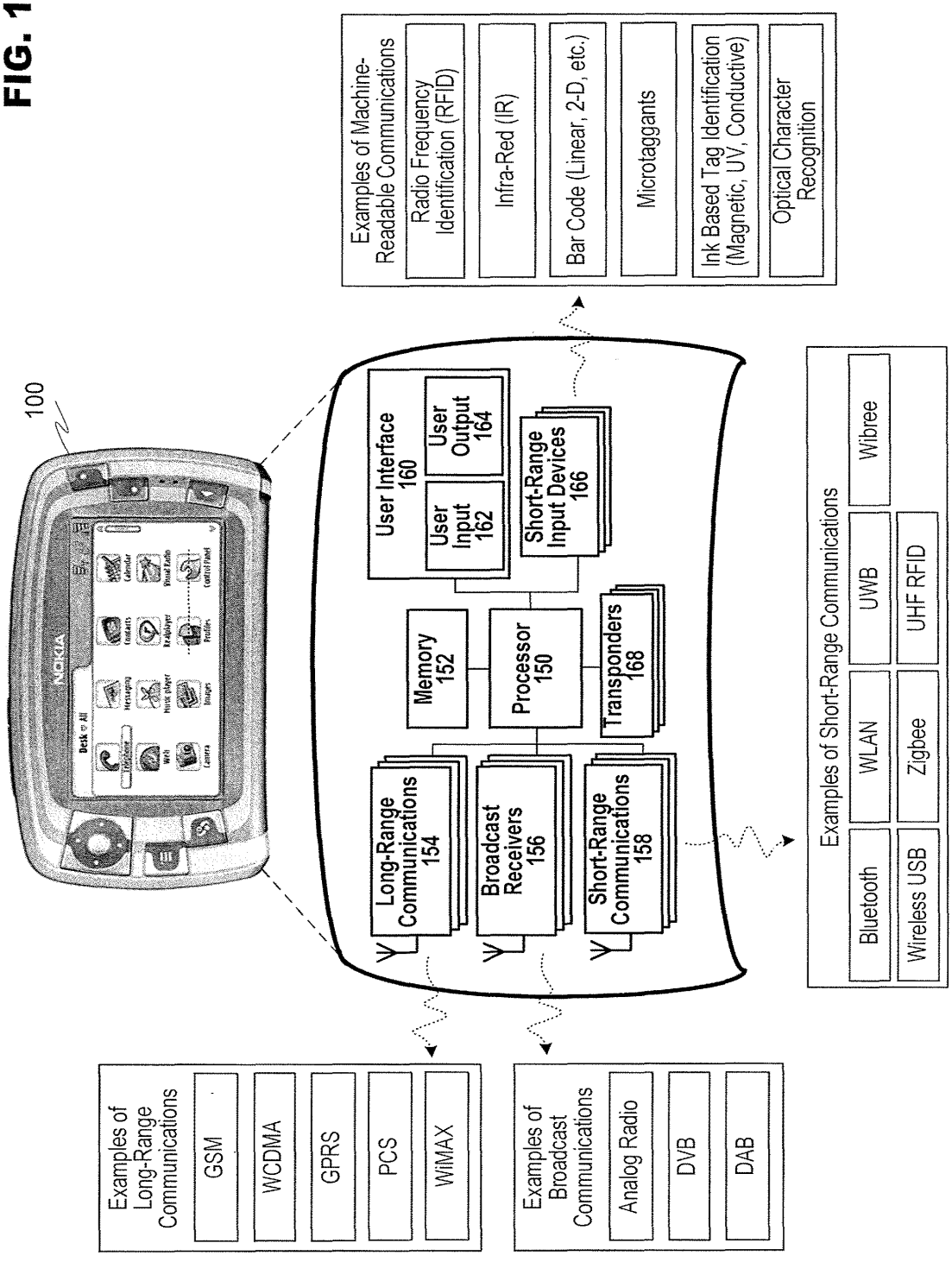
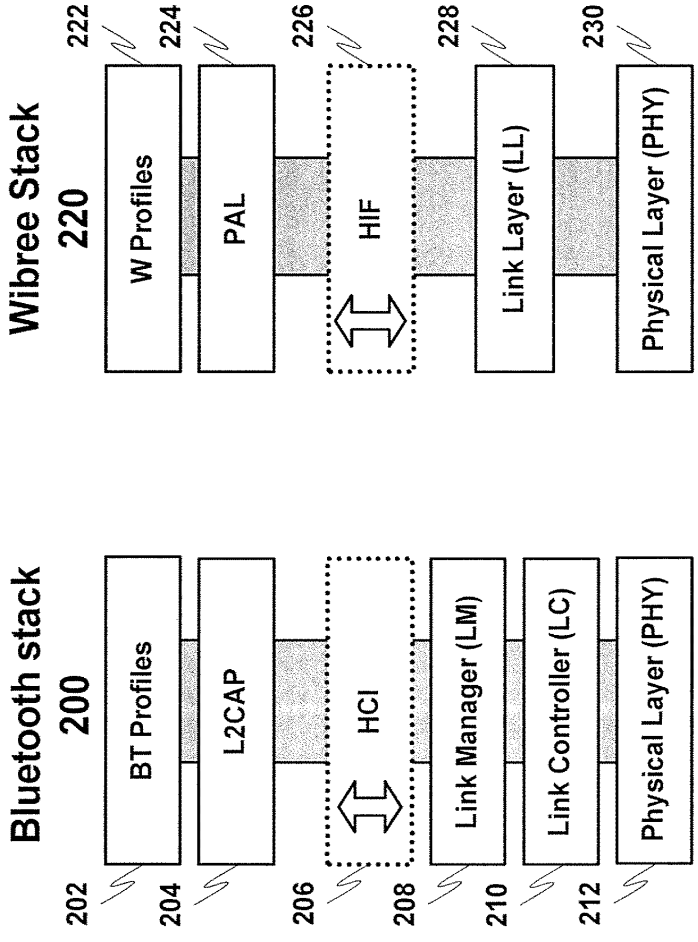

100
Examples of Machine-Readable Communications
Radio Frequency Identification (RFID)
Infra-Red (IR)
Bar Code (Linear, 2-D, etc.)
Microtaggants
Ink Based Tag Identification (Magnetic, UV, Conductive)
Optical Character Recognition
User Interface 160
User Input 162
User Output 164
Short-Range Input Devices 166
Memory 152
Processor 150
Transponders 168
Long-Range Communications 154
Broadcast Receivers 156
Short-Range Communications 158
Examples of Short-Range Communications
Bluetooth
WLAN
UWB
Wibree
Wireless USB
Zigbee
UHF RFID
Examples of Long-Range Communications
GSM
WCDMA
GPRS
PCS
WiMAX
Examples of Broadcast Communications
Analog Radio
DVB
DAB

FIG. 2



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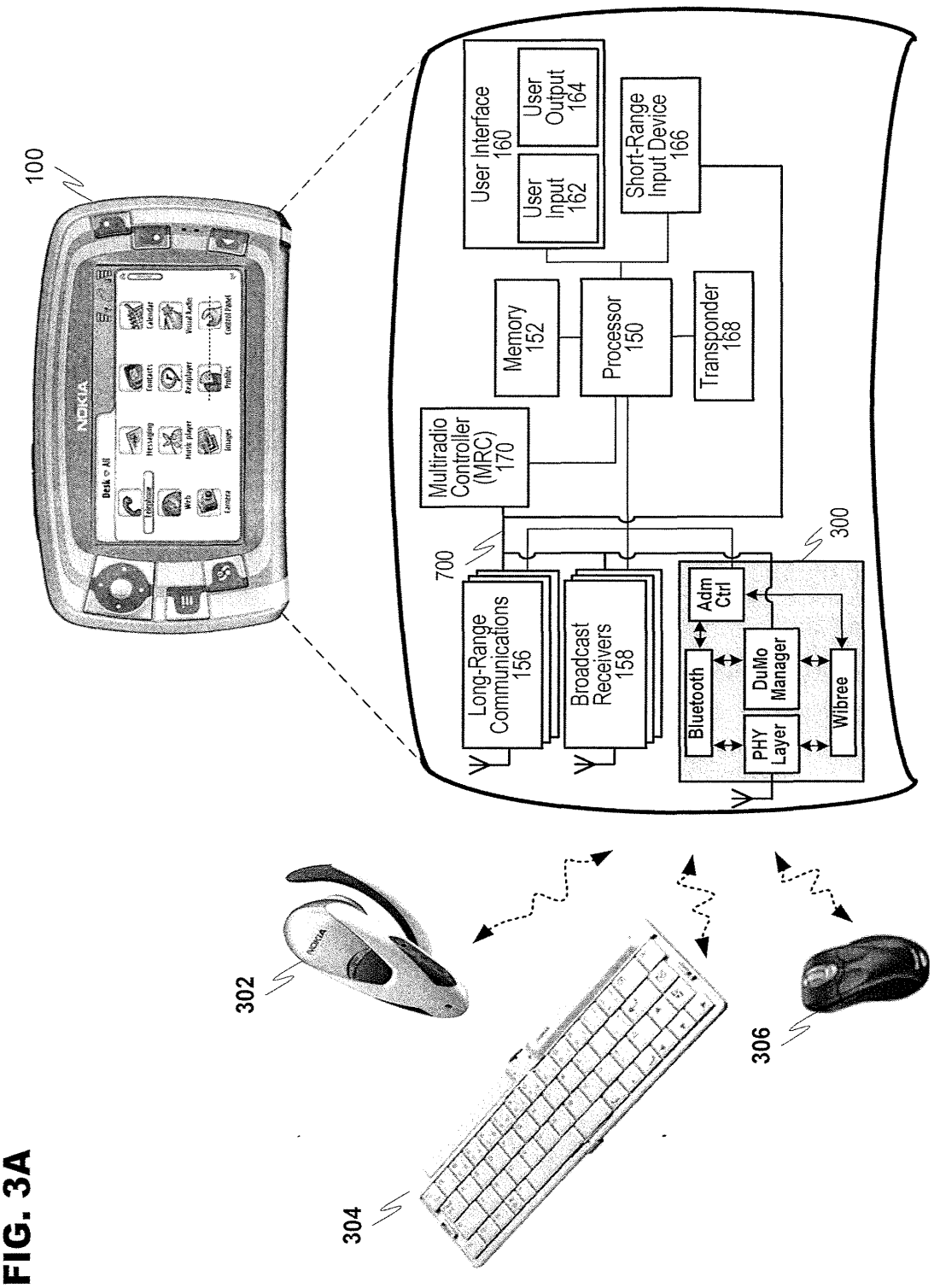

100
User Interface 160
User Input 162
User Output 164
Short-Range Input Device 166
Memory 152
Processor 150
Transponder 168
Multiradio Controller (MRC) 170
700
300
Long-Range Communications 156
Broadcast Receivers 158
Adm Ctrl
Bluetooth
DuMo Manager
PHY Layer
Wibree
302
304
306

FIG. 3A

FIG. 3B

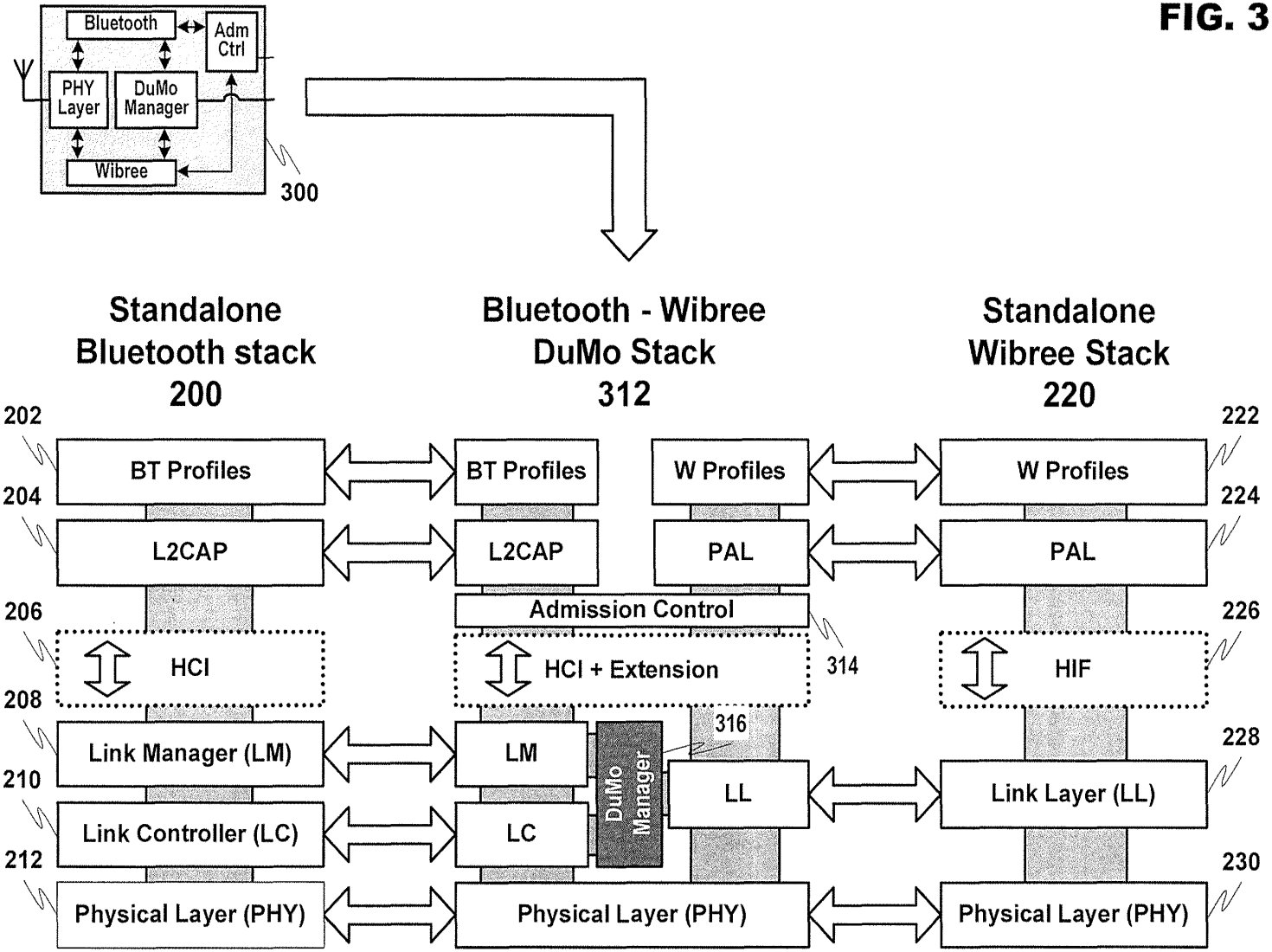
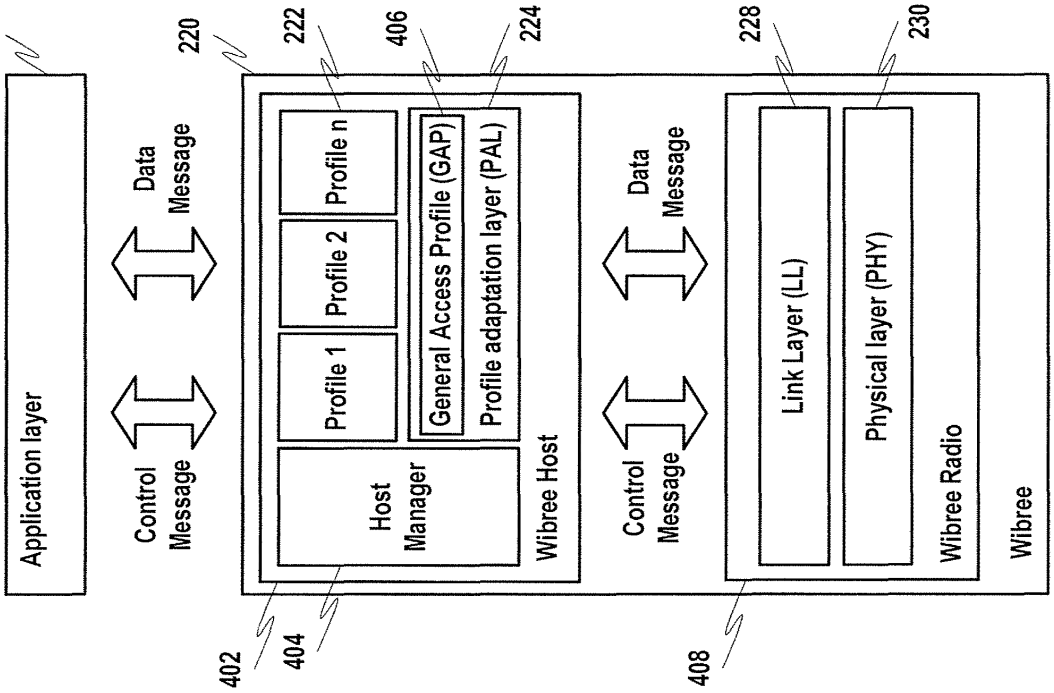
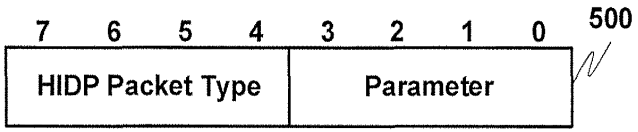

Bluetooth
Adm Ctrl
PHY Layer
DuMo Manager
Wibree
300
Standalone Bluetooth stack 200
Bluetooth - Wibree DuMo Stack 312
Standalone Wibree Stack 220
202
222
BT Profiles
BT Profiles
W Profiles
W Profiles
204
224
L2CAP
L2CAP
PAL
PAL
206
Admission Control
226
HCI
HCI + Extension
314
HIF
208
316
228
Link Manager (LM)
LM
DuMo Manager
LL
Link Layer (LL)
210
Link Controller (LC)
LC
212
230
Physical Layer (PHY)
Physical Layer (PHY)
Physical Layer (PHY)

FIG. 4



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FIG. 5A



502

Hex	Packet Type	Sent By	Payload Length (Bytes)
0	HANDSHAKE	Device	1
1	HID_CONTROL	Device and Host	1
2-3	Reserved	N/A	
4	GET_REPORT	Host	1 to 4
5	SET_REPORT	Host	1 + Report data payload
6	GET_PROTOCOL	Host	1
7	SET_PROTOCOL	Host	1
8	Reserved	N/A	
9	Reserved	N/A	
A	DATA	Device and Host	1 + Report data payload
B	DATAC	Device and Host	1 + Continuation of report data payload
C-F	Reserved	N/A	

FIG. 5B

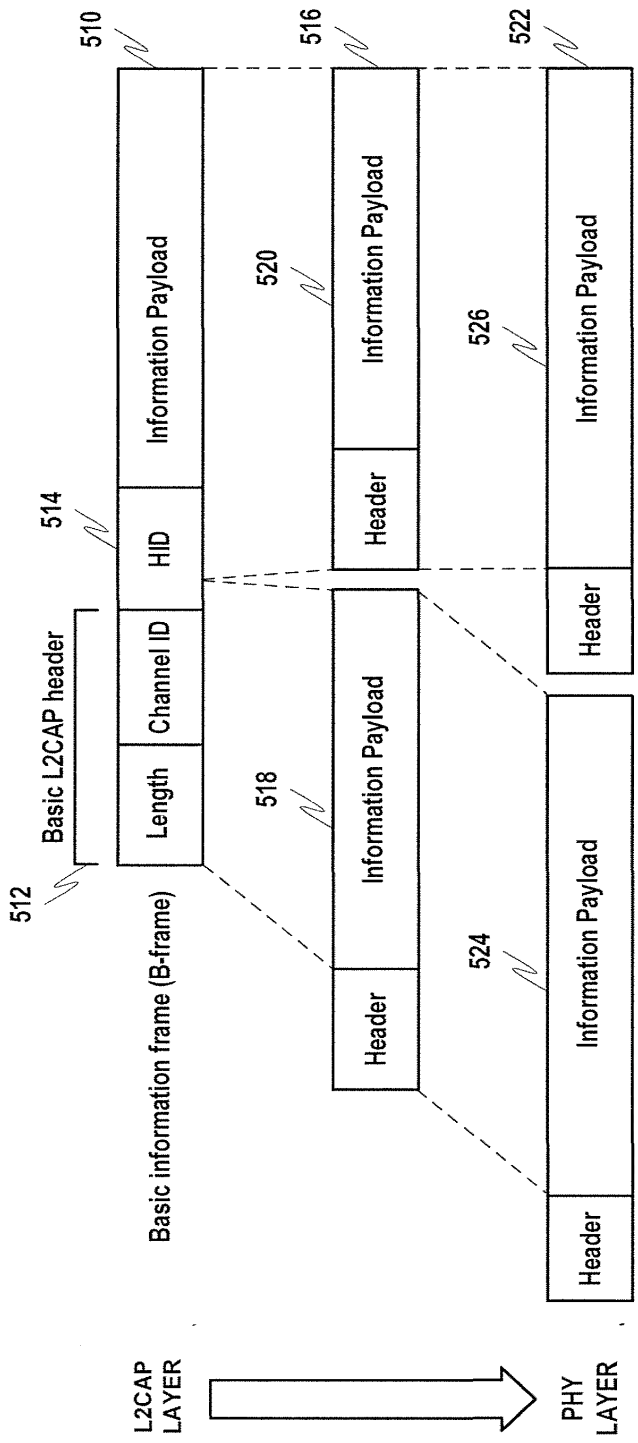
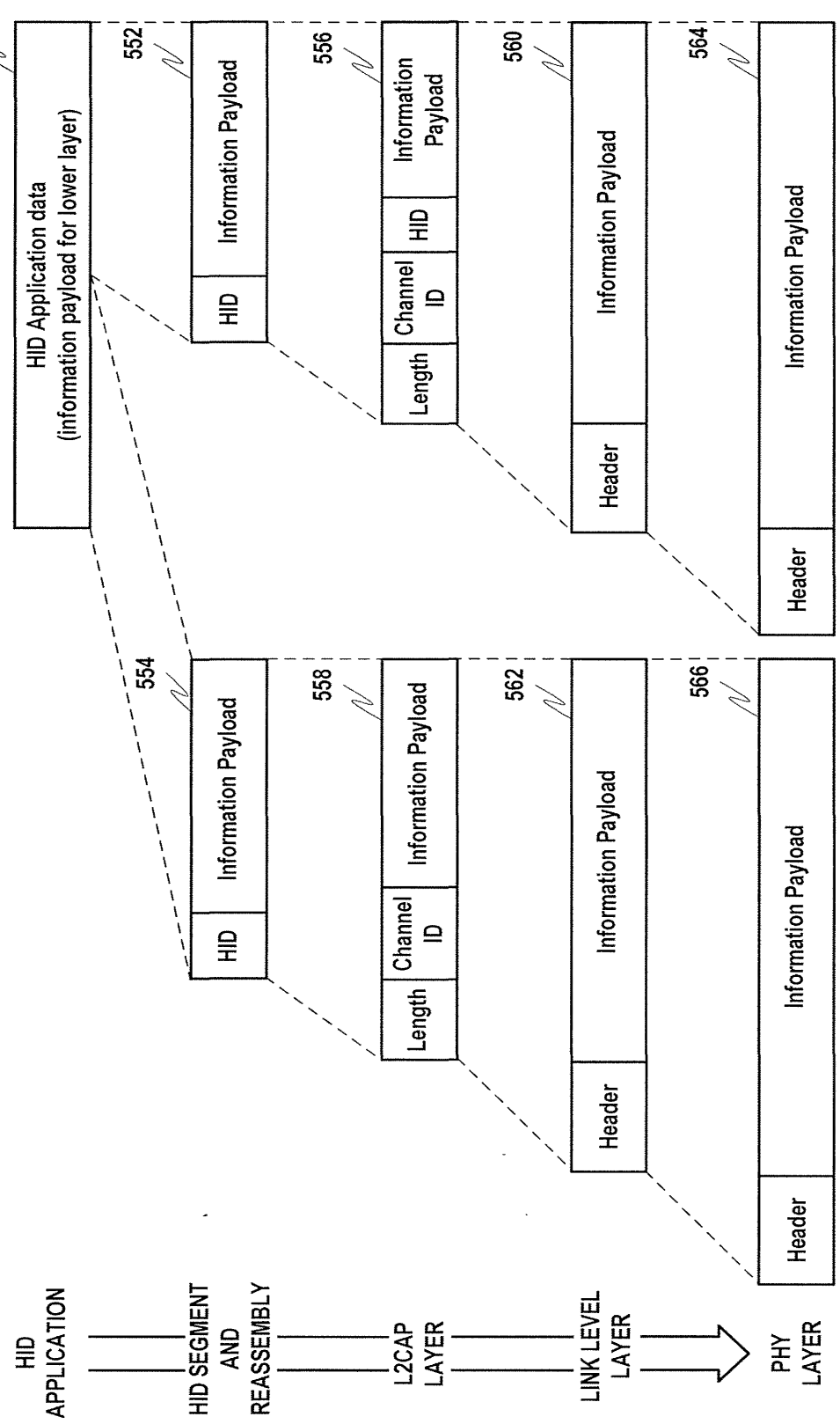

510
516
522
514
520
526
Information Payload
Information Payload
Information Payload
HID
Header
Header
Basic L2CAP header
Length
Channel ID
518
524
512
Information Payload
Information Payload
Header
Header
Basic information frame (B-frame)
L2CAP LAYER
PHY LAYER

FIG. 5C



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FIG. 6

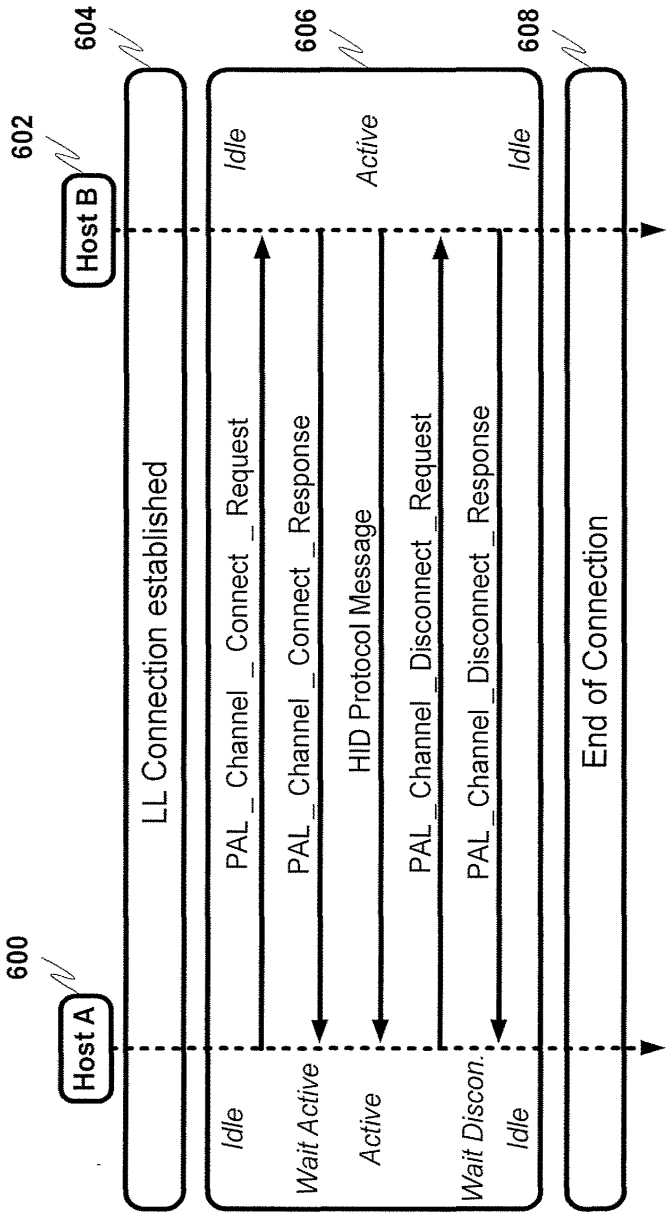
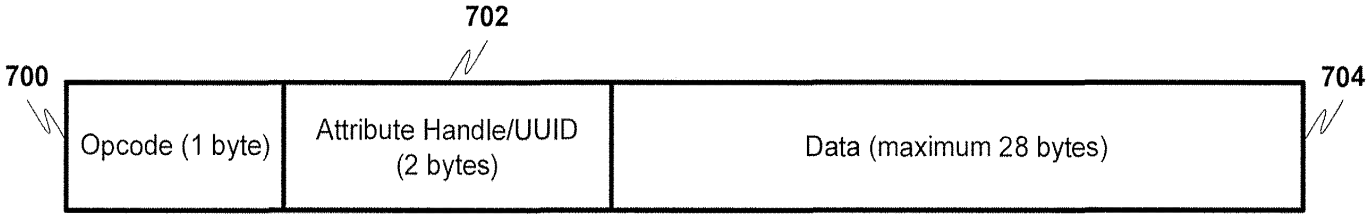
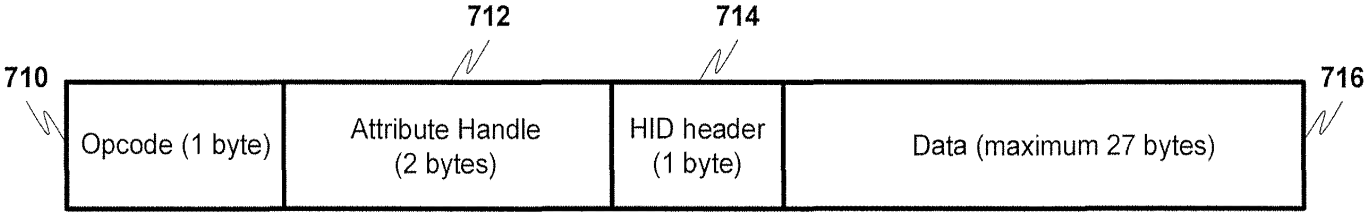

600
602
604
606
608
Host A
Host B
LL Connection established
Idle
Wait Active
Active
Wait Discon.
Idle
PAL_Channel_Connect_Request
PAL_Channel_Connect_Response
HID Protocol Message
PAL_Channel_Disconnect_Request
PAL_Channel_Disconnect_Response
Idle
Active
Idle
End of Connection

FIG. 7

ATTRIBUTE PACKET:



ATTRIBUTE HANDLE-VALUE INDICATION (CODE 0X90):



ATTRIBUTE UUID-16-VALUE INDICATION (CODE 0X91):

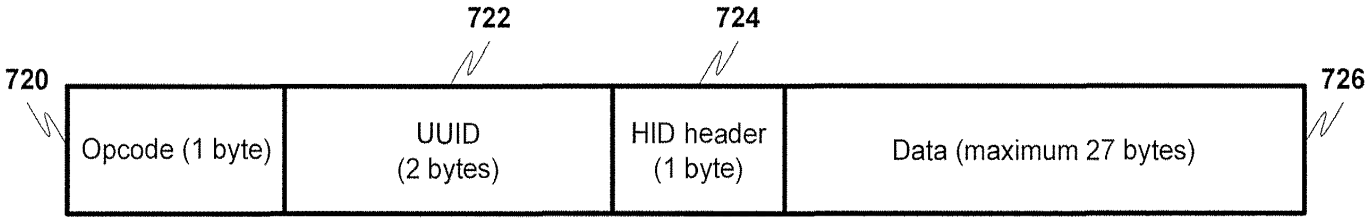


FIG. 8

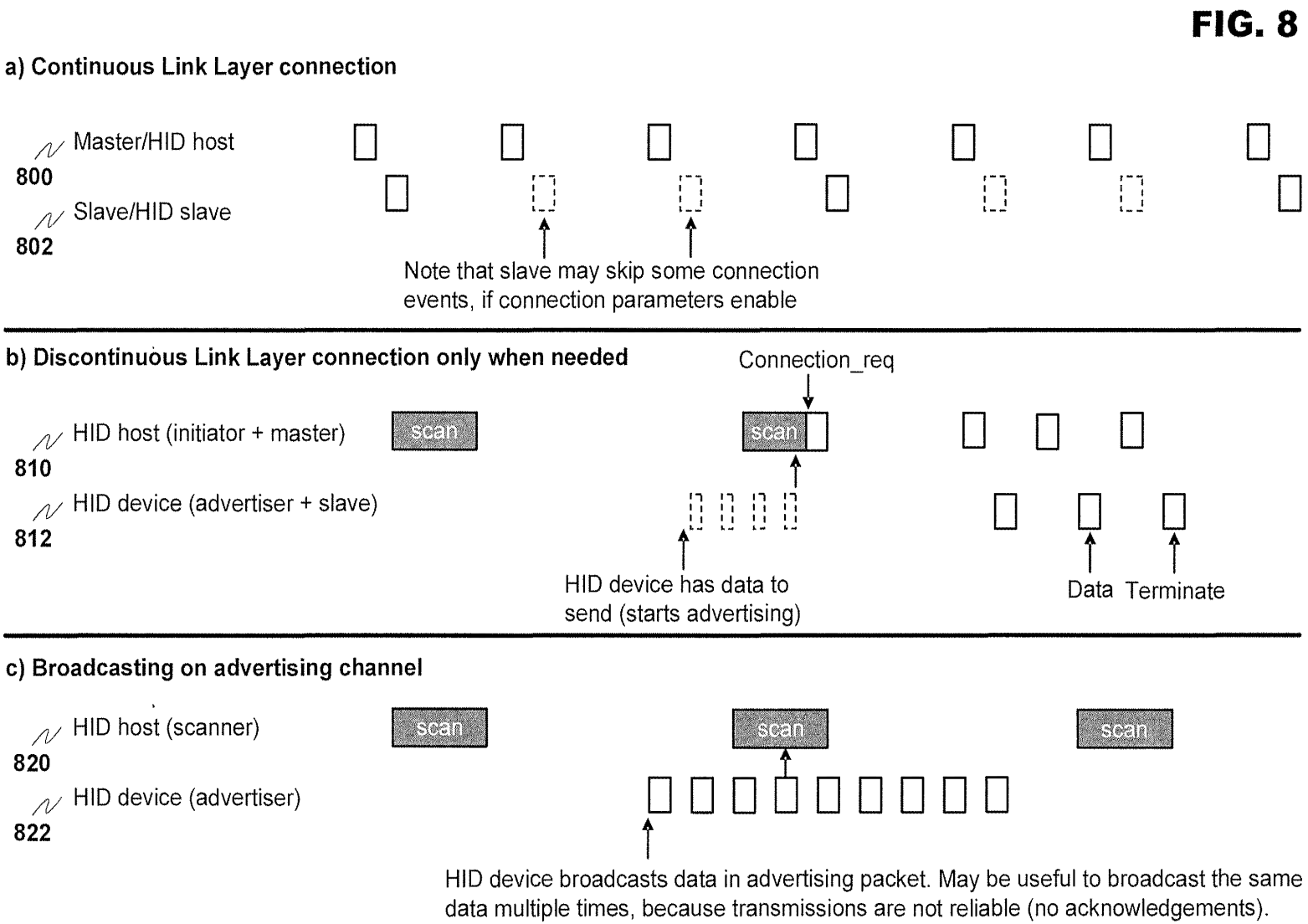

a) Continuous Link Layer connection
Master/HID host
800
Slave/HID slave
802
Note that slave may skip some connection events, if connection parameters enable
b) Discontinuous Link Layer connection only when needed
Connection_req
HID host (initiator + master)
scan
scan
810
HID device (advertiser + slave)
812
HID device has data to send (starts advertising)
Data
Terminate
c) Broadcasting on advertising channel
HID host (scanner)
scan
scan
scan
820
HID device (advertiser)
822
HID device broadcasts data in advertising packet. May be useful to broadcast the same data multiple times, because transmissions are not reliable (no acknowledgements).

FIG. 9

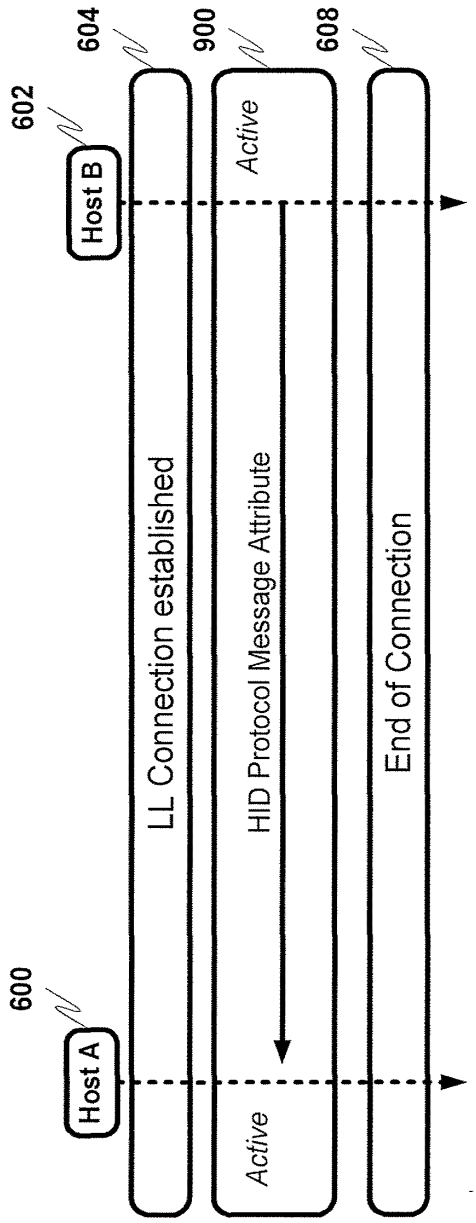
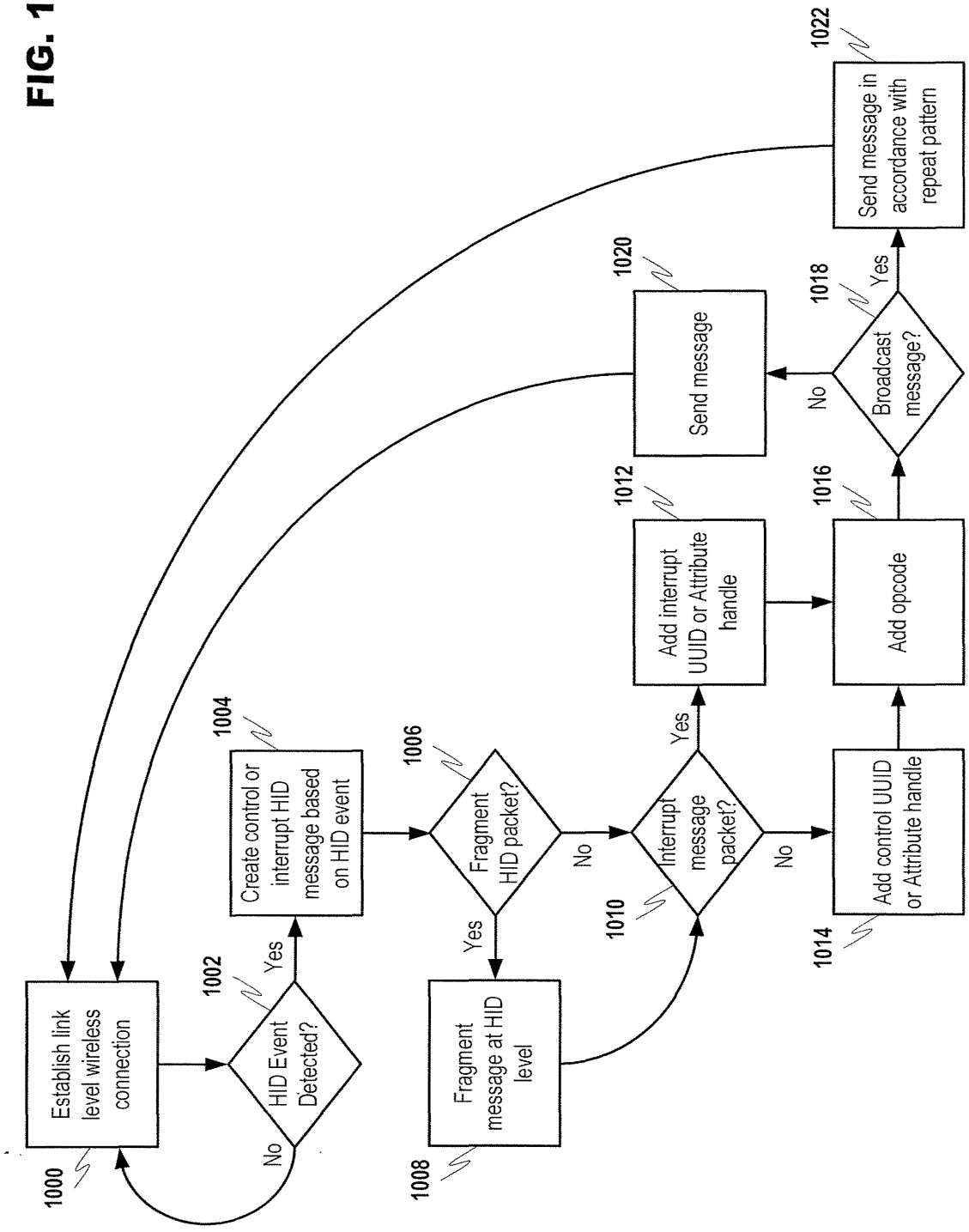

600
602
604
900
608
Host A
Host B
LL Connection established
HID Protocol Message Attribute
End of Connection
Active
Active

FIG. 10



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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2007/054621

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L12/28 H04L12/56

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CRAIG RANTA ET AL: "Human Interface Device (HID) Profile 1.0" INTERNET CITATION, 22 May 2003 (2003-05-22), pages 1-123, XP002486381 [retrieved on 2003-05-22] paragraph [05.4] paragraph [07.1] paragraph [07.3] paragraph [7.5.1] paragraph [07.6] ----- -/--	1-26

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 July 2008	24/07/2008

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Rothlübbers, C

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2007/054621

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	"Ultra Low Power (ULP) Bluetooth Technology"[Online] 9 August 2007 (2007-08-09), pages 1-29, XP002487550 Retrieved from the Internet: URL:http://www.ndc.fi/images/pdf%20tiedostot/Bluetooth%20Ultra%20Low%20Power%20(ULP).pdf> [retrieved on 2008-07-09] the whole document	1-26

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

PATENTS
111054–0001U4C7
1005-007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of:
James A. Proctor, Jr., et al.

Serial No.: 15/271,410

Filed: September 21, 2016

For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Examiner: Not yet assigned

Art Unit: Not yet assigned

Confirmation No.: 7653

Cesari and McKenna, LLP
88 Black Falcon Avenue
Boston, MA 02210
September 29, 2016

CERTIFICATE OF TRANSMISSION

I hereby certify that the following paper is being electronically transmitted to the Patent and Trademark Office by EFS-Web on September 29, 2016.

/Stephany DeBlois/
Stephany DeBlois

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

INFORMATION DISCLOSURE STATEMENT

In keeping with the duty of candor and good faith owed to the Patent and Trademark Office, Applicant wishes to bring to the Examiner's attention the references

listed on the accompanying form PTO-1449. A copy of each listed foreign and non-patent literature reference is enclosed.

To the extent required by 37 C.F.R. §1.98(a)(3), Applicant has described what they consider to be the relevance, and/or provided an English translation, of any non-English-language documents, or portion thereof.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

/David J Thibodeau Jr Reg No 31671/

David J. Thibodeau, Jr.
Reg. No. 31,671
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210
Telephone: (617) 951-2500
Facsimile: (617) 951-3927

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/271,410	09/21/2016	James Arthur Proctor JR.	111054-0001U4C7

CONFIRMATION NO. 7653

24267
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210

FORMALITIES LETTER

OC000000086194445

Date Mailed: 10/04/2016

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing.

Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **70** surcharge.
- $(**0**) previous unapplied payment amount.
- $ **70** TOTAL FEE BALANCE DUE.

Items Required To Avoid Processing Delays:

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):

James Arthur Proctor JR.
James Arthur Proctor III

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/tlulu/

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/271,410

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	30 minus 20 =	* 10	x 40 =	400	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	1130		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/271,410	09/21/2016	2642	1130	111054-0001U4C7	30	3

CONFIRMATION NO. 7653

24267
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210

FILING RECEIPT

OC000000088194444

Date Mailed: 10/04/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

James Arthur Proctor JR., Indialantic, FL;
James Arthur Proctor III, Indialantic, FL;

Applicant(s)

Proxicom Wireless, LLC, Indialantic, FL;

Power of Attorney: The patent practitioners associated with Customer Number 24267

Domestic Priority data as claimed by applicant

This application is a CON of 14/861,563 09/22/2015
which is a CON of 14/472,477 08/29/2014 PAT 9161164
which is a CON of 13/775,435 02/25/2013 PAT 8849698
which is a CON of 13/212,723 08/18/2011 PAT 8385896
which is a CON of 12/364,828 02/03/2009 PAT 8090359
which claims benefit of 61/095,001 09/08/2008
and claims benefit of 61/095,359 09/09/2008

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 09/30/2016
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/271,410**
Projected Publication Date: 01/12/2017
Non-Publication Request: No
Early Publication Request: No
**** SMALL ENTITY ****
Title

EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Preliminary Class

455

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PATENTS
111054–0001U4C7
1005-007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of:
James A. Proctor, Jr., et al.

Serial No.: 15/271,410

Examiner: Not yet assigned

Filed: September 21, 2016

Art Unit: 2642

For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Confirmation No.: 7653

Cesari and McKenna, LLP
88 Black Falcon Avenue
Boston, MA 02210
November 10, 2016

CERTIFICATE OF TRANSMISSION

I hereby certify that the following paper is being electronically transmitted to the Patent and Trademark Office by EFS-Web on November 10, 2016.

/Stephany DeBlois/
Stephany DeBlois

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

RESPONSE TO NOTICE TO FILE MISSING PARTS OF APPLICATION

Enclosed in response to the Notice to File Missing Parts of Application-Filing Date Granted mailed October 4, 2016, are executed Declarations and a Statement

Claiming Small Entity Status; along with Authorization to charge our Deposit Account No. 03-1237 $70 to cover the filing fee and surcharge for this Response.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

/David J Thibodeau Jr Reg No 31671/
David J. Thibodeau, Jr.
Reg. No. 31,671
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210
Telephone: (617) 951-2500
Facsimile: (617) 951-3927

PATENTS
111054–0001U4C7
1005-007

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)	
TITLE OF INVENTION	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

As the below-named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 15/271,410 filed on September 21, 2016.

The above-identified application was made or authorized to be made by me.

I believe I am the original inventor or an original joint inventor of a claimed invention in the application entitled EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED, the specification of which was filed on September 21, 2016, as United States Application Number 15/271,410.

I hereby state that I have reviewed and understand the contents of the above-identified application specification, including the claims, as amended by any amendment specifically referred to herein.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in §1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

LEGAL NAME OF INVENTOR	
Inventor: James Arthur Proctor Jr.	Date (Optional):
Signature: James A Proctor Jr	

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional form for each additional inventor.

PATENTS
111054-0001U4C7
1005-007

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)	
TITLE OF INVENTION	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

As the below-named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number *15/271,410* filed on September 21, 2016.

The above-identified application was made or authorized to be made by me.

I believe I am the original inventor or an original joint inventor of a claimed invention in the application entitled EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED, the specification of which was filed on September 21, 2016, as United States Application Number 15/271,410.

I hereby state that I have reviewed and understand the contents of the above-identified application specification, including the claims, as amended by any amendment specifically referred to herein.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in §1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

LEGAL NAME OF INVENTOR

Inventor: James Arthur Proctor III Date (Optional): 11/9/2016

Signature: James A Proctor III

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional form for each additional inventor.

STATEMENT CLAIMING SMALL ENTITY STATUS
(37 CFR § 1.27(a))-SMALL BUSINESS CONCERN

DOCKET NUMBER: 111054-0001U4C7

Applicant or Patentee: Proxicom Wireless, LLC
Application or Patent No.: 15/271,410
Filed or Issued: September 21, 2016
Title: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

I hereby state that I am

☐ the owner of the small business concern identified below:

☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN Proxicom Wireless, LLC
ADDRESS OF SMALL BUSINESS CONCERN 1680 N. Riverside Dr., Indialantic, FL 32903

I hereby state that the above identified small business concern qualifies as a small business concern as defined in 13 CFR Part 121 for purposes of paying reduced fees to the United States Patent and Trademark Office. Questions related to size standards for a small business concern may be directed to: Small Business Administration, Size Standards Staff, 409 Third Street, SW, Washington, DC 20416 or you may call 202-205-6618.

I hereby state that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

☐ the specification filed herewith with title as listed above.

☒ the application identified above.

☐ the patent identified above.

If the rights held by the above identified small business concern are not exclusive, each person, concern or organization having rights in the invention must file separate statements as to their status as small entities. No rights to the invention are held by any person who would not qualify as a person under 37 CFR 1.27(a)(1), or by any concern which would not qualify as a small business concern under 37 CFR 1.27(a)(2), or a nonprofit organization under 37 CFR 1.27(a)(3).

Each additional person, concern or organization having any rights in the invention is listed below:

☒ no such person, concern, or organization exists.

☐ each such person, concern, or organization is listed below.

Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities.

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.27(g)(2))

NAME OF PERSON SIGNING James A. Proctor, Jr.

TITLE OF PERSON IF OTHER THAN OWNER Managing Director, Proxicom Wireless, LLC

ADDRESS OF PERSON SIGNING Proxicom Wireless, LLC, 1680 N. Riverside Dr., Indialantic, FL 32903

SIGNATURE James A Proctor Jr DATE 11/9/2016

1185250.1

Electronic Patent Application Fee Transmittal

Application Number:	15271410
Filing Date:	21-Sep-2016
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Filer:	David J. Thibodeau/stephany deblois
Attorney Docket Number:	111054-0001U4C7

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	2051	1	70	70
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**70**

Electronic Acknowledgement Receipt	
EFS ID:	27470154
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	24267
Filer:	David J. Thibodeau/stephany deblois
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	10-NOV-2016
Filing Date:	21-SEP-2016
Time Stamp:	11:15:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$70
RAM confirmation Number	111016INTEFSW00010657031237
Deposit Account	031237
Authorized User	Stephany DeBlois
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	2A88785.PDF	17781 aaa74e1af8b3ae15a1ee7b48cfed7ee2f4a8dadc	no	2
Warnings:					
Information:					
2	Oath or Declaration filed	2A88773.PDF	230929 ca9f8a7d484a7e9f3118c55a815f3996109dcd4a	no	2
Warnings:					
Information:					
3	Assertion of entitlement to small entity status	2A88733.PDF	40851 7ffb8aca99919f3afa91b145c11e8ffa5b93a0d5	no	1
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30523 bec4e58bd69436da39f82092b11da03357fb4136	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	320084		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/271,410	09/21/2016	3622	1200	111054-0001U4C7	30	3

CONFIRMATION NO. 7653

UPDATED FILING RECEIPT

24267
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210

OC000000087246174

Date Mailed: 11/17/2016

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

James Arthur Proctor JR., Indialantic, FL;
James Arthur Proctor III, Indialantic, FL;

Applicant(s)

Proxicom Wireless, LLC, Indialantic, FL;

Power of Attorney: The patent practitioners associated with Customer Number 24267

Domestic Priority data as claimed by applicant

This application is a CON of 14/861,563 09/22/2015 ABN
which is a CON of 14/472,477 08/29/2014 PAT 9161164
which is a CON of 13/775,435 02/25/2013 PAT 8849698
which is a CON of 13/212,723 08/18/2011 PAT 8385896
which is a CON of 12/364,828 02/03/2009 PAT 8090359
which claims benefit of 61/095,001 09/08/2008
and claims benefit of 61/095,359 09/09/2008

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 09/30/2016
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/271,410**
Projected Publication Date: 01/12/2017
Non-Publication Request: No
Early Publication Request: No
**** SMALL ENTITY ****
Title

EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Preliminary Class

705

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/271,410

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	30 minus 20 =	* 10	x 40 =	400	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	1130		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON MA 02210

MAILED
NOV 18 2016
OFFICE OF PETITIONS

Doc Code: TRACK1.GRANT

Decision Granting Request for Prioritized Examination (Track I or After RCE)	Application No.: 15/271,410

1. THE REQUEST FILED September 21, 2016 IS **GRANTED.**

The above-identified application has met the requirements for prioritized examination

A. ☒ for an original nonprovisional application (Track I).
B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination.** The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;
B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims**, or a multiple dependent claim;
C. filing a **request for continued examination**;
D. filing a notice of appeal;
E. filing a request for suspension of action;
F. mailing of a notice of allowance;
G. mailing of a final Office action;
H. completion of examination as defined in 37 CFR 41.102; or
I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to Brian W. Brown at 571-272-5338.

/Brian W. Brown/
[*Signature*]

Petitions Examiner, Office of Petitions
(Title)

U.S. Patent and Trademark Office
PTO-2298 (Rev. 02-2012)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/271,410	09/21/2016	James Arthur Proctor JR.	111054-0001U4C7	7653

24267 7590 12/14/2016
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210

EXAMINER	
SHERR, MARIA CRISTI OWEN	

ART UNIT	PAPER NUMBER
3685	

NOTIFICATION DATE	DELIVERY MODE
12/14/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docket@c-m.com
USPTOMail@c-m.com

Office Action Summary	Application No. 15/271,410	Applicant(s) PROCTOR ET AL.	
	Examiner CRISTINA OWEN SHERR	Art Unit 3685	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *9/21/2016*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-30* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☐ Claim(s) _____ is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☒ Claim(s) *1-30* are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

2. This Office Action is in response to the Application filed 21 September 2016. Claims 1-30 are pending in this case.

Election/Restrictions

3. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-23 and 25-30, drawn to location monitoring, classified in H04W 4/22.

II. Claim 24, drawn to transmitting advertisements, classified in G06Q 30/02.

4. The inventions are distinct, each from the other because of the following reasons:

5. Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct if they do not overlap in scope and are not obvious variants, and if it is shown that at least one subcombination is separately usable. In the instant case, subcombination II has separate utility such as advertising. See MPEP § 806.05(d).

6. The examiner has required restriction between subcombinations usable together. Where applicant elects a subcombination and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a

continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

7. Restriction for examination purposes as indicated is proper because all the inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because one or more of the following reasons apply:

- The various groups of claims are separately classified.

8. **Applicant is advised that the reply to this requirement to be complete must include (i) an election of an invention to be examined** even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention**.

9. The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

10. Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other invention.

11. In the event Applicant chooses Group I, the claims are further distinguishable as follows --

This application contains claims directed to the following patentably distinct species

Claims 1 and 25 are generic to the following disclosed patentably distinct species:

A. First embodiment as disclosed on pages 31-32 of the Specification, as filed.

B. Third Embodiment (designated “another embodiment”), as disclosed on pages 33-35 of the Specification, as filed.

12. The species are independent or distinct because they are mutually exclusive. In addition, these species are not obvious variants of each other based on the current record.

13. Applicant is required under 35 U.S.C. 121 to elect a single disclosed species, or a single grouping of patentably indistinct species, for prosecution on the merits to which

the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 1 and 25 are generic.

14. There is a search and/or examination burden for the patentably distinct species as set forth above because at least the following reason(s) apply: the species are mutually exclusive.

15. **Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species to be examined** even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected species or grouping of patentably indistinct species**, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

16. The election may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the election of species requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected species or grouping of patentably indistinct species.

17. Should applicant traverse on the ground that the species, or groupings of patentably indistinct species from which election is required, are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing them

to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the species unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other species.

18. Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.

19. A telephone call was made to David Thibodeau, Reg.No. 31,671 on 5 December, 2016, to request an oral election to the above restriction requirement, but did not result in an election being made.

20. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be corrected in compliance with 37 CFR 1.48(a) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. A request to correct inventorship under 37 CFR 1.48(a) must be accompanied by an application data sheet in accordance with 37 CFR 1.76 that identifies each inventor by his or her legal name and by the processing fee required under 37 CFR 1.17(i).

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CRISTINA OWEN SHERR whose telephone number is (571)272-6711. The examiner can normally be reached on 8:30-5:00 Monday through Friday.

22. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Calvin L. Hewitt, II can be reached on (571)272-6709. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CRISTINA OWEN SHERR/
Examiner, Art Unit 3685

/CALVIN L HEWITT II/
Supervisory Patent Examiner, Art Unit 3685

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/271,410	09/21/2016	James Arthur Proctor JR.	111054-0001U4C7

CONFIRMATION NO. 7653

24267
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210

PUBLICATION NOTICE



Title:EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Publication No.US-2017-0011425-A1
Publication Date:01/12/2017

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PATENTS
111054–0001U4C7
1005-007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of:
James A. Proctor, Jr., et al.

Serial No.: 15/271,410

Filed: September 21, 2016

For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Examiner: Sherr,Maria Cristi Owen

Art Unit: 3685

Confirmation No.: 7653

Cesari and McKenna, LLP
88 Black Falcon Avenue
Boston, MA 02210
January 24, 2017

CERTIFICATE OF TRANSMISSION

I hereby certify that the following paper is being electronically transmitted to the Patent and Trademark Office by EFS-Web on January 24, 2017.

/Stephany DeBlois/
Stephany DeBlois

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

ELECTION/RESTRICTION UNDER 35 U.S.C. 121

In response to the Office action dated December 14, 2016, a restriction requirement, please find a selection of species and claims associated therewith. Also, please enter the following amendments:

IN THE CLAIMS:

1. (Currently Amended) A mobile wireless device for facilitating the use of proximity beacons comprising:

a first radio for communicating with one or more servers and receiving identifier related information;

a second radio for receiving proximity beacon transmissions from a plurality of beacon transmitter devices and for providing proximity beacon information derived from the proximity beacon transmissions; and

a data processor for determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information;

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and proximity beacon identification information;

wherein the proximity beacon identification information indicates the proximity beacon transmissions are associated with a proximity beacon service; and

wherein the proximity beacon identification information is the same for all proximity beacon transmissions from the plurality of beacon transmitter devices and identifies [[of]] each of the plurality of proximity beacon transmitter devices as being enabled with the proximity beacon service.

2. (Original) The mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit number matching the format of a MAC address.

3. (Original) The mobile wireless device of Claim 2, wherein the MAC address is a Bluetooth BD_ADDR.

4. (Original) The wireless device of claim 3 wherein both the MAC address and the unique identifier received by the second radio occasionally change, for security reasons.

5. (Original) The wireless device of claim 2 wherein both the MAC address and the unique identifier change from time to time, making one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more central server to access the identifier information.

6. (Original) The mobile wireless device of Claim 1, wherein at least the portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices.

7. (Original) The mobile wireless device of Claim 6, wherein the data processor determines the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object.

8. (Original) The mobile wireless device of Claim 1, wherein the data processor determines the proximity utilizing an action function including one or more previously downloaded unique identifiers.

9. (Original) The mobile wireless device of Claim 1, wherein the data processor determines the proximity by comparing the proximity beacon information with the identifier related information.

10. (Original) The mobile wireless device of Claim 1, wherein the data processor determines the proximity by sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radio, and receives at least a portion of the identifier related information usable to make the proximity determination.

11. (Original) The mobile wireless device of Claim 10, wherein the unique identifier associated with the at least one beacon transmitter is associated at the at least one of the one or more servers with being a broadcast device having a known location.

12. (Original) The mobile wireless device of Claim 1, wherein the data processor further determines, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a known location.

13. (Original) The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device, downloaded in reaction to the sending of a unique identifier by the mobile wireless device to the at least one server, wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information.

14. (Original) The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device.

15. (Original) The mobile wireless device of Claim 1 wherein

the identifier related information comprises a list of contact information, and the data processor performs the proximity determination of a beacon transmitter device associated with an entity included within the list of contact information based upon comparing a contact information related unique identifier with at least the portion of the proximity beacon information, and wherein the mobile wireless device, upon determining there is a match, engages in further steps to allow further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, and further

wherein the both the MAC address and the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with

entity included within the list of contact information change from time to time, but remains identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification.

16. (Original) The wireless device of claim 1 wherein the changing of the MAC address and the unique identifier associated with the at least one beacon transmitter is coordinated with the at least one of the one or more remote central servers.

17. (Original) The wireless device of claim 1 wherein the unique identifier of at least the portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one server of the one or more remote central servers.

18. (Original) The wireless device of claim 1 wherein the unique identifier associated with at least one beacon transmitter is associated with a single beacon transmitter and is generated algorithmically and only known to at least one the central servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval within the beacon transmitter, and further

wherein the MAC address associated with the beacon transmitter is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices.

19. (Original) The mobile wireless device of Claim 1, wherein the second radio is a Bluetooth based radio.

20. (Original) The mobile wireless device of Claim 1, wherein the second radio is a Wi-Fi based radio.

21. (Original) The mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit BD_ADDR, wherein both the MAC address and the unique

identifier change from time to time, making one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more central server to access the identifier related information, and wherein at least the portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices, wherein the data processor determines the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object.

22. (Original) The mobile wireless device of Claim 21, wherein the data processor determines the proximity utilizing an action function including one or more previously downloaded unique identifiers.

23. (Original) The mobile wireless device of Claim 1, wherein the proximity beacon service utilizes a standards based protocol derived from Bluetooth and including unsolicited automatically repetitive advertisements, and wherein the proximity beacon transmissions are transmitted within the format of the unsolicited automatically repetitive advertisements, and wherein the proximity beacon identification information is included within a configurable field of the unsolicited automatically repetitive advertisements while conforming to the standards based protocol and, wherein no connection is made between the mobile wireless device and the plurality of beacon transmitted receiving when receiving the unique identifier.

24. (Cancelled)

25. (Currently Amended) A system for facilitating the use of proximity beacons comprising:

one or more central servers for communicating with a plurality of wireless devices;

software residing on a wireless device of the plurality of wireless devices for:

utilizing a first radio of the wireless device to communicate with at least one of the one or more servers and for receiving identifier related information; and for,

utilizing a respective second radio of the wireless device for receiving proximity beacon transmissions from a plurality of beacon transmitter devices and for providing received proximity beacon information derived from the proximity beacon transmissions; and for,

determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information;

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and proximity beacon identification information;

wherein the proximity beacon identification information indicates the proximity beacon transmissions are associated with a proximity beacon service; and

wherein the proximity beacon identification information is the same for all proximity beacon transmissions from the plurality of beacon transmitter devices and identifies [[of]] each of the plurality of proximity beacon transmitter devices as being enabled with the proximity beacon service.

26. (Original) The system of Claim 25, wherein the identifier related information comprises application software for execution upon the mobile wireless device.

27. (Original) The system of Claim 25, wherein the identifier related information is received in response to the software residing on the wireless device sending at least one unique identifier determined from the proximity beacon information.

28. (Original) The system of Claim 27 wherein after determining the at least one beacon transmitter device is in proximity, at least one server of the plurality of servers provides an identifying picture of a consumer to at least one device for use by an operator of the device for confirming the picture matches an individual in proximity as a step in a multi-step electronic commerce transaction.

29. (Original) The system of Claim 28, wherein the MAC address and unique identifier of the proximity beacon transmissions from each of the at least one beacon transmitter devices change from time to time, and wherein at least the unique identifiers of the at least one of beacon transmitter devices remain associated with an account associated with the consumer.

30. (Original) The system of Claim 25, wherein the second radio is a Bluetooth compliant radio.

REMARKS

In response to the office action dated December 14, 2016, Applicant provisionally elects Group I, claims 1-23 and 25-30. This election is made with traverse.

With entry of the foregoing amendments, claim 24 has been cancelled. Applicant retains all rights to present claim 24 and other claims in a divisional application or other continuation application.

Claims 1 and 25 are being amended to delete the word "of" in the second to last line, which was a typographical error. No new matter is being added.

Paragraph 11 of the Office Action indicated that "Claims 1 and 25 are generic" to the species styled "A. First embodiment as disclosed on pages 31-32 of the Specification as filed" and to the species styled "B. Third embodiment (designated 'another embodiment'), as disclosed on pages 33-35 of the Specification as filed."

The Office Action thus refers to two possible embodiments that are described in the specification as filed. By electing claims 1 and 25, the Applicant does not intend that the elected claims be limited in their interpretation to only those two embodiments. See *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.") and *Inline Plastics Corp. v. Easypak, LLC,* 799 F.3d 1364, 1368 (Fed. Cir 2015).

No explanation of the scope of, or reason for, the further distinction of species A and B in paragraph 11 was given by the Examiner, other than "the species are independent or distinct because they are mutually exclusive".

Claims 2-23 depend from claim 1 and contain all features thereof. Likewise, claims 26-30 depend from claim 25 and also contain all the same features thereof. It is

therefore understood that Applicant is entitled to have dependent claims 2-23 and 26-30 examined in this application, given that the dependent claims contain all of the limitations of the generic claims from which they depend. See 37 CFR 1.75 and 1.141. To the extent that one or more of the claims that depend from claim 1 or claim 25 are also being restricted, clarification of the scope of the restriction and/or reconsideration is respectfully requested.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

/David J Thibodeau Jr Reg No 31671/

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Electronic Acknowledgement Receipt

EFS ID:	28151888
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	24267
Filer:	David J. Thibodeau/stephany deblois
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	24-JAN-2017
Filing Date:	21-SEP-2016
Time Stamp:	15:22:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2AF3656.PDF	49929 9be70cf00df39387ecd2d3b9fb3f1cb53778 6163	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response to Election / Restriction Filed	1	1
	Claims	2	8
	Applicant Arguments/Remarks Made in an Amendment	9	10
Warnings:			
Information:			
	Total Files Size (in bytes):	49929	

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
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PTO/SB/06 (09-11)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/271,410	Filing Date 09/21/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	01/24/2017	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 29	Minus	** 30	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
ERIC DANTZLER

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PATENTS
111054–0001U4C7
1005-007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of:
James A. Proctor, Jr., et al.

Serial No.: 15/271,410

Filed: September 21, 2016

For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Examiner: Sherr, Maria Cristi Owen

Art Unit: 3685

Confirmation No.: 7653

Cesari and McKenna, LLP
88 Black Falcon Avenue
Boston, MA 02210
May 23, 2017

CERTIFICATE OF TRANSMISSION

I hereby certify that the following paper is being electronically transmitted to the Patent and Trademark Office by EFS-Web on May 23, 2017.

/Stephany DeBlois/
Stephany DeBlois

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

APPLICANT SUMMARY OF INTERVIEW

Applicant thanks Examiner Sherr for the courtesy of several telephone calls on May 17 and May 22, 2017.

During the call on May 22, 2017, the Applicant explained it still believed that claims 1 and 25 should be examined together. Those claims have most of their features in common and not appear to place an undue search or examination burden on the Examiner.

Nonetheless, Applicant indicated that they would further provisionally elect claims 1-23 with traverse.

The Applicant also thanks the Examiner for indicating that the Applicant may submit software method claims of the same technical scope as claims 1-23 to be examined in this application.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

/David J Thibodeau Jr. Reg No 31671/

David J. Thibodeau, Jr.
Reg. No. 31,671
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210
Telephone: (617) 951-2500
Facsimile: (617) 951-3927

Electronic Acknowledgement Receipt

EFS ID:	29282971
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	24267
Filer:	David J. Thibodeau/stephany deblois
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	23-MAY-2017
Filing Date:	21-SEP-2016
Time Stamp:	10:16:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant summary of interview with examiner	2AQ9084.PDF	18174 4d0866429174 3d39b6318a57b0d97d158372dfef	no	2

Warnings:

Information:	
Total Files Size (in bytes):	18174

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New Applications Under 35 U.S.C. 111

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New International Application Filed with the USPTO as a Receiving Office

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Examiner: Sherr,Maria Cristi Owen

Art Unit: 3685

Confirmation No.: 7653

Cesari and McKenna, LLP
88 Black Falcon Avenue
Boston, MA 02210
June 1, 2017

CERTIFICATE OF TRANSMISSION

I hereby certify that the following paper is being electronically transmitted to the Patent and Trademark Office by EFS-Web on June 1, 2017.

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Stephany DeBlois

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

SUPPLEMENTAL AMENDMENT

Please enter the following amendments before considering the above-identified patent application:

IN THE CLAIMS:

1. (Previously Presented) A mobile wireless device for facilitating the use of proximity beacons comprising:

a first radio for communicating with one or more servers and receiving identifier related information;

a second radio for receiving proximity beacon transmissions from a plurality of beacon transmitter devices and for providing proximity beacon information derived from the proximity beacon transmissions; and

a data processor for determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information;

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and proximity beacon identification information;

wherein the proximity beacon identification information indicates the proximity beacon transmissions are associated with a proximity beacon service; and

wherein the proximity beacon identification information is the same for all proximity beacon transmissions from the plurality of beacon transmitter devices and identifies [[of]] each of the plurality of proximity beacon transmitter devices as being enabled with the proximity beacon service.

2. (Original) The mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit number matching the format of a MAC address.

3. (Original) The mobile wireless device of Claim 2, wherein the MAC address is a Bluetooth BD_ADDR.

4. (Original) The wireless device of claim 3 wherein both the MAC address and the unique identifier received by the second radio occasionally change, for security reasons.

5. (Original) The wireless device of claim 2 wherein both the MAC address and the unique identifier change from time to time, making one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more central server to access the identifier information.

6. (Original) The mobile wireless device of Claim 1, wherein at least the portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices.

7. (Original) The mobile wireless device of Claim 6, wherein the data processor determines the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object.

8. (Original) The mobile wireless device of Claim 1, wherein the data processor determines the proximity utilizing an action function including one or more previously downloaded unique identifiers.

9. (Original) The mobile wireless device of Claim 1, wherein the data processor determines the proximity by comparing the proximity beacon information with the identifier related information.

10. (Original) The mobile wireless device of Claim 1, wherein the data processor determines the proximity by sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radio, and receives at least a portion of the identifier related information usable to make the proximity determination.

11. (Original) The mobile wireless device of Claim 10, wherein the unique identifier associated with the at least one beacon transmitter is associated at the at least one of the one or more servers with being a broadcast device having a known location.

12. (Original) The mobile wireless device of Claim 1, wherein the data processor further determines, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a known location.

13. (Original) The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device, downloaded in reaction to the sending of a unique identifier by the mobile wireless device to the at least one server, wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information.

14. (Original) The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device.

15. (Original) The mobile wireless device of Claim 1 wherein

the identifier related information comprises a list of contact information, and the data processor performs the proximity determination of a beacon transmitter device associated with an entity included within the list of contact information based upon comparing a contact information related unique identifier with at least the portion of the proximity beacon information, and wherein the mobile wireless device, upon determining there is a match, engages in further steps to allow further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, and further

wherein the both the MAC address and the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with

entity included within the list of contact information change from time to time, but remains identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification.

16. (Original) The wireless device of claim 1 wherein the changing of the MAC address and the unique identifier associated with the at least one beacon transmitter is coordinated with the at least one of the one or more remote central servers.

17. (Original) The wireless device of claim 1 wherein the unique identifier of at least the portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one server of the one or more remote central servers.

18. (Original) The wireless device of claim 1 wherein the unique identifier associated with at least one beacon transmitter is associated with a single beacon transmitter and is generated algorithmically and only known to at least one the central servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval within the beacon transmitter, and further

wherein the MAC address associated with the beacon transmitter is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices.

19. (Original) The mobile wireless device of Claim 1, wherein the second radio is a Bluetooth based radio.

20. (Original) The mobile wireless device of Claim 1, wherein the second radio is a Wi-Fi based radio.

21. (Original) The mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit BD_ADDR, wherein both the MAC address and the unique

identifier change from time to time, making one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more central server to access the identifier related information, and wherein at least the portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices, wherein the data processor determines the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object.

22. (Original) The mobile wireless device of Claim 21, wherein the data processor determines the proximity utilizing an action function including one or more previously downloaded unique identifiers.

23. (Original) The mobile wireless device of Claim 1, wherein the proximity beacon service utilizes a standards based protocol derived from Bluetooth and including unsolicited automatically repetitive advertisements, and wherein the proximity beacon transmissions are transmitted within the format of the unsolicited automatically repetitive advertisements, and wherein the proximity beacon identification information is included within a configurable field of the unsolicited automatically repetitive advertisements while conforming to the standards based protocol and, wherein no connection is made between the mobile wireless device and the plurality of beacon transmitted receiving when receiving the unique identifier.

24. – 30. (Cancelled)

31. (New) A method for facilitating the use of proximity beacons comprising:

communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

obtaining proximity beacon information derived from proximity beacon transmissions, wherein the proximity beacons transmissions were received from one or more beacon transmitter devices using a second radio; and

determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information;

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and proximity beacon identification information;

wherein the proximity beacon identification information indicates the proximity beacon transmissions are associated with a proximity beacon service; and

wherein the proximity beacon identification information is the same for all proximity beacon transmissions associated with the proximity beacon service, transmitted from the plurality of beacon transmitter devices.

32. (New) The method of claim 31, additionally comprising:

performing one or more steps of the method under control of an application via a software interface; and

executing the application on at least one of the mobile devices.

33. (New) The method of claim 32 wherein the software interface is an NDIS driver.

34. (New) The method of claim 31 additionally comprising:

performing at least a portion of the steps on one or more servers.

35. (New) The method of claim 31, wherein both the MAC address and the unique identifier received via the second radio occasionally change between proximity beacon transmissions from one of the one or more beacon transmitter devices.

36. (New) The method of claim 31, wherein the identifier related information is received

in response to the software residing on the mobile device sending at least one unique identifier determined from the proximity beacon information.

37. (New) The method of claim 31 wherein after determining the at least one beacon transmitter device is in proximity, at least one server of the one or more of servers provides an identifying picture of a consumer to at least one device for use by an operator of the device for confirming the picture matches an individual in proximity as a step in an electronic commerce transaction.

REMARKS

Applicant submits this amendment to the claims. The Amendment cancels prior system claims 25-30 and presents new method claims 31-37, consistent with the conversation with the Examiner on May 22, 2107.

There are now a total of 30 claims in the application presented for examination. Thus the case is believed to still be properly considered under the Track On Prioritized Examination Request previously granted on November 22, 2016.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

/David J Thibodeau Jr Reg No 31671/
David J. Thibodeau, Jr.
Reg. No. 31,671
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210
Telephone: (617) 951-2500
Facsimile: (617) 951-3927

Electronic Acknowledgement Receipt

EFS ID:	29372269
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	24267
Filer:	David J. Thibodeau/stephany deblois
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	01-JUN-2017
Filing Date:	21-SEP-2016
Time Stamp:	16:39:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2AS0281.PDF	41945 ac08bfaa0c8184a7a71af77788aa27cd188d4434	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Supplemental Response or Supplemental Amendment	1	1
	Claims	2	8
	Applicant Arguments/Remarks Made in an Amendment	9	9
Warnings:			
Information:			
	Total Files Size (in bytes):	41945	

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<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/271,410	Filing Date 09/21/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	06/01/2017	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**0**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
ANGELA s. WHITE

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/80 (11-08)
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 86012

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 86012

OR

☐ Firm or Individual Name	VLP Law Group LLP		
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

Proxicom Wireless LLC
1680 N. Riverside Drive
Indialantic, FL 32903

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	James A. Proctor	Date	8/17/2017
Name	James A. Proctor	Telephone	321.252.8411
Title	Managing Director		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Proxicom Wireless, LLC

Application No./Patent No.: 15/271,410 Filed/Issue Date: September 21, 2016

Titled:

Proxicom Wireless, LLC , a Limited Liability Company

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 040275 , Frame 0722 , or for which a copy therefore is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____ , Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

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The document was recorded in the United States Patent and Trademark Office at

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☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/David J Thibodeau Jr Reg No 3167/ 17 August 2017

Signature Date

David J. Thibodeau, Jr. Reg. No. 31671

Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	30109097
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	24267
Filer:	David J. Thibodeau/Roberta Fels
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	17-AUG-2017
Filing Date:	21-SEP-2016
Time Stamp:	14:43:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	20170817-111054-0001U4C7_TPO_Executed_Power_of_Attorney.pdf	207947 36ce3a0ecee5c86119d82568cda2ec73a838a5a0	no	1

Warnings:

Information:					
2	Assignee showing of ownership per 37 CFR 3.73	20170817-111054-0001U4C7_TPO_Assignee_Statement.pdf	422160 9187d7a9cd1fb123ba05aed9d742cc6cc9be5071	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	630107	

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/271,410	09/21/2016	James Arthur Proctor JR.	111054-0001U4C7

CONFIRMATION NO. 7653

POA ACCEPTANCE LETTER

86012
VLP Law Group LLP
555 Bryant Street
Suite 820
Palo Alto, CA 94301

OC000000093569328

Date Mailed: 08/21/2017

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/17/2017.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/dtdinh/

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/271,410	09/21/2016	James Arthur Proctor JR.	111054-0001U4C7

CONFIRMATION NO. 7653

POWER OF ATTORNEY NOTICE

24267
CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210

OC000000093569304

Date Mailed: 08/21/2017

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/17/2017.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/dtdinh/

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15271410
Filing Date	2016-09-21
First Named Inventor	James Arthur Proctor, Jr.
Art Unit	3685
Examiner Name	Maria Cristi Owen Sherr
Attorney Docket Number	111054-0001U4C7

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8229458	B2	2012-07-24	Busch	
	2	8185133	B2	2012-05-22	Billmaier et al.	
	3	7965983	B1	2011-06-21	Swan et al.	
	4	7962369	B2	2011-06-14	Rosenberg	
	5	7877082	B2	2011-01-25	Eagle et al.	
	6	7647024	B2	2010-01-12	Wang et al.	
	7					

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15271410
	Filing Date	2016-09-21
	First Named Inventor	James Arthur Proctor, Jr.
	Art Unit	3685
	Examiner Name	Maria Cristi Owen Sherr
	Attorney Docket Number	111054-0001U4C7

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100138481	A1	2010-06-03	Behrens	
	2	20090219132	A1	2009-09-03	Maytal et al.	
	3	20080139114	A1	2008-06-12	Ranganathan	
	4	20080109843	A1	2008-05-08	Ullah	
	5	20080039020	A1	2008-02-14	Eskin	
	6	20070270099	A1	2007-11-22	Le Gars	
	7					

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15271410
	Filing Date	2016-09-21
	First Named Inventor	James Arthur Proctor, Jr.
	Art Unit	3685
	Examiner Name	Maria Cristi Owen Sherr
	Attorney Docket Number	111054-0001U4C7

NON-PATENT LITERATURE DOCUMENTS			Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15271410
	Filing Date	2016-09-21
	First Named Inventor	James Arthur Proctor, Jr.
	Art Unit	3685
	Examiner Name	Maria Cristi Owen Sherr
	Attorney Docket Number	111054-0001U4C7

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David J Thibodeau Jr Reg No 31671/	Date (YYYY-MM-DD)	2017-08-23
Name/Print	David J. Thibodeau, Jr.	Registration Number	31,671

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	15271410
Filing Date:	21-Sep-2016
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Filer:	David J. Thibodeau/Roberta Fels
Attorney Docket Number:	111054-0001U4C7

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	90	90
		Total in USD ($)		**90**

Electronic Acknowledgement Receipt	
EFS ID:	30157720
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
Filer:	David J. Thibodeau/Roberta Fels
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	23-AUG-2017
Filing Date:	21-SEP-2016
Time Stamp:	11:13:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$90
RAM confirmation Number	082317INTEFSW11172700
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	20170823_111054-0001U4C7_TPO_Supplemental_IDS_Transmittal.pdf	17571 67e8da7e508b94efec528b1c0784fcef47a4fa9f	no	2
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	20170823_111054-0001U4C7_TPO_SB08_Form.pdf	612379 63f1f10f40b330a06d9d3639dde64f464805a4fc	no	5
Warnings:					
Information:					
A U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form. You may remove the form to add the required data in order to correct the Informational Message or if you chose not to, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
3	Fee Worksheet (SB06)	fee-info.pdf	30849 4820658cbd1cbbd4f8730b85732036c54c725d9f	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	660799		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENTS
111054–0001U4C7

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of:
Proctor, James A., Jr., et al.

Serial No.: 15/271,410

Filed: September 21, 2016

For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Examiner: Sherr, Maria Cristi Owen

Art Unit: 3685

Confirmation No.: 7653

VLP Law Group LLP
37 Governor Wentworth Road
Amherst, NH 03031
August 23, 2017

CERTIFICATE OF TRANSMISSION

I hereby certify that the following paper is being electronically transmitted to the Patent and Trademark Office by EFS-Web on August 23, 2017.

/Roberta Fels/
Roberta Fels

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

In keeping with the duty of candor and good faith owed to the Patent and Trademark Office, Applicant wishes to bring to the Examiner's attention the reference listed on the accompanying form PTO/SB/08.

This submission is accompanied by the $90.00 fee set forth in 37 C.F.R. § 1.17(p).

Please charge any additional fee occasioned by this paper to our Deposit Account No. 50-4929.

Respectfully submitted,

/David J Thibodeau Jr Reg No 31671 /

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VLP Law Group LLP
Telephone: (617) 925-5520
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/271,410	09/21/2016	James Arthur Proctor JR.	111054-0001U4C7	7653

86012 7590 09/25/2017

VLP Law Group LLP
555 Bryant Street
Suite 820
Palo Alto, CA 94301

EXAMINER
SHERR, MARIA CRISTI OWEN

ART UNIT	PAPER NUMBER
3685	

NOTIFICATION DATE	DELIVERY MODE
09/25/2017	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@vlplawgroup.com

Office Action Summary	Application No. 15/271,410	Applicant(s) PROCTOR ET AL.	
	Examiner CRISTINA OWEN SHERR	Art Unit 3685	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6/1/2017*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-21 and 31-37* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-21 and 31-37* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date *September 21, 2016, September 29, 2016, and August 23, 2017*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

2. This Office Action is in response to the Application filed 21 September 2016. Claims 1-23 and 31-37 are pending in this case.

3. Claims 31-37 are newly-added. Claims 24-30 are canceled pursuant to a Requirement for Restriction issued December 14, 2016.

Election/Restrictions

4. Applicant's election without traverse of claims 1-23 in the reply filed on June 1, 2017 is acknowledged.

Priority

5. This application claims a continuation of pending U.S. Patent Application No. 14/861,563, filed September 22, 2015 which is a continuation of pending U.S. Patent Application No. 14/472,477, filed August 29, 2014 which is a continuation of U.S. Patent Application No. 13/775,435, filed February 25, 2013, now issued as U.S. Patent No. 8,849,698 on September 30, 2014 which is a continuation of U.S. Patent Application No. 13/212,723, filed August 18, 2011, now issued as U.S. Patent No. 8,374,592 on February 12, 2013 which is a continuation of U.S. Application No. 12/364,828, filed February 3, 2009, now issued as U.S. Patent No. 8,090,359 on January 3, 2012 which claims the benefit of U.S. Provisional Application No. 61/095,001, entitled "Central Server Enabled Proximity Based Applications Utilizing Both Short Range, and Wide Area Wireless Radios", filed on September 8, 2008 and U.S. Provisional Application No.

61/095,359, entitled “Central Server Enabled Proximity Based Applications Utilizing Both Short Range, and Wide Area Wireless Radios”, filed on September 9, 2008. However, in reviewing the various continuations, at least the limitation of claim 1 “determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information” is not found in the previous Applications.

6. For this reason, Priority is set at 21 September 2016.

Information Disclosure Statement

7. The information disclosure statements (IDS) submitted on September 21, 2016, September 29, 2016, and August 23, 2017, are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Remarks

8. Statements of intended use do not serve to distinguish from the prior art. MPEP 2103 I C.

9. In this case, claim 1 recites “a first radio”, “a second radio”, and “a data processor”. We note that the said terms do not invoke 35 U.S.C.112 (6) or 35 U.S.C.112 (f). For this reason, what each is "for" does not have patentable weight.

10. Additionally, the claims recite multiple instances of intended use –

a. claim 13 “…for execution”

b. claim 14 “for execution…”

c. claim 15 “wherein… to allow further communication… wherein the further communication …”

d. claim 37 “for use by an operator…”

11. Nonfunctional descriptive material does not serve to distinguish from the prior art. *In re Kao*, 639 F.3d1057, ___, 98 USPQ2d 1799, 1811-12 (Fed. Cir. 2011); King *Pharmaceuticals Inc. v. Eon Labs Inc.*, 616 F.3d1267, ___, 95 USPQ2d 1833, 1842 (Fed. Cir. 2010); *In re Gulack*, 217 USPQ 401 (Fed. Cir. 1983), *In re Ngai*, 70 USPQ2d (Fed. Cir. 2004), *In re Lowry*, 32 USPQ2d 1031 (Fed. Cir. 1994); MPEP 2111.05.

12. Claims 1 and 31 recite “wherein the proximity beacon identification information indicates…” “wherein the proximity beacon identification information is the same…”. The said recitations constitute nonfunctional descriptive material which does not serve to distinguish from the prior art.

13. Limitations not positively recited do not serve to distinguish from the prior art.

14. In this case, claim 31 recites “transmissions were received from . . .second radio”. The said recitation does not serve to distinguish from the prior art.

Claim Rejections - 35 USC § 101

15. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

16. Claims 1-23 and 31-37 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

17. Regarding claims 1-23 and 31-37 –

18. Claims 1-23 and 31-37 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. because the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

19. The claims are directed to the abstract idea of determining distance.

Subject Matter Eligibility Standard

20. When considering subject matter eligibility under 35 U.S.C. 101, it must be determined whether the claim is directed to one of the four statutory categories of invention, i.e., process, machine, manufacture, or composition of matter. If the claim does fall within one of the statutory categories, it must then be determined whether the claim is directed to a judicial exception (*i.e.*, law of nature, natural phenomenon, and abstract idea), and if so, it must additionally be determined whether the claim is a patent-eligible application of the exception. If an abstract idea is present in the claim, any element or combination of elements in the claim must be sufficient to ensure that the claim amounts to significantly more than the abstract idea itself. Examples of abstract ideas include fundamental economic practices; certain methods of organizing human activities; an idea itself; and mathematical relationships/formulas. (*Alice Corporation Pty. Ltd. v. CLS Bank International, et al* US Supreme Court, No. 13-298, June 19, 2014).

Analysis

21. In this case, claim 31 recites a method.

22. Additionally, the claim is directed to the abstract idea of determining distance. (*Alice Corporation Pty. Ltd. v. CLS Bank International, et al* US Supreme Court, No. 13-298, June 19, 2014) The transaction device in this claim merely automates an algorithm via basic computer functions, and therefore, the claim does not include additional elements that are sufficient to amount to significantly more than the judicial exception because additional claim elements do not provide meaningful limitations to transform the abstract idea into a patent eligible application of the abstract idea such that the claim amounts to significantly more than the abstract idea itself.

23. Taking the claim elements separately, the functions performed by the machine at each step of the process are purely conventional. Receiving data, transmitting data, and comparing data ---one of the most basic functions of a computer. All of these computer functions are well-understood, routine, conventional activities previously known to the industry. In short, each step does no more than require a generic computer to perform generic computer functions.

24. The claims do not, for example, purport to improve the functioning of the computer itself. Nor do they effect an improvement in any other technology or technical field. Instead, the claims at issue amount to nothing significantly more than an instruction to apply the abstract idea of advertising using some unspecified, generic computer. "Under our precedents, that is not 'enough' to transform an abstract idea into a patent--eligible invention." See *Alice Corp. Pty. Ltd.*, 134 S.Ct. at 2360.

Conclusion

25. The claims, as a whole, do not amount to significantly more than the abstract idea itself. This is because the claims do not effect an improvement to another technology or technical filed; the claims do not amount to an improvement to the functioning of a computer system itself; and the claims do not move beyond a general link of the use of an abstract idea to a particular technological environment.

26. Accordingly, the Examiner concludes that there are no meaningful limitations in the claims that transform the judicial exception into a patent eligible application such that the claims amount to significantly more than the judicial exception itself.

27. The dependent claims 32-37 do not resolve the deficiency of independent claims and accordingly stand rejected under 35 USC 101 based on the same rationale.

28. Independent claim 1 and its dependent claims 2-23 merely implement the abstract idea of claim 31.

Claim Rejections - 35 USC § 112

29. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

30. The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

31. Claims 1-23 and 31-37 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

32. Regarding claims 1 and 31 –

33. The claims recite a "mobile wireless device" comprising… a first radio and second radio. The Specification, as filed, does not support the said recitation. (See, *Katz*).

34. The claims recite a "radio for communicating with one or more servers" however, the PgPub US 2017/0011425 at par 11 and 78 teaches short range radios. There is no support for a computer communicating with a server via radio. (See, *Katz*).

35. Regarding claim 4 –

36. The claim recites "occasionally change for security reasons", wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (MPEP 2163 (A)).

37. Regarding claim 18 –

38. The claim recites "is changed as well as to prevent . . .". wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at

par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (also, MPEP 2161 (1) lack of algorithm).

39. Regarding claim 32 –

40. The claim recites multiple mobile devices. The Specification, as filed, does not support the said recitation. (*Katz*, MPEP 2161.01)

41. Regarding claim 34 –

42. The claim recites multiple servers as well as a server with radios (*e.g.*, using a first radio . . using a second radio . . .). The Specification, as filed, does not support the said recitation. (*Katz*, MPEP 2161.01).

43. Claim 41 recites, in newly-added language "programmatically categorizing… that are *detected*…" wherein the said limitation is broader than the Specification, as filed (See PgPub US 2009/0171730 at par 414-416, detection is done in the IT infrastructure), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (MPEP 2163 (A)).

44. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

45. The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

46. Claims 1-23 and 31-37 rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and

distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

47. Claims 1-23 and 31-37 are rejected as failing to define the invention in the manner required by 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph.

48. The claims are narrative in form and replete with indefinite language. The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. For example, the claims contain excessive functional language. The claims must be in one sentence form only. Note the format of the claims in the patents cited.

49. A single claim which claims both an apparatus and the method steps of using the apparatus is indefinite under 35 U.S.C. 112, second paragraph. *In re Katz* Interactive Call Processing Patent Litigation, 639 F.3d 1303 (Fed. Cir. 2011).

50. The claims recite multiple instances of apparatus and method steps of using the apparatus –

Claim 1 --- “a second radio… information derived… “ (*Katz, UltimatePointer*).

Claim 2 --- “a randomly generated” (*Katz, UltimatePointer*).

Claim 4 --- “occasionally change”.

Claim 5 --- “… change from time to time”, “… making… anonymous over time…”.

Claim 6 --- “which is used…”.

Claim 11 --- “is associated at the at least one of the one more servers with being…”

Claim 13 --- "downloaded in reaction to… wherein the mobile wireless device first received… as part of the proximity beacon information".

Claim 15 --- "wherein the mobile wireless device, upon determining…", "wherein the further communications utilize the first radio…, but remains identifiable by the wireless mobile device…", "upon determining there is a match…"

Claim 16 --- "wherein the changing… is coordinated with the at least one of the one more remote central servers…"

Claim 17 --- "wherein the unique identifier… changes over time based upon an algorithm in synchronization…"

Claim 18 --- "… and is generated algorithmically and only known to at least one of the central servers… and updated based… upon a clock interval…" "wherein the MAC address … is changed as well…"

Claim 21 --- "wherein the MAC address is a randomly generated… change from time to time, making one or more of an entity's identity associated with… anonymous over time… which is used to determine a downloaded unique identifier… "

Claim 22 --- "one or more previously downloaded unique identifiers…"

Claim 23 --- "wherein no connection is made between the mobile wireless device …"

51. Please note that the language of the hybrid limitations does not carry patentable weight.

52. Regarding claim 1 –

53. The claim recites “each of the proximity beacon transmitter devices as being enabled with the proximity beacon device” and “wherein the proximity beacon id. However, the claim is directed to a mobile wireless device. It is unclear whether the claim is directed to the mobile wireless device or combination mobile wireless device and proximity beacon transmitter devices. The scope of the claims is therefore rendered unclear.

54. Regarding claim 11 –

55. The claim recites “is associated at the at least one of the one more servers with being…”. However, the claim is directed to a mobile wireless device. The scope of the claims is therefore rendered unclear.

56. Regarding claim 23 –

57. The claim recites “wherein the proximity beacon service utilizes . . .”. However, the claim is directed to a mobile wireless device. The scope of the claims is therefore rendered unclear.

58. Regarding claim 31 –

59. The claim recites “were received… using a second radio” It is unclear who received the beacon transmissions, and where the second radio is. The scope of the claims is therefore rendered unclear.

60. Regarding claim 12 –

61. The term "known location" in claim 12 is a relative term which renders the claim indefinite. The term "known location" is not defined by the claim, the specification does

not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

62. Regarding claim 23 –

63. The term "standards based protocol" in claim 23 is a relative term which renders the claim indefinite. The term "standards based protocol" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

64. Regarding claim 13 –

65. The claim recites “upon the mobile wireless device”, “by the mobile wireless device”, “wherein the mobile wireless device”, thereby engaging in circular reasoning and rendering the claim unclear.

66. Regarding claim 14 –

67. The claim recites “for execution upon the mobile wireless device”, thereby engaging in circular reasoning and rendering the claim unclear.

68. Regarding claim 15 –

69. The claim recites “wherein the mobile wireless device”, thereby engaging in circular reasoning and rendering the claim unclear.

70. Regarding claim 23 –

71. The claim recites “between the mobile wireless device”, thereby engaging in circular reasoning and rendering the claim unclear.

72. Regarding claim 32 –

73. Note that claim 31 is already performed, and the first limitation of claim 32 says claim 31 is performed under control of an application. So executing is unclear as the first limitation suggests that it was already executed.

74. Regarding claim 32 –

75. Claim 32 recites the limitation "… at least one of the mobile devices". There is insufficient antecedent basis for this limitation in the claim.

76. For the above reasons, claims 1-23 and 31-37 are rejected as failing to define the invention in the manner required by 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph.

Claim Rejections - 35 USC § 102

77. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

78. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

79. Claims 1, 6-14, 19, 20, 23, 31, and 34-36 are rejected under pre-AIA 35 U.S.C. 102(a) as being anticipated by Hillier (US 2016/0025837).

80. Regarding claims 1 and 31-

81. Hillier teaches a mobile wireless device for facilitating the use of proximity beacons (abs) comprising:

a first radio for communicating with one or more servers and receiving identifier related information; (par 49)

a second radio for receiving proximity beacon transmissions from a plurality of beacon transmitter devices and for providing proximity beacon information derived from the proximity beacon transmissions (par 53-54); and

a data processor for determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information; (par 49)

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and proximity beacon identification information. (par 45, 75)

wherein the proximity beacon identification information indicates the proximity beacon transmissions are associated with a proximity beacon service; (par 49-54) and

wherein the proximity beacon identification information is the same for all proximity beacon transmissions from the plurality of beacon transmitter devices and identifies each of the plurality of proximity beacon transmitter devices as being enabled with the proximity beacon service. (par 49-54)

82. Regarding claims 6 and 35 –

83. Hillier teaches that at least the portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a

downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices. (par 49)

84. Regarding claim 7 –

85. Hillier teaches that the data processor determines the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object. (par 49-54)

86. Regarding claim 8 –

87. Hillier teaches that the data processor determines the proximity utilizing an action function including one or more previously downloaded unique identifiers. (par 49-54)

88. Regarding claim 9 –

89. Hillier teaches that the data processor determines the proximity by comparing the proximity beacon information with the identifier related information. (par 49-54)

90. Regarding claim 10 –

91. Hillier teaches that the data processor determines the proximity by sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radio, and receives at least a portion of the identifier related information usable to make the proximity determination. (par 45)

92. Regarding claim 11 –

93. Hillier teaches that the unique identifier associated with the at least one beacon transmitter is associated at the at least one of the one or more servers with being a broadcast device having a known location. (par 45)

94. Regarding claim 12 –

95. Hillier teaches that the data processor further determines, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a known location. (par 45-54)

96. Regarding claim 13 –

97. Hillier teaches that the identifier related information comprises application software for execution upon the mobile wireless device, downloaded in reaction to the sending of a unique identifier by the mobile wireless device to the at least one server, wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information. (par 45)

98. Regarding claim 14 –

99. Hillier teaches that the identifier related information comprises application software for execution upon the mobile wireless device. (par 45)

100. Regarding claim 19 –

101. Hillier teaches that the second radio is a Bluetooth based radio. (par 45-54)

102. Regarding claim 20 –

103. Hillier teaches that the second radio is a Wi-Fi based radio. (par 49)

104. Regarding claim 23 –

105. Hillier teaches that the proximity beacon service utilizes a standards based protocol derived from Bluetooth and including unsolicited automatically repetitive advertisements, and wherein the proximity beacon transmissions are transmitted within the format of the unsolicited automatically repetitive advertisements, and wherein the

proximity beacon identification information is included within a configurable field of the unsolicited automatically repetitive advertisements while conforming to the standards based protocol and, wherein no connection is made between the mobile wireless device and the plurality of beacon transmitted receiving when receiving the unique identifier. (par 43)

106.

107. Regarding claim 34 –

108. Hillier teaches performing at least a portion of the steps on one or more servers. (par 45).

109. Regarding claim 36 –

110. Hillier teaches that the identifier related information is received in response to the software residing on the mobile device sending at least one unique identifier determined from the proximity beacon information. (par 45-54)

Claim Rejections - 35 USC § 103

111. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

112. Claims 2-5, 15-18, and 21-22 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hillier (US 2016/0025837) in view of Altman et al (US 2013/0217332)

113. Hillier teaches as above

114. Regarding claim 2 –

115. Altman teaches that the MAC address is a randomly generated 48 bit number matching the format of a MAC address. (par 166).

116. It would be obvious to one of ordinary skill in the art to combine Hillier and Altman in order to obtain greater transaction security.

117. Regarding claim 3 –

118. Altman teaches wherein the MAC address is a Bluetooth BD_ADDR. (par 159, 166).

119. Regarding claim 4 –

120. Altman teaches that both the MAC address and the unique identifier received by the second radio occasionally change, for security reasons. (par 166)

121. Regarding claim 5 –

122. Altman teaches that both the MAC address and the unique identifier change from time to time, making one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more central server to access the identifier information. (par 166)

123. Regarding claim 15 –

124. Hillier teaches that the identifier related information comprises a list of contact information, and the data processor performs the proximity determination of a beacon transmitter device associated with an entity included within the list of contact information

based upon comparing a contact information related unique identifier with at least the portion of the proximity beacon information, and wherein the mobile wireless device, upon determining there is a match, engages in further steps to allow further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, (par 45-54) and further

wherein the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information remains identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification. (par 45-54)

125. Altman teaches a MAC address that changes from time to time. (par 166)

126. Regarding claim 16 –

127. Altman teaches that the changing of the MAC address and the unique identifier is coordinated with the at least one of the one or more remote central servers. (par 166, 159)

128. Regarding claim 17 –

129. Altman teaches that then the unique identifier changes over time based upon an algorithm in synchronization with at least one server of the one or more remote central servers. (par 159, 166)

130. Regarding claim 18 –

131. Altman teaches that the unique identifier is generated algorithmically and only known to at least one the central servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval, and further wherein the MAC address is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices. (par 166)

132. Regarding claim 21 –

133. Altman teaches that the MAC address is a randomly generated 48 bit BD_ADDR, wherein both the MAC address and the unique identifier change from time to time (par 159, 166)

134. Hillier teaches one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more central server to access the identifier related information, and wherein at least the portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices, wherein the data processor determines the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object. (par 45-54)

135. Regarding claim 22 –

136. Hiller teaches that the data processor determines the proximity utilizing an action function including one or more previously downloaded unique identifiers. (par 45-54)

137. Claims 32-33 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hillier (US 2016/0025837) in view of Sorenson et al (US 2003/0053484).

138. Regarding claim 32 –

139. Hillier teaches as above teach as above.

140. Sorenson teaches performing one or more steps of the method under control of an application via a software interface; and executing the application on at least one of the mobile devices. (par 135)

141. It would be obvious to one of ordinary skill in the art to combine Hillier with Sorenson in order to achieve a more user-friendly method.

142. Regarding claim 33 –

143. Sorenson teaches that the software interface is an NDIS driver. (par 135).

144. Claim 37 is are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hillier (US 2016/0025837) in view of Brackett et al (US 2005/0114654)

145. Regarding claim 37 –

146. Hillier teaches determining the at least one beacon transmitter device is in proximity. (par 45-54).

147. Brackett teaches at least one server of the one or more of servers provides an identifying picture of a consumer to at least one device for use by an operator of the device for confirming the picture matches an individual in proximity as a step in an electronic commerce transaction. (par 20)

148. It would be obvious to one of ordinary skill in the art to combine Hillier with the facial recognition feature of Brackett in order to obtain greater transaction security.

Conclusion

149. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CRISTINA OWEN SHERR whose telephone number is (571)272-6711. The examiner can normally be reached on 8:30-5:00 Monday through Friday.

150. Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

151. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Calvin L. Hewitt, II can be reached on (571)272-6709. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

152. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

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/CALVIN L HEWITT II/
Supervisory Patent Examiner, Art Unit 3685

Notice of References Cited	Application/Control No. 15/271,410	Applicant(s)/Patent Under Reexamination PROCTOR ET AL.	
	Examiner CRISTINA OWEN SHERR	Art Unit 3685	Page 1 of 1

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	F	US-				
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Sheet 1 of 9

Complete if Known	
Application Number	**Not Yet Assigned**
Filing Date	**September 22, 2015**
First Named Inventor	**James A. Proctor, Jr.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C6**

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)		Publication Date MM/DD/YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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Examiner Signature	/Cristina Owen Sherr/	Date Considered	09/03/2017

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Filing Date	**September 22, 2015**
First Named Inventor	**James A. Proctor, Jr.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
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Examiner Signature	/Cristina Owen Sherr/	Date Considered	09/03/2017

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet	4	of	9

Complete if Known	
Application Number	**Not Yet Assigned**
Filing Date	**September 22, 2015**
First Named Inventor	**James A. Proctor, Jr.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C6**

U.S. PATENT DOCUMENTS

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	82	2008/0182591		7/31/2008	Krikorian, Raffi	
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Substitute for form 1449A/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	**Not Yet Assigned**
				Filing Date	**September 22, 2015**
				First Named Inventor	**James A. Proctor, Jr.**
(use as many sheets as necessary)				Art Unit	**Not Yet Assigned**
				Examiner Name	**Not Yet Assigned**
Sheet	5	of	9	Attorney Docket Number	**111054–0001U4C6**

U.S. PATENT DOCUMENTS

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Sheet 6 of 9

Complete if Known	
Application Number	**Not Yet Assigned**
Filing Date	**September 22, 2015**
First Named Inventor	**James A. Proctor, Jr.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C6**

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Examiner Initials'	Cite No.[1]	Foreign Patent Document Country Code[3]–Number[4]–Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	1	SG 134837	10/29/2007	SKYHOOK WIRELESS, INC.		
	2	SE 0702686-7	12/4/2007	Accumulate AB		
	3	WO 2007/081356	7/19/2007	SKYHOOK WIRELESS, INC.		

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				First Named Inventor	**James A. Proctor, Jr.**
(use as many sheets as necessary)				Group Art Unit	**Not Yet Assigned**
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	1	Heeger, David, "Signal Detection Theory Handout," University of Stanford, 1998, www.psych.stanford.edu/~lera/psych115s/notes/signal/, 7 pages.	
	2	Wauters, R., "TC50: Gift Card Auction Site Rackup Aims To Shake Up Market" [online], September 14, 2009. Retrieved from the Internet URL: http://techcrunch.com/2009/09/14/tc50-gift-card-auction-site-rackup-aims-to-shake-up-market/, one page.	
	3	Rusli, E., "Gift card marketplace Cardpool Introduces Instand Redemption, Attracts Super Angels" [online], September 7, 2010. Retrieved from the Internet URL: http://techcrunch.com/2010/09/07/gift-card-marketplace-cardpool-plasticjungle/, one page.	
	4	Office Action, U.S. Application No. 12/364,823, mail date December 28, 2010.	
	5	Office Action, U.S. Application No. 12/364,828, mail date September 15, 2010.	
	6	Notice of Allowance, U.S. Application No. 12/364,828, mail date July 1, 2010.	
	7	Office Action, U.S. Application No. 12/364,938, mail date September 14, 2010.	
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Examiner Signature	/Cristina Owen Sherr/	Date Considered	09/03/2017

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	16	U.S. Provisional Application No. 60/863,304 filed on October 27, 2006 by Rajiv Laroia for POWER ALLOCATION SCHEME, 15 pages.	
	17	Ortiz-Yepes, "Enhancing Authentication in eBanking with NFC enabled mobile phones;" Masters Thesis, Department of Mathematics and Computer Science, Eihdhoven University of Technology; August 11, 2008.	
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	22	http://www.ietf.org/rfc/rfc4793.txt; "The EAP Protected One-Time Password Protocol (EAP-POTP); 77 pages, February 2007; retrieved from Internet March 21, 2012.	
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	25	Office Action, U.S. Application No. 12/364,828, mail date May 14, 2010.	
	26	Office Action, U.S. Application No. 12/364,938, mail date May 13, 2010.	
	27	Office Action, U.S. Application 13/015,306 mail date June 17, 2011.	
	28	Office Action, U.S. Application 13/015,306 mail date July 17, 2012.	
	29	Notice of Allowance, U.S. Application 13/015,306 mail date November 8, 2012.	
	30	Office Action, U.S. Application 13/015,306 mail date January 9, 2012.	
	31	Notice of Allowance, U.S. Application 13/212,723 mail date January 16, 2013.	

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				Filing Date	**September 22, 2015**
				First Named Inventor	**James A. Proctor, Jr.**
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	32	S. S. (Peter) Wang et al., E-911 LOCATION STANDARDS AND LOCATION COMMERCIAL SERVICES, Nokia Research Center (2000) 5 pages.	
	33	Jonathan P. Munson & Vineet K. Gupta, Location-Based Notification as a General-Purpose Service, Proceedings of the 2nd International Workshop on Mobile Commerce (2002) 5 pages.	
	34	File History of U.S. Provisional Patent Application No. 60/814,254, filed on June 16, 2006, 44 pages.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15271410
Filing Date	2016-09-21
First Named Inventor	James Arthur Proctor, Jr.
Art Unit	3685
Examiner Name	Maria Cristi Owen Sherr
Attorney Docket Number	111054-0001U4C7

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8229458	B2	2012-07-24	Busch	
	2	8185133	B2	2012-05-22	Billmaier et al.	
	3	7965983	B1	2011-06-21	Swan et al.	
	4	7962369	B2	2011-06-14	Rosenberg	
	5	7877082	B2	2011-01-25	Eagle et al.	
	6	7647024	B2	2010-01-12	Wang et al.	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15271410
	Filing Date	2016-09-21
	First Named Inventor	James Arthur Proctor, Jr.
	Art Unit	3685
	Examiner Name	Maria Cristi Owen Sherr
	Attorney Docket Number	111054-0001U4C7

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100138481	A1	2010-06-03	Behrens	
	2	20090219132	A1	2009-09-03	Maytal et al.	
	3	20080139114	A1	2008-06-12	Ranganathan	
	4	20080109843	A1	2008-05-08	Ullah	
	5	20080039020	A1	2008-02-14	Eskin	
	6	20070270099	A1	2007-11-22	Le Gars	
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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Examiner Signature	/Cristina Owen Sherr/	Date Considered	09/03/2017

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CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David J Thibodeau Jr Reg No 31671/	Date (YYYY-MM-DD)	2017-08-23
Name/Print	David J. Thibodeau, Jr.	Registration Number	31,671

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 1 of 2

Complete if Known	
Application Number	**15/271,410**
Filing Date	**September 21, 2016**
First Named Inventor	**James A. Proctor, Jr., et al.**
Art Unit	**Not Yet Assigned**
Examiner Name	**Not Yet Assigned**
Attorney Docket Number	**111054–0001U4C7**

U.S. PATENT DOCUMENTS

Examiner Initials'	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		2002/0101993		08-01-2002	Eskin	
		6,629,149		09-30-2003	Fraser et al.	
		6,934,535		08-23-2005	Phyalammi	
		2006/0003785		01-05-2006	Zatezalo	
		2006/0104243		05-18-2006	Park	
		7,151,764		12-19-2006	Heinonen et al.	
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		2007/0118748		05-24-2007	Edney	
		7,249.182		07-24-2007	Heinonen et al.	
		2008/0089519		04-17-2008	Ekberg	
		2008/0132223		06-05-2008	Lin et al.	
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		2008/0305738		12-11-2008	Khedouri et al	
		7,756,467		07-13-2010	Bent et al.	
		2010/0274859		10-28-2010	Bucuk	
		8,787,575		07-22-2014	Laaksonen et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials'	Cite No.[1]	Foreign Patent Document Country Code[3]–Number[4]–Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
		CA 2 766 024	08-08-2002	ACK Ventures Holdings, LLC		
		CA 2 766 184	08-08-2002	ACK Ventures Holdings, LLC		
		WO 2009050322	04-23-2009	Nokia Corporation		
		WO 2009063272	05-22-2009	Nokia Corporation		

Examiner Signature	/Cristina Owen Sherr/	Date Considered	09/03/2017

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Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	**15/271,410**
				Filing Date	**September 21, 2016**
(use as many sheets as necessary)				First Named Inventor	**James A. Proctor, Jr., et al.**
				Group Art Unit	**Not Yet Assigned**
				Examiner Name	**Not Yet Assigned**
Sheet	2	of	2	Attorney Docket Number	**111054–0001U4C7**

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		Hunn, Nick, "EZURiO – An Introduction to Wibree" November 2006, 7 pages.	
		Shruthi et al., "Wibree Using Digital Radio Technology" International Journal of Advanced Trends in Computer Science and Engineering, Vol. 3 , No.1, Pages : 260 – 264 (2014), Special Issue of ICETETS 2014 - Held on 24-25 February, 2014 in Malla Reddy Institute of Engineering and Technology, Secunderabad– 14, AP, India	
		Ateniese et al., "Untraceable RFID Tags via Insubvertible Encryption", CCS'05, November 7–11, 2005, Alexandria, Virginia, USA. Copyright 2005 ACM 1-59593-226-7/05/0011, 10 pages.	
		Juels, Ari, "Minimalist Cryptography for Low-Cost RFID Tags" SCN'04 Proceedings of the 4th international conference on Security in Communication Networks, Springer-Verlag Berlin, Heidelberg ©2005, 29 Pages	
		Molnar, David, Andrea Soppera, and David Wagner. "A scalable, delegatable pseudonym protocol enabling ownership transfer of RFID tags." International Workshop on Selected Areas in Cryptography. Springer Berlin Heidelberg, 2005, 15 pages.	
		IEEE Standard for Information Technology Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (LR-WPANs), IEEE Std 802.15.4, 1 October 2003, 679 pages.	
		Honkanen et al., "Low End Extension for Bluetooth," Radio and Wireless Conference, 2004 IEEE, pages 199-202	
		Jakobsson et al., "Security Weaknesses in Bluetooth," D. Naccache (Ed.): CT-RSA 2001, LNCS 2020, 2001. c Springer-Verlag Berlin Heidelberg 2001, 16 pages.	
		Juels, et al., "Squealing Euros: Privacy Protection in RFID-Enabled Banknotes,"2003, 22 pages.	
		Gao et al., The Advanced Health and Disaster Aid Network: A Light-Weight Wireless Medical System for Triage, Article in IEEE Transactions on Biomedical Circuits and Systems · October 2007, 15 pages.	
		D Molnar , Privacy and Security in Library RFID Issues, Practices, and Architectures, Anonymized for submission, May 3, 2004, 19 pages.	
		Sarma et al., RFID Systems and Security and Privacy Implications, B.S. Kaliski Jr. et al. (Eds.): CHES 2002, LNCS 2523, 2003. c Springer-Verlag Berlin Heidelberg 2003, 16 pages	
		Weis et al., Security and Privacy Aspects of Low-Cost Radio Frequency Identification Systems, International Journal of Security and Networks, Volume 5 Issue 2/3, March 2010, 12 pages.	
		Golle, et al., "Universal Re-encryption for Mixnets", 2004, 15 pages.	
		Shih et al., "Wake on Wireless: An Event Driven Energy Saving Strategy for Battery Operated Devices," MOBICOM '02 September 23–26, 2002, Atlanta, Georgia, USA, Copyright 2002, 12 pages.	
		D. Ramireddy PowerPoint Presentation – WIBREE Technology, Mar 26, 2015, 21 pages.	
		Jukka Reunamäki PowerPoint Presentation - Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs), Submission Title: [Nokia PHY submission to Task Group 4], July 2001, 59 pages.	
		Huomo et al., PowerPoint Presentation - Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs), Submission Title: [Nokia MAC Proposal for IEEE802.15 TG4], July 2001, 50 pages.	
Examiner Signature	/Cristina Owen Sherr/	Date Considered	09/03/2017		

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Palo Alto, CA 94301

Courtesy Reminder for
Application Serial No: 15/271,410

Attorney Docket No: 111054-0001U4C7
Customer Number: 86012
Date of Electronic Notification: 09/25/2017

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Nov 3 2017

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Name(s):
David J Thibodeau Jr

S-signature:
/David J Thibodeau Jr/

Registration Number:
31671

U.S. Application Number:
15271410

Confirmation Number:
7653

E-mail Address:
DThibodeau@VLPLawGroup.com

Phone Number:
6179255520

Proposed Time of Interview:
11-13-2017 11:00 AM ET

Prefered Interview Type:
Telephonic

I am the applicant or applicant's representative for this application.

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PATENTS
111054–0001U4C7
1005-007

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of: James A. Proctor, Jr., et al.	
Serial No.: 15/271,410	Examiner: Sherr,Maria Cristi Owen
Filed: September 21, 2016	Art Unit: 3685
For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	Confirmation No.: 7653

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

AMENDMENT

Please enter the following amendments before considering the above-identified patent application:

PTO/SB/08a (03-15)
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Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9805347	B2	2017-10-31	Hurry	
	2	9659285	B2	2017-05-23	Hunter et al.	

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	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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Examiner Signature		Date Considered	

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

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OR

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☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David J Thibodeau Jr Reg No 31671/	Date (YYYY-MM-DD)	2017-11-27
Name/Print	David J. Thibodeau, Jr.	Registration Number	31671

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Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
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First Named Inventor/Applicant Name:	James Arthur Proctor
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	Document Description	**Start**	**End**
	Applicant Arguments/Remarks Made in an Amendment	10	32
	Claims	2	9
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1

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2	Information Disclosure Statement (IDS) Form (SB08)	20171127_111054-0001U4C7_TPO_IDS.pdf	1035009 0709e033ee3d6ab05deb9f146e6c757712a7058d	no	4
Warnings:					
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		Total Files Size (in bytes):	10723350		

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REMARKS

Status of the Claims

With entry of the foregoing amendments, claims 1-23 and 31-37 remain in the application. No claim has been allowed.

As more fully explained below, the application is entitled to a filing date of September 8, 2008 and should therefore be treated under the law as a pre-America Invents Act (pre-AIA) application.

Examiner Interview

The Applicant thanks Examiner Sherr for the courtesy of a telephone interview on Thursday, November 16, 2017. During the interview, proposed claim amendments to address the rejections and objections were discussed. Although no agreement was reached, the discussion was helpful in making the amendments entered herein.

Elections / Restrictions

The Applicant's January 24, 2017 response to the restriction requirement was a provisional election of the Group I claims (claims 1-23 and 25-30) *with traverse*. The amendment filed June 1, 2017 was not made in response to any subsequent further restriction by the Examiner, and thus did not change the status of the Applicant's original election with traverse.

The Applicant reserves all rights to reinstate the non-elected claims upon indication of an allowable generic claim.

Prioirty

The Office Action begins with a conclusion that one of the limitations of claim 1, namely

> "determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information"

was supposedly not found in any of the previous Applications. Reconsideration and confirmation of the entitlement to a priority date of September 8, 2008 (the filing date of U.S. Provisional Patent Application No. 61/095,001, referred to herein as "the '001 application"), or at least September 9, 2008 (the filing date of U.S. Provisional Patent Application No. 61/095,359, the "'359 application"), and certainly not later than January 28, 2009 (the filing date of U.S. Patent Application No. 12/364,828 (the '828 application) is respectfully requested.

Each of these prior applications explains how the Applicant uses the detection of identifiers to determine when two devices are in close proximity to each other, that is, are "present" with respect to one another. In one example implementation described in all three prior applications, if an identifier is detected on a short range wireless link, then it is determined that the two devices are close enough together to engage in a further information exchange on a second, longer range wireless link.

For example, a first reference using beacon devices to transmit wireless identifier[s] to facilitate proximity decision first appears on page 1 of the '001 provisional application at page 1, lines 9-11 and lines 21-24 where it was stated that:

> Title 2:
>
> Wireless beacon device for transmitting a wireless identified to facilitate proximity detection
>
> ...

> The present invention is generally concerned with facilitating communications between two wireless devices when they are in close proximity to each other, and using a central server to determine if one or more of the devices should be notified of the other device's presence or other related information such as advertising.

and it is further explained in the '001 application at page 2, lines 11-16 that:

> Specifically, the current invention utilizes the short range wireless communication to detect the presence of other devices, and the wide area wireless network to perform communications to a central server, and perform the actual communications between the wireless devices. The distinction being that the short range wireless is ONLY used for the detection process, and to advertise a device's presence by transmitting an identifier, or receiving identifiers from other devices.

The '001 application also makes reference to using the detected identifiers at page 3, lines 8-14:

> When a receiving device detects one or more identifier, it will use the WWAN link to communicate with the central server. The device will pass along a list of currently detected identifiers and request that the server provide the device with the information related to any identifier that is 1) relevant to that device, and 2) that device is authorized to receive. As an example, a detected identifier may be relevant to the receiving device if

Finally, page 9 of the '001 application neatly maps to the elements of claim 1 as well:

More Detailed Key Concepts to protect

1) A device capable of operating two wireless protocols simultaneously, utilizing a first wireless protocol in the device to detect the proximity of another wireless device and the second wireless protocol to communicate with a remote server, where:

   a. One or more of the devices are mobile devices
   b. Where the first wireless protocol is a local, or personal area network wireless protocol such as 802.11, Bluetooth, UWB or other local connectivity protocol
   c. Where the first wireless capability is re-purposed using a modified or enhanced protocol for
      i. Advertising the presence of the devices or,
      ii. Detecting the presence of another device
   d. Where the method of detecting or advertising the presence of another device utilizing the modified protocol involves embedding or detecting messaging in the standard based broadcasts from the standards based wireless modem, where the standards based protocol is based on, related to, or otherwise derived from IEEE802.11, Bluetooth
   e. Utilizing a wireless wide area data link from one or more of the wireless devices to:
      i. Connect to a central server
      ii. Perform user authorization functions
      iii. Perform download of information associated with account identifiers utilizing the short range wireless capability

For these reasons, the application is entitled to the filing date of the '001 application.

Support for the element of claim 1 in question is also found in the second provisional application '359 filed on September 9, 2008. The second provisional application has all of the same language quoted above, as well as other supporting language. We refer at least to the statement at page 22 that references the use of "beacons" to broadcast the presence of identifiers:

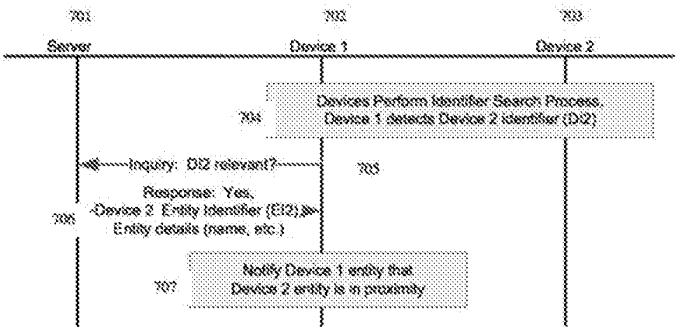
- Using the fields in the NDIS driver in a non-standard way such as using the SSID of the beacons to broadcast, or advertize the presence of your associated account identifier registered to the central server

Certainly the '828 application, with its January 28, 2009 filing date, removes all doubt of there being support in the prior applications. For it was said at page 18 lines 5-26 of the '828 application:

> *Preferred embodiments of the present invention are generally concerned with facilitating the exchange of information and transactions between two entities associated with two wireless devices when the devices are in close proximity to each other. In one embodiment, this can be accomplished by a first device using a first short range wireless capability to detect an identifier transmitted from a second device in proximity to the first device, ideally using existing short range radio communication standard capabilities such as Bluetooth (IEEE802.15.1-2002) or Wi-Fi (IEEE802.11). The detected identifier, being associated with the device, is also associated with an entity. Rather than directly exchanging application data flow between the two devices using the short range wireless capability, a second wireless capability then allows for one or more of the devices to communicate with a central server via the internet, and perform an exchange of application data flow. By using a central server to draw on stored information and content associated with the entity or entities, the server can broker the exchange of information between the entities and the devices. (page 4, lines 10-22)*
>
> *…..More particularly, a given device 106, 108 uses a short range wireless link 107 such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link to detect the presence of other devices such as device 108, and uses the wide area wireless network connections 103, 104 such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100, and to perform the actual substantive communications between the wireless devices 106 and 108. Device 108 typically uses the short range wireless link 107 and wide area wireless link 103 in a similar manner to locate and initiate communicate with device 106. One distinction relative to prior art is that the short range wireless 107 is only used for the detection process, or to advertise a device's presence. In this embodiment, specific information called "wireless identifier" or simply "identify" (described in more detail below) is passed between devices 106 and 108 over the short range link 107. By transmitting a wireless identifier using the short range Wi-Fi, Bluetooth or other short range wireless link 107 and receiving wireless identifiers from other devices, this short range wireless link 107 will allow for a proximity detection process. (page 11, lines 6-20)*
>
> *Figure 3 is a block diagram with further detail of this operation. A device 106, 108, or 202 after performing a search (Fig 3, step 301) for identifiers on the WPAN or WLAN, will subsequently use the WWAN link to communicate with the central server 100. If the device does not find identifiers 302 it will either continue to search, or search at a later time 301. If identifiers are found in 302, the device may employ an action function 303, which would act as a filter that determines which of the detected identifiers should be passed to the server. (page 13, lines 8-14)*

Figure 7 shows an example of a message flow diagram for an embodiment where an individual is in a library for example, and a friend arrives. The individual is notified by their device receiving an identifier that their friend is present and they enter a chat session. Each person has a device (Figure 1, 106 and 108 respectively) that implements the preferred embodiments described above. The first individual associated with Device 1 (702) referred to as Entity 1 (EI1) performs a detection process as described in Figure 4, 5, and 6 previously (step 704) . The device identifier associated with Device 2 (703), DI2 is thereby detected. Device 1 (702) then transmits an inquiry message 705 using the WWAN (cellular data link such as GPRS, EDGE, 1xEV-DO, IS-2000, Wi-Max, LTE, or the like) to the server 701 inquiring if information related to the account and entity associated with DI2 is relevant, and available to the entity EI1 associated with Device 1 (702). The server 701 retrieves the account information related to EI1 and determines that EI2 is listed in a friends list in the account associated with EI1 and that EI1 should be notified when EI2 is detected. Next the server retrieves the account information associated with EI2 and determines that EI1 is on a list of entities which are allowed to be notified of EI2 being present and personal information such a the name of the individual, their phone number and the like. The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details. A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707.

Step 707 of Figure 7 in the '828 application also illustrates a sequence of steps performed, subsequent to the identifier search and detection steps (705 and 706), to notify the "Device 1 entity" that the "Device 2 entity" is "in proximity":



Claim 1 is also supported by at least page 33, line 11 to page 34 line 3 of the '828 application:

2. In a second embodiment,
A device is capable of operating two wireless protocols simultaneously, utilizing a first wireless protocol in the device to detect the proximity of another wireless device and using the second wireless protocol to communicate with a remote server, where:
a. One or more of the devices are mobile devices;
b. Where the first wireless protocol is a local, or personal area network wireless protocol such as 802.11, Bluetooth, UWB or other local connectivity protocol;
c. Where the first wireless capability used for detecting the presence of another device, or advertising the presence or a device;
d. Utilizing a wireless wide area data link from one or more of the wireless devices to, optionally:
i. Connect to a central server;
ii. Perform user authorization functions;
iii. Perform download of information associated with account identifiers utilizing the short range wireless capability;

The above citations to the specification are meant to be examples, and not a complete list of all supporting material, or a description of all possible embodiments of the Applicant's claims.

Acknowledgment of the Applicant's priority claim to the three prior applications is respectfully requested.

INFORMATION DISCLOSURE STATEMENTS

Applicant thanks the Examiner for consideration of the prior art in the information disclosure statements (IDS) submitted on September 21, 2016, September 29, 2016, and August 23, 2017. A supplemental Information Disclosure Statement is being filed herewith.

REMARKS ON "STATEMENTS OF INTENDED USE" AND "NON-FUNCTIONAL DESCRIPTIVE MATERIAL"

A. The Office Action's unqualified conclusion that "statements of intended use do not serve to distinguish from the prior art" is an incomplete citation to MPEP 2103(I)(C)

In this case, Claim 1 indeed recites "a first radio", "a second radio", and "one or more data processors" and then ascribes certain functions to each of these hardware components. Similar recitations are provided in claims 13-15 and 37.

The Applicant agrees that these terms do not invoke the "means plus function" construct permitted by 35 U.S.C.112(6) or 35 U.S.C.112 f). However, the Examiner has erred in concluding that no patentable weight may ever be given to any claim recitations that indicate the functions performed by the claim elements.

The cited portion of the MPEP actually describes:

> USPTO personnel are to correlate each claim limitation to all portions of the disclosure that describe the claim limitation. This is to be done in all cases, regardless of whether the claimed invention is defined using means- (or step-) plus- function language. The correlation step will ensure that USPTO personnel correctly interpret each claim limitation.
>
> The subject matter of a properly construed claim is defined by the terms that limit its scope. It is this subject matter that must be examined. As a general matter, the grammar and intended meaning of terms used in a claim will dictate whether the language limits the claim scope. Language that suggests or makes optional but does not require steps to be performed or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation.

MPEP § 2103(C) (emphasis supplied). Thus the MPEP requires the Examiner to first (1) correlate all portions of the disclosure that describe the claim limitation in question and the (2) construe the claim by any language that limits its scope.

Here, the Examiner has made no attempt to correlate the claim limitations in question to the corresponding parts of the disclosure. In contrast to the Examiner's apparent conclusion, the claim recitations are not "merely optional or suggestive."

It appears the Examiner is confusing functional claim recitations, which are common in claims directed to computer-related inventions, with "intended use" recitations of the kind which normally occur in claim preambles. The Examiner has even explicitly considered the other claim limitations on the record (for example, in the later rejections under 35 USC 102 and 103) when concluding that the recited processor, for example, "has the ability to determine the proximity of at least one beacon transmitter…by utilizing the identifier related information" and uses that information in particular ways (see at least paragraphs 81, 85, 87 and 91 of the Office Action).

Nonetheless, and without agreeing that the rejection is proper, the Applicant has now amended the apparatus claims to a form that recites "one or more data processors" that execute instructions to perform the specified operations.

This format for a claim was recently considered permissible in issued U.S. Patent 9,805,347. This format has been recognized as a proper way to recite a computer-related invention by the courts, as more fully discussed below.

Because claim 1 recites a capability of the first radio, the second radio, and the data processor, and because those capabilities are recited as being present (and not optional), and because the recitation of a processor performing instructions is not per se intended use according to the law, Applicant submits that the Examiner has erred in alleging that the recitations are "merely intended use".

B. The office action also mistakenly concludes that "nonfunctional descriptive material" can never serve to distinguish from the prior art", citing to MPEP 2111.05 and various cases referred to therein.

The claim elements in question are claim 1's recitation of "wherein the proximity beacon identification information indicates..." and "wherein the proximity beacon identification information is the same..."; and claim 31's recitation of "transmissions were received from ...second radio".

As per MPEP 2111.05,

> "USPTO personnel must consider all claim limitations when determining patentability of an invention over the prior art. In re Gulack, 703 F.2d 1381, 1385, 217 USPQ 401, 403-04 (Fed. Cir. 1983). Since a claim must be read as a whole, USPTO personnel may not disregard claim limitations comprised of printed matter. See Id. at 1384, 217 USPQ at 403; see also Diamond v. Diehr, 450 U.S. 175, 191, 209 USPQ 1, 10 (1981).

Applicant does recognize that USPTO personnel need not give patentable weight to printed matter absent a new and unobvious functional relationship between the "printed matter" and the substrate. But when such a functional relationship exists, patentable weight must be ascribed.

The Court of Appeals for the Federal Circuit has repeatedly stated that "[d]uring examination, 'claims . . . are to be given their broadest reasonable interpretation consistent with the specification, and . . . claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art.'" *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004) (other citations omitted); *In re Morris*, 127 F.3d 1048, 1053-54 (Fed. Cir. 1997. *In re Smith International, Inc.*, (Appeal No. 2016-2303 decided September 27, 2017) is a recent case where the CAFC held that

> The correct inquiry in giving a claim term its broadest reasonable interpretation in light of the specification is not whether the specification proscribes or precludes some broad reading of the claim term adopted by the examiner. And it is not simply an interpretation that is not inconsistent with the specification. It is an interpretation that corresponds with what and how the inventor describes his invention in the specification, i.e., an interpretation that is "consistent with the specification." (citing also to *In re Suitco Surface*, 603 F.3d 1255, 1259–60 (Fed. Cir. 2010).

The prohibition against using non-functional descriptive material as the distinguishing feature of a claim is based on the "printed matter" doctrine in which matter that has no functional relationship to the "substrate" upon which is it is "printed" does not provide a patentable distinction to the substrate. For example, information, messages, indicia, raw data, colors, etc. can be considered such descriptive material. However, patentable weight *will be given* when such descriptive material has a functional relationship to the substrate.

The later sections of the MPEP 2111.05, such as MPEP 2111.05(I) provide further guidance:

> A. Evidence Supporting a Functional Relationship
>
> To be given patentable weight, the printed matter and associated product must be in a functional relationship. A functional relationship can be found where the printed matter performs some function with respect to the product to which it is associated. See Lowry, 32 F.3d at 1584, 32 USPQ2d at 1035 (citing Gulack, 703 F.2d at 1386, 217 USPQ at 404). For instance, indicia on a measuring cup perform the function of indicating volume within that measuring cup. See In re Miller, 418 F.2d 1392, 1396, 164 USPQ 46, 49 (CCPA 1969). A functional relationship can also be found where the product performs some function with respect to the printed matter to which it is associated. For instance, where a hatband places a string of numbers in a certain physical relationship to each other such that a claimed algorithm is satisfied due to the physical structure of the hatband, the hatband performs a function with respect to the string of numbers. See Gulack, 703 F.2d at 1386-87, 217 USPQ at 405.
> ...
>
> II. FUNCTIONAL RELATIONSHIP BETWEEN PRINTED MATTER AND ASSOCIATED PRODUCT (OR PROCESS) MUST BE NEW AND UNOBVIOUS
>
> Once a functional relationship between the product and associated printed matter is found, the investigation shifts to the determination of whether the relationship is new and unobvious.

In the computer-related invention context, as in this case, where programming performs some function with respect to the computer or computer component with which it is associated, the programming can create a patentable distinction. (See at least slide 22 of "Examining Functional Claim Limitations: Focus on Computer/Software-Related Claims", May 2015, United States Patent and Trademark Office, available at: https://www.uspto.gov/sites/default/files/documents/fnctnllnggcmptr.pptx)

For instance, a claim to computer storage medium programmed with attribute data objects that perform the function of facilitating retrieval, addition, and removal of information in the intended computer system, ***establishes a functional relationship*** such that the claimed attribute data objects are given patentable weight. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035, as cited in MPEP 2111.05 B(III).

The Court of Appeals for the Federal Circuit has most recently spoken on this topic in *MasterMine Software, Inc. v. Microsoft Corp.*, 2017 U.S. App. LEXIS 21479 (Fed. Cir. Oct. 30, 2017) (Newman, O'Malley, Stoll) recognizing that "apparatus claims are not necessarily indefinite for using functional language", citing to *Microprocessor Enhancement Corp. v. Tex. Instruments Inc. (MEC)*, 520 F.3d 1367, 1375 (Fed. Cir. 2008), finding that a claimed "processor" programmed "for executing instructions" was proper form, and not indefinite (See *MasterMine*, slip op. at 14).

In the present case, the claims as a whole are not merely directed to the format of the proximity beacon transmissions. Rather, the claims recite how the identifiers and beacon transmissions are received via two different radios, and how one or more processors then determine proximity of the beacon transmitter device, or entity, or object using the identifiers, and how the beacon transmissions identify an associated beacon service, and

how the proximity beacon identifiers are then used to identify which beacon transmitters are enabled with the same proximity beacon service[1].

Certainly with the foregoing amendments, claim 1 now requires one or more processors programmed to perform detection of a very specific type of identifier (namely one comprising a MAC address, a unique identifier, and proximity beacon information, and where the proximity beacon information is associated with a proximity beacon service, and where the beacon identification information is the same for all proximity beacon transmissions from the beacon transmitter devices that are enabled with a selected proximity beacon service).

For the reasons stated below, these functions are also not anticipated by, or obvious, in view of the prior art.

The elements of claim 1 are therefore not directed to nonfunctional descriptive language, but are exactly the type of positive recitations of the functions performed by a data processor permitted under the law.

[1] Pages 13 and 14 of the '828 application describe one implementation of the data processor executed code which is referred to as an "action function".... "If the device does not find identifiers 302 it will either continue to search, or search at a later time 301. If identifiers are found in 302, the device may employ an action function 303, which would act as a filter that determines which of the detected identifiers should be passed to the server.....If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this determination. "

CLAIM REJECTIONS - 35 USC 101

Claims 1-23 and 31-37 stand rejected under 35 U.S.C. 101 as supposedly being directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more. The Applicant must respectfully disagree that the claims are directed to the types of inventions excluded from patentability.

a) There is no evidence on the record to establish that the claims are merely an abstract idea under part one of the *Alice* test

The Examiner has alleged, without providing any evidentiary support, that the claims are directed towards the supposedly abstract idea of "determining distance". The U.S. Supreme Court, in *Alice Corporation Pty., Ltd. v. CLS Bank International*, ____ U.S. _____, 134 S. Ct. 2347 (2014) listed four examples of abstract ideas, including:

> fundamental economic practices;
> certain methods of organizing human activities;
> an idea itself; and
> mathematical relationships/formulas.

A claim that requires "determining distance" falls into none of these categories.

Indeed, the Examiner has not even indicated which of these categories applies to the Applicant's claims, or given any reason at all for why the claims are merely "abstract ideas". It appears that all the Examiner did was to characterize a portion of the language of the claim, and then conclude the claim is an abstract idea (with no evidentiary or legal proof). The Examiner then glosses over, apparently without any further consideration,

the remaining specifics delineated in the claims[2]. The Examiner has therefore not met the Patent Office's burden of setting forth a prima facie case of unpatentability, and the rejection should be withdrawn.

It is a well know scientific principal that determination of distance can only be carried out by a physical apparatus, or method operating on a physical apparatus, that observes or detects phenomena occurring in the physical world. For that reason alone, any method or apparatus that determines distance cannot possibly be a merely abstract idea.

In addition, the claimed invention as a whole does not merely relate to "determining distance". Indeed, the word "distance" appears nowhere in the claims. The claims actually require a first radio that receives specific information (that is, identifier related information), a second radio that receives a second type of transmission (that is, proximity beacon transmissions) and provides further proximity beacon information from those received transmissions, and a processor that determines *proximity* of a beacon transmitter device, entity, or object from the identifiers in a particular way.

A device that includes two different radios – a type of hardware -- with a computer that processes the information received by the radios to determine which other radios are in proximity cannot reasonably be considered to be a merely abstract idea.

The rejection under Step 1 of the *Alice* test is thus prima facie deficient and should be withdrawn.

b) The claims are not for a mere abstract idea due to presence of particular limitations that confine their scope to being much narrower than merely "determining distance" and provide enough "extra" to pass the *Alice* test

[2] Paragraph 22 of the office action, in considering claim 31, concluded the "transaction device" "merely automates an algorithm". But no "transaction device" appears anywhere in claim 31 or any other claim.

The Examiner also concluded that the claims do not recite any limitations that are "significantly more" than the abstract idea. The Examiner reaches this conclusion, but offers no actual consideration of whether the claims recite an improvement to another technology or technical field, an improvement to the functioning of a computer itself, meaningful limitations beyond generally linking the use of an abstract idea to a particular technological environment, or why they do not preempt all implementations of the abstract idea. These further considerations are a necessary part, the so-called "Part Two", of a proper analysis under the *Alice* case.

It is respectfully submitted that the Applicant's claims act to narrow, confine, and otherwise tie down the claim so as not to cover all ways of determining distance. Per the Applicant's claim 1, a specific mobile wireless device is used – one that has two radios – (a first radio that receives identifier related information, and a second radio that receives a second type of transmission (that is, proximity beacon transmissions) and provides further proximity beacon information from those transmissions. The device also includes a processor that determines proximity of a beacon transmitter device, entity, or object from those special types of identifiers. The Applicant's claim 31 is a method claim that contains analogous limitations that specify a specific sequence of steps to be carried out, at least in part, by a mobile device receiving these special types of transmissions and determining proximity from them.

In another field of endeavor, it is well known that a radio ranging system determines distance by transmitting pulses, and making time of flight measurements on received reflections. Thus, the claims as recited also do not pre-empt all apparatus and methods for "determining distance." [3]

[3] As mentioned above, this format for a claim has been recognized by the Courts as a proper way to recite a computer-related invention.

The Applicant's claimed invention also provides an improvement to the operation of an electronic system itself, and solves several technical problems that would otherwise occur. The claimed beacon transmissions are used to inform the mobile wireless devices of the availability of services that depend upon the proximity of two devices. As explained in the specification:

> *The present embodiment has the advantage that communication between two devices may continue after the devices have left proximity of each other, but in the same manner as they had been communicating previously. As a result, a user who detects a short range transmission of an identifier, then begins a conversation or some other interaction with that device via the wireless wide area network may continue that conversation even in the case where the two devices move out of the proximity of the each other, and are no longer within the reception range of the {original} short range wireless communication protocol. (page 11, line 23- page 12 line 1)*
>
> A *distinguishing feature of this approach relative to prior art is that the patron device 202 in this example may move out of proximity of broadcast device 204, yet continue to view the content being provided by the server 100 related to the detected broadcast device 204. (page 12 lines 22-25)*

A further technical advantage is provided by the invention recited in certain dependent claims, such as claim 5, which require changing both the MAC address and the unique identifier over time:

> *Further, since it is contemplated that the wireless identifiers transmitted on the short range wireless link from the devices would occasionally change, for security reasons, the present embodiment has the advantage that ongoing communications between mobile devices will not be interrupted despite a change in one of the device's identifier. In the case where the identifier is a MAC address of the short range wireless network adapter for one of the devices, it is not otherwise possible to change this address and easily maintain on going communications in a true peer to peer topology. (page 12, lines 1-7)*

For these several reasons, the rejections under 35 USC 101 should be withdrawn.

CLAIM REJECTIONS – 35 USC 112

Claims 1-23 and 31-37 stand rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as supposedly failing to comply with the written description requirement.

Regarding claims 1 and 31, and the recitation of a "mobile wireless device comprising… a first radio … and a second radio", Figure 1 of all three prior applications show the "first radio" as the mobile device's local link 107 described as being a Wi-Fi, Bluetooth, etc. radio and a "second radio" as the link 104 described as being a wireless wide area network link / connection. See also the '828 specification as filed at page 11 lines 6-17, which describes using the short-range wireless link 107 for certain functions such as detecting the presence of other devices such as device 108 and using the wireless wide-area wireless network connections 103, 104 to perform communications to the central server 100.

Regarding claim 4, the '828 specification at page 12 lines 11 indicates that the wireless identifiers transmitted on the short-range wireless link occasionally change for security reasons.

Regarding claim 18, reference is made to '828 application and the chart of Figure 11 which lists a "dynamic MAC address", as well as the text on page 40 lines 17 through 20 where it explained that the identifiers are occasionally changed, and that the identifiers may be a MAC address.

Regarding claim 32, Figure 1 shows multiple mobile devices.

Regarding claim 34, the statement at page 28 lines 15-19 of the '828 priority application explained that the central server may be implemented as a collection of servers.

The Examiner's reference to a "claim 41", "programmatically categorizing", "IT infrastructure" as well as the reference to U.S. Patent Publication 2009/0171730 all appear to be in error and are thus understood to have no relation to the present case. Confirmation of that understanding is requested.

Claims 1-23 and 31-37 were also rejected as failing to define the invention in the manner required by 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph.

The Examiner makes several general statements that the "claims are in narrative form", "replete with indefinite language", that "the structure which makes up the device must be clearly and positively recited", that "the claims contain excessive functional language", and that "the claims must be in one sentence form only." These general assertions, without further explanation, do not meet the Patent Office's burden for making formal rejection of the claims on a proper legal basis. Furthermore, it is not understood what is meant by "excessive functional language" - and since the claims are indeed all in the one sentence form only, the Applicant has to question whether these rejections were also made in error.

If the Examiner intends to make a rejection of the claims on these bases, an actual rejection of the claims, and an indication of which claims are involved, the language or claim elements in question, and specific reasons for failure to meet the statutory requirement, is respectfully requested.

The Examiner also appears to conclude that any claim which recites both an apparatus and method steps of using the apparatus is indefinite. That is not the law. With regard to the comments made above, it is certainly proper form to recite a radio, and that the

radio is "configured to" perform certain functions. It is also proper form to recite a data processor that executes program code for performing certain functions.

More particularly, paragraph 53 of the office action refers to certain portions of claim 1, namely the recitation of "each of the proximity beacon transmitter devices as being enabled with the beacon service" and "wherein proximity Beacon identification information..." as being unclear.

It is indeed the case that claim 1 recites a mobile wireless device. However, the aspects of the claim called into question by the Examiner serve to further describe attributes of the proximity beacon identification information that is received and processed by the mobile wireless device. That is, those proximity beacon transmissions have the precise format recited in the claim – including a MAC address, a unique identifier and proximity beacon identification information.

Claim 11 depends from claim 1 and further requires the unique identifier to be associated with a certain type of broadcast device – namely, a broadcast device having a predetermined location.

Claim 23 depends from claim 1 and serves to further define attributes of the beacon service. In particular, the beacon service is one that sends unsolicited, automatically repetitive advertisements, and where the beacon identification information is included within a configurable field of those repetitive beacon advertisements.

Regarding claim 31, it is sufficient for the claim to recite that the method involves receiving proximity beacon information using a second radio.

Claim 12 is now amended to refer to a "predetermined location" – that is, any location that is known in advance. There is no need to define a format for the location data; one of skill in the art recognizes that the claims are simply specifying that the data processor can

determine that the beacon transmitter is a broadcast device having a location that the processor already knows.

Regarding the recitation of a "standards-based protocol" in claim 23, the claim as a whole makes reference to a Bluetooth protocol. One of skill in the art knows that the claimed protocols must be those that derive from the well-known Bluetooth standard.

Claim 13 depends from claim 1 and requires that the identifier related information comprise application software, and that the application software is downloaded in reaction to the sending of unique identifier to the at least one server. There is no circular reasoning or indefiniteness.

Similarly, claim 14 does not involve circular reasoning; the claim is just further defining what is included in the identifier-related information.

Claim 15 depends from claim 1 and has further limitations for how the proximity of the beacon transmitter is determined, namely by comparing contact information with the proximity beacon information, and when there is a match, allowing further communications utilizing the second radio.

Claim 23 has been amended.

Claim 32 does further define claim 31, since it requires that the steps of the method of claim 31 be performed under control of an application that is executing on one of the mobile devices. Claim 32 does not carry with it any requirement that any or all of the steps of claim 31 be first performed or performed in any particular order.

Claim 32 has also been amended to indicate that the mobile device of claim 31 is the device referred to.

CLAIM REJECTIONS – 35 USC 102

Claims 1, 6-14, 19, 20, 23, 31, and 34-36 stand rejected under pre-AIA 35 U.S.C. 102(a) as being anticipated by Hillier (US 2016/0025837).

For the reasons stated above, this application rightfully claims priority to U.S. Provisional Patent Application 61/095,001 and a filing date of September 8, 2008. Therefore, the Hillier publication is not prior art and the rejections should be withdrawn.

CLAIM REJECTIONS – 35 USC 103

Claims 2-5, 15-18, and 21-22 stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hillier (US 2016/0025837) in view of Altman et al (US 2013/0217332)

Claims 32-33 also stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hillier (US 2016/0025837) in view of Sorenson et al (US 2003/0053484)

Neither Hillier nor Altman are prior art. All of these rejections should also be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, reconsideration and allowance of the application is respectfully requested.

Respectfully submitted,

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IN THE CLAIMS:

1. (Currently Amended) A mobile wireless device ~~for facilitating the use of proximity beacons~~ comprising:

a first radio ~~for communicating with one or more servers and receiving identifier related information~~;

a second radio ~~for receiving proximity beacon transmissions from a plurality of beacon transmitter devices and for providing proximity beacon information derived from the proximity beacon transmissions~~;

one or more processors;

one or more non-transitory memory devices coupled to the one or more processors, the one or more non-transitory memory devices storing a set of instructions that when executed by the one or more processors cause the one or more processors to perform operations including:

receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers;

~~and~~

~~a data processor for determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information;~~

receiving, using the second radio, proximity beacon transmissions when the device is located within a detection range of each of a plurality of beacon transmitter devices, ~~wherein~~ each of the proximity beacon transmissions ~~comprises~~ including a MAC address, a unique identifier, and proximity beacon identification information, and ~~;wherein~~ the proximity beacon identification information ~~indicates~~ indicating the proximity beacon transmissions are associated with the [[a]] proximity beacon service;

deriving proximity beacon information from the proximity beacon transmissions;

determining a proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information; and

[[wherein]] the proximity beacon identification information [[is]] being the same for all proximity beacon transmissions ~~from the plurality of beacon transmitter devices and identifies each of the plurality of proximity beacon transmitter devices as being enabled~~ associated with the proximity beacon service.

2. (Original) The mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit number matching [[the]] a format of a MAC address.

3. (Original) The mobile wireless device of Claim 2, wherein the MAC address is a Bluetooth BD_ADDR.

4. (Currently Amended) The mobile wireless device of claim 3 wherein both the MAC address and the unique identifier received by the second radio from a single beacon transmitter device occasionally change, for security reasons.

5. (Currently Amended) The wireless device of claim 2 wherein both the MAC address and the unique identifier change from time to time, making one or more of an entity's identity associated with a beacon transmitter device ~~the at least one beacon transmitter~~ and the ~~at least one~~ beacon transmitter device's identity anonymous over time to other devices or entities not having permissions at the one or more servers ~~central server~~ to access the identifier information.

6. (Currently Amended) The mobile wireless device of Claim 1, wherein at least a[[the]] portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices.

7. (Currently Amended) The mobile wireless device of Claim 6, wherein the [[data]] one or more processors ~~processor~~ further execute the instructions to perform operations including:

further ~~determines~~ determining the proximity of the at least one beacon transmitter device by comparing the downloaded unique identifier with the portion of the proximity beacon information, the portion comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object.

8. (Currently Amended) The mobile wireless device of Claim 1, wherein the one or more processors ~~data processor~~ further execute the instructions to perform operations including:

further determining ~~determines~~ the proximity of the at least one beacon transmitter device by utilizing an action function including one or more previously downloaded unique identifiers.

9. (Currently Amended) The mobile wireless device of Claim 1, wherein the one or more processors ~~data processor~~ further execute the instructions to perform operations including:

~~determines~~ further determining the proximity of a specific beacon transmitter device by comparing the proximity beacon information with the identifier related information.

10. (Currently Amended) The mobile wireless device of Claim 1, wherein the one or more processors ~~data processor~~ further execute the instructions to perform operations including:

~~determines~~ further determining the proximity of at least one beacon transmitter device by sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radio, and receiving[[ives]] at least a portion of the identifier related information usable to make the proximity determination.

11. (Currently Amended) The mobile wireless device of Claim 10, wherein the unique identifier associated with the at least one beacon transmitter is associated ~~at the at least one of the one or more servers~~ with ~~being~~ a broadcast device having a predetermined ~~known~~ location.

12. (Currently Amended) The mobile wireless device of Claim 1, wherein the one or more processors ~~data processor~~ further execute the instructions to perform operations including

determining~~determines~~, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a predetermined ~~known~~ location.

13. (Currently Amended) The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device, downloaded in reaction to [[the]] sending of a unique identifier by the mobile wireless device to [[the]] at least one server of the one or more servers, and wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information.

14. (Original) The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device.

15. (Currently Amended) The mobile wireless device of Claim 1 wherein

the identifier related information comprises a list of contact information, and the one or more processors further execute the instructions to perform operations including:

further determining the proximity of a beacon transmitter device associated with an entity included within the list of contact information based upon comparing a contact

identifier information ~~related unique identifier~~ with at least the portion of the proximity beacon information, and the mobile wireless device, upon determining there is a match, engaging ~~engages~~ in further steps to allow further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, and further

wherein [[the]] both the MAC address and the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information change from time to time, but remain ~~remains~~ identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification.

16. (Currently Amended) The mobile wireless device of claim [[1]] 4 wherein the changing of the MAC address and the unique identifier associated with the single ~~at least one~~ beacon transmitter device is coordinated with [[the]]at least one of the one or more ~~remote central~~ servers.

17. (Currently Amended) The mobile wireless device of claim 1 wherein the unique identifier of at least a [[the]] portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one server of the one or more ~~remote central~~ servers.

18. (Currently Amended) The mobile wireless device of claim 1 wherein the unique identifier associated with at least one beacon transmitter is associated with a single beacon transmitter and is generated algorithmically and only known to at least one of the ~~central~~ servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval within the beacon transmitter, and further

wherein the MAC address associated with the beacon transmitter is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices.

19. (Original) The mobile wireless device of Claim 1, wherein the second radio is a Bluetooth based radio.

20. (Original) The mobile wireless device of Claim 1, wherein the second radio is a Wi-Fi based radio.

21. (Currently Amended) The mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit BD_ADDR, wherein both the MAC address and the unique identifier change from time to time, making one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more ~~central~~ servers to access the identifier related information, and with ~~wherein~~ at least the portion of the identifier related information ~~includes~~ including a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter ~~of the plurality of beacon transmitter devices~~, and

wherein the one or more processors further execute the instructions to perform additional operations, including determining ~~data processor determines~~ the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object.

22. (Currently Amended) The mobile wireless device of Claim 21, wherein the one or more processors further execute the instructions to perform additional operations, including determining ~~data processor determines~~ the proximity by utilizing an action function including one or more previously downloaded unique identifiers.

23. (Currently Amended) The mobile wireless device of Claim 1, wherein the proximity beacon service utilizes a standards based protocol derived from Bluetooth and including unsolicited automatically repetitive advertisements, and wherein the proximity

beacon transmissions are transmitted within the format of the unsolicited automatically repetitive advertisements, and wherein the proximity beacon identification information is included within one or more [[a]] configurable fields of the unsolicited automatically repetitive advertisements while conforming to the standards based protocol and, wherein no connection is made between the mobile wireless device and the plurality of ~~beacon transmitted receiving when receiving~~ beacons transmitter devices in order to receive the unique identifier.

24. – 30. (Cancelled)

31. (Currently Amended) A method for facilitating [[the]]use of proximity beacons comprising:

communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

receiving, at the mobile device using a second radio, proximity beacon transmissions from one or more beacon transmitter devices

~~obtaining~~ deriving, at the mobile device, proximity beacon information ~~derived~~ from the proximity beacon transmissions~~, wherein the proximity beacons transmissions were received fromone or more beacon transmitter devices using a second radio~~; and [[ ]] determining, at the mobile device, a [[the]]proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information;

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and proximity beacon identification information;

wherein the proximity beacon identification information indicates the proximity beacon transmissions are associated with a proximity beacon service; and

wherein the proximity beacon identification information is the same for all proximity beacon transmissions associated with the proximity beacon service, transmitted from the plurality of beacon transmitter devices.

32. (Currently Amended) The method of claim 31, additionally comprising:

performing one or more steps of the method, by one or more processors of the mobile device, under control of an application via a software interface; and

executing the application on ~~at least one of~~ the mobile device[[s]].

33. (Previously Presented) The method of claim 32 wherein the software interface is an NDIS driver.

34. (Currently Amended) The method of claim 31 additionally comprising:

performing at least a portion of the steps on one or more processors of the one or more ~~that are~~ servers.

35. (Previously Presented) The method of claim 31, wherein both the MAC address and the unique identifier received via the second radio occasionally change between proximity beacon transmissions from one of the one or more beacon transmitter devices.

36. (Currently Amended) The method of claim 31, wherein the identifier related information is received in response to [[the]]software residing on the mobile device sending at least one unique identifier determined from the proximity beacon information.

37. (Currently Amended) The method of claim 31 wherein after determining the at least one beacon transmitter device is in proximity, at least one server of the one or more of servers providing[[es]] an identifying picture of a consumer to at least one device ~~for use by an operator of the device~~ for confirming the picture matches an individual in proximity as a step in an electronic commerce transaction.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/271,410	Filing Date 09/21/2016	☑ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $210 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT	11/27/2017	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0		x $40 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	lisa thomas
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(Not for submission under 37 CFR 1.99)

Application Number	15271410
Filing Date	2016-09-21
First Named Inventor	James A. Proctor
Art Unit	3685
Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9805347	B2	2017-10-31	Hurry	
	2	9659285	B2	2017-05-23	Hunter et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2016-09-21
	First Named Inventor	James A. Proctor
	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
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Examiner Signature	/Cristina Owen Sherr/	Date Considered	03/13/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.O.S/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15271410
	Filing Date	2016-09-21
	First Named Inventor	James A. Proctor
	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David J Thibodeau Jr Reg No 31671/	Date (YYYY-MM-DD)	2017-11-27
Name/Print	David J. Thibodeau, Jr.	Registration Number	31671

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/271,410	09/21/2016	James Arthur Proctor JR.	111054-0001U4C7	7653

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EXAMINER	
SHERR, MARIA CRISTI OWEN	

ART UNIT	PAPER NUMBER
3685	

NOTIFICATION DATE	DELIVERY MODE
03/22/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@vlplawgroup.com

Office Action Summary	**Application No.** 15/271,410	**Applicant(s)** Proctor et al.	
	Examiner CRISTINA O SHERR	**Art Unit** 3685	**AIA Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 11/27/17.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☑ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-23 and 31-37 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-23 and 31-37 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date 11/27/17.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

2. This Office Action is in response to the Applicant's Amendment filed 27 November 2017. Claims 1-23 and 31-37 are currently pending in this case. Claims 24-30 were previously canceled. Claims 1, 4-13, 1518, 21-23, 31-32, 34, 36, and 37 are currently amended.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 27 November 2017, is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Response to Arguments

4. Applicant's arguments filed November 27, 2017, have been fully considered but they are not persuasive.

5. Applicant argues, regarding claim 1, as currently amended, that the limitations of claim 1 are entitled to a priority date of January 28, 2009.

6. Examiner respectfully disagrees.

7. In reviewing the various continuations, at least the limitation of claim 1 "determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information" in the context of the claims, where identifier related information is received from a server using a first radio, the proximity beacon transmissions are received using a second radio, the proximity beacon information is derived from the proximity beacon transmissions, and then a proximity of a device associated with the derived proximity beacon information is determined by the mobile device using the identifier related information received from the server is not found in the previous Applications. Note that at least U.S. Patent Application No. 14/861,563, filed September 22, 2015 and U.S. Patent Application

No. 14/472,477 do not support the limitation "determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information"

8. For this reason, Priority is set at 21 September 2016.

9. Applicant argues, regarding claims 1 -23 and 31-37, as currently amended, that the claims recite statutory subject matter.

10. Examiner respectfully disagrees.

11. The claims, as a whole, do not amount to significantly more than the abstract idea itself. This is because the claims do not effect an improvement to another technology or technical filed; the claims do not amount to an improvement to the functioning of a computer system itself; and the claims do not move beyond a general link of the use of an abstract idea to a particular technological environment.

12. Applicant argues, regarding claim 4, as currently amended, that the claims is properly supported by U.S. Application No. 12/364,828.

13. Examiner respectfully disagrees. The prior applications do not support the limitation of "determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information" in the context of the claims, where identifier related information is received from a server using a first radio, the proximity beacon transmissions are received using a second radio, the proximity beacon information is derived from the proximity beacon transmissions, and then a proximity of a device associated with the derived proximity beacon information is determined by the mobile device using the identifier related information received from the server.

14. Priority, therefore, is set at 21 September 2016.

15. Applicant argues, regarding claim 18, as currently amended, that the claims is properly supported by U.S. Application No. 12/364,828.

16. Examiner respectfully disagrees.

17. Note that, as above, Priority is set at 21 September 2016.

Priority

18. This application claims a continuation of pending U.S. Patent Application No. 14/861,563, filed September 22, 2015 which is a continuation of pending U.S. Patent Application No. 14/472,477, filed August 29, 2014 which is a continuation of U.S. Patent Application No. 13/775,435, filed February 25, 2013, now issued as U.S. Patent No. 8,849,698 on September 30, 2014 which is a continuation of U.S. Patent Application No. 13/212,723, filed August 18, 2011, now issued as U.S. Patent No. 8,374,592 on February 12, 2013 which is a continuation of U.S. Application No. 12/364,828, filed February 3, 2009, now issued as U.S. Patent No. 8,090,359 on January 3, 2012 which claims the benefit of U.S. Provisional Application No. 61/095,001, entitled "Central Server Enabled Proximity Based Applications Utilizing Both Short Range, and Wide Area Wireless Radios", filed on September 8, 2008 and U.S. Provisional Application No. 61/095,359, entitled "Central Server Enabled Proximity Based Applications Utilizing Both Short Range, and Wide Area Wireless Radios", filed on September 9, 2008. However, in reviewing the various continuations, the prior applications do not support the limitation of "determining the proximity of at least one beacon transmitter device, entity, or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information" in the context of the claims, where identifier related information is received from a server using a first radio, the proximity beacon transmissions are received using a second radio, the proximity beacon information is derived from the proximity beacon transmissions, and then a proximity of a device associated with the derived proximity beacon information is determined by the mobile device using the identifier related information received from the server.

19. For this reason, Priority is set at 21 September 2016.

Claim Rejections - 35 USC § 101

20. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

21. Claims 1-23 and 31-37 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

22. Regarding claims 1-23 and 31-37 –

23. Claims 1-23 and 31-37 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter because the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

24. The claims are directed to the abstract idea of determining distance.

Subject Matter Eligibility Standard

25. When considering subject matter eligibility under 35 U.S.C. 101, it must be determined whether the claim is directed to one of the four statutory categories of invention, i.e., process, machine, manufacture, or composition of matter. If the claim does fall within one of the statutory categories, it must then be determined whether the claim is directed to a judicial exception (*i.e.*, law of nature, natural phenomenon, and abstract idea), and if so, it must additionally be determined whether the claim is a patent-eligible application of the exception. If an abstract idea is present in the claim, any element or combination of elements in the claim must be sufficient to ensure that the claim amounts to significantly more than the abstract idea itself. Examples of abstract ideas include fundamental economic practices; certain methods of organizing human activities; an idea itself; and mathematical relationships/formulas. (*Alice Corporation Pty. Ltd. v. CLS Bank International, et al* US Supreme Court, No. 13-298, June 19, 2014).

Analysis

26. In this case, claim 31 recites a method.

27. Additionally, the claim is directed to the abstract idea of determining distance. (*Alice Corporation Pty. Ltd. v. CLS Bank International, et al* US Supreme Court, No. 13-298, June 19, 2014) The transaction device in this claim merely automates an algorithm via basic computer functions, and therefore, the claim does not include additional elements that are sufficient to amount to significantly more than the judicial exception because additional claim elements do not provide meaningful limitations to transform the abstract idea into a patent eligible application of the abstract idea such that the claim amounts to significantly more than the abstract idea itself.

28. Taking the claim elements separately, the functions performed by the machine at each step of the process are purely conventional. Receiving data, transmitting data, and comparing data ---one of the most basic functions of a computer. All of these computer functions are well-understood, routine, conventional activities previously known to the industry. In short, each step does no more than require a generic computer to perform generic computer functions.

29. The claims do not, for example, purport to improve the functioning of the computer itself. Nor do they effect an improvement in any other technology or technical field. Instead, the claims at issue amount to nothing significantly more than an instruction to apply the abstract idea of advertising using some unspecified, generic computer. "Under our precedents, that is not 'enough' to transform an abstract idea into a patent--eligible invention." See *Alice Corp. Pty. Ltd*., 134 S.Ct. at 2360.

Conclusion

30. The claims, as a whole, do not amount to significantly more than the abstract idea itself. This is because the claims do not effect an improvement to another technology or technical filed; the claims do not amount to an improvement to the functioning of a computer system itself; and the claims do not move beyond a general link of the use of an abstract idea to a particular technological environment.

31. Accordingly, the Examiner concludes that there are no meaningful limitations in the claims that transform the judicial exception into a patent eligible application such that the claims amount to significantly more than the judicial exception itself.

32. The dependent claims 32-37 do not resolve the deficiency of independent claims and accordingly stand rejected under 35 USC 101 based on the same rationale.

33. Independent claim 1 and its dependent claims 2-23 merely implement the abstract idea of claim 31.

Claim Rejections - 35 USC § 112

34. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

35. The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

36. Claims 4 and 18 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

37. Regarding claim 4 –

38. The claim recites "occasionally change for security reasons", wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (MPEP 2163 (A)).

39. Regarding claim 18 –

40. The claim recites "is changed as well as to prevent . . .". wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (also, MPEP 2161 (1) lack of algorithm).

41. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

42. The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

43. Claims 1-23 and 31-37 rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

44. Claims 1-23 and 31-37 are rejected as failing to define the invention in the manner required by 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph.

45. The claims are narrative in form and replete with indefinite language. The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. For example, the claims contain excessive functional language. The claims must be in one sentence form only. Note the format of the claims in the patents cited.

46. A single claim which claims both an apparatus and the method steps of using the apparatus is indefinite under 35 U.S.C. 112, second paragraph. *In re Katz* Interactive Call Processing Patent Litigation, 639 F.3d 1303 (Fed. Cir. 2011).

47. The claims recite multiple instances of apparatus and method steps of using the apparatus –

- Claim 2 --- "a randomly generated" (*Katz, UltimatePointer*).
- Claim 4 --- "occasionally change".
- Claim 5 --- "… change from time to time", "… making… anonymous over time…".
- Claim 6 --- "which is used…".
- Claim 13 --- "downloaded in reaction to… wherein the mobile wireless device first received… as part of the proximity beacon information".
- Claim 15 --- "wherein the mobile wireless device, upon determining…", "wherein the further communications utilize the first radio…, but remains identifiable by the wireless mobile device…", "upon determining there is a match…"
- 17 --- "wherein the unique identifier… changes over time based upon an algorithm in synchronization…"
- Claim 18 --- "… and is generated algorithmically and only known to at least one of the servers… and updated based… upon a clock interval…" "wherein the MAC address … is changed as well…"
- 23 --- "wherein no connection is made between the mobile wireless device …"

48. Please note that the language of the hybrid limitations does not carry patentable weight.

49. Regarding claim 23 –

50. The term "standards based protocol" in claim 23 is a relative term which renders the claim indefinite. The term "standards based protocol" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

51. Regarding claim 13 –

52. The claim recites “upon the mobile wireless device”, “by the mobile wireless device”, “wherein the mobile wireless device”, thereby engaging in circular reasoning and rendering the claim unclear.

53. Regarding claim 14 –

54. The claim recites “for execution upon the mobile wireless device”, thereby engaging in circular reasoning and rendering the claim unclear.

55. Regarding claim 15 –

56. The claim recites “wherein . . . . the mobile wireless device”, thereby engaging in circular reasoning and rendering the claim unclear.

57. Regarding claim 23 –

58. The claim recites “between the mobile wireless device”, thereby engaging in circular reasoning and rendering the claim unclear.

59. Regarding claim 32 –

60. Note that claim 31 is already performed, and the first limitation of claim 32 says claim 31 is performed under control of an application. So executing is unclear as the first limitation suggests that it was already executed.

61. Regarding claim 34 –

62. Claim 34 recites the limitation of “performing at least a portion of the steps on one or more processor of the one or more servers.” Claim 31, on which claim 34 depends, recites that all of the steps are performed at the mobile device. It is unclear to one of ordinary skill how at least a portion of the steps can be performed on a processor of a server when the steps are performed on a mobile device.

Claim Rejections - 35 USC § 102

63. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory

basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

64. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

65. Claims 1, 6-14, 19, 20, 23, 31, and 34-36 are rejected under pre-AIA 35 U.S.C. 102(a) as being anticipated by Hillier (US 2016/0025837).

66. Regarding claims 1 and 31-

67. Hillier teaches a mobile wireless device (abs) comprising:

a first radio; (par 49)

a second radio; (par 53-54)

one or more processors: (par 49)

one or more non-transitory memory devices coupled to the one or more processors, (par 49) the one or more non-transitory memory devices storing a set of instructions that, when executed by the one or more processors cause the one or more processors to perform operations including:

receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers; (par 49, 45, 75)

receiving, using the second radio, proximity beacon transmissions when the device is located within a detection range of each of a plurality of beacon transmitter devices, each of the proximity beacon transmissions including a MAC address, a. unique identifier, and proximity beacon identification information, and the proximity beacon identification information indicating the proximity beacon transmissions are associated with the proximity beacon service; (par 53-54, 49, 45, 75)

deriving proximity beacon information from the proximity beacon, transmissions; determining a proximity of at least one transmitter device, entity or object associated with at least a portion of the proximity beacon information by utilizing the identifier related information; (par 49-54) and

the proximity beacon identification information being the same for all proximity beacon transmissions associated with the proximity beacon service. (par 49-54)

68. Regarding claims 6 and 35 –

69. Hillier teaches that at least a portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices. (par 49)

70. Regarding claim 7 –

71. Hillier teaches that the one or more processors further execute the instructions to perform operations including further determining the proximity of the at least one beacon transmitter device by comparing the downloaded unique identifier with the portion of the proximity beacon information, the portion comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object. (par 49-54)

72. Regarding claim 8 –

73. Hillier teaches that the one or more processors further execute the instructions to perform operations including further determining the proximity of a specific beacon transmitter device by comparing the proximity beacon information with the identifier related information. (par 49-54)

74. Regarding claim 9 –

75. Hillier teaches that the one or more processors further execute the instructions to perform operations including further determining the proximity of a specific beacon transmitter device by comparing the proximity beacon information with the identifier related information. . (par 49-54)

76. Regarding claim 10 –

77. Hillier teaches that the one or more processors further execute the instructions to perform operations including further determining the proximity of at least one beacon transmitter device by sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radio, and receiving at least a portion of die identifier related information usable to make the proximity determination. (par 45)

78. Regarding claim 11 –

79. Hillier teaches that the unique identifier associated with the at least one beacon transmitter is associated with a broadcast device having a predetermined location. (par 45)

80. Regarding claim 12 –

81. Hillier teaches that the one or more processors further execute the instructions to perform operations including determining, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a predetermined location. (par 45-54)

82. Regarding claim 13 –

83. Hillier teaches that the identifier related information comprises application software for execution upon the mobile wireless device, downloaded in reaction to sending of a unique identifier by the mobile wireless device to at least one server of the one or more servers, and wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information. (par 45)

84. Regarding claim 14 –

85. Hillier teaches that the identifier related information comprises application software for execution upon the mobile wireless device. (par 45)

86. Regarding claim 19 –

87. Hillier teaches that the second radio is a Bluetooth based radio. (par 45-54)

88. Regarding claim 20 –

89. Hillier teaches that the second radio is a Wi-Fi based radio. (par 49)

90. Regarding claim 23 –

91. Hillier teaches that the proximity beacon service utilizes a standards based protocol derived from Bluetooth and including unsolicited automatically repetitive advertisements, and wherein the proximity beacon transmissions are transmitted within the format of the unsolicited automatically repetitive advertisements, and wherein the proximity beacon identification information is included within one or more configurable fields of the unsolicited automatically repetitive advertisements while conforming to the standards based protocol and, wherein no connection is made between the mobile wireless device and the plurality of beacons transmitter devices in order to receive the unique identifier. (par 43)

92. Regarding claim 34 –

93. Hillier teaches performing at least a portion of the steps on one or more processors of the one or more servers. (par 45).

94. Regarding claim 36 –

95. Hillier teaches that the identifier related information is received in response to software residing on the mobile device sending at least one unique identifier determined from the proximity beacon information. (par 45-54)

Claim Rejections - 35 USC § 103

96. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

97. Claims 2-5, 15-18, and 21-22 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hillier (US 2016/0025837) in view of Altman et al (US 2013/0217332)

98. Hillier teaches as above

99. Regarding claim 2 –

100. Altman teaches that the MAC address is a randomly generated 48 bit number matching the format of a MAC address. (par 166).

101. It would be obvious to one of ordinary skill in the art to combine Hillier and Altman in order to obtain greater transaction security.

102. Regarding claim 3 –

103. Altman teaches wherein the MAC address is a Bluetooth BD_ADDR. (par 159, 166).

104. Regarding claim 4 –

105. Altman teaches that both the MAC address and the unique identifier received by the second radio from a single beacon transmitter device occasionally change, for security reasons. (par 166)

106. Regarding claim 5 –

107. Altman teaches that both the M AC address and the unique identifier change from time to time, making one or more of an entity's identity associated with a beacon transmitter device and the beacon transmitter device's identity anonymous over time to other devices or entitles not having permissions at the one or more servers to access the identifier information. (par 166)

108. Regarding claim 15 –

109. Hillier teaches that the Identifier related information comprises a list of contact information, and the one or more processors further execute the instructions to perform operations including;

further determining the proximity of a beacon transmitter device associated with an entity included within the list of contact information based upon comparing a contact identifier Information with at least the portion of the proximity beacon information, and the mobile wireless device, upon determining there is a match engaging further steps to allow farther communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, (par 45-54) and further

wherein both the MAC address and the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information change from time to time, but remain identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification. (par 45-54).

110. Altman teaches a MAC address that changes from time to time. (par 166)

111. Regarding claim 16 –

112. Altman teaches that the changing of the MAC address and the unique identifier associated with the single beacon transmitter device is coordinated with at least one of the one or more servers. (par 166, 159)

113. Regarding claim 17 –

114. Altman teaches that the unique identifier of at least a portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one sewer of the one or more servers. (par 159, 166)

115. Regarding claim 18 –

116. Altman teaches that the unique identifier associated with at least one beacon transmitter is associated with a single beacon transmitter and is generated algorithmically and only known to at least one of the servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval within the beacon transmitter, and further wherein, the MAC address associated with the beacon transmitter is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices. (par 166)

117. Regarding claim 21 –

118. Altman teaches that teaches that the MAC address is a randomly generated 48 bit BD_ADDR, wherein both the MAC address and the unique identifier change from time to time (par 159, 166)

119. Hillier teaches one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more servers to access the identifier related information, and with at least the portion of the identifier related information including a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter ; and wherein the one or more processors further execute the instructions to perform operations, including determining the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object. (par 45-54)

120. Regarding claim 22 –

121. Hiller teaches that the one or more processors further execute the instructions to perform additional operations, including determining the proximity by utilizing an action function including one or more previously downloaded unique identifiers. (par 45-54)

122. Claims 32-33 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hillier (US 2016/0025837) in view of Sorenson et al (US 2003/0053484).

123. Regarding claim 32 –

124. Hillier teaches as above.

125. Sorenson teaches performing one or more steps of the method under control of an application via a software interface; and executing the application on the mobile device. (par 135)

126. It would be obvious to one of ordinary skill in the art to combine Hillier with Sorenson in order to achieve a more user-friendly method.

127. Regarding claim 33 –

128. Sorenson teaches that the software interface is an NDIS driver. (par 135).

129. Claim 37 is are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hillier (US 2016/0025837) in view of Brackett et al (US 2005/0114654)

130. Regarding claim 37 –

131. Hillier teaches determining the at least one beacon transmitter device is in proximity. (par 45-54).

132. Brackett teaches at least one server of the one or more of servers providing an identifying picture of a consumer to at least one device for confirming the picture matches an individual in proximity as a step in an electronic commerce transaction. (par 20)

133. It would be obvious to one of ordinary skill in the art to combine Hillier with the facial recognition feature of Brackett in order to obtain greater transaction security.

Conclusion

134. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

135. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

136. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CRISTINA OWEN SHERR whose telephone number is (571)272-6711. The examiner can normally be reached on 8:30 - 5:30.

137. Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

138. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Calvin L Hewitt can be reached on 571-272-6709. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

139. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mohammad A. Nilforoush/
Primary Examiner, Art Unit 3685

UNITED STATES PATENT AND TRADEMARK OFFICE

USPTO Automated Interview Request (AIR)

Apr 24 2018

This paper requesting to schedule and/or conduct an interview is appropriate because:

This submission is requested to be accepted as an authorization for this interview to communicate via the internet. Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned concerning scheduling of the interview via video conference, instant messaging, or electronic mail, and to conduct the interview in accordance with office practice including video conferencing.

Name(s):
Dav id J Thibodeau Jr

S-signature:
/David J Thibodeau Jr/

Registration Number:
31671

U.S. Application Number:
15271410

Confirmation Number:
7653

E-mail Address:
dthibodeau@vlplawgroup.com

Phone Number:
6179255520

Proposed Time of Interview:
5-2-2018 11:00 AM ET

Prefered Interview Type:
Telephonic

I am the applicant or applicant's representative for this application.

UNITED STATES PATENT AND TRADEMARK OFFICE
PALM-SILVER

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	15271410	Filing Date	2016-09-21	Docket Number (if applicable)	111054-0001U4C7	Art Unit	3685
First Named Inventor	James Arthur Proctor			Examiner Name	SHERR, MARIA CRISTI OWEN		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☒ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☒ Other Exhibits A - G

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 504929

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

X Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/David J Thibodeau Jr Reg No 31671/	Date (YYYY-MM-DD)	2018-07-20
Name	David J. Thibodeau, Jr.	Registration Number	31671

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/AIA/424 (04-14)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	James Arthur Proctor	Nonprovisional Application Number (if known):	15271410
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.

2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.

3. The applicable box is checked below:

I. ☐ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

(b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.

ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☑ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /David J Thibodeau Jr Reg No 31671/	Date 20 July 2018
Name (Print/Typed) David J. Thibodeau, Jr.	Practitioner Registration Number 31671

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.**

☑ *Total of 1 forms are submitted.

Privacy Act Statement

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15271410
Filing Date	2016-09-21
First Named Inventor	James Arthur Proctor
Art Unit	3685
Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6,233,565	B1	2001-05-15	Lewis et al.	
	2	7,003,283	B1	2006-02-21	Hiltunen et al.	
	3	7,010,267	B1	2006-03-07	Vanluijt et al.	
	4	7,340,438	B1	2008-03-04	Nordman et al.	
	5	7,515,914	B1	2009-04-07	Herrod et al.	
	6	7,877,082	B1	2011-01-25	Eagle et al.	
	7	8,089,405	B1	2012-01-03	Piersol et al.	
	8	8,576,846	B1	2012-11-05	Kumar et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

	9	9,137,012	B1	2015-09-15	Bailey et al.	
	10	7,886,962	B2	2011-02-15	Vawter et al.	
	11	7,174,031	B2	2007-02-06	Rhoads et al.	
	12	7,991,644	B2	2011-08-02	Bryant et al.	
	13	8,254,338	B2	2012-08-28	Anschutz et al.	
	14	7,580,699	B1	2009-08-25	Shaw et al.	
	15	7,522,058	B1	2009-04-21	Light et al.	
	16	7,942,337	B2	2011-05-17	Jain	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030200489	A1	2003-10-23	Hars	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Attorney Docket Number	111054-0001U4C7

	2	20030200140	A1	2003-10-23	Hars	
	3	20040243519	A1	2004-12-02	Perttila	
	4	20050188062	A1	2005-08-25	Li et al.	
	5	20070242643	A1	2007-10-18	Chandra et al.	
	6	20080045236	A1	2008-02-21	Nahon	
	7	20080108308	A1	2008-05-08	Ullah	
	8	20040186768	A1	2004-09-23	Wakim et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15271410
	Filing Date	2016-09-21
	First Named Inventor	James Arthur Proctor
	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Social Serendipity: Mobilizing Social Software, Eagle et al., Pervasive Computing, 1536-1268, pp. 28- 34 (2005)	
	2	Beacon-Stuffing: Wi-Fi Without Associations, Chandra et al., IEEE Computer Society, 1550-6193, pp. 53-57 (2007)	

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15271410
	Filing Date	2016-09-21
	First Named Inventor	James Arthur Proctor
	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David J Thibodeau Jr. Reg No 31671/	Date (YYYY-MM-DD)	2018-07-20
Name/Print	David J. Thibodeau, Jr.	Registration Number	31671

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	15271410
Filing Date:	21-Sep-2016
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Filer:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
REQUEST FOR PRIORITIZED EXAMINATION	2817	1	2000	2000
Pages:				
Claims:				
Miscellaneous-Filing:				
PROCESSING FEE, EXCEPT PROV. APPLS.	2830	1	70	70
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with $0 paid	2251	1	100	100
Miscellaneous:				
RCE- 1ST REQUEST	2801	1	650	650
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	120	120
		Total in USD ($)		**2940**

Electronic Acknowledgement Receipt

EFS ID:	33238770
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
Filer:	David J. Thibodeau
Filer Authorized By:	
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	20-JUL-2018
Filing Date:	21-SEP-2016
Time Stamp:	13:59:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$2940
RAM confirmation Number	072318INTEFSW14021900
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response After Final Action	20180720_111054-0001U4C7_TPO_Response.pdf	233599 9da0fa9fb3b9f05e013f4f29416fe70d0adfec8a	no	52
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	20180720_111054-0001U4C7_TPO_Exhibit_A.pdf	2928552 2bb60faabaeb425b4f7070100abf7d63d1f8ba40	no	76
Warnings:					
Information:					
3	Miscellaneous Incoming Letter	20180720_111054-0001U4C7_TPO_Exhibit_B.pdf	1364236 5974004b2ace3c0809866700b8588de8ce228e09	no	38
Warnings:					
Information:					
4	Miscellaneous Incoming Letter	20180720_111054-0001U4C7_TPO_Exhibit_C.pdf	27378 0ea7b0a8550d9fc392ac27a500d0d275841746bd	no	1
Warnings:					
Information:					
5	Miscellaneous Incoming Letter	20180720_111054-0001U4C7_TPO_Exhibit_D.pdf	36490 7f812e7e397a5aab0a72fac7fe6320e4e302539c	no	1
Warnings:					
Information:					
6	Miscellaneous Incoming Letter	20180720_111054-0001U4C7_TPO_Exhibit_E.pdf	27391 11e9cf7a73829a3fe4c31fee88269c97188af945	no	1
Warnings:					
Information:					

7	Miscellaneous Incoming Letter	20180720_111054-0001U4C7_TPO_Exhibit_F.pdf	26369 eda8ff31bf69f6b44d0f1f3dc5f2da566092c600	no	1
Warnings:					
Information:					
8	Miscellaneous Incoming Letter	20180720_111054-0001U4C7_TPO_Exhibit_G.pdf	1105202 91acef08511d5e8c9f06d2aa25aeac9552dd23d0	no	5
Warnings:					
Information:					
9	Request for Continued Examination (RCE)	20180719_111054-0001U4C7_TPO_RCE.pdf	1350048 93d16c8facc9eb3cef3791d3ea444607fe91ebea	no	3
Warnings:					
Information:					
10	TrackOne Request	20180719_111054-0001U4C7_TPO_Request_Prioritized_Exam.pdf	119704 541d447581fd2df722a8903865be8d9842fd68e8	no	2
Warnings:					
Information:					
11	Information Disclosure Statement (IDS) Form (SB08)	20180719_111054-0001U4C7_TPO_IDS.pdf	1035426 4793ac98dd320b066383cd1e65622d9f557c6f59	no	6
Warnings:					
Information:					
12	Miscellaneous Incoming Letter	NPL_Social_Serendipity.pdf	2076858 cabae5b744de30481bb974102d07e9ae4e637e92	no	7
Warnings:					
Information:					
13	Non Patent Literature	NPL_Beacon_Stuffing.pdf	140312 489e4f824cfa78307d791fd7942b51a77b65988d	no	5
Warnings:					
Information:					

14	Fee Worksheet (SB06)	fee-info.pdf	37585 c475c720b682323d7298737b622428f0b5d27a8e	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	10509150	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of: James A. Proctor, Jr., et al.	
Serial No.: 15/271,410	Examiner: Sherr, Cristina Owen
Filed: September 21, 2016	Art Unit: 3685
For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	Confirmation No.: 7653

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

AMENDMENT IN RESPONSE TO OFFICE ACTION
FILED WITH REQUEST FOR CONTINUED EXAMINATION (RCE)

This amendment is being filed in response to the Final Office Action dated March 22, 2018, in lieu of an Appeal Brief, and in connection with a Request for Continued Examination. Further consideration of the application is respectfully requested.

Amendments to the clams begin on page 2.

Remarks begin on page 11.

IN THE CLAIMS

The following replaces all prior listings of the claims in the application:

1. (Currently Amended). A mobile wireless device comprising:

a first radio;

a second radio;

one or more processors;

one or more non-transitory memory devices coupled to the one or more processors, the one or more non-transitory memory devices storing a set of instructions that when executed by the one or more processors cause the one or more processors to perform operations including:

receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers;

receiving, using the second radio, a plurality of proximity beacon transmissions when the device is located within a detection range of ~~each of a plurality of~~ one or more beacon transmitter devices, each of the proximity beacon transmissions ~~i~~ncluding a MAC address, a unique identifier, and a proximity beacon service identifier ~~proximity beacon identification information, and the proximity beacon identification information indicating the proximity beacon transmissions are associated with the proximity beacon service~~;

deriving proximity beacon information from the proximity beacon transmissions;

determining ~~a proximity of~~ that at least one beacon transmitter device~~, entity, or object~~ associated with ~~at least a portion of~~ the proximity beacon service is in proximity ~~beacon information~~ to the mobile wireless device by utilizing at least the identifier related information; and

the proximity beacon ~~identification information being~~ service identifier indicating the ~~same for all~~ proximity beacon transmissions are associated with the proximity beacon service~~.~~, and the proximity beacon service identifier being the same for two or more proximity beacon transmissions associated with the proximity beacon service.

2. (Original). The mobile wireless device of Claim 1, wherein the MAC address is selected from a group consisting of (a) a randomly generated 48 bit number matching a format of a MAC address and (b) a Bluetooth BD_ADDR.

3. (Cancelled).

4. (Currently Amended). The mobile wireless device of claim ~~3~~ 1 wherein both the MAC address and the unique identifier received by the second radio from a single beacon transmitter device occasionally change~~, for security reasons~~; and

wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices.

5. (Currently Amended). The mobile wireless device of claim ~~2~~ 1 wherein both the MAC address and the unique identifier change from time to time, making one or more of an entity's identity associated with a beacon transmitter device and the beacon transmitter device's identity anonymous over time to other devices or entities not having permissions at the one or more servers to access the identifier information.

6. (Previously Presented). The mobile wireless device of Claim 1, wherein at least a portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices.

7. (Currently Amended). The mobile wireless device of Claim 6, wherein the one or more processors further execute the instructions to perform operations including:

further determining ~~the proximity of the~~ that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by comparing the downloaded unique identifier with the portion of the proximity beacon information, the portion comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object.

8. (Currently Amended). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including:

further determining ~~the proximity of the~~ that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by utilizing an action function including one or more previously downloaded unique identifiers.

9. (Currently Amended). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including:

further determining ~~the proximity of~~ that a specific beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by comparing the proximity beacon information with the identifier related information.

10. (Currently Amended). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including:

further determining ~~the proximity of~~ that at least one beacon transmitter device ~~by~~ associated with the beacon service is in proximity to the mobile wireless device, by:

sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radio~~,~~; and

receiving, in response to the sending, at least a portion of the identifier related information ~~usable to make the proximity determination~~ used in the determining step.

11. (Cancelled).

12. (Previously Presented). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including

determining, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a predetermined location.

13. (Currently Amended). The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device, ~~downloaded~~ and the one or more processors further execute the instructions to perform operations including:

downloading the application software in reaction to sending of a unique identifier by the mobile wireless device to at least one server of the one or more servers, and wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information.

14. (Original). The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device.

15. (Currently Amended). The mobile wireless device of Claim 1 wherein

the identifier related information comprises a list of contact information, and the one or more processors further execute the instructions to perform operations including:

further determining ~~the proximity of a~~ that at least one beacon transmitter device associated with the beacon service is further associated with an entity included within the list of contact information based upon comparing a contact identifier information with at least the portion of the proximity beacon information, and

the mobile wireless device, upon determining there is a match, engaging in further steps to allow further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, and further

wherein both the MAC address and the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information change from time to time, but remain identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification.

16. (Cancelled).

17. (Currently Amended). The mobile wireless device of claim 1 wherein the unique identifier of at least a portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one server of the one or more servers.

18. (Previously Presented). The mobile wireless device of claim 1 wherein the unique identifier associated with at least one beacon transmitter is associated with a single beacon transmitter and is generated algorithmically and only known to at least one of the servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval within the beacon transmitter, and further

wherein the MAC address associated with the beacon transmitter is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices.

19. (Original). The mobile wireless device of Claim 1, wherein the second radio is one of a Bluetooth based radio or a Wi-Fi- based radio.

20. (Cancelled).

21. (Previously Presented). mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit BD_ADDR, wherein both the MAC address and the unique identifier change from time to time, making one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more servers to access the identifier related information, and with at least the portion of the identifier related information including a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter, and

wherein the one or more processors further execute the instructions to perform additional operations, including determining the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object.

22. (Previously Presented). The mobile wireless device of Claim 21, wherein the one or more processors further execute the instructions to perform additional operations, including determining the proximity by utilizing an action function including one or more previously downloaded unique identifiers.

23. (Currently Amended). The mobile wireless device of Claim 1, wherein the proximity beacon service utilizes a ~~standards based~~ protocol ~~derived from Bluetooth and including~~ that includes unsolicited automatically repetitive advertisements, and wherein the proximity beacon transmissions are transmitted within the format of the unsolicited automatically repetitive advertisements, and wherein the proximity beacon ~~identification information~~ service identifier is included within one or more configurable fields of the unsolicited automatically repetitive advertisements ~~while conforming to the standards based protocol~~ and, wherein no connection is made between the mobile wireless device and the plurality of beacons transmitter devices in order to receive the unique identifier.

24. – 30. (Cancelled)

31. (Currently Amended) A method for facilitating use of proximity beacons comprising:

communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

receiving, at the mobile device using a second radio, proximity beacon transmissions from one or more beacon transmitter devices;

deriving, at the mobile device, proximity beacon information from the proximity beacon transmissions; and

determining, at the mobile device, ~~a proximity of~~ that at least one beacon transmitter device~~, entity, or object ,~~ associated with ~~at least a portion of~~ the ~~proximity~~ beacon ~~information~~ service is in proximity to the mobile wireless device by utilizing the identifier related information;

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and a proximity beacon ~~identification information~~ service identifier;

wherein the proximity beacon ~~identification information~~ service identifier indicates the proximity beacon transmissions are associated with a proximity beacon service; and

wherein the proximity beacon ~~identification information~~ service identifier is the same for ~~all~~ two or more proximity beacon transmissions associated with the proximity beacon service ~~proximity beacon transmissions associated with the proximity beacon service, transmitted from the plurality of beacon transmitter devices~~.

32. (Previously Presented). The method of claim 31, additionally comprising:

performing one or more steps of the method, by one or more processors of the mobile device, under control of an application via a software interface; and

executing the application on the mobile device.

33. (Cancelled).

34. (Previously Presented). The method of claim 31 additionally comprising:

performing at least a portion of the steps on one or more processors of the one or more servers.

35. (Previously Presented). The method of claim 31, wherein both the MAC address and the unique identifier received via the second radio occasionally change between proximity beacon transmissions from one of the one or more beacon transmitter devices.

36. (Previously Presented). The method of claim 31, wherein the identifier related information is received in response to software residing on the mobile device sending at

least one unique identifier determined from the proximity beacon information.

37. (Currently Amended). The method of claim 31 wherein after determining the at least one beacon transmitter device is in proximity, at least one server of the one or more of servers providing an identifying picture of a consumer to at least one device for confirming the picture matches an ~~an~~ individual in proximity as a step in an electronic commerce transaction.

38. (New). The mobile wireless device of claim 1 wherein the one or more processors perform additional operations comprising:

determining that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile wireless device utilizing both the identifier related information and the proximity beacon transmissions.

39. (New). The mobile wireless device of claim 1 wherein the one or more processors perform additional operations comprising:

performing further actions based upon the proximity beacon information and the identifier related information.

40. (New). The method of claim 31 wherein the step of determining, at the mobile device, that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device additionally comprises:

utilizing an action function including one or more previously downloaded unique identifiers.

41. (New). The method of claim 31 wherein the MAC address is selected from a group consisting of (a) a randomly generated 48 bit number matching a format of a MAC address and (b) a Bluetooth BD_ADDR.

42. (New). The method of claim 31 wherein both the MAC address and the unique identifier received by the second radio from a single beacon transmitter device occasionally change~~,~~ and

wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices.

REMARKS

STATUS OF THE CLAIMS

With entry of the foregoing amendments, claims 1-2, 4-10, 12-16, 17-19, 21-23, 31-32, and 35-42 are now presented for examination. Claims 3, 11, 20, 24-30, and 33-34 have been cancelled. New claims 38-42 have been added. There are a total of 30 claims, of which 2 are independent. No claim has been allowed.

EXAMINER INTRVIEW OF MAY 2, 2018

The Applicant thanks Examiner Nilforoush and Examiner Sherr for the courtesy of a telephone interview held on May 2, 2018. Although no agreement was reached, the discussion was of assistance in preparing the enclosed amendments to the claims.

SUMMARY OF ISSUES

The following issues remain in the application:

A. Whether the above amendments introduce any new matter into the application;

B. Whether the Application is entitled to a filing date of September 8, 2008 and certainly not later than February 3, 2009;

C. Whether the claims are directed to statutory subject matter under 35 U.S.C. 101;

D. Whether the claims comply with 35 USC 112 first and second paragraphs; and

E. Whether the claims are novel under 35 USC 102; and

F. Whether the claims are obvious under 35 USC 103.

A. NO NEW MATTER HAS BEEN INTRODUCED; SUPPORT IS FOUND FOR ALL CLAIMS AS AMENDED

No new matter has been introduced with the amendments submitted with this response. To assist the examiner in understanding this, each of the claims are listed and / or paraphrased below, with citations to corresponding parts of the specification and drawings of U.S. Patent Application 12/364, 828 ("the '828 application") filed February 3, 2009, a copy of which is enclosed as Exhibit A. The '828 application is one of the prior applications that was incorporated by reference, and to which this application claims priority[1]. It should be noted that the technical specification and drawings of the present application as filed on September 21, 2016 are the same as the technical specification and drawings filed in the '828 application, with the exception of the "Related Applications" section on page 1 and the claims. Each of the figure and page number citations in this section are to the '828 application as filed on February 3, 2009.

Claim 1 is an independent claim, and recites:

a mobile wireless device **[See the '828 application, e.g, Figure 1 items 106, 108]** that comprises:

a first radio **[See, the '828 application e.g, Figure 1 items 103, 104, and the text as filed at p.11, lines 6-10** ("A given device 106, 108 ... uses the wide area wireless network connections 103, 104 such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100")].

[1] It should also be understood that this discussion of support for the claims does not necessarily include all references to all relevant portions of the specification and drawings. Accordingly, omission of any reference to the specification or to the drawings should not be construed in any way as an intent to relinquish claim scope, or as an implication or statement regarding the conformance with 35 U.S.C. § 112. Other embodiments not mentioned here, as well as the Doctrine of Equivalents, may apply in determining claim scope.

a second radio [**See, the '828 application e.g, Figure 1 item 107 and p.11, lines 6-8,** ("...a given device 106, 108 uses a short range wireless link 107 such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link to detect the presence of other devices such as device 108")].

one or more processors [**See the '828 application e.g., p. 10, lines 11-12,** ("The internal structure of devices 106, 108 ... includes one or more data processors")].

one or more non-transitory memory devices coupled to the one or more processors, the one or more non-transitory memory devices storing a set of instructions that when executed by the one or more processors cause the one or more processors to perform operations including [**See the '828 application e.g., p. 10, lines 11-14,** ("The internal structure of devices 106, 108 ... includes one or more data processors....among the other internal components of a computer system (e.g., ... processor....memory...), **and e.g., p. 10 lines 17-18**, ("Memory provides volatile storage for computer software instructions and data.")].

receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers [For at least one embodiment, **See., the '828 application e.g., Figure 7 steps 702 and 705 and p.18 lines 12-16)** ("Device 1 (702) then transmits an inquiry message 705 … using the WWAN …. to the server 701 inquiring if information related to the account and entity associated with DI2 is relevant, and available to the entity EI1 associated with Device 1 (702)"). ...**See also the '828 application e.g., Figure 7 step 706 and p. 18 lines 21-24,** ("The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details.")].

For other embodiments, also **see the '828 application e.g., p. 13, line 27 to p.14, line 1,** "If the identifiers for the individuals within the friends list have been passed to the

device...", and **e.g., p. 39, lines 22-24** "The changing of the identifier … may be downloaded from the server directly;")]

receiving, using the second radio, a plurality of proximity beacon transmissions when the device is located within a detection range of one or more beacon transmitter devices [**See the '828 application e.g., Figure 6 and p.17 , lines 10-11, (**"In an IBSS all devices participating or advertising their interest in participating in an ad-hoc network transmit identifiers called beacons")],

each of the proximity beacon transmissions including a MAC address, a unique identifier, and a proximity beacon service identifier [For one embodiment, **see the '828 application, e.g., Figure 6 items 604, 605, 606 and p. 17 lines 12-14,** ("These beacons contain the MAC address of the transmitting network adapter, the basic service set identifier (BSSID), and ad-hoc network name or service set identity (SSID)."). **See also the '828 application p. 18 line 18-23,** ("There are several embodiments related using the IBSS beacons and the identifiers. First the identifier may be used as the MAC address of the station device or network adapter, and one or both the BSSID and the SSID may be used to indicate these particular beacons are associated with a service. In other embodiments, one or more of the BSSID and the SSID may be used as the identifier." **See also the '828 application p. 17 line 28 to p. 18, line 1 (** "In the preferred embodiment, where the MAC address is used for the identifier, all the devices participating would likely have the same network name and SSID to aid in the identification of the device as being enabled")]

deriving proximity beacon information from the proximity beacon transmissions [**See the '828 application p.17 lines 21-22** ("...one or more of the BSSID and the SSID may be used as the identifier) **and p.17 line 28-29** "where the MAC address is used for the identifier.")]

*determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device by utilizing at least the identifier related information; [***See., the '828 application e.g., at Figure 3 steps 302 and 303, and p.13 lines 12-14** ("If identifiers are found in 302, the device may employ an action function 303, which would act as a filter that determines which of the detected identifiers should be passed to the server)] **See also e.g., Figure 7 steps 706 and 707 and p.18 , lines 18-27** ("Next the server retrieves the account information associated with EI2 and determines that EI1 is on a list of entities which are allowed to be notified of EI2 being present .... The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details. A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707.")). **See also, e.g., p. 26 lines 5-9** ("…permission for disclosing a device's presence may require being on a friends list as well. For example, when a server receives an inquiry from a device with a list of identifiers, it may only respond with information for users associated with the identifiers that are on that device's friends list, and on each of the individual's friend lists as well.") **See also the '828 application Figure 3, Step 303** (the "Application" applies an "action function" to each identifier") and **p. 13, line 27 to p.14, line 1,** "If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this determination.")]

the proximity beacon service identifier indicating the proximity beacon transmissions are associated with the proximity beacon service [**See the '828 application e.g., p. 17 lines 20-21,** ("...one or both the BSSID and the SSID may be used to indicate these particular beacons are associated with a service."). **See also p. 17 line 29 to p.18, line 1** ("all the devices participating would likely have the same network name and SSID to aid in the identification of the device as being enabled")]

and

the proximity beacon service identifier being the same for two or more proximity beacon transmissions associated with the proximity beacon service [**See the '828 application e.g., p. 17, line 28 to p.18 line 1** (" In the preferred embodiment, where the MAC address is used for the identifier, all the devices participating would likely have the same network name and SSID")].

Claim 31 is an independent method claim for facilitating use of proximity beacons comprising:

communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio [**See the '828 application e.g, Figure 1 items 103, 104, and the text as filed at p.11, lines 6-10** ("A given device 106, 108 ... uses the wide area wireless network connections 103, 104 such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100")]; **See also the '828 application e.g., Figure 7 step 706 and p. 18 lines 21-24,** "The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details."). For least one alternative embodiment, see e.g. **the '828 application**, **p. 13, line 27 to p. 14, line 1,** ("If the identifiers for the individuals within the friends list have been passed to the device..."). **See also e.g., pg. 39, lines 21-24** ("The changing of the identifier … may be downloaded from the server directly;")]

receiving, at the mobile device using a second radio, proximity beacon transmissions from one or more beacon transmitter devices [**See, the '828 application e.g, Figure 1 item 107 and p.11, lines 6-8,** ("...a given device 106, 108 uses a short range wireless link 107 such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link

to detect the presence of other devices such as device 108")] and also **See e.g., Figure 6 and p.17 , lines 10-11, (**"In an IBSS all devices participating or advertising their interest in participating in an ad-hoc network transmit identifiers called beacons")]

deriving, at the mobile device, proximity beacon information from the proximity beacon transmissions [**See the '828 application e.g., Figure 6 items 604, 605, 606 and p. 17 lines 12-14,** ("These beacons contain the MAC address of the transmitting network adapter, the basic service set identifier (BSSID), and ad-hoc network name or service set identity (SSID)."); **See also the '828 application at p.17 lines 21-23** ("...one or more of the BSSID and the SSID may be used as the identifier) **and p.17 lines 28-29** "where the MAC address is used for the identifier.")]

determining, at the mobile device, that at least one beacon transmitter device associated with the the proximity beacon service is in proximity by utilizing the identifier related information [**See the '828 application, e.g., p. 5 lines 4-6,** "Applications running on a device may also interact with the server to perform various functions, for example retrieving information associated with an entity or device, by utilizing a detected identifier." **See also e.g., Figure 3 steps 302 and 303, and p.13 lines 12-14** ("If identifiers are found in 302, the device may employ an action function 303, which would act as a filter that determines which of the detected identifiers should be passed to the server)], **See also e.g., Figure 7 steps 706 and 707 and p.18 , lines 18-26** ("Next the server retrieves the account information associated with EI2 and determines that EI1 is on a list of entities which are allowed to be notified of EI2 being present .... The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details. A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707."). **See also, e.g., p. 26 lines 5-9** ("…permission for disclosing a device's presence may require being on a friends list as well. For example, when a server receives an inquiry from a device with a list of identifiers, it may only respond with

information for users associated with the identifiers that are on that device's friends list, and on each of the individual's friend lists as well.")
See also Figure 3, Step 303 ("Application applies "action function" to each identifier"), **and also e.g., p. 13, line 27 to p. 14, line 1,** "If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this determination."). **See also e.g., p. 39 lines 7-11** ("Sending at least one detected identifier to the network, potentially with additional information from the action function, and retrieving information back from the server related to that identifiers' account information stored on that server")]

wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and a proximity beacon service identifier [**See the '828 application e.g., Figure 6 items 604, 605, 606 and p. 17 lines 12-14,** ("These beacons contain the MAC address of the transmitting network adapter, the basic service set identifier (BSSID), and ad-hoc network name or service set identity (SSID).")];

wherein the proximity beacon service identifier indicates the proximity beacon transmissions are associated with a proximity beacon service [**See the '828 application e.g., p. 17 lines 20-22,** ("...one or both the BSSID and the SSID may be used to indicate these particular beacons are associated with a service."). **See also pg. 17 line 29 to p. 18, line 1** ("all the devices participating would likely have the same network name and SSID to aid in the identification of the device as being enabled")

and

wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service (**See the '828 application e.g., p. 17, line 8 to p. 18 line 1,** " In the preferred embodiment, where the MAC address is used for the identifier, all the devices participating would likely have the same network name and SSID")].

Regarding the dependent claims:

In some claims the MAC address is further defined as a randomly generated 48 bit number or a Bluetooth BD_ADDR (claims 2, 3 and 21) **(See the '828 application e.g., p.17 line 16 and p. 15, lines 21-24).**

In some claims, the transmitted proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service (claims 4 and 42) **(See the '828 application e.g. at p. 17 line 28 to p. 18, line 1**).

In some claims, both the MAC address and the unique identifier are occasionally changed or change from time to time to make an entity's identity anonymous over time; **(See, the '828 application e.g., p. 12 line 9);** this change in identifiers may be coordinated with one or more servers (**See, e.g., p. 7 lines 1-3**); the change in identifiers may depend on a clock interval within the beacon transmitter (claims 4, 5, 16, 17, 21, 35 and 41) **(See, e.g. p. 28 line 22 to p.29 line 6).**

In some claims, the identifier related information includes a downloaded unique identifier associated with a beacon transmitter (claim 6); and/or that downloaded unique identifier may be compared to the proximity beacon information (claims 7, 21 and 38) **(See the '828 application e.g. Figure 13 and p. 28 line 20 to p.29 line 3. See also p. 35 lines 5-10).**

In some claims, the proximity of the mobile wireless device to at least one beacon transmitter associated with the beacon service is determined by an action function (claims 8, 22 and 40) **(See the '828 application, Figure 3 and item 303 and e.g., p. 13 lines 12-21).**

In some claims, the proximity of the mobile wireless device to a specific beacon transmitter device is determined by comparing the proximity beacon information with the identifier related information (claims 9 and 10) **(See the '828 application, e.g., Figure 7 steps 706 and 707 and p. 18 lines 18-26)** or that beacon transmitter may be a broadcast device (claims 11 and 12) **(See, e.g., p.14 lines 19-23).**

In some claims, application software is downloaded in response to sending the unique identifier to the server (claims 13 and 14) **(See the '828 application, e.g., p. 13 lines 4-5** ("content may include …. application software")**.**

In some claims, the identifier information is a list of contact information, the proximity of a beacon transmitter associated with an entity on the "friends list" (contact list) is determined, and if there is a match, further communication is permitted (claim 15) **(See the '828 application, e.g., p. 26 lines 6-11).**

In some claims, the second radio may be a Bluetooth radio or a WiFi radio (claim 19) (**See the '828 application, e.g., p.11 line 7**).

In some claims, the beacon service may use a protocol that includes unsolicited automatically repeating beacon advertisements (claim 23) **(See the '828 application, e.g., Figure 6 and p. 12 lines 22-25)**

In some claims, the method may be performed by the mobile device under control of a software application via a software interface (claim 32) (**See the '828 application, e.g., p. 38 lines 21-22);** that software interface may be an NDIS driver (claim 33). (**See, e.g., p. 38 line 25**).

In some claims, one or more of the steps are carried out by a server (claim 34) **(See the '828 application, e.g., Figure 7 steps 706 and 707 and p.18 lines 18-26**).

.

In some claims, the identifier related information is received in response to mobile device software sending a unique identifier determined from the proximity beacon (claim 36) (**See the '828 application, e.g., Figure 7 steps 706 and 707 and p.18 , lines 18-26**).

In some claims, after determining at least one beacon transmitter is in proximity, a server sends an identifying picture of a consumer (claim 37) (**See the '828 application, e.g., p. 22, lines 9-10).**

B. THE APPLICATION IS ENTITLED TO CLAIM PRIORITY TO A FILING DATE OF SEPTEMBER 8, 2008 OR CERTAINLY NOT LATER THAN AT LEAST FEBRUARY 3, 2009

This Application as filed contained a priority claim to September 9, 2008, which was the filing date of U.S. Provisional Patent Application No. 61/095,359 (the "'359 application"), and also a priority claim to February 3, 2009, which was filing date of U.S. Patent Application No. 12/364,828 (the '828 application).

The Final Office Action concluded that the prior applications did not support the claimed limitation of

> determining a proximity of at least one beacon transmitter device … object associated with at least a portion of the proximity beacon information by utilizing the identifier related information

"in the context of the claims", where

> identifier related information is received from a server using a first radio,
>
> the proximity beacon transmissions are received using a second radio,
>
> the proximity beacon information is derived from the proximity beacon transmissions, and
>
> a proximity of a device associated with the derived proximity beacon information is determined by the mobile device using the identifier related information received from the server.

The following explanation and the attached Exhibits show support for the claim limitation and where context for this claim element is found in each of the two prior applications.

1. Support and Context for Claim 1 are Found in the '828 Application filed February 3, 2009

Exhibit C hereto is a chart showing all claim limitations questioned in the Final Office Action and at least one example of the context in which those limitations are found in U.S. Patent Application 12/364, 828 ("the '828 application") filed February 3, 2009 (See Exhibit A for a copy of that application as filed).

One context for the claimed features[2] is the system shown in Figure 1 of the '828 application, which executes the process steps of Figure 7, using the beacon transmissions illustrated in Figure 6.

More particularly, aspects of the Applicant's invention are concerned with facilitating the exchange of information between two wireless devices that are in close proximity to one another. The wireless devices accomplish this using two different types of radios. A first, short-range wireless radio capability is used to detect identifiers transmitted from other wireless devices in proximity. A second, wide area wireless capability allows the devices to communicate with a central server and perform subsequent exchanges of additional information, such as additional data flow relating to an application, as a non-limiting example. (See the '828 specification at page 4, lines 10-21).

In that example embodiment, applications running on the mobile devices then further interact with the server, using the detected identifiers to perform various functions, such as retrieving information associated with the other device in proximity. One example of such an application might be to first detect an identifier received from a device located in proximity. The identifier is sent to a server which then returns information related to that

[2] Discussed here is one embodiment that provides one example of a context and support for the claim elements. The '828 specification explains other embodiments that also support the claims. One such embodiment is the one described and shown in Figure 8.

detected device identifier, such as tour guide information related to the device's fixed location (see the '828 specification at page 5 lines 4 -11).

Figure 1 of the '828 application is a block diagram of one example system that provides context for the claim 1 embodiment. A central server 100, two wireless devices 106 and 108, wireless wide-area network (WWAN) connections 103, 104 and short range local wireless link 107 are shown. Wireless devices 106 use a short range wireless link 107 such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) radio to detect the presence of other devices such as device 108. Wireless device 106 uses the wide area wireless network connections 103, 104 (such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16)) to communicate with the central server 100. (Page 11, lines 6-12.)

In the embodiment associated with Figure 1, a "wireless identifier" is first passed between devices 106 and 108 over the short-range wireless link 107. (Page 11, lines 16-20).

As then shown in Figure 6 of the '828 application, the devices may transmit (and also receive) these identifiers over the short range link. The identifiers are communicated, in this embodiment, using a very specific type of message 604, 605, 606 – called a "beacon" (page 17, lines 10-14). Figure 6 additionally explicitly labels 604, 604, 606 with the term "Beacon" associated with this example embodiment.

In some embodiments, these beacons may be implemented as part of an Independent Basic Service Set (IBSS) in a Wi-Fi wireless link (also referred to as a "Ad-Hoc" Wi-Fi network). Disclosed embodiments of the IBSS beacons communicate additional "proximity beacon information" such as the claimed "identifiers". For example, lines 12-14 of page 17 states "These beacons contain the MAC address of the transmitting network adapter, the basic service set identifier (BSSID), and ad-hoc network name or service set identity (SSID)" disclosing three fields which are further disclosed as being

utilized in various ways (separately and in combination) within the disclosed embodiments.

For example, in some disclosed embodiments, a BSSID and/or SSID in the beacon may be used to indicate the beacon is associated (or enabled) with a service - such as a proximity beacon service. (see the '828 application at page 18 line 1 and page 17 line 20-21).

It is also explained that either the BSSID or the SSID or both may be used as the identifier for the service. (See the '828 application at page 17, lines 18-24). In some embodiments, a MAC address, may be used as an identifier for use with the service, while in others it is not.

Thus,"proximity beacon transmissions" are received using a second radio, as claimed.

Also, the claimed "proximity beacon information" is "derived" from the proximity beacon transmissions" as claimed.

Figure 7 of the '828 application shows a detailed example of a message flow diagram showing how the server is also involved in a final determination of whether additional information related to devices in proximity will be shared. A first device, "Device 1 (702)" associated with an Entity 1 (Ell) performs a beacon detection process (step 704) – that is, using the short range wireless link. The identifier associated with a second device, "Device 2 (703)", DI2 is thereby detected. Device 1 (702) then transmits an inquiry message in step 705 using the WWAN (cellular data link such as GPRS, EDGE, lxEV-DO, IS- 2000, Wi-Max, LTE, or the like) to the server 701 inquiring if further information related to the entity associated with DI2 is relevant, and available to the entity Ell associated with Device 1 (702). (See the '828 application at page 18, lines 8-16).

The server, having determined that Ell is allowed to be notified, responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to Ell and including information such as Entity Identifier EI2 and associated details. (See the '828 application at page 18, lines 21-24). (e.g. one example of "tbe proximity beacon service identifier" passed from the server to the device)

As a second example of "identifier related information" downloaded from the server, a device may receive identifier related information for use in performing filtering of requests to the server (for example re-requests, or beacons not relevant to the device or user) and utilize this information in a so-called "action function". (See the '828 application at least Figure 3 and Step 303, page 13 lines 12-18, page 13 line 25 to page 14 line 5, as further non-limiting examples).

In another embodiment, the identifiers may actually contain further information relating them to an entity, for use in detecting devices associated with that entity directly in the mobile device – such as by using the action function locally (See the '828 application, for example, at page 13, line 27 to page 14, line 1, "If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this determination."), (See also page 39, lines 21-24, "The changing of the identifier … may be downloaded from the server directly").

Thus the "identifier related information" is received from a server using a first radio", as claimed.

Returning to the embodiment of Figure 7 of the '828 application, the identifier related information received from the server is then used, in step 707, by an application running on Device 1 (702), for example, to notify the user that Device 2 is in proximity in step 707. The user of Device 1 may then further interact with the application using the information derived from the identifiers, e.g., to request a chat session with an entity

associated with Device 2 (703), and send a message 708 is sent the server 701 commanding "send 'Hello' to EI2" (page 18, lines 24-29).

Additionally, in another embodiment, the device may perform the action function using the identifier related information to directly determine proximity by itself using the identifier related information containing identifiers (See also the '828 application at page 13, line 27 – page 14, line 1, "If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this determination."), (See also e.g., pg. 39, lines 22-24 "The changing of the identifier … may be downloaded from the server directly").

Thus the "determining that at least one beacon transmitter device associated with the beacon service" is determined by the mobile device using the identifier related informatio", in the context of the rest of the claim.

Based upon the foregoing (non-limiting) examples, a filing date of at least February 3, 2009 is therefore respectfully requested for the present application[3].

[3] Indeed, since support for all claims is also found in the '828 application (see the discussion in Section A above) all claims of the present application are entitled to at least a February 3, 2009 filing date.

2. Support and Context for claim 1 is also found in the '359 application filed September 9, 2008.

Exhibit D enclosed herewith is a chart showing the limitations of claim 1 in question and examples of context for where those limitations are found in the U.S. Provisional Patent Application 61/095,359 ("the '359 application") filed on September 9, 2008, to which priority was claimed, and which was incorporated by reference. (Exhibit B is a copy of the '359 application as filed).

The invention in the '359 application is said to be generally concerned with facilitating communications between two wireless devices when they are in close proximity to each other, and using a central server to determine if one or more of the devices should be notified of the other device's presence or other related information. (See the '359 application, page 1 lines 22-25).

One context for the claimed features is the system shown in Figure 1 on the top of page 2 (within the '359 specification), and also shown on page 25 (with the figures). Figure 1 is a block diagram of one example system that includes a central server and two wireless devices. Two wide-area network (WWAN) connections (WWAN Link 1 and WWAN Link 2) and a short range local wireless link (WiFi, Bluetooth or other) are shown.

Embodiments of Figure 1 utilize the short range wireless communication link to initially detect the presence of other devices, and uses the wide area wireless network to perform communications to a central server, which then controls \the actual communications between the wireless devices. The distinction, within the disclosed embodiments, being that the short range wireless is ONLY used for the detection process, by transmitting an identifier, or receiving identifiers from other devices. (See the '359 application, page 2, last paragraph)

A first reference to the claimed use of beacons to transmit the wireless identifier[s] to facilitate proximity decision first appears on page 1 of the '359 application at page 1, lines 11-12 and lines 21-24 where a proposed title is "Wireless beacon device for transmitting a wireless identifier to facilitate proximity detection".

It is explained later in the '359 application that Bluetooth may be used for the short range wireless link, and that the SSID, or other fields of a beacon may be used to broadcast, or advertise, the identifier. Further, WiFi or Bluetooth protocols may be used in non-standard ways to send beacons and advertise or broadcast identifiers. (See at least page 22 of the '359 application)

Thus, "a plurality of proximity beacon transmissions" are received using a second radio in the prior '359 application.

Also, the claimed "proximity beacon information" (such as the SSID or other fields) are "derived from the proximity beacon transmissions" in the '359 application.

It is also explained that the wireless device sends the identifier (received on the local link) to the server, and then receives back from the server (over the wide area link) additional information related to that identifier (see the '359 application at page 3, third par, the last two lines page 4, and the first two lines of page 5). These are a first example of "identifier related information" passed from the server to the device.

As a second example, a device use the identifier related information in performing filtering of requests to the server (for example re-requests, or beacons not relevant to the device or user). and then utilize this information in a so-called "Action Function". (See the '359 application at Figure 3 and Step 303 (page 27), and related description on page 3, as further non-limiting examples).

In another embodiment, the identifier related information may include identifiers of an entity for use in detecting devices associated with an entity. That detection may be performed locally in the mobile device using an "action function" (See the '359 application also at p. 3, last paragraph, "If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this determination."), (See also e.g., p. 23, "The changing of the identifier … may be downloaded from the server directly")]

Thus the "identifier related information" is "received from a server" "using the first radio" in the '359 application.

The information received from the server may include additional information related to the devices from which the detected beacons were received. For example, the wireless device may employ an action function, which enables the wireless device to act as a filter (page 3, third paragraph). In one embodiment, identifiers for individuals on a friends list are passed to the action function on the mobile device by the server. The mobile device can then determine which of the detected identifiers (that is, those from proximate devices) are relevant by comparing them to the list. (See the '359 application at page 3, last paragraph).

It is also explained that when the server receives an inquiry from a device with a list of identifiers, it may only respond with information which the users associated with the identifiers that are on that device's friends list AND on each of the individual's friend lists as well. This process thus allows for disclosure of a user's presence (that is, their "proximity") but only to individuals on this list as controlled by the server. (See the '359 application at page 4, third paragraph).[4]

[4] This is but one example of the mobile device receiving further information using the identifier-related information received from the server. For example, the wireless device may receive other information related to the detected beacon to assist with the proximity determination, such as a software applications used by the wireless device (which may be the "action function" mentioned above). (See the '359 application at page 23, last paragraph).

Additionally, in another embodiment, the device may perform the action function using the identifier related information to directly determine proximity by itself using the identifier related information containing identifiers (See also e.g., p 3, last paragraph, "If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this determination."), (See also e.g., p. 23, "The changing of the identifier … may be downloaded from the server directly")]

Thus claim 1's recitation of "determining that at least one beacon transmitter device" "associated with the beacon service" is "in proximity to the mobile wireless device" "by utilizing at least the identifier related information", in found the '359 application.

The benefit of the '359 application's filing date of September 9, 2008 should therefore be accorded to the present application.

3. No reason was stated in the Final Office Action for why independent claim 31 is not entitled to the earlier filing dates

The Final Office Action only quotes certain elements of apparatus claim 1, and thus on its face only appears to question support for those particular elements in the context of claim 1. The independent method claim 31 does not use the identical language as claim 1, and the Final Office Action does not raise any specific issue with regard to the language of the elements of claim 31.

It is respectfully submitted that the Patent Office has not met its burden to provide an explanation as to why at least claim 31 is not supported by either (or both) of the '828 application or the '359 application.

Nonetheless, in an overabundance of caution, Exhibit C hereto is a chart showing where support for each of the steps of claim 31 are found in the ‘828 application filed February 3, 2009.

Exhibit D is a similar chart showing where support for claim 31 is found in the ‘359 application filed September 9, 2008.

C. THE CLAIMS ARE DIRECTED TO PATENT ELIGIBLE SUBJECT MATTER

Claims 1-2, 4-10, 12-19, 21-23, 31-32, and 35-37 stand rejected under 35 U.S.C. 101 as supposedly being directed to a judicial exception without significantly more. The Applicant must respectfully disagree that these claims are directed to the types of inventions excluded from patentability.

1. The Law of Patent Eligibility Under the Two-Step Alice – Myriad Test

The Office Action refers to the U.S. Supreme Court decision in *Alice Corporation Pty., Ltd. v. CLS Bank International*, 134 S. Ct. 2347 (2014) (the "*Alice* decision") and its recitation of four types of abstract ideas, including:

> fundamental economic practices;
> certain methods of organizing human activities;
> an idea itself; and
> mathematical relationships/formulas.

Alice and other Supreme Court decisions have established a two-step eligibility analysis for determining whether a claim falls into one of these exceptions. Step one of the analysis involves determining whether the claims are "directed to" a judicial exception. *Alice.,* 134 S.Ct. at 2355. If so, step two requires consideration of whether the claims contain "an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'" Id. (quoting *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 132 S. Ct. 1289, 1294). As recognized by the Patent Trademark Office's Appeals Board, the Office bears the initial burden of establishing a prima facie case of patent-ineligible subject matter under Section 101. *Ex Parte Poisson, Patent Tr. & App. Bd.*, Appeal 2012-011084, p. 5.

Subsequent Decisions Under Step One

Courts have struggled to provide a clear definition of what constitutes an "abstract idea" under step one of the *Alice* eligibility analysis. *Versata Dev. Grp., Inc. v. SAP Am., Inc.,* 793 F.3d 1306, 1331 (Fed. Cir. 2015). Instead, courts tend to identify claims directed to abstract ideas by comparison to prior decisions whenever possible. *Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1294 (Fed. Cir. 2016) ("the decisional mechanism courts now apply [with respect to the eligibility analysis] is to examine earlier cases in which a similar or parallel descriptive nature can be seen—what prior cases were about, and which way they were decided").

For example, claims that merely implement a well-known business practice on conventional computer components are likely directed to an abstract idea. *Enfish LLC v. Microsoft Corp.*, 822 F.3d at 1338 (Fed. Cir. 2016). So too are claims directed to the use of conventional computer functionalities to assist in the performance of calculations or the manipulations of data that have no effect on the operation of that computer or an outside process. *Digitech Image Techs., LLC v. Electronics for Imaging, Inc.,* 758 F.3d 1344, 1350 (Fed. Cir. 2014); *Amdocs,* 841 F.3d at 1300.

In contrast, claims directed to a specific and unconventional technological solution to a technological problem are likely not directed to an abstract idea. *Amdocs,* 841 F.3d at 1300. For example, the use of mathematical algorithms to improve a physical process is not an abstract idea. *Diamond v. Diehr*, 450 U.S. 175, 192 (1981). Claims to software that improves the operation of a computer device are similarly unlikely to be directed to an abstract idea. *Enfish,* 822 F.3d at 1339. An invention is also patent-eligible when it extends to improvements in the functioning of a computer itself, so long as that improvement stems from a particular computerized implementation, and not simply to the automation of a known task. See *McRO, Inc. v. Bandai Namco Games America*, 837 F.3d 1299 (Fed. Cir. 2016) (finding eligible claims to the automation of lip-synchronized animations); *Amdocs* 841 F.3d at 1294 (Fed. Cir. 2016) (finding eligible claims related to

enhancing accounting records); *Trading Technologies International, Inc. v. CQG, Inc.*, Case No. 2016-1616 (Fed. Cir. Jan. 18, 2017) (finding eligible claims to an improved user interface for stock and bond trading).

Application of step one of the eligibility analysis can thus in many instances be characterized as a question of "whether the focus of the claims is on the specific asserted improvement in computer capabilities ... or, instead, on a process that qualifies as an 'abstract idea' for which computers are invoked merely as a tool." *Enfish*, 822 F.3d at 1336.

2. Subsequent Court Decisions Interpreting Step Two

If (and only if) a claim is determined under step one to be directed to an abstract idea, then does the eligibility analysis proceeds to step two. Step two has been characterized as the "search for an 'inventive concept'"—"an element or ordered combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'" *Amdocs,* 841 F.3d at 2393-94 (quoting *Alice* 134 S.Ct. at 2355).

One instructive mechanism for identifying additional elements that constitute "significantly more" than an abstract idea is a review of prior decisions identifying such elements. These decisions indicate, for example, that the use of a well-known equation, which on its own may be an abstract idea, can be transformed to patent eligible subject matter when applied "in a process designed to solve a technological problem in 'conventional industry practice.'" *Alice,* 134 S. Ct. at 2358 (quoting *Diehr,* 450 U.S. at 192). This conclusion has been affirmed by the Federal Circuit since the Supreme Court's ruling in *Alice.* For example, in *Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC,* the Federal Circuit held that the otherwise abstract idea of "filtering Internet content," when applied to a specific configuration of otherwise conventional

elements to solve problems in prior implementations of that idea, was patent eligible. 827 F.3d 1341, 1352 (Fed. Cir. 2016).

Other decisions subsequent to *Alice* establish that application of step two cannot be conducted in a vacuum, by disregarding whatever abstract idea was identified in step one. Rather, if such a claim represents an improvement in computer-related technology, the claim as a whole may represent an ordered combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon an ineligible concept itself. *Enfish* at 822 F.3d 1336 as cited in *Core Wireless Licensing S.A.R.L. v. LG Electronics, Inc.,* 2016-2684, 2017-1922 (Fed. Cir. Jan. 23, 2018),

3. All Claims in the Present Case are Directed to either an Apparatus or a Method and thus Pass Muster Under Alice Step One

The Final Office Action notes that claim 31 "recites a method", an apparent admission that the claim 31 is directed to one of the four statutory categories of patent-eligible subject matter. The Final Office Action does not address the “Step One” threshold question for any of the other claims.

However, there can be no question that claims 32, 34-37, and 40-41 that depend from claim 31 also recite a method.

There also can be no question that claim 1 and the claims that depend from it recite a mobile wireless device, which is a machine.

Thus all of the claims meet Step One of the *Alice* analysis.

4. The Claims also Pass Muster Under Alice Step Two

While the Final Office Action rejects the claims under the two-step eligibility analysis described above, the Office's application of that eligibility analysis falls far short. Indeed, the Office's analysis of eligibility is primarily made up of conclusory statements, which cannot satisfy the Office's burden of establishing a prima facie case of patent-ineligible subject matter under Section 101.

Why?

> The Final Office Action mischaracterizes the language of claims, which are not directed to the concept of "determining distance";
>
> The Final Office Action also refers to a claimed "transaction device" that has never appeared in claim 31 or in any other claims;
>
> The Final Office Action ignores applicable court cases that are similar in subject matter to the present case;
>
> The Final Office Action misapplies Step Two of the eligibility analysis, for two reasons, by both failing to (a) consider the claims "as a whole" and by failing to (b) provide any proof as to why there is not "significantly more" per the Patent Office's own examination policies.

Each of these reasons will now be addressed in detail.

i. The Claims are "Directed To" "Facilitating Communication Between Two Wireless Devices Using Beacon Transmissions" - NOT "Determining Distance"

It should first be noted that the claims are not directed to "determining distance". As explained above in the Summary of Claimed Subject Matter, the claims actually relate to facilitating communication between two wireless devices. The specific beacon-based communication techniques are applicable when the two devices are in proximity to one

another, that is, when they are physically close enough to one another to detect beacon transmissions[5].

Nowhere is "determining distance" recited in any of the claims.

A determination of distance is not the same thing as determining whether two things are in proximity to one another. Determining distance necessarily involves some measurement of a physical dimension such as feet, or yards, or kilometers. On the other hand, determining "proximity" (in the context of the wireless devices of the claimed invention), involves determining whether the two devices are close enough to receive wireless beacon transmissions, regardless of the actual physical distance between them[6].

ii. "Facilitating Communication by Detecting Beacon Transmissions" is a Technical Concept; and "Determining Distance" Involves Measuring a Physical Phenomenon that has been found to not be an Abstract Idea by the Courts

Even if "receiving proximity beacons" as part of determining when two devices are "in proximity" can be rightfully equated to "determining distance", distance measurement is *a physical phenomenon, not an abstract idea.* Neither measuring distance nor determining whether two devices are in proximity to one another fall within any of the four categories of abstract ideas per the *Alice* decision (fundamental economic practices;

[5] The claims do not recite "determining distance" anywhere. There also is no "transaction device" or "mathematical algorithm" recited in the claims. Claim 23's recitation of "advertisements" relates to announcing the availability of a particular type of beacon transmission, and is not a reference to, for example, an offer for sale of goods.

[6] The U.S. Patent and Trademark Office determines the scope of claims during prosecution not solely on the basis of the claim language, but also by giving claims their broadest reasonable construction "in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364[, 70 USPQ2d 1827, 1830] (Fed. Cir. 2004). In the present case, nowhere does the specification discuss or show how to measure a physical distance between the two wireless devices. See also *In re Suitco Surface, Inc.*, 603 F.3d 1255, 1259, 94 USPQ2d 1640, 1643 (Fed. Cir. 2010); *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000).

certain methods of organizing human activities; an idea itself; or mere mathematical relationships/formulas).

Two decisions of the Court of Appeals for the Federal Circuit (*Thales* and *SiRF*) actually are quite relevant to the present application, as they relate to determining the relative position of an object , are in agreement.

One such decision, *Thales Visionix Inc. v. United States, No. 15-5150* (Fed. Cir. Mar. 8, 2017), involved determining the position of a moving object. That invention was said to relate to using sensors to reduce errors in measuring the relative position and orientation of a moving object on a moving reference frame determining position. Such an invention, involving measurement of a physical phenomenon, was found by the Federal Circuit to not be an abstract idea[7].

Analogous to the *Thales* case, the inventions claimed in this case receive "beacon transmissions" as part of the process (or a machine) to determine when two devices are in proximity. As one of skill in the art understands, such beacon transmissions must be received with a radio, and thus rely on a physical phenomenon, as did the invention in the *Thales* case.

iii. The Invention Provides Improvements to Wireless Communication Technology that Are Not Routine, Conventional, or Well-Known and thus Meet Step Two.

Even if the claims are directed to an abstract idea of "distance measurement", under step two of an *Alice* analysis, there is "significantly more". Another court case analogous to the present case is the CAFC's decision in *SiRF Technology Inc. v. International Trade Commission,* 601 F.3d 1319 (Fed. Cir. 2010). That case involved a claim to an invention

[7] As in the Thales case, the claims in the present application do not seek to tie up all methods of determining whether two devices are in proximity to one another or measure position.

that determined distance using a GPS receiver. As in *SiRF*, the programmed processors in the present case also "act in concert with the radios" to enable the mobile devices to determine which other devices are in proximity (e.g., analogous to the "position" claimed in SiRF).

When the claim is taken as a whole, the additional claim elements in the apparatus claims and additional steps recited in the method claims must also be considered in any "abstract idea" analysis. Here those additional elements, in at least one claimed embodiment, include:

- detecting "identifier related information" from a first radio;
- detecting other identifiers received from a second radio;
- the identifiers received from the second radio including a proximity beacon service identifier that indicates which beacons are associated with a proximity beacon service; and
- utilizing the identifier related information to confirm that the detected identifiers are associated with a particular type of service, a "proximity beacon service".

Indeed, these additional limiting steps provide significantly more, meaningful improvements to an existing technology (wireless communications).

Several technological improvements provided by the Applicant's invention as explained (or evident from) the specification are as follows:

> The method of exchanging identifiers directly between the mobile devices using the short range link, and then waiting to receive additional information until the server has determined additional proximity-related information will be exchanged, reduces the amount of data that would otherwise be exchanged between the server and the wireless devices.

Additionally, in some embodiments, the use of downloaded information from the server *(identifier related information)* to perform the detection of a proximal device (for example, using an action function of the device to filter which identifiers should be send to the server, or to directly detect proximal devices) would have significant power saving benefits.

When a beacon is identified as being associated with the proximity beacon service for example, power consumption of the wireless devices is reduced due to reduced processing requirements for the detection of beacon transmissions and resulting processing of associated information and interaction with the server.

The loading and power consumption of the server is also reduced, as a result of reduced interaction with the wireless devices, for example based upon the use of the action function embodiments. Additional power consumption is reduced based upon the off loading of transmissions directly between peer devices.

The invention also permits the two devices to continue to communicate after they move away from each other, via the connections established with the server. Such a benefit is an innovation over pure peer to peer communication which is limited to only communicating when the two devices are in proximity, disconnecting as they move apart. The as claimed embodiments allow for the communications to continue, after the detections have occurred.

Changing wireless identifiers permits communication between the two devices to remain secure, even after their identifiers were initially exchanged to determine proximity. For example, the use of the same identifiers of a particular device will allow those who have detected a device in proximity only once, to monitor a the arrival and departure of that device indefinitely. The as claimed embodiments allow the use of changing identifiers. For example, the sending of identifiers to the server, and determining the presence of devices based upon the returned information allows for the revocation of permissions to others which to receive information about an entity associated with a particular device.

The claims, when considered as a whole, thus relate to improvements to the existing technology of wireless communication, and therefore pass *Alice* Step Two.

iv. The Final Office Action Fails to Meet the Patent Office's Burden of Showing Why the Claims Merely Involve Routine, Well Known, Conventional Elements or Steps

The Final Office Action also concludes that all other parts of the claim beyond the supposed abstract idea of "determining distance" merely involves routine, conventional steps.

But that conclusion is not supported by any findings of fact in the record, and certainly does not meet the burden of setting forth a *prima facie* case. As the CAFC explains in the case of *Berkheimer v HP, Inc.* (Fed. Cir. Feb. 8, 2018):

> At step two, we "consider the elements of each claim both individually and `as an ordered combination' to determine whether the additional elements `transform the nature of the claim' into a patent eligible application." *Alice,* 134 S. Ct. at 2355 (quoting *Mayo*, 566 U.S. at 78-79). The second step of the Alice test is satisfied when the claim limitations "involve more than performance of `well understood, routine, [and] conventional activities previously known to the industry.'" *Content Extraction,* 776 F.3d at 1347-48 (quoting *Alice*, 134 S. Ct. at 2359).
>
> The question of whether a claim element or combination of elements is well-understood, routine and conventional to a skilled artisan in the relevant field is a question of fact. Any fact, such as this one, that is pertinent to the invalidity conclusion must be proven by clear and convincing evidence. See *Microsoft Corp. v. i4i Ltd. Partnership,* 564 U.S. 91, 95 (2011)

The Final Office Action in this case provides no evidence that anything recited in Appellants' claims amount to "purely conventional" steps of "receiving data, transmitting data, and comparing data". To the contrary, this is once again just an unsubstantiated conclusion based on an oversimplification and generalization of the claims.

The Federal Circuit's decision in the Berkheimer case recently prompted the Deputy Commissioner of U.S. Patent and Trademark Office (USPTO) to issue a memorandum on April 19,2018 (copy attached as Exhibit G). That memorandum has changed the examination procedure pertaining to subject matter eligibility since the Final Office Action was issued.

In that memorandum, the USPTO confirmed that the determination as to "whether something is well-understood, routine, and conventional to a skilled artisan at the time of the patent is a factual determination" and cautioned that an examiner should conclude that an element represents well-understood, routine, and conventional activity ***only when the examiner can readily conclude that the claimed elements are widely prevalent or in common use in the relevant industry***.

Moreover, the USPTO memorandum stated that even a showing under 35 U.S.C. § 102 and 103 is not sufficient to establish that the additional elements are well-understood, routine, conventional activities or elements to those in the relevant field.

The USPTO memorandum set forth four (4) possible ways to provide support for an allegation of a claim element being well-understood, routine, or conventional – but none of which have been satisfied by the present Final Office Action. The four ways are for the Examiner to:

(1) cite an express statement in the specification or to a statement made by an applicant during prosecution that demonstrates the well-understood, routine, conventional nature of the additional elements;

(2) cite to one or more court decisions discussed in MPEP § 2106.05(d)(II) as noting the well-understood, routine, conventional nature of the additional elements;

(3) a citation to a publication that demonstrates the well-understood, routine, conventional nature of the additional elements; and

(4) a statement that the examiner is taking official notice of the well-understood, routine, conventional naturel of the additional elements.

The Examiner has not satisfied any of these four ways of establishing additional elements as being well-understood, routine, or conventional and thus, has not presented a prima facie case.

It should be noted that the Examiner regards the additional features as being merely "receiving data, transmitting data, and comparing data", which they are not. Instead, the claims actually recite a "first radio" and a "second radio" specifically configured to receive identifier related information associated with a proximity beacon service, and beacon transmissions of a very specific type (which must include a MAC address, a unique identifier, and a proximity beacon service identifier). The claims also require determining that at least one beacon transmitter device, entity, or object associated with the beacon service is in proximity in a very particular way - by utilizing the identifier related information.

Thus, the examiner must consider these elements as specifically claimed, without generalizing them. The examiner must also provide proof that they are well-understood, routine, and conventional by one of (l)-(4) above, and not by merely alleging that "receiving data", "transmitting data" and "comparing data" are in general are conventional.

Appellants respectfully submit that any analysis of the claimed features based on the principles set forth in the Berkheimer decision, as well as in following the guidance set forth in the USPTO memorandum based on Berkheimer, results in a finding that the claims recite substantially more than any alleged abstract idea. Therefore, the claims are statutory.

For these several reasons, the rejections under 35 USC 101 should be withdrawn.

D. THE CLAIMS COMPLY WITH REQUIREMENTS OF 35 USC 112

1. The Claims Comply with the Written Description Requirement

Claims 4 and 18 stand rejected for supposedly failing to comply with the written description requirement.

The previous recitation of "for security reasons" has been deleted from claim 4.

As the Final Office Action points out, it is indeed the case that the present application (published as U.S. Patent Publication 2017/0011425A1 (the '425 publication) mentions at paragraph [0044] (which corresponds to the application as filed at page 13, lines 6-7) that the invention provides an advantage over other systems, such as a "true peer-to-peer topology", where it is "not otherwise possible to change the MAC address."

What the Final Office Action fails to appreciate, however, and *as explained elsewhere in the application, the Applicant's invention overcome these problems with other systems - by providing that the identifiers can be changed over time.* As one example, support for claim 4's recitation of changing MAC addresses is found in the application at page 7, lines 3-6. There it is explained that "*By using a central server, the system may coordinate the change of the identifiers from time to time such that the disclosure of an identifier by one device to another does not compromise the identity of the device*."

In one example implementation using a Bluetooth local link, at paragraph (page 15, lines 23-24 of the application as filed), "the BD ADDR or MAC address of the Bluetooth device can be used as the identifier".

The specification therefore describes an embodiment where the BR ADRR or the MAC address can be changed, and that it can be used as the identifier in certain Bluetooth embodiments.

Thus claims 4 and 18 are supported by the application as filed.

2. The Claims Also Particularly Point Out and Distinctly Claim the Invention

Several claims were also rejected for supposedly failing to particularly point out and distinctly claim the invention, and for failing to define the invention in the manner required by 35 USC 112, second paragraph.

The reasons given for the rejection of all claims on this basis were generally stated as:

> The claims are narrative in form and replete with indefinite language. The structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device. For example, the claims contain excessive functional language. The claims must be in one sentence form only. Note the format of the claims in the patents cited.
>
> and
>
> A single claim which claims both an apparatus and the method steps of using the apparatus is indefinite under 35 U.S.C. 112, second paragraph

No specific reasons for independent claims 1 or 31 being in an impermissible "narrative form" or being "replete with indefinite language" or "reciting excessive functional language" was stated in the Final Office Action.

Nonetheless, claims 1 and 31 have been amended above to clarify that the "proximity beacon transmissions" include a "proximity beacon service identifier". The "determining" operation in the claims has also been amended to clarify that the "proximity" of the "mobile wireless device" to a "beacon transmitter associated with the beacon service" is determined by using the "identifier related information".

The legal test for definiteness under 35 USC 112, second paragraph is actually whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification" *Orthokinetics Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576 (Fed Cir. 1986) (citations omitted).

The claims in question, certainly as now amended, also each recite a logical and operative device (in the case of claim 1) and a logical and operative method (in the case of claim 31) that are understood by one of skill in the art.

For example, one element of claim 1 requires:

> receiving, using the second radio, a plurality of proximity beacon transmissions when the device is located within a detection range of one or more beacon transmitter devices

After reading the specification one of skill in the art understands that this is but an initial step towards the ultimate goal. In other words, receiving some sort of "proximity beacon transmission" is <u>just a first step towards determining a proximity of a beacon transmitter that is of a particular type – namely a beacon transmitter that is associated with a beacon service</u>. Thus, when one of skill in the art reads the later element:

> determining that at least one beacon transmitter device associated with the proximity beacon service is in proximity … by utilizing the identifier related information

one also understands that element to involve determining whether the beacon was actually received from a particular device that we care about – namely that the proximity beacon was received from a particular "device" that is relevant – that is, a proximity beacon that is associated with a "proximity beacon service".

It is respectfully submitted that one of skill in the art understands this part of the claim in light of the specification. See, for example page 17 lines 16-18, ("...one or both the BSSID and the SSID may be used to indicate these particular beacons are associated with a service.")].

In addition, the format adopted for claim 1 – a processor programmed to perform a series of steps - is indeed proper form for a claim as recognized by both the Patent Office itself and the Courts.

For instance, a claim to computer storage medium programmed with attribute data objects that perform the function of facilitating retrieval, addition, and removal of information in the intended computer system, established a functional relationship such that the claimed attribute data objects are given patentable weight. See *In re Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035, as cited in MPEP 2111.05 B(III).

The Court of Appeals for the Federal Circuit has most recently spoken on this topic in *MasterMine Software, Inc. v. Microsoft Corp*., 2017 U.S. App. LEXIS 21479 (Fed. Cir. Oct. 30, 2017) (Newman, O'Malley, Stoll) recognizing that "apparatus claims are not necessarily indefinite for using functional language", citing to *Microprocessor Enhancement Corp. v. Texas Instruments Inc. (MEC)*, 520 F.3d 1367, 1375 (Fed. Cir. 2008), finding that a claimed "processor" programmed "for executing instructions" was proper form, and not indefinite (See *MasterMine*, slip op. at 14).

Claims 31-32, 35-37 and 40-41 are method claims. Lacking any specific identification or reason in the Final Office Action, these method claims must be presumed to not have excessive functional language, or improperly reciting functions of an apparatus.

The various dependent claims mentioned in this context in the office action are each addressed below.

Claim 2 depends from claim 1 and merely further defines the type of MAC address referred to in the step of "receiving, using the second radio".

Claims 4 and 5 further clarify the type of MAC address and unique identifier used – namely addresses and identifiers that occasionally change or change over time.

Claim 6 further defines the identifier related information.

Claims 15, 17, 18 and 23 add additional steps performed by the one or more processors.

Claims 31-32 and 33-37 are method claims and thus are not "improperly reciting an apparatus".

Regarding claim 23, the reference to a "standards based protocol derived from Bluetooth" has been deleted.

Claim 13 describes the types of unique identifier. The Final Office Action does not identify any specific "circular reasoning" in the order of the stated elements in this claim.

Claim 14 simply indicates that received identifier related information is of a particular type – it includes application software.

Claim 15 lists the operations performed by the one or more processors (such as allowing further communication, and receiving MAC address and identifier that change from time

to time) and that those operates are executed at a particular time - after determining that the contact identifier matches the proximity beacon.

Claim 23 also lists the operations performed by the one or more processors, and is not "circular" in structure.

Claim 32 further defines how the steps recited in method claim 31 are performed – that is, under control of an application program.

Claim 34 has been cancelled.

E. THE CLAIMS ARE NOVEL SINCE THE APPLICATION CLAIMS PRIORITY TO AN APPLICATION FILED MANY YEARS BEFORE THE HILLIER PRIOR ART

Previous claims 1, 6-14, 19, 20, 23, 31, and 34-36 were rejected under pre-AIA 35 U.S.C. 102(a) as being anticipated by Hillier (US 2016/0025837).

For the reasons stated above, this application rightfully claims priority to U.S. Provisional Patent Application 61/095,359 that was filed on of September 9, 2008, or at the very least, to U.S. Patent Application 12/364, 828 filed February 3. 2009 which has a technical specification and drawings identical in all relevant aspects to the specification and drawings of the present application.

Therefore, the Hillier publication from 2016 is not prior art. The rejection should be withdrawn.

F. THE CLAIMS ARE UNOBVIOUS BECAUSE THE APPLICATION CLAIMS PRIORITY TO AN EARLIER APPLICATION FILED MANY YEARS BEFORE BOTH THE HILLIER AND ALTMAN AND SORENSON PRIOR ART

Previous claims 2-5, 15-18, and 21-22 stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hillier (US 2016/0025837) in view of Altman et al (US 2013/0217332)

Claims 32-33 also stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hillier (US 2016/0025837) in view of Sorenson et al (US 2003/0053484)

For the reasons stated above, this application rightfully claims priority to the either, or both, of the '359 and '828 applications.

Therefore, neither Hillier nor Altman nor Sorenson are prior art.

The cited claims and all other claims in the application are unobvious and patentable.

CONCLUSION

In view of the foregoing amendments and remarks, reconsideration and allowance of the application is respectfully requested.

Respectfully submitted,
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July 20, 2018

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

FEE TRANSMITTAL FOR PATENT APPLICATIONS	Attorney Docket Number	4394.1005-000
	Application Number	
	First Named Inventor	James Arthur Proctor, Jr.

CLAIM CALCULATION (includes any preliminary amendment)

CLAIMS	(1) FOR	(2) NUMBER FILED		(3) NUMBER EXTRA	(4) RATE			(5) CALCULATIONS
	TOTAL CLAIMS (37 CFR 1.16(c) or (j))	26	– 20 =	6	X $ 52 =	X $ 26 =	$	156
	INDEPENDENT CLAIMS (37 CFR 1.16(b) or (i))	2	– 3 =	0	X$220 =	X $110 =	$	0
	MULTIPLE DEPENDENT CLAIMS (if applicable) (37 CFR 1.16(d))				+ $390 =	+ $195 =	$	
				BASIC FEE Paper or Electronic Filing - Large Entity Paper Filing - Small Entity Electronic filing - Small Entity			$	82
	APPLICATION SIZE FEE $270 for each add'l 50 sheets exceeding 100 **IF FILED ELECTRONICALLY:** Total No. Pages/Sheets X .75 (If a fraction remains, add 1 page to the total thereby including the fraction). Using the total after calculation, the fee is $270 for each additional 50 sheets over 100.			Specification: 52 Pages Drawings: 14 Sheets Sequence Listing: 0 pages Total No. Pages/Sheets 66			$	0
				SEARCH FEE			$	270
				EXAMINATION FEE			$	110
	Surcharge - Late Filing of Declaration or Filing Fees (37 CFR 1.16(f)) =						$	
	Petition for Extension of Time Fee (37 CFR 1.17) =						$	
	Petition to Make Special Under 37 C.F.R. 1.102(c)(1)]						$	
	Assignment Recordation Fee = (only when filed with application)						$	
	TOTAL =						$	618.00

1. Small entity status:
   - a. ☒ A small entity statement is enclosed.
   - b. ☐ A small entity statement was filed in the prior non-provisional application and such status is still proper and desired.
   - c. ☐ Is no longer claimed.
2. ☒ Please charge any deficiency or credit any overpayment in the fees that may be due in this matter to Deposit Account No. 08-0380.
3. ☐ A check is enclosed for **$** ☒ Please charge **$618.00** to Deposit Account No. 08-0380.
4. ☐ Other: _____

Signature	/David J. Thibodeau, Jr., Reg. No. 31,671/	Date	February 3, 2009
Submitted by Typed or Printed Name	David J. Thibodeau, Jr.	Reg. Number	31,671

864992_1 – September 15, 2008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: James Arthur Proctor, Jr. and James Arthur Proctor, III

For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Information Disclosure Statement is submitted:

☒ under 37 CFR 1.97(b), or
(Within any one of the following time periods: three months of filing national application (other than a CPA) or date of entry of the national stage in an international application; or before the mailing date of a first office action on the merits; or before the mailing of a first office action after the filing of a Request for Continued Examination).

☐ under 37 CFR 1.97(c) together with either:
- ☐ a Statement under 37 CFR 1.97(e), as checked below, or
- ☐ a $180.00 fee under 37 CFR 1.17(p), or

(After the 37 CFR 1.97(b) time period, but before any of a final action, notice of allowance, or an action that closes prosecution, whichever occurs first)

☐ under 37 CFR 1.97(d) together with:
- ☐ a Statement under 37 CFR 1.97(e), as checked below, and
- ☐ a $180.00 fee under 37 CFR 1.17(p), or

(Filed after final action, notice of allowance, whichever occurs first, or if prosecution otherwise closes, but on or before payment of the issue fee)

☐ under 37 CFR 1.97(i):
Applicant requests that the IDS and cited reference(s) be placed in the application file.
(Filed after payment of issue fee)

Statement Under 37 CFR 1.97(e)

☐ Each item of information contained in this Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Information Disclosure Statement; or

☐ No item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned, after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of this Information Disclosure Statement.

Statement Under 37 CFR 1.704(d) (Patent Term Adjustment)
Applies to original applications (other than design) filed on or after May 29, 2000

☐ Each item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the Information Disclosure Statement.

☒ Enclosed herewith is a Listing of References:

- ☐ Copies of the cited references are enclosed except as indicated below.
- ☒ Copies of issued U.S. patents and published U.S. applications are not required and are not being provided.
- ☐ Copies of the cited references submitted with an Information Disclosure Statement in prior application, U.S. Application No. [ ], to which priority under 35 U.S.C. 120 is claimed, are not required under 37 CFR 1.98(d)(1) and (2) and are thus not provided.

☐ The listed references were cited in the enclosed Search Report in counterpart foreign application [add application number], which is listed in the attached Listing of References.

☐ The "concise explanation" requirement (non-English references) for reference(s) [ ] under 37 CFR 1.98(a)(3) is satisfied by:

- ☐ the explanation provided on the attached sheet.
- ☐ the explanation provided in the Specification.
- ☐ submission of the enclosed International Search Report.
- ☐ submission of the enclosed English-language version of a foreign Search Report and/or foreign Office Action.
- ☐ the enclosed English language abstract.

☐ Applicant requests that the following non-published pending applications be considered:
(Affix a label or apply the stamp "Non-Published IDS Reference - Do Not Scan" to the front of each unpublished pending appl'n.)

U.S. Patent Application No. [ ], by [inventor(s)], filed [ ], Docket No.: [ ]

U.S. Patent Application No. [ ], by [inventor(s)], filed [ ], Docket No.: [ ]

U.S. Patent Application No. [ ], by [inventor(s)], filed [ ], Docket No.: [ ]

☐ A copy of each above-cited application, including the current claims, is enclosed, except any application filed on or after June 30, 2003, which has been scanned into the PTO's Image File Wrapper (IFW) system and is available to the examiner.

☐ A copy of each above-cited application, including the current claims, is enclosed, except those entered in prior application, U.S. Application No. [ ], to which priority under 35 U.S.C. 120 is claimed.

It is requested that the information disclosed herein be made of record in this application.

Method of payment:

☐ A check for the fee noted above is enclosed, or the fee has been included in the check with the accompanying Reply.

☐ Please charge Deposit Account 08-0380 in the amount of $[ ].

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Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By /David J. Thibodeau, Jr., Reg. No. 31,671/
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Concord, MA 01742-9133
Dated: February 3, 2009

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor, Jr.
Filer:	David J. Thibodeau/Nicole Isabelle
Attorney Docket Number:	4394.1005-000

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	82	82
Utility Search Fee	2111	1	270	270
Utility Examination Fee	2311	1	110	110
Pages:				
Claims:				
Claims in excess of 20	2202	6	26	156
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**618**

Electronic Acknowledgement Receipt	
EFS ID:	4725905
Application Number:	12364828
International Application Number:	
Confirmation Number:	4798
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor, Jr.
Customer Number:	21005
Filer:	David J. Thibodeau/Nicole Isabelle
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	4394.1005-000
Receipt Date:	03-FEB-2009
Filing Date:	
Time Stamp:	15:48:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$618
RAM confirmation Number	1041
Deposit Account	080380
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	43941005000TRANS.pdf	121932 2f5c8d5add0e16fd3fa2f460316cb7472ddfcef5	no	1
Warnings:					
Information:					
2		43941005000SPEC.pdf	214957 87faf9aad72cf59c9c58b851e5fe37d678bd3984	yes	52

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	41
Claims	42	51
Abstract	52	52

Warnings:					
Information:					
3	Drawings-only black and white line drawings	43941005000DRWS.pdf	789949 7e5da5f99226b2f72912831e07c7074833d5e853	no	14
Warnings:					
Information:					
4	Miscellaneous Incoming Letter	43941005000SES.PDF	123721 f7619b0bb1ed2b7b50675fe821daa103a0bb1562	no	1
Warnings:					
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5	Oath or Declaration filed	43941005000DEC.pdf	246018 33526afbc7afffc9bd1df1e0df6bc275afbf088d	no	2
Warnings:					
Information:					
6	Petition to make special based on Age/ Health	43941005000PETITION.pdf	42615 066fa43eb161b91343ae13bb305ce202be00bbf5	no	1
Warnings:					
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7	Fee Worksheet (PTO-06)	43941005000FEETRANS.pdf	65195 54a14a39d8bb03d154ffe00082bc0ffcb4ea6946	no	1

Warnings:					
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8	Information Disclosure Statement Letter	43941005000IDS.pdf	94906 ff05706d948b5ae8d4b3193f24eb8b6174858ae4	no	3
Warnings:					
Information:					
9	Information Disclosure Statement (IDS) Filed (SB/08)	43941005000LOR.pdf	73027 3e9bc14191bb665403a81130aedd79c5aa952d64	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
10	Fee Worksheet (PTO-06)	fee-info.pdf	37314 9e51e4cfd4aae43c5680e8a176f3d0fb60a55cfc	no	2
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		Total Files Size (in bytes):	1809634		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

UTILITY PATENT APPLICATION TRANSMITTAL *(Only for new nonprovisional applications under 37 CFR 1.53(b))*	Attorney Docket No.	4394.1005-000
	First Named Inventor	James Arthur Proctor, Jr.
	Express Mail Label No.	

Title of Invention	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

Name of Assignee for Publication Purposes		City and State for Publication Purposes	

APPLICATION ELEMENTS
See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: **Commissioner for Patents**
P.O. Box 1450
Alexandria, VA 22313-1450

1. ☒ Fee Transmittal Form
2. ☒ Specification **Total Pages 52**
   Both the claims and the abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
3. ☒ Drawing(s) (35 U.S.C. 113) **Total Sheets 14**
   ☒ Fig. of the Drawings for Publication **10**
   ☐ No Figure to be Published
4. ☒ Oath or Declaration **Total Pages 2**
   a. ☒ Newly executed (original or copy)
   b. ☐ Copy from a prior application (37 C.F.R. 1.63(d))
   (for continuation/divisional with Box 18 completed)
   i. ☐ DELETION OF INVENTOR(S)
   Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. ☐ CD-ROM or CD-R in duplicate ☐ Text file attached herewith
   Large table or Computer Program *(Appendix)*
6. ☐ Nucleotide and/or Amino Acid Sequence Submission
   (if applicable, items a.-c. are required)
   a. ☐ Computer Readable Form (CRF)
   i. ☐ Computer Readable Form (CRF)
   ii. ☐ Transfer Request (37 CFR 1.821(e))
   b. ☐ Specification Sequence Listing on:
   i. ☐ CD-ROM or CD-R (2 copies); or
   ii. ☐ Text file attached herewith *(electronic filing)*
   iii. ☐ Paper [ ] **Pages**
   c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☐ Assignment Papers *(Do not submit when e-filing application)*
8. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney
   (when there is an assignee)
9. ☐ English Translation Document *(if applicable)*
10. ☒ Information Disclosure Statement
    (Listing of References *(formerly PTO-1449)*)
    ☐ Copies of foreign patent docs., publications, and other info.
11. ☐ Preliminary Amendment
12. ☐ Return Receipt Postcard *(Check this box if going by express mail)*
13a. ☐ A Foreign Priority Claim under 35 U.S.C. § 119 or 365
    i. ☐ is made to [country], [app. #], filed [ ]
    ii. ☐ is presented in the attached
    ☐ Specification ☐ Preliminary Amendment
    ☐ Separate Sheet ☐ Declaration
13b. ☐ A Certified Copy of each Priority Document
    i. ☐ is enclosed
    ii. ☐ was filed in U.S. Application No. [ ]
14. ☐ Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i).
    Applicant must attach form PTO/SB/35 or equivalent.
15. ☐ Remarks [/ Change of Correspondence Address]
16. ☒ Small Entity Statement(s)
17. ☒ Other: Petition to Make Special under 37 C.F.R.§1.102(c)(1)

18. **If a CONTINUING APPLICATION,** check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title:
☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.:
Prior application information: Examiner: Group Art Unit:

The entire disclosure of the prior application is considered a part of the disclosure of the accompanying application and is hereby incorporated by reference. ***(Add standard Related Applications section with incorporation by reference to specification or update same)***

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Submitted by Typed or Printed Name	David J. Thibodeau, Jr.	Reg. Number	31,671

864994_1

Inventor(s): James Arthur Proctor, Jr. and James Arthur Proctor, III

Attorney's Docket No.: 4394.1005-000

EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED

RELATED APPLICATION(S)

This application claims the benefit of U.S. Provisional Application No. 61/095,001, entitled "Central Server Enabled Proximity Based Applications Utilizing Both Short Range, and Wide Area Wireless Radios", filed on September 8, 2008 and U.S. Provisional Application No. 61/095,359, entitled "Central Server Enabled Proximity Based Applications Utilizing Both Short Range, and Wide Area Wireless Radios", filed on September 9, 2008. The entire teachings of the above applications are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Several key internet applications have become increasingly popular in recent years. A current trend in internet usage involves social networking. Social networking involves making use of internet services which allow for the interaction and sharing of information between users of service.

Recently, mobile wireless communication standards have progressed to the point where relatively high speed data connections are possible to the phone over the wireless wide area network (WWAN). These standards include 1xEV-DO, HSDPA, EDGE, GPRS, Wi-Max (IEEE802.16e) and the like. Some social networking sites have included interfaces to their web sites optimized to make use of such high data rate mobile services for use on a mobile phone. These services are referred to as mobile social networking. For the most part, these services are simply versions of the standard

social networking, redesigned to be usable on a mobile phone, adding little in the way of increased capability.

With the common capability of global positioning system (GPS) receivers being incorporated into phones, some additional capabilities have been added to some mobile social networking interfaces by incorporating location information for the user and that of the individual they interact with.

These services are utilizing GPS to determine the location of one mobile wireless user and to another to facilitate mobile social networking. An example of an existing application utilizing this approach is Loopt (www.loopt.com), which coordinates location based social interaction. One problem with GPS based mobile application involves the GPS receiver not receiving sufficient signal strength in many indoor locations. As a result these enhanced capabilities have typically been targeted at either navigation to a specified location, or as in the case with Loopt, allowing a user to see where their friends are located in a relatively large geographic location, on a map.

Another popular application for the internet is electronic commerce. Just as with social network, e-commerce services have provided interfaces optimized for use on mobile phones which provide basically the same capabilities as the standard interfaces. Very little location or proximity information has been used to enhance the mobile e-commerce experience.

Some attempts have been made to utilize RFID (Radio Frequency Identification) chips to perform mobile payments. This approach requires the additional hardware on a phone in the form of a RFID chip, or other specialized features. As a result, mobile electronic commerce has mostly allowed users to perform transaction with a remote party, such as purchasing an item on ebay (www.ebay.com). To date mobile electronic payments for individuals who are in close proximity to each other have not been practical for a number of reasons. First there is a need for the individuals to have a third trusted party to help facilitate the electronic transaction. Secondly, there needs to be a

convenient, electronically secure, personally secure and anonymous method for each of the individuals to specify the party with which they wish to engage in a transaction. Thirdly, there is a need to cross validate the identities of the individuals engaged in the transaction. Finally, this method must work in indoors locations.

Most mobile phones on the market today support at least two wireless standards; one for the cellular wireless wide area network connection (WWAN) and one for a wireless personal or local area network (WPAN, WLAN). The cellular connection or WWAN is utilized for voice and data and can adhere to many different standards such as CDMA (IS-2000), GSM, W-CDMA, WiMax, etc.. The WPAN or WLAN connection is typically for short range communications and is often used for wireless hands free devices, such as headsets, peripherals, or higher speed internet connections. The typical standards used for the sort range wireless communications include Bluetooth, Wi-Fi, and in some cases Ultra-Wide-Band (UWB).

In another approach to mobile social networking some services have attempted to utilize short range wireless capabilities often available on phones such as IEEE802.11 (Wi-Fi) or Bluetooth to facilitate peer to peer communications. These are also referred to a MANETs or Mobile Ad-hoc Networks. These services typically consist of a software application operating on a mobile phone using peer to peer networks to facilitate communication between wireless devices. Examples of such existing applications include Mobile-Cheddar, Peer-2-Me, and Flobbi. Published US Patent application US 2008/0182591 A1 filed December 13, 2007 describes one such peer to peer approach. One issue with these approaches is that one can not communicate with a peer once the devices are no longer in proximity. A further disadvantage is that all information to be exchanged must be stored locally on each of the peer devices as the communication occurs directly between the two devices and any policy for the delivery of locally stored content is difficult to enforce without the potential for fraud such as spoofing identities between the peers. Such fraud may lead to concerns of personal safety or privacy allowing the identity of an individual to be determined when it is not desired. Further this peer to peer model is inadequate for

mobile electronic commerce in part due to the lack of an independent third party to facilitate the services required for a secure proximity based mobile electronic transaction as previously mentioned.

SUMMARY OF THE INVENTION

The present invention is generally concerned with facilitating the exchange of information and transactions between two entities associated with two wireless devices when the devices are in close proximity to each other utilizing both a short range and a long range wireless capability.

Preferred embodiments of the present invention are generally concerned with facilitating the exchange of information and transactions between two entities associated with two wireless devices when the devices are in close proximity to each other. In one embodiment, this can be accomplished by a first device using a first short range wireless capability to detect an identifier transmitted from a second device in proximity to the first device, ideally using existing short range radio communication standard capabilities such as Bluetooth (IEEE802.15.1-2002) or Wi-Fi (IEEE802.11). The detected identifier, being associated with the device, is also associated with an entity. Rather than directly exchanging application data flow between the two devices using the short range wireless capability, a second wireless capability then allows for one or more of the devices to communicate with a central server via the internet, and perform an exchange of application data flow. By using a central server to draw on stored information and content associated with the entity or entities, the server can broker the exchange of information between the entities and the devices. In a preferred embodiment, this exchange may be comprised of information stored on the server associated with a detected entity, and it may be comprised of information received from the detected device via the second wireless capability and facilitated by the server.

In addition, the server can also allow for a brokering service, ideally independent of the entities, to enable the application of policy based on the identity of

the two entities for the disclosure of stored information associated with the entities, the flow in information between the devices and the entities, and the enablement of procedures such as security verification between the entities.

Applications running on a device may also interact with the server to perform various functions, for example retrieving information associated with an entity or device, by utilizing a detected identifier. Such information may include stored content associated with the entity's account record such as music, pictures, links to social networking sites, instant messaging addresses, advertising content, and even executable scripts or application such as in AJAX. An example of such an application may include the detection of a device's identifier in a fixed location allowing for tour guide like information to be provided for that location.

As the server may be running applications which perform more function than just the retrieval of content, a pre-defined interaction process may also be applied by the server to the devices such as allowing the approval to share private content with the entity associated with the detected device. This process may eventually allow or disallow the sharing of information and to facilitate the interacting with another entity.

As a more complex example, in other embodiments, the devices may utilize the server as a third party to provide for new capabilities such as a secure three way e-commerce transaction between two entities. In this more complex process, the server may require confirmation of each party's identity with visual cross verification of the parties using pictures or other unique identifiers. The server may use this visual cross verification in conjunction with detecting that the individuals are in proximity with each other. The server may verify the proximity using GPS or using the peer to peer detection process in another embodiment. Further, the server may facilitate a process requiring each party to perform a step by step confirmation during the transaction including the stages of: the request for purchase, the payment, the receipt of goods and services, and the providing of payment receipt.

This differs from the approaches employed by prior art location aware mobile social networking techniques in that no GPS is needed to determine when one device is in proximity to another. Many wireless devices in use are not GPS-capable, and even when they are, GPS will often not operate indoors or where the GPS signal is weak. Using a peer to peer detection process to locate nearby devices allows for the operation of proximity detection indoors.

Preferred embodiments of the present invention can also differ from known peer to peer based social networking in that the information flow between the devices running the applications are over the wide area network via a central server, rather than carried over the peer to peer network itself. An example of this is a service called Flobbi, as discussed previously, where community members can identify each other via Bluetooth transmissions, then interact with chat. The messaging in this case is carried over Bluetooth itself. A distinction from such peer to peer approaches is the use of a central server to "broker" the transactions between peers, enhancing the ability to manage security and information disclosure. Such use allows for the opportunity to customize delivered content to include elements such as advertising or other content customized to the recipient based on additional information such as known personal purchasing history, or interests.

A further distinction of the preferred embodiment is the use of a central server to determine identities of detected peer devices, which additionally allows for secure and fraud resistant application of policies for the disclosure of information and content. An issue with the existing pure peer to peer approaches is that they are not capable of enforcing policy associated with the disclosure of information to unknown entities in a secure and fraud resistant manor. One reason for this is that information related to a user's device must be disclosed in the process of detection in the form of a static identifier. By the nature of the identifier, it must be static or peers would not be able to directly determine the identity of a friend over time with the information stored on their device. By using a central server, the system may coordinate the change of the identifiers from time to time such that the disclosure of an identifier by one device to

another does not compromise the identity of the device. In this case the identifier may be assigned from a central server and such server coordinate the identifier's change from time to time.

Reliance on a central server also allows the secure and fraud resistant application of disclosure policy. Such policy might include the verification of the identity of the party to which information (identity and presence for instance) or content (pictures of the account owner) is to be provided. Such verification is performed in an anonymous way such that in the process of verifying information associated with each party, no personal information is disclosed between the parties prior to satisfaction of some pre-set policy such as inclusion on a friend list or belonging to a specific group or organization. Another important policy required for such services would be the determination of any past negative feed back ratings by other past peers for behavior for the particular user to which the information is to be provided. An individual with significant poor ratings having detected a peer, may be denied access to personal information or even notification of arrival of the detected peer based on the server policy setting by the detected peer or the server in general.

A further distinction is to enable electronic payments for individuals who are in close proximity to each other. The central server can act as a third trusted party to help facilitate the electronic transaction between the individuals. Secondly, the server allows for a convenient, electronically secure, personally secure and anonymous method for each of the individuals to specify the party with which they wish to engage in a transaction. Thirdly, participants in a transaction can cross validate the identities of the individuals engaged in the transaction. Finally, because this method is proximity based it will also work indoors or in other situations where GPS location information is not available.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing will be apparent from the following more particular description of example embodiments of the invention, as illustrated in the accompanying drawings in which like reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating embodiments of the present invention.

Figure 1 is a block diagram of two mobile devices utilizing a preferred embodiment.

Figure 2 is a block diagram of a fixed broadcast device and a mobile device.

Figure 3 is a flow diagram of the operation of an application on the mobile devices.

Figure 4 is a message sequence chart showing the Bluetooth discovery process using in one embodiment.

Figure 5 is a message sequence chart showing the Bluetooth Remote Name Request Process.

Figure 6 is a message sequence chart showing the IBSS beacon process.

Figure 7 is a message sequence chart showing the interaction between the server and two devices performing a detection and entering a chat application.

Figure 8A is a message sequence chart showing an E-commerce example.

Figure 8B is a continued example message sequence chart showing an E-commerce example.

Figure 9 is a message sequence chart showing an example of a mobile device and a fixed broadcast device interaction.

Figure 10 is a flow diagram for the server processing associated with the detection process.

Figure 11 is an example individual account record stored in the server associated with an Entity.

Figure 12 illustrates a timing reference for intermittent active and dormant times.

Figure 13 shows a diagram of functional blocks associated with management of dynamically assigned device identifiers.

DETAILED DESCRIPTION OF THE INVENTION

A description of example embodiments of the invention follows.

The teachings of all patents, published applications and references cited herein are incorporated by reference in their entirety.

Figure 1 is a block diagram of two mobile devices utilizing a preferred embodiment.

Referring to Figure 1, a central server 100 is connected to devices 106 and 108 by an internet protocol (IP) based network, carried over a series of connections, at least one of which is a wireless connection. For example, the server 100 has a connection allowing IP based communications to a cellular network 102 using connection 101. The cellular network is connected to devices 106 and 108 by wide area wireless links 104 and 103 respectively, allowing for IP based communications between the devices (106 and 108) and the server 100.

Devices 106, 108 can be considered "client(s)" of the server 100. The clients 106, 108 and server 100 provide processing, storage, and input/output devices for executing wireless system protocols, interfaces, and application level programs according to the invention. Client devices 106, 108 can also be linked through various communications networks to other computing devices, including other client devices/processes and other server computer(s). Communications network(s) providing the connection 101 can typically be part of a remote access network, a global network (e.g., the Internet), a worldwide collection of computers, Local area or Wide area networks, and gateways that currently use respective protocols (TCP/IP, 3G Wireless, Bluetooth, etc.). Other electronic device/computer network architectures are suitable.

The internal structure of devices 106, 108 or server 100 includes one or more data processors (not shown in detail) that are well known in the art to include a system bus for data transfer among the other internal components of a computer system (e.g., processor, disk storage, memory, input/output ports, network ports, etc.). Attached to the bus are other input/output devices (e.g., keyboard, mouse, displays, printers, speakers, network interfaces, etc.). Network interfaces allow the computer to connect to various other devices attached to a network. Memory provides volatile storage for computer software instructions and data used to implement an embodiment of the present invention (e.g., applications programs and the like). Disk storage can provide non-volatile storage for computer software instructions and data used to implement an embodiment of the present invention.

In one embodiment, the invention may include a computer program product including a computer readable medium (e.g., a removable storage medium such as one or more DVD-ROM's, CD-ROM's, diskettes, tapes, etc.) that provides at least a portion of the software instructions for the invention system. Computer program product can be installed by any suitable software installation procedure, as is well known in the art. In another embodiment, at least a portion of the software instructions may also be downloaded over a cable, communication and/or wireless connection. In other embodiments, the invention programs are a computer program propagated signal

product 107 embodied on a propagated signal on a propagation medium (e.g., a radio wave, an infrared wave, a laser wave, a sound wave, or an electrical wave propagated over a global network such as the Internet, or other network(s)). Such carrier medium or signals provide at least a portion of the software instructions for the present invention.

More particularly, a given device 106, 108 uses a short range wireless link 107 such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link to detect the presence of other devices such as device 108, and uses the wide area wireless network connections 103, 104 such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100, and to perform the actual substantive communications between the wireless devices 106 and 108. Device 108 typically uses the short range wireless link 107 and wide area wireless link 103 in a similar manner to locate and initiate communicate with device 106. One distinction relative to prior art is that the short range wireless 107 is only used for the detection process, or to advertise a device's presence. In this embodiment, specific information called "wireless identifier" or simply "identify" (described in more detail below) is passed between devices 106 and 108 over the short range link 107. By transmitting a wireless identifier using the short range Wi-Fi, Bluetooth or other short range wireless link 107 and receiving wireless identifiers from other devices, this short range wireless link 107 will allow for a proximity detection process.

The support for IP based networking is standard for WWAN or 3G connections such as 1xEV-DO or HSPA, and as a result, communication between one device to another using the WWAN is currently supported in many devices with no modification. The use of simple detection of one or more identifiers requires significantly less resources in a phone than performing a complete peer to peer based communication network protocol, which accommodates dynamic configuration of nodes being added and dropped continuously. It is noted that the IP address on the WWAN interface is not location dependent in the present embodiment, but is addressing approaches are location dependent when true Peer to Peer topologies are used. The present embodiment has the

advantage that communication between two devices may continue after the devices have left proximity of each other, but in the same manner as they had been communicating previously. As a result, a user who detects a short range transmission of an identifier, then begins a conversation or some other interaction with that device via the wireless wide area network may continue that conversation even in the case where the two devices move out of the proximity of the each other, and are no longer within the reception range of the short range wireless communication protocol. Further, since it is contemplated that the wireless identifiers transmitted on the short range wireless link from the devices would occasionally change, for security reasons, the present embodiment has the advantage that ongoing communications between mobile devices will not be interrupted despite a change in one of the device's identifier. In the case where the identifier is a MAC address of the short range wireless network adapter for one of the devices, it is not otherwise possible to change this address and easily maintain on going communications in a true peer to peer topology.

Referring to Figure 2, central server 100 is connected to the cellular network 101, and is able to communicate information to and from wireless device 202 using a wide area wireless link such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like within structure 205. Device 204 does not have a wide area wireless or cellular link, but transmits identifying information using short range wireless link 203. Device 202 is capable of receiving the indentifying information and requesting information related to that device from server 100.

An example of an application using this infrastructure follows. The device 204 will simply broadcast an identifier, with no WWAN connection but may facilitate advertising or local information. For instance, an account associated with one or more identifiers may belong to a museum. As a museum patron walks to an exhibit, the patron's device 202 will receive an identifier sent from museum broadcast device 204 operated by the museum. The patron device 202 passes the identifier or museum device 204 to the central server 100, which in-turn recognizes it as being associated with that exhibit within that museum and passes relevant information back to the user's

device 202. A distinguishing feature of this approach relative to prior art is that the patron device 202 in this example may move out of proximity of broadcast device 204, yet continue to view the content being provided by the server 100 related to the detected broadcast device 204. Content may include text, pictures, web pages, application software such as games, informative display applications, or other content such as audio or video to be offered to the user's device as well. Other examples might include electronic coupons (such as in a grocery store), menus or special offers in a restaurant.

Figure 3 is a block diagram with further detail of this operation. A device 106, 108, or 202 after performing a search (Fig 3, step 301) for identifiers on the WPAN or WLAN, will subsequently use the WWAN link to communicate with the central server 100. If the device does not find identifiers 302 it will either continue to search, or search at a later time 301. If identifiers are found in 302, the device may employ an action function 303, which would act as a filter that determines which of the detected identifiers should be passed to the server. This function may instead be omitted and all identifiers passed to the server 100. The idealized effect of the action function would be to reduce the number of requests to the server by not re-requesting recently requested identifiers which have already been passed to the server, for some period of time. In step 304, if no identifiers require server information, searching is continued in step 301.

Assuming there are identifiers which are new to the device, the device will pass along a list of currently detected identifiers and request 305 that the server return information related to any other local device. The server will return the information related to any identifier that meets certain policy requirements. For instance, information is returned which is 1) relevant to that device, and 2) that the device is authorized to receive.

As an example of the overall process, a detected identifier may be relevant to the receiving device if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this

determination. In the preferred embodiment, the server would determine the identity and the relevance of the detected identifiers, and the action function 303 would work to reduce frequency of re-requests to the server. Figure 7 describes an example of how to use this for messaging associated with the device and server interaction during the detection and identifier inquiry process, with a more detailed explanation to follow.

To enable server 100 to associate an identifier with an entity, each device or entity (such as the museum) associated with an identifier has an account on server 100 or a related server as is common in information technology. The account is associated with the entity and the device and the current identifier.

As used herein, an "entity" may be a legal entity, such as an individual person or a business.

An "object" is intended to include a physical thing, such as a product that is being offered for sale, and may include a tangible article or intangible such as an electronic music or video file or photograph.

There is various information associated with each account. An example data record for an account is shown in Figure 11. When the account is associated with an individual or (other entity), there may be personal information such as the individual's name, contact information, information regarding allowed communication, such as chat or IM, links to their other social networking services, and the like. When the account is associated with a broadcast device 204 the account may contain content to be displayed to the detecting device 202. By utilizing the central server 100, broadcast devices may be tied to a location or product thereby providing relevant information about the location such as in the museum tour example previously discussed. In this situation, the content delivered to device 202 may be informative information about an exhibit including pictures, text, audio, or video and the like. In the case of a broadcast device being in a supermarket and near a specific product, advertisement or discounts with electronic coupons my be stored in the account and provided to device 202.

There can also be policy based permissions associated with each account and applied to any information associated with that account. The stored policy permissions can be used to determine what information and under which situations information may be disclosed to another device or user associated with another account. For example, the entity (person in this case) associated with device 202 may have set a policy in their account to not receive any unsolicited information from a broadcast device so as to not be disturbed. However, the person associated with 202 may see the broadcast device and a sign stating a discount is available, and provide input to their device to request any broadcast information on a one time exception basis. The messaging associated with an example mobile and broadcast device process will be described in more detail to follow associated with Figure 9.

As already mentioned above, in step 301 of Figure 3, each device performs a search function looking for identifiers sent from other devices utilizing a short range wireless capability. The following describes the process of devices detecting identifiers from other devices in more detail.

The identifiers themselves may be a hardware address such as the MAC address of the wireless device, or they may be another label such as the SSID for a IEEE802.11 device, or the device name for a Bluetooth device. Referring to Figure 4, in the case where a Bluetooth wireless personal area network device is utilized, a first device 401 transmits an inquiry (ID_Packet) message 404, and any proximal Bluetooth devices 402, 403 respond with messages identifying the MAC address, called BD_ADDR in IEEE802.15.1 of each device using a message referred to as an "Inquiry Response" FHS message 405 containing the BD_ADDR or Bluetooth device address of the detected device. In the Bluetooth standard all devices 402, 403 are required to respond in this manner assuming they are enabled to be discoverable. To enable this, an application on the mobile device ensures the Bluetooth device is set to discoverable mode. Device 1 (401) will attempt to locate Devices on different channels by scanning the channels and transmitting multiple Inquiry (ID_Packet) messages. Such an example is shown with inquiry exchange 406 and 407 to discover Device N (403).

In one embodiment the BD_ADDR or MAC address of the Bluetooth device can be used as the Identifier and no further Bluetooth interaction is required until the next scan process is performed.

In another embodiment, the Bluetooth "Device Name" is used as the identifier. Figure 5 shows the process of a first device "Device 1" (501) determining another Bluetooth enabled device's (502) Bluetooth Device Name. Following the device discovery process completion from Figure 4, Device 1 501 sends a Page message 503 to another device (Device L 502). Message 504 is sent in response to create a temporary Asynchronous Connectionless Link (ACL) to be established between Device 1 501 and Device L 502, without an explicit connection request. Not having an explicit connection request indications the Entity associated with Device L would not have to provide explicit approval for a connection from their user input on the device, as would be the case if other services were requested from the device such as might be the case with a wireless headset or remotely connected GPS receiver to a phone. An ACL connection allows link management packets to be exchanged, and following interchanges of messages 505 and 506 to determine features of the devices, a temporary connection is established between the two devices. A name request message (507) is then sent by Device 1 to Device L, and Device L responds with at least one LMS_name_res message 508 containing the Bluetooth device name of Device L 502. If the name is longer than that allowed within the LMS_name_res message, additional messages follow to allow for the entire name to be delivered. Finally the connection is ended with message 509, LMP_detach.

The transmitted identifiers associated with any given device are only known to the central server and the device transmitting the identifiers. These identifiers may change from time to time, making a user's or a device's identity anonymous over time. The central server and any particular device must be coordinated such that the identifier and any device transmitting it, remains identifiable by the central server. This process is coordinated between the wireless device, and the central server utilizing the WWAN or cellular data link, carrying messaging between them and using an identifier manager

1303 to maintain a list of device identifiers 1302 in a central but secure location. This is shown in more detail in Figure 13.

Referring to Figure 6, an example of using on IEEE802.11 link as the short range wireless capability is discussed. Generally, Wi-Fi devices operation in a so-called infrastructure mode which utilizes a BSS or basic service set. One component of a infrastructure network based wireless LAN is the use of a central access point or AP. In a mobile network the use of a central AP is not practical, as only the AP transmits an identifier, which does not meet the requirements of the preferred embodiment. The second topology for Wi-Fi networks is the so-called Ad-Hoc mode of operations, referred to as an independent basic service set or IBSS. In an IBSS all devices participating or advertising their interest in participating in an ad-hoc network transmit identifiers called beacons. These beacons contain the MAC address of the transmitting network adapter, the basic service set identifier (BSSID), and ad-hoc network name or service set identity (SSID). The BSSID in a typical ad-hoc network is generated by the first station to enter the BSSID and is locally administered, typically a randomly generated 48 bit number matching the format of a MAC address. In an ad-hoc network, each device 601, 602, 603 participating or desiring to participate transmits a beacon. There are several embodiments related using the IBSS beacons and the identifiers. First the identifier may be used as the MAC address of the station device or network adapter, and one or both the BSSID and the SSID may be used to indicate these particular beacons are associated with a service. In other embodiments, one or more of the BSSID and the SSID may be used as the identifier. In any of the embodiments for delivery of the identifier in an IBSS beacon, it is possible to coordinate the change of those identifiers with the server 100. As the MAC address is always broadcast in any operation of a Bluetooth or Wi-FI link, the use of a MAC address as an identifier provides for an additional level of security for the device 601, 602, 603, when identifier is changed from time to time as devices may be detected and identities tracked using a constant MAC address. In the preferred embodiment, where the MAC address is used for the identifier, all the devices participating would likely have the same network name

and SSID to aid in the identification of the device as being enabled, although not necessarily required. Examples using an 802.11 network in ad-hoc mode transmitting beacons are showed as messages 604, 605, and 606.

Chat Example between two mobile devices

Figure 7 shows an example of a message flow diagram for an embodiment where an individual is in a library for example, and a friend arrives. The individual is notified by their device receiving an identifier that their friend is present and they enter a chat session. Each person has a device (Figure 1, 106 and 108 respectively) that implements the preferred embodiments described above. The first individual associated with Device 1 (702) referred to as Entity 1 (EI1) performs a detection process as described in Figure 4, 5, and 6 previously (step 704) . The device identifier associated with Device 2 (703), DI2 is thereby detected. Device 1 (702) then transmits an inquiry message 705 using the WWAN (cellular data link such as GPRS, EDGE, 1xEV-DO, IS-2000, Wi-Max, LTE, or the like) to the server 701 inquiring if information related to the account and entity associated with DI2 is relevant, and available to the entity EI1 associated with Device 1 (702). The server 701 retrieves the account information related to EI1 and determines that EI2 is listed in a friends list in the account associated with EI1 and that EI1 should be notified when EI2 is detected. Next the server retrieves the account information associated with EI2 and determines that EI1 is on a list of entities which are allowed to be notified of EI2 being present and personal information such a the name of the individual, their phone number and the like. The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details. A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707. The user of Device 1 provides input to the device directing it to request a chat session with the entity associated with Device 2 (703), and a message 708 is sent the server 701 commanding "send 'Hello' to EI2". The server acknowledges reception of the message with a "ACK" message 709, in return. Next

server 701 sends "Request Chat: 'Hello' from EI1" to Device 2 703. The user of Device 2 accepts the chat and returns a message "I'm by the front door" with message 711, sending it to the server to be relayed to device 1 (702).

E-commerce between two mobile devices

Figures 8A and 8B show a message flow diagram for an embodiment where two individuals are performing a financial transaction on the street (for example, a customer and a street vendor). Each has a device (Figure 1, 106 and 108 respectively) enabled with the preferred embodiments described above. In this example, an individual's device would see a vendor and the vendor's device (enabled with the current invention) would notify them that the vendor was also enabled with a device supporting the identifier search and other protocols described above, as well as being capable of electronic payments. These steps are performed in the following way. In step 804 the customer's device 802 (Device 1) performs an identifier search process as previously described, and detects a device identifier 2 (DI2) sent from Device 2 (803) belonging to the merchant. Device 1 will send a message to the server 801 (also represented by 100 in Figure 1) using the WWAN (cellular data link such as GPRS, EDGE, 1xEV-DO, IS-2000, Wi-Max, LTE, or the like) 104 requesting information related to DI2 and its relevance to the entity related to device 1 802. The server 801 then determines the relevance of DI2 based on the account properties stored in the account associated with the consumer Device 1. In this case, the account settings only allow messages from or notifications of entities on a friends list stored in the account record (represented in Figure 10) associated with the consumer. Server 801 responds to device 802 with "no" indicating that DI2 is not relevant to the Consumer.

The customer, having an account enabled with electronic payments, and wanting an item the vendor has, would press a button or make other input to his phone (or other device) which would indicate they would like to make a purchase and pay using their device (808). In this case the input selection would be "search for merchants." The customer's device would then send a message (809) to the central

server directing the server to perform a one time search for merchants, despite the current account settings. In one embodiment, the server would then direct the consumer's device 802 to initiate another search (809). Other embodiments may not include the server commanding Device 1 (802) to perform the search, but rather the search may be performed automatically, or use results from a recent search. In Step 811, Device 1 (802) performs another search and detects the identifier from Device 2 (803), DI2. Device 1 then sends a message 812 to the server again requesting information for all relevant devices detected, which will include at least DI2. In Step 813 the server, having received the request and list including DI2, looks up account information associated with DI2 and determines that the associated entity is a merchant. As the settings of the account associated Device 1 now allow for the notification of the user when a merchant is detected in proximity, DI2 is determined to be relevant to Device 1 and the Entity 1 (EI1) should be notified. The server then sends a message 814 to Device 1 (802) stating merchant services are available in proximity with a list of available merchant's information including information related to the entity (EI2). The user of device 1, Entity 1 (EI1) then provides input in step 815, (pressing a soft key on a touch screen for instance), selecting the specific merchant EI2 to engage with in a transaction. Device 1 (802) will then send a message (816) to the server requesting a transaction with EI2 associated with Device 2 (803). The server (801) will then respond in this embodiment with a message 817 to Device 1 confirming receipt of the requested transaction and providing information to allow the EI1 associated with Device 1 to independently confirm the identity of EI2 associated with Device 2 (803). In this embodiment the identifying information can include the name of the merchant, the merchant's logo, a picture of the vendor, or their mobile shopping cart. In other embodiments, the picture may be of a specific unattended vending machine in the location it is currently operating. It may also include other information such as the address of the merchant in cases where a fixed store location is provided. As this particular merchant in this example is a street vendor, an address may not be used. GPS information stored in the account associated with Device 2 may be used as further confirmation in some instances. However, in this example, GPS coordinates are not be

available on Device 2 due to lack of capability, or Device 2 being indoors and without sufficient signal to determine a location. Further GPS information from Device 1 (802) may be used to provide further confirmation information. In this embodiment the photograph sent in message 817 shows a picture of the particular merchant and also his city issued business license in text and as a picture of where it is displayed on the cart. The consumer entity EI1 provides input to Device 1 in step 818 confirming the identity of EI2, the merchant entity associated with Device 2 (803). Device 1 then sends a message 819 to the server 801 confirming the identity of the merchant.

Server 801 then sends a message 820 to the merchant's device 803 notifying them of the request for a transaction with EI1. Device 2 (803) then indicates to the merchant that a customer with the capability and desire to pay electronically is in proximity. In step 821 the customer associated with Device 1 (802) places an order with the merchant associated with Device 2 (803) and a list of products to be purchased is generated and the merchant provides input to Device 2 (803) to proceed with a electronic transaction. In step 822 Device 2 performs a scan of identifiers and DI1 associated with device 1 (802) and the Consumer is detected. A request is sent to the server 801 with a list of identifiers which were detected to determine if any of them are relevant to the merchant. Note that while the merchant device 803, (and the merchant) have now been notified of the desire for EI1 to enter a transaction, they do not necessarily know the identifier for EI1 yet. In other embodiments, the identifier associated with EI1 and Device 1 (802) may be sent in message 819, and a confirmation that this identifier is detected during the scan process 821 may be performed at the device. In the preferred embodiment, further security may be provided by the having the server perform this function independently. The server performs this confirmation in step 824 may matching the device 1 identifier DI1 with the information stored in the account associated with Entity 1 (EI1) also referred to as the Consumer.

The server than generates a message 825 to Device 2 (803) indicating that EI1 is relevant, and the transaction participant is present. The message in the preferred embodiment can also include a picture of the Consumer. Additionally, the message

could also include other pictures of other individuals allowed to use this device for purchases. If more than one identifier was detected in step 822 and matched in step 824 to entities having requested transactions previously which are pending for that merchant, a list of information for each entity involved with a pending transaction request can be provided in message 825. The merchant then selects the correct consumer using the picture of that consumer, confirming the identity of the part to the transaction in step 826. The consumer information provided in message 825 in another embodiment may simply be the name of the customer and the merchant may either ask their name, or request identification such as a driver's license. In the preferred embodiment, where a picture is passed in message 825, it is not necessary that the individual's name be passed to the merchant for the merchant to be able to provide confirmation of the identity of the Consumer thus providing a level of anonymity to the transaction such as may be present when cash is used.

Following the confirmation by the merchant of the identity of the Consumer participating in the current transaction in step 826, Device 2 sends a message 827 to the server confirming the identity of the Consumer as Entity 1 (E1), and with information required for the transaction including the list of products to be purchased, their prices, the total price, and a request to charge E1 this total amount. Server 801 then confirms receipt of this message in step 828. The server then sends a message 829 to Device 1 requesting the Consumer to confirm the list of goods to be purchased and the total price to be paid. In step 830, the Consumer (Entity 1) reviews the list and amount to be paid and provides input to device 1 confirming the accuracy of the information and they the authorizing the server to pay. In step 832 the server charges E1 utilizing stored preferred charge card information, stored credit, or other payment methiod such as a PalPal™ user name (PayPal is a trademark of Ebay, Inc.) and password stored in the account associated with E1, and charges the consumer. In the case where a stored credit is used, the Consumer's account can be debited, and the credits not applied to the merchants account until a later step. In the case of a credit card, or PalPal™ transaction, the server provides payment to E2 (the merchant) utilizing information

stored in the account associated with Device 2. The server then indicates payment is made to the merchant, and instructing the merchant to deliver the goods with message 833. E2 (the Merchant) then provides the goods and provides input to Device 2 that the goods have been delivered in step 834. Message 835 is generated by Device 2 (803) to the server confirming product delivery, and acknowledging the receipt of the payment confirmation message 833. The server can then send message 836 requesting the Consumer to confirm they received the goods. If a confirmation is not received in response to this request, this information may later be used to settle any dispute that might arise. In step 837 the consumer confirms receipt of the products, and message 838 is generated to the server confirming the receipt of goods by the consumer. In Step 839 the server concludes the transaction by completing any steps required to credit the Merchant with the payment amount from the Consumer, if required. The server then sends a message 840 to the Merchant indication the transaction is complete, which is acknowledges in message 841. The Consumer is notified of the completed transaction with message 842, which is acknowledged with message 843.

Finally, the transaction details may be stored by the server, or sent to a thirdly party server for tracking spending habits of that account holder, or customers of that merchant allowing the merchant to track that specific customer's behavior and cater to them in the future with various specials delivered via email, or during their next visit via their device in the form of an electronic coupon. This process can be performed with a goal to help the merchant expose the customer to other products or services the merchant believes the customer might find desirable.

The present invention can be extended to facilitate other types of transactions as well. In one specific application, consider use of the invention to facilitate a transaction such as the rental of an automobile. A well known business called ZipCar ^{TM}, presently operating in several major urban areas in the United States, makes available a fleet of vehicles for shared use by their club members who pay a monthly fee plus a per use charge. Using the present invention, the club member would have a wireless device that serves as the "Consumer device" (Device 1) and the ZipCar vehicle would be

equipped with a wireless device serving as the "Merchant" device (Device 2). The consumer would walk up to an available ZipCar vehicle and, using their wireless device, start an initial exchange of identifiers with the desired Merchant device, for example, using the short range local wireless network. The Consumer device and/or Merchant device would send a message to an application running on the Server requesting that a person associated with an account for the Consumer be granted access to a specific vehicle (e.g., an "object") that is in the vicinity of and associated with the Merchant device. A set of confirmatory messages (such as to exchange access codes, to confirm the location of the vehicle, the per-use fee due, and payment for the same, etc.), are then typically also exchanged between the Consumer and the Merchant device with the assistance of the Server and the long range wireless network. Upon confirmation of the necessary transaction information, the Server sends a message to the Merchant device to unlock the vehicle requested (which may be sent over the second long range wireless network or a yet another network, such as a satellite network).

Example of a Mobile Device and a Broadcast Device.

Figure 9 shows a message flow diagram for an embodiment where an individual is in the presence of a broadcast device, such as for the museum example of Figure 2. As with Figure 2, the individual device 202 and the broadcast device 204 are present and enabled. In this example, an individual 902 is in a grocery store and their device 902 (Device 1) performs a scan for identifiers in step 904, as described previously. DI2 is detected having been transmitted from device 2 (903). Device 1 (902) sends a message to server 901 inquiring if DI2 is relevant to the entity associated with Device 1 and if the information associated with that device identifier (DI2) is available to be returned. In step 906, the server retrieves the accounts associated with both DI2 and Device 1 (EI1). The server detects that the entity associated with DI2 is an advertisement company, and that this device is a broadcast device only, and that there is an electronic coupon available for download to Device 1, and multimedia content available to be played if desired. Additionally, the account settings associated with EI1 allow for the notification of broadcast devices in proximity.

Server 901 then transmits a Response message 907 indicated the presence of the detected device and the content available. The device 902 requests input from the entity associated with the device 901 for permission to download the coupon, and the availability to play content such as video about how to prepare a recipe using the vendors product. In this case the individual associated with Device 1 accepts the content, and a message 909 is sent to the server accepting the content. Response message 910 begins the delivery of the content.

As previously mentioned, several key distinctions of this embodiment include that the user of device 902 may walk away out of range form the broadcast device 903 and continue to receive the content using their cellular link, or may choose to play the content at a later time having stored the detected like in a favorites list. Additionally, the content stored in the account associated with the broadcast device 2 (903) is relevant to the placement of the device and the products near it. Further, as the content is stored in the server 901 rather than in the broadcast device 903, the content may be updated, modified, or deleted at anytime. For example the server 901 knowing that the consumer has never been detected previously, may customize the electronic coupon to provide a deeper discount than a regularly detected consumer. In the case where the devices are used for electronic commerce as in Figure 8, knowledge of the user's past purchases may be used to induce the consumer to try a new product. Alternatively if the consumer is a regular purchaser a loyalty program may provide a coupon upon a particular number of repeated purchases.

Figure 10 is a processing flow chart performed by the server receiving a request from a device inquiring about the relevant and availability of information associated with detected device identifiers. In step 1001 the server is waiting for a request from a device. When a request is received in decision 1002, step 1003 is performed. In this step the account information associated with the requesting device is retrieved. In step 1004 the information associated with the accounts for each of the detected device identifiers is retrieved. In step 1005 the server performs a matching process between the policies of the requesting account and each of the policies for each account

associated with each detected device identifier. In step 1006 the information related to the matched policies for the associated entities will be sent to the requesting mobile device.

Just as in the previous example of an identifier being deemed relevant to a user based on a friends list, permission for disclosing a device's presence may require being on a friends list as well. For example, when a server receives an inquiry from a device with a list of identifiers, it may only respond with information for users associated with the identifiers that are on that device's friends list, and on each of the individual's friend lists as well. These friends' lists and policies can be stored within a user account which allows for disclosure of a user's presence only to individuals on this list, such as described in Figure 11 (to be described below.)

It is contemplated that the permissions not be an "all or nothing" decision, but that different classes of information may be assigned different permissions and mechanisms. An example of this might be a user's presence, identity, and cart services being made available to only one set of other accounts (or users), while the presence of an anonymous individual being made available to anyone, but with other classes services available such as multi-player games being treated differently. Additionally multiple contacts may be included in the account, each given customized permissions. An example can be that any user may be notified of an anonymous user or other information based on additional policies.

As only the server contains personal information, and performs the association of an account with a particular identifier, it can inherently enforce the security of the policies as a distinct advantage relative to true peer to peer services. In this way, the central server controls the process of passing information related to an account to a particular requesting device.

Figure 11 shows an example account record to be associated with an entity and at least one device. The columns of the account record can consist of a Record Index

which will be used to described the account, a Field which is a descriptive name for the contents stored in the record, and a Field Information Group Disclosure Policy Assignment List (PAL). The PAL provides rules for the disclosure of the information in the associated row in the Field column. The following list are possible PAL entries:

ALL:	may be disclosed to any requesting entity
EXPLICIT APPROVAL:	the Entity associated with the account must provide input approving the disclosure of the information
NONE:	Do not disclose this information to any other entity
M:	where M is a integer from 1 to N indicating a Information Group Disclosure Policy which may consist of a list of contacts, friends, groups, characteristics, and the like.

Most of the fields in Figure 11 are self explanatory and typical in the industry such as the account number, however a few fields are worth a clarifying discussion. The Device identifier is in record index 2, with a Identifier type in record 4. The identifier type can define what type of identifier the device associated with this account would use. Record index 10 is the Entity Type Field. This describes is the entity is a Merchant, Individual, or if the device associated with this account is a broadcast only device.

Referring now to Figure 12 a timing map reference for scanning times and dormant times for devices is shown. In one embodiment, it is desired that the power consumption and scan timing for the devices in a cellular network be reduced. Since the server and the WWAN is involved with all mobile devices, coordination of the broadcasting periods and the searching periods for the short range radios is possible. This can be based on a common reference time such as that provided by most cellular systems, any the time of day clocks inherently within mobile devices. This allows for

reduced power consumption and other resource consumption in the devices. If no coordination is achieved, then the short range receivers in each device must be scanning for transmitted identifiers much more often and for longer durations. Utilizing a common timing base, and the central server to notify the devices of a coordination approach for "active times" and "non-active times" and will allow for the devices to minimize the power consumption in the transmission of and scanning for identifiers. This approach also allows for synchronizing the update of each device's identifier (as described previously) to enhance anonymity and security, coordinated with the central server. The "non-active times" may be used as "boundaries" over which the changing identifiers may be updated. This update may be based on either direct communication with the server, or rule and algorithm based updates previously coordinated with the central server so as to minimize server messaging, but allowing the updates to remain synchronized to the server such that the device and the server are always associating the same identifier between them.

As will be recognized by an individual skilled in the area of information technology, the concept of a central server may well be implemented as a collection of servers to allow for load balancing, redundancy, and the like in a manor common to the information technology industry.

Figure 13 shows a diagram of functional blocks associated with the management of dynamically assigned device identifiers. The Server 1301 has an application agent called an Identifier Manager (1303) which has access to a pool of device identifiers (1302). The Identifier Manager monitors timing information and determines when it is time to update a particular device's identifier. This time may be a regular interval, or a random generated time period by an algorithm such as a pseudo-random sequence generator, or a combination of both. When it is time to update a device identifier, Manager 1303 retrieves a new identifier form the pool 1302. The pool of identifiers may be a list or range of identifiers, or generated algorithmically. The new identifier is stored in the account associated with the entity determined to require updating and a message sent to the device 1305 associated with that account commanding it to update

its device identifier with the new one. This messge is sent over the WWAN Data network 1304 such as IS-2000, HSPA, GPRS, IS-95, Edge, Wi-Max, and the like. All devices 1305 to 1307 will eventually all be updated in a similar manner. This update process does not disrupt ongoing communication and interaction between devices despite the update as the communications are preformed based on the identity of the entities following the detection of the device identifiers which are no longer utilized. This unique capability allows for the updating process to be implemented and not impact the applications being utilized concurrently.

Other example applications utilizing still other embodiments follow below.

Requiring the brokering of the communication via a central server can also allow a mobile device to receive information associated with a "broadcast only" device, such as in the museum example discussed previously. This is important, as such broadcast devices can enable a vast set of new applications built upon the infrastructure developed in this application, beyond the museum application. Some of these applications may involve an electronic commerce aspect, for example.

Electronic Commerce Applications

Ecommerce between a fixed broadcast device and a mobile device

Football stadium example

An embodiment of a transaction model, enabled by the infrastructure described above can be an event such as a concert, or sporting event (particularly when it is an indoor venue where no GPS is available). A number of the broadcast only devices are placed through out the seating areas. The devices are very short range, and only transmit intermittently and as a result may be battery powered and to remain active over a very long time period. Each device can be placed in a known location, in a predicable manner.

An attendee at the event has his or her device enabled with the identifier protocol and other embodiments described above. The device detects a broadcast device, and interacts over the internet with the server via the WWAN connection (as already described above). The server receives an indication of the broadcast device's identifier and the identifier of the account associated with the device which detected the broadcast device. The server retrieves content associated with the service provider's account and provide that content to the application on the requesting mobile device. The content may indicate that the venue has a product delivery service. The user may then press an indication on their device that they would like to see a menu or list of items for sale from the merchant(s) in the venue. The application on the user's device would then allow them to see a menu, for instance, and select items to purchase. The user then would be asked to confirm the purchase. The server would then indicate to the merchant that a user located near a specific broadcast device has ordered something. In this case, it is expected that a delivery fee could also be charged for the enhanced service. The server would facilitate the purchasing of the goods or services from the merchant and payment from customer's account, and provide confirmation to each. Such confirmation can include an electronic receipt provided to the customer, for user upon arrival of the delivery person of the good or service. The customer can then select an indication on their device confirming receipt of the good or service via the mobile device, thereby completing the transfer of funds and the transition. Optionally, the delivery person of the good or service may have an enabled mobile device as well. In this case the identifiers may be detected by the customer's device and reported to the server to confirm that the provider's delivery person was present. Further, the delivery person's device can be able to detect the broadcast device's identifier and reported to the server confirming the delivery person was in the correct area independently. Even further proximity confirmation may be achieved by the customer's device's transmitted identifier being detected by the delivery person's device and reported to the central server further confirming the physical proximity of the parties involved in the transaction. Upon arrival of the delivery person, the customer may be notified that the delivery person is looking for them, and has arrived. These cross confirmations can

allow for the central server evidence to justify payments both in completed transactions and in disputed or failed transactions. Further, the delivery person may receive a picture of the requesting customer assisting to identify the customer to whom the food is to be delivered. Once the customer is found, the delivery person can confirm the delivery of the good or service to the customer via the user input on their mobile device, and that confirmation being reported to the central server. The customer can have the option to report confirmation or denial of the reception of the product or service as well, as in the last example.

In another embodiment, the merchant device may be fixed, but have an internet connection (wireless or otherwise). Further, in some embodiments, the merchant may be an automated device such as a vending machine. In such a model, a customer may use their enabled cell phone to purchase an item such as a beverage from the machine without the need to insert currency into the machine. This can be accomplished by the customer's cell phone detecting the vending machine transmission of the identifier or visa-versa. Following the detection of either the customer's identifier by the vending machine, or the customer detecting the vending machine identifier, the respective device notifies the server, which in turn provides notification (assuming the account settings allow for notification) to the potential customer via their device. Assuming the customer selects to purchase an item from the vending machine using their account associated with their device, the customer may be presented a menu as in the example above. The customer may further be presented information to ensure the identity of the vending machine, such as a description of the machine, a machine identification number, or a (most likely) a picture of the machine where it is located. The customer can then confirm this is the machine they are interfacing with, and select to pay via their account. The customer may in one model select the item to dispense by input to their phone, or they may simply select to provide payment to the machine allowing them to make the selection manually as is the typical mode of operation today. The vending machine can then interact with the server via its own internet connection, and

participate in the transaction in a manner similar to the mode described above allowing for step by step confirmation as previously described.

Electronic opinion polling, tied to a known location.

In a much simpler example, such a capability might be used to tie a survey to a known location in such a way as to provide an e-coupon to the survey taker on their device in return for completion of the survey. Alternatively, this type of interaction can enable a very large crowd to interact with a Jumbo-Tron like display to provide input to polls or to participate in group activities. Users at different locations in a audience may form teams and interact with other teams for group activities.

Feature Summary of Preferred Embodiments

1. In a first embodiment:

One device is transmitting a wireless identifier using a wireless protocol capable of peer to peer communication;

The wireless identifier being associated with a specific account on a server connected to the internet;

A second device receiving the wireless identifier

The second device capable of communicating with the server over an internet connection;

The second device requesting information from the service associated with the first identifier

- The second device having a second identifier associated with a second account on the server; and/or

- The server providing different amounts of information related to the first account based on the parameters associated with one or both of the first and second accounts

The identifiers associated with the accounts being updated such that the identifiers would no longer be recognized as being associated with specific accounts without past or current interaction with the server ;

Using one or more of Cellular network timing information, and information form the central server to coordinate the broadcast and search times amongst the devices. (to reduce power and resource consumption); and/or

Data necessary to engage in an E-commerce transaction may be exchanged as well such as the identity verification such as via a picture and/or mutual identifier detection.

2. In a second embodiment,

A device is capable of operating two wireless protocols simultaneously, utilizing a first wireless protocol in the device to detect the proximity of another wireless device and using the second wireless protocol to communicate with a remote server, where:

a. One or more of the devices are mobile devices;
b. Where the first wireless protocol is a local, or personal area network wireless protocol such as 802.11, Bluetooth, UWB or other local connectivity protocol;
c. Where the first wireless capability used for detecting the presence of another device, or advertising the presence or a device;
d. Utilizing a wireless wide area data link from one or more of the wireless devices to, optionally:
    i. Connect to a central server;

ii. Perform user authorization functions;

iii. Perform download of information associated with account identifiers utilizing the short range wireless capability;

iv. Request forwarding of messages / packets to the other active account;

e. Utilizing the messaging with a mobile proximity based social networking capability; and optionally,

i. The messaging being performed via the WWAN; and/or

f. The server providing a centrally assigned user identity, with relationship brokering or identification capability.

3. In another embodiment,

A central serving capability is provided to mobile devices utilizing a wireless WAN connection to provide and exchange information between one or more application on one or more wireless devices and the central server where

- the information passed to the central server is collected by one wireless device from another wireless device via a separate local wireless reception from the other wireless device;
- the separate local wireless reception from the second wireless device contains information directly assigned by, derived from, or known to the central server associated with the identity of the second wireless device;
- this identity is related to certain information and preferences of an account holder associated with an application operating on the second wireless device;
- the application is operating on both wireless devices;

- the application operating on the first device also provides its own identifying information to the central server as well as detected identifiers from devices with applications on them;
- The central server contains account information registered to the applications running on each wireless device;
- The preferences associated with the account information also contain policies related to the disclosure of one account's stored information to other accounts and hence to their application on their devices;
- These policies including a classification of other accounts each classification having different policies some of these policies being one of:
  - no not allow notification of my presence
  - allow notification of my presence
  - disclose my name/ do not disclose my name
  - disclose age / do not disclose age
  - disclose personal details;
- Where an application running on each device can optionally perform point of sale transitions coordinated via the central server, over the WWAN, utilizing user input on each device as confirmation of successive steps in the transition;
- Further, where at least one of the confirmation steps additionally involves displaying an identifying picture related to one of the devices, on the other device;
- Additionally the server performing an authorization for the transition to a third party;
- Or, optionally, a device is interacting with a point of sale device to associate an itemized list of items with a detected second device;
- The service performing a confirmation with the application on the second device requiring user input that the bill of goods list is correct; and/or

- The server storing the information related to the second devices detected account identity and inventory in a database for later use

4. In still other embodiments, a device in the present invention has a wireless capability with no WWAN capability, but only with the ability to broadcast a unique identifier, and

- A central server stores having the broadcast device's details;
- And when the first device provides these detail to the server, authorized and current information about the broadcast device are provided to the first wireless device;
- Where this information optionally includes advertising information or information related to "e-coupons" for special offers for products or services; and/or
  - Where the content of the e-coupons might be customized based on the identity of the requesting device or account holder;
    - Where the content is further customized based on other information known by the server related to the user's account ; or
    - Where the other information is related to the user's past purchasing practices or previous requests; and/or
- A mobile device, upon detecting a broadcast device and if enabled to do so, will report that broadcast Id to the server over a WWAN, and retrieve the current content from the server associated with that device and:
  - Display it to the user on their device; or
  - Execute instructions associated with the information retrieved from the server.

5. In still further embodiments, a good or service delivery model utilizing the above described broadcast device, is placed in a known location, and further

a. A mobile device is for detecting the fixed device's identifier via the WPAM/WLAN;

b. The mobile device reporting this identifier and passing an identifier associated with itself, or the account associated with the user utilizing the device;

c. The server determining that the detected broadcast device is associated with the broadcast device with a known location;

d. The server further determining that the identifier is associated with a service, and further associated with an account or that service;

e. The server retrieving content associated with the service provider's account and providing that content to the application on the requesting mobile device;

f. Where that content may be a list of items for sale, services for sale, a opinion pole, food menu, or other menu style content which allows for user selection of items, which can be implemented in java code, xml, simple text, or other for example optionally including active code elements;

g. The application on the mobile device displaying the content to the user display with the itemized list of goods, services, or other selection items;

h. A user providing selection of one or more of the items, and confirming they wish to purchase said items, and take delivery at or near the location of the fixed broadcast device;

i. The server facilitating the purchasing of the goods or services from the merchant's account and the customer's account, and providing confirmation to each. Such confirmation including an electronic receipt

provided to the customer, for user upon arrival of the deliverer of the good to or service;

j. The customer confirming receipt of the good or service via the mobile device, thereby completing the transfer of funds and the transition; and/or

k. The deliverer of the good or service optionally having a mobile device and optionally:

i. such that identifiers from that device may be detected by the customers device and reported to the server to confirm that the provider's delivery person was present;

ii. such that the broadcast devices identifier is detected by the delivery person's mobile device and reported to the server confirming the deliver person was in the correct area

iii. such that the customer's device's transmitted identifier is detected by the delivery persons device and reported to the central server further confirming the physical proximity of the parties involved in the transaction; and/or

iv. The delivery person confirming the delivery of the good or service to the customer via the user input on their mobile device, and that confirmation being reported to the central server.

6. In another embodiment, a software program is arranged to operate at the application layer on a mobile device, which interfaces to a device driver interface:

- Using wi-fi 802.11 to perform a WLAN local connection protocol; or
- Using Bluetooth to perform the WLAN local connection;
- Where the device driver interface is an NDIS driver or the like;
- Using 1xEVDO, HSDPA, GPRS, EDGE or the like for a wide area WWAN interface;

- The application then providing the reported identifiers to a server, which will make decisions regarding a users interest in these detected identifiers, and policy regard privacy other identifiers;
    - The decision process optionally based on priority of the identifier, the class an identifier belongs to, a list the identifier is, or is not included on;
- Based on the result of the action function,
- Sending at least one detected identifier to the network, potentially with additional information from the action function, and retrieving information back from the server related to that identifiers' account information stored on that server;
- The server then receiving a request from a device's application, with a detected identifier
    - The server examining both the requesting and the requested identifier's identity and making a policy decision regarding the release of the requested identifiers information related to their account;
    - The server in some cases providing a continuously or periodically changing account or device identifier to a specific application on a device to enhance the privacy of the identity of that device;
        - The changing of the identifier may be effected by a rule based generation local to the application, or may be downloaded from the server directly; and/or
        - The update of the identifier being synchronized to such that it is coordinated with predetermined scanning and broadcasting periods allowing for a known update boundary;

7. In still another embodiment, a method uses the mobile device's time of day derived from the network or other reference for

synchronizing a PAN/WLAN discovery and advertisement times to save battery life;

doing the same in a synchronized way among multiple devices;

while coordinating the timing information utilizing the WWAN and a central server available commonly to the devices, such as by

- Synchronizing identifier transmission timing to save power from WWAN network parameters obtained for the server;
- Coordinating any identifier updates to this same timing source; and/or
- Using a pool of identifiers available to the central server to assign identifiers to devices changing the identifiers at some time interval derived for the common time reference

8. In another embodiment,

A central server uses an identity manager to assign identifiers to devices using a WWAN cellular data link, and wherein

identifiers are occasionally changed

identifiers are assigned from a pool of identifiers available to the servers;

identifiers are used as 48 bit media access control (MAC) addresses of the short range wireless network adapter

identifiers are optionally used as

an SSID in a IBSS in IEEE-802.11 network beacons

a BSSID of the IEEE802.11 network adapter;

in a IEEE802.15.1 Inquiry Response Message as the BD_ADDR

a device name in a Bluetooth name response packet ; or

listed in a services list as provided in a LMP_features_req message or LMP_features_req_ext message for a Bluetooth device

While this invention has been particularly shown and described with references to example embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the scope of the invention encompassed by the appended claims.

CLAIMS

What is claimed is:

1. A method for a central server to exchange information between one or more wireless devices executing applications, the central server performing the steps of:

receiving identifier information, as collected by a first wireless device from a second wireless device via a local wireless link between the first and second wireless devices;

wherein the identifier information is associated with one or more of an identity or related information concerning an entity or object located in proximity to the second wireless device; and

storing identifier information and one of identity information or other related information of the entity or object in proximity to the second device; and

subsequent to the step of receiving the identifier from the first device, taking further action by the server to deliver information or a service to the first wireless device.

2. The method of claim 1 wherein the information or service delivered to the first wireless device is associated with the entity or object that is located in proximity to the second wireless device.

3. The method of claim 1 wherein the information delivered from the server to the first wireless device includes at least one of

advertising information;

information relating to products or services; and/or

information related to e-coupons.

4. The method of claim 3 wherein content of the e-coupons is customized based on at least one of:

an identity of the requesting first device or associated account holder;

other information accessible to the server related to the account holder; and/or

past purchasing practices or previous requests of an account holder.

5. The method of claim 1 additionally wherein

the first wireless device, upon detecting proximity of a second wireless device, further performs the steps of:

reporting an identifier of the second wireless device to the server over a second wireless link, the second wireless link being a wide area wireless link, and

retrieving current content from the server associated with that device; and optionally:

displaying content to the user on their device; or

executing instructions associated with the information retrieved from the server.

6. The method of claim 1 wherein a service is associated with the second wireless device and the server further performs the steps of:

receiving an identifier associated with the service;

determining that the detected second wireless device identifier is associated with a service, and further associated with an account for that service; and

retrieving content associated with an account for the service provider and providing that content to the application on the first mobile device.

7. The method of claim 6 wherein the content may one or more of a list of items for sale, services for sale, a opinion poll, food menu, or other content which allows for user selection of items.

8. The method of claim 7 further comprising:

receiving information indicating a user selection of one or more of the items,

confirming that a user wishes to purchase said items; and/or

initiating delivery of a good or service at or near a location proximate to the second wireless device.

9. The method of claim 1 further comprising:

facilitating the purchase of the goods or services from a merchant account associated with the second wireless device and a customer account associated with the first wireless device;

providing confirmation to each account; and/or

receiving customer confirmation of receipt of a good or service via the first wireless device, thereby completing a transaction.

10. The method of claim 9 further comprising:

detecting an identifier at a customer wireless device and reporting the same to the server, the detecting step used to confirm that a service provider's delivery person was present;

a further detecting step, carried out at a delivery persons wireless device, such that an identifier is detected by the delivery person's wireless device; and

reporting to the server, also carried out at the deliver persons wireless device, confirming the delivery person was in a correct area for delivery.

11. The method of claim 10 additionally comprising:

confirming the delivery of the good or service to the customer via user input on a wireless device; and

reporting that confirmation to the central server.

12. The method of claim 1 further comprising:

receiving confirmation at the first wireless device;

sending a message to the second wireless device to thereby provide access to an entity or object located in proximity to the second wireless device.

13. A method as in claim 1 wherein a wireless device has time synchronization information derived from a network time or other reference, and that information is used to synchronize time periods and, optionally, one or more of the steps of:

coordinating the timing information utilizing a network time and a time from the central server made available commonly to the first and second wireless devices;

transmitting of identifiers or searching for identifiers using parameters obtained for the server; or

coordinating identifier updates to this same timing source.

14. A central server to exchange information between one or more wireless devices executing applications, the central server comprising:

a receiver, for receiving identifier information, as collected by a first wireless device from a second wireless device via a local wireless link between the first and second wireless devices, wherein the identifier information is associated with one or more of an identity or related information concerning an entity or object located in proximity to the second wireless device;

a storage device, for storing identifier information and one of identity information or other related information of the entity or object in proximity to the second device; and

a transmitter, for subsequent to the step of receiving the identifier from the first device, to deliver information or a service to the first wireless device.

15. The server of claim 14 wherein the information or service delivered to the first wireless device is associated with the entity or object that is located in proximity to the second wireless device.

16. The server of claim 14 wherein the information delivered from the server to the first wireless device includes at least one of

advertising information;

information relating to products or services; and/or

information related to e-coupons.

17. The server of claim 16 wherein content of the e-coupons is customized based on at least one of:

an identity of the requesting first device or associated account holder;

other information accessible to the server related to the account holder; and/or

past purchasing practices or previous requests of an account holder.

18. The server of claim 14 additionally wherein

the first wireless device comprises a transmitter for, upon detecting proximity of a second wireless device, reporting an identifier of the second wireless device to the server over a second wireless link, the second wireless link being a wide area wireless link, and

receiving current content from the server associated with that device; and

a processor, for, optionally:

displaying content to the user on their device; or

executing instructions associated with the information retrieved from the server.

19. The server of claim 14 wherein a service is associated with the second wireless device additionally comprising:

a receiver, for receiving an identifier associated with the service; and

a processor,

for determining that the detected second wireless device identifier is associated with a service, and further associated with an account for that service; and

retrieving content associated with an account for the service provider and forwarding that content to the application on the first mobile device.

20. The server of claim 19 wherein the content may one or more of a list of items for sale, services for sale, a opinion poll, food menu, or other content which allows for user selection of items.

21. The server of claim 20 further wherein:

the receiver receives information indicating a user selection of one or more of the items,

the processor further

confirms that a user wishes to purchase said items; and/or

initiates delivery of a good or service at or near a location proximate to the second wireless device.

22. The server of claim 14 further comprising:

a processor,

for facilitating the purchase of the goods or services from a merchant account associated with the second wireless device and a customer account associated with the first wireless device;

providing confirmation to each account; and/or

receiving customer confirmation of receipt of a good or service via the first wireless device, thereby completing a transaction.

23. The server of claim 22 wherein the processor further:

detects an identifier at a customer wireless device and reporting the same to the server, to confirm that a service provider's delivery person was present;

receiving an identifier from a delivery persons wireless device; and

confirming the delivery person was in a correct area for delivery.

24. The server of claim 23 wherein the processor additionally:

confirms the delivery of the good or service to the customer via user input on a wireless device; and

reports that confirmation to the central server.

25. The server of claim 14 wherein the processor further:

receives confirmation at the first wireless device;

sends a message to the second wireless device to thereby provide access to an entity or object located in proximity to the second wireless device.

26. The server of claim 14 wherein a wireless device has time synchronization information derived from a network time or other reference, and that information is used by a processor to synchronize time periods and, optionally,:

coordinate the timing information utilizing a network time and a time from the central server made available commonly to the first and second wireless devices;

transmit identifiers or searching for identifiers using parameters obtained for the server; or

coordinate identifier updates to this same timing source.

ABSTRACT OF THE DISCLOSURE

Techniques for facilitating the exchange of information and transactions between two entities associated with two wireless devices when the devices are in close proximity to each other. A first device uses a first short range wireless capability to detect an identifier transmitted from a second device in proximity, ideally using existing radio capabilities such as Bluetooth (IEEE802.15.1-2002) or Wi-Fi (IEEE802.11). The detected identifier, being associated with the device, is also associated with an entity. Rather than directly exchanging application data flow between the two devices using the short range wireless capability, a second wireless capability allows for one or more of the devices to communicate with a central server via the internet, and perform the exchange of application data flow. By using a central server to draw on stored information and content associated with the entities the server can broker the exchange of information between the entities and the devices.

Figure 1

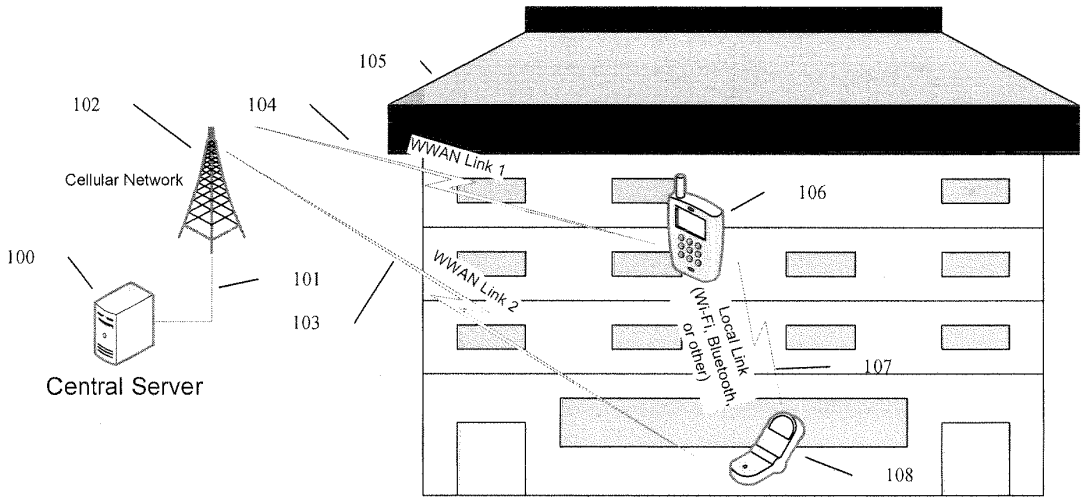

105
102
104
WWAN Link 1
Cellular Network
106
100
WWAN Link 2
Local Link
(Wi-Fi, Bluetooth,
or other)
101
103
107
Central Server
108
Building 2

Figure 2

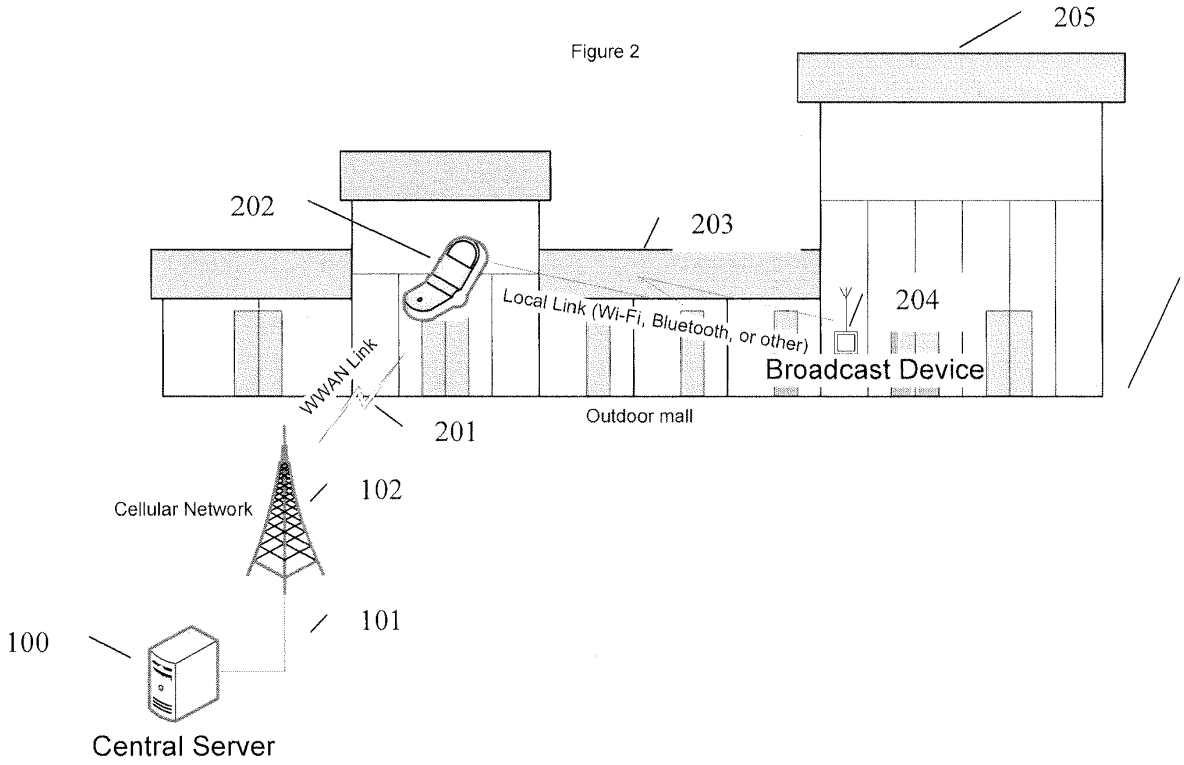
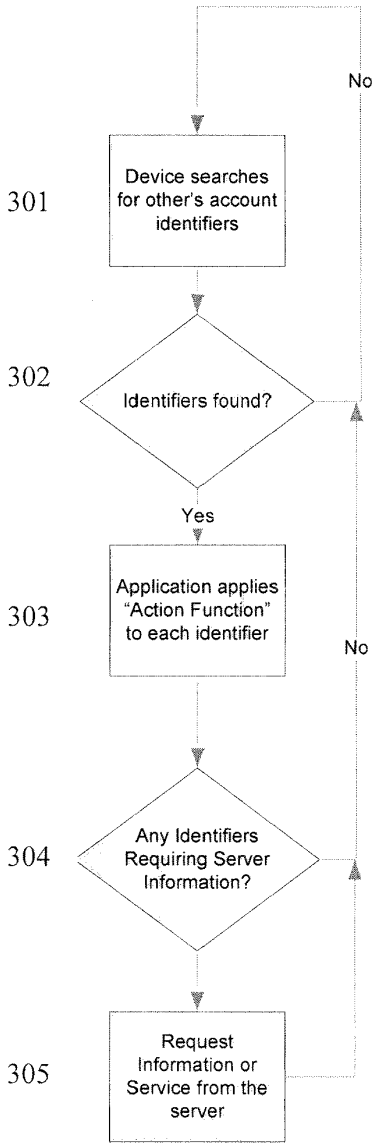

205
202
203
204
Local Link (Wi-Fi, Bluetooth, or other)
Broadcast Device
WWAN Link
201
Outdoor mall
Cellular Network
102
101
100
Central Server

Figure 3


No
301
Device searches for other's account identifiers
302
Identifiers found?
Yes
303
Application applies "Action Function" to each identifier
No
304
Any Identifiers Requiring Server Information?
305
Request Information or Service from the server

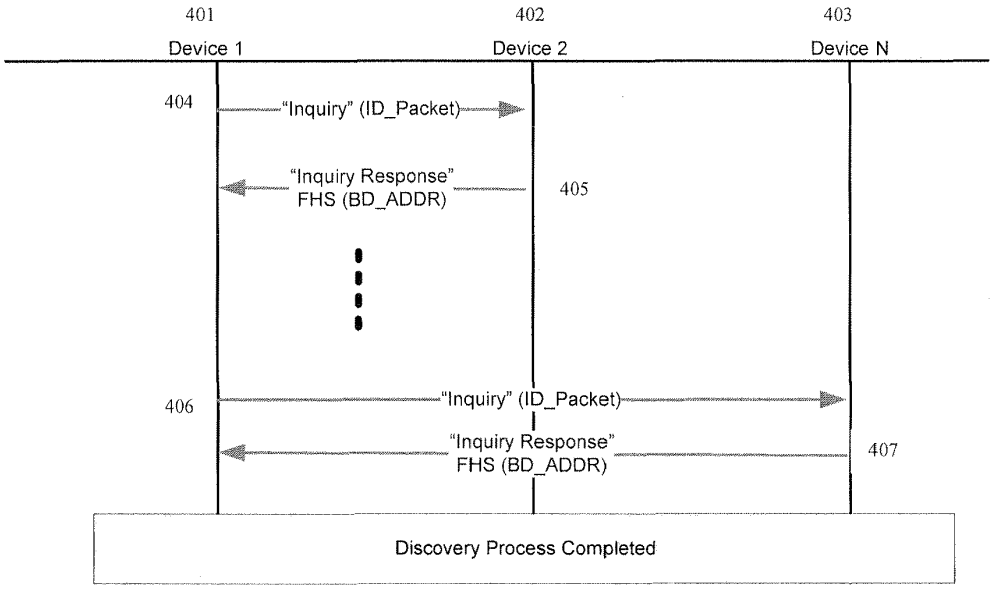


Figure 4 – 802.15.1-2002 (Bluetooth V1.2) Device Discovery

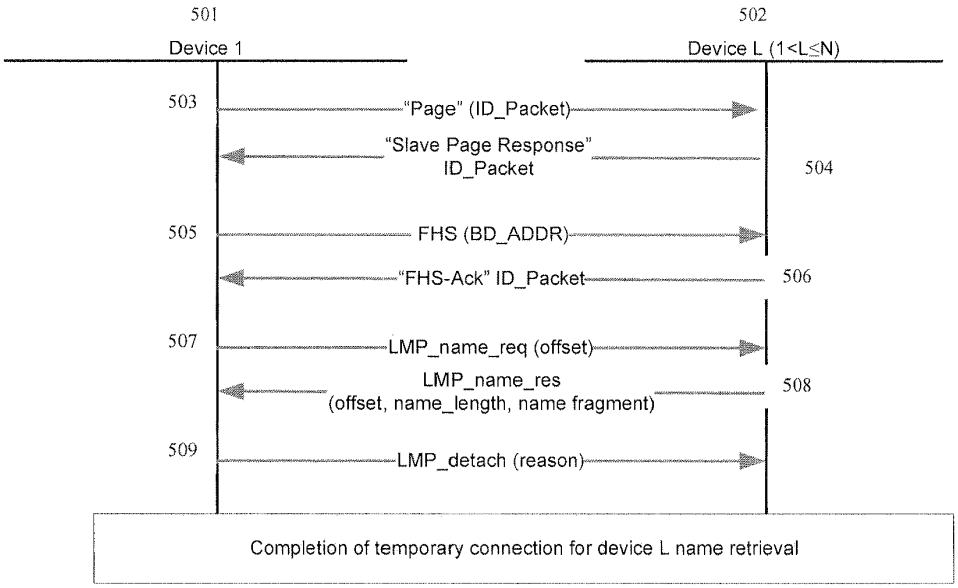


Figure 5 – 802.15.1-2002 (Bluetooth V1.2) Remote Name Request

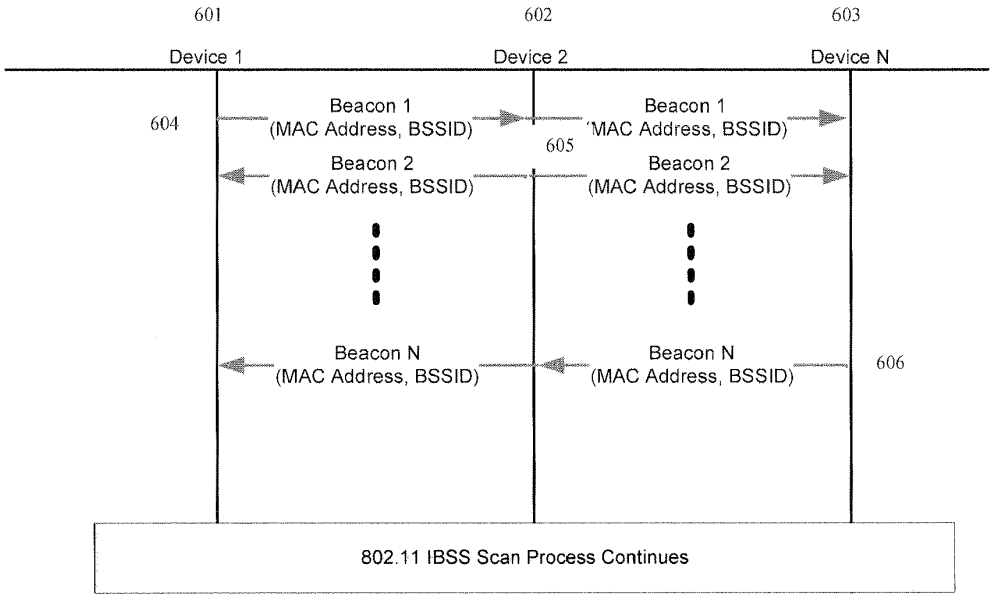


Figure 6 - 802.11 IBSS Beacon Process

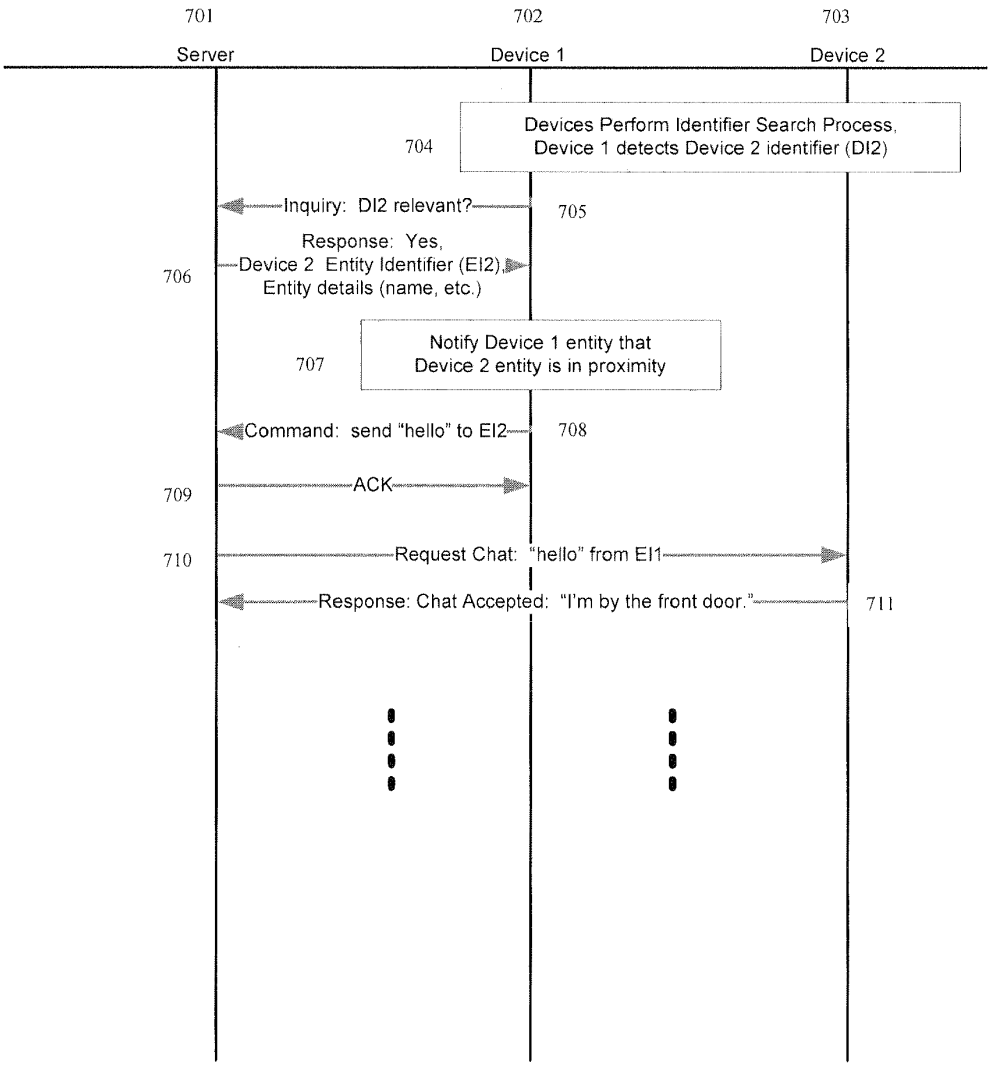


Figure 7 – Process of Detection and entering a Chat Session

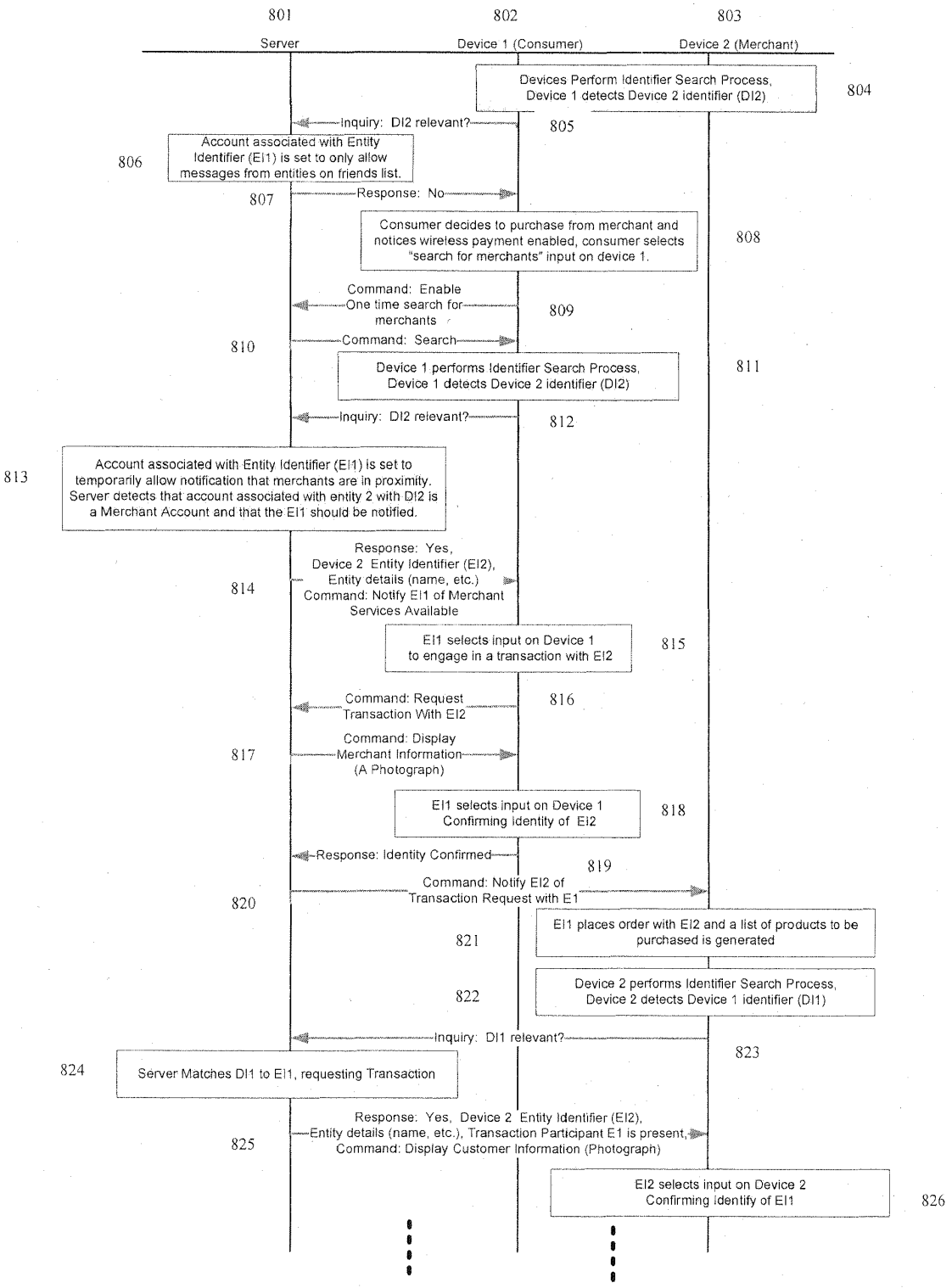
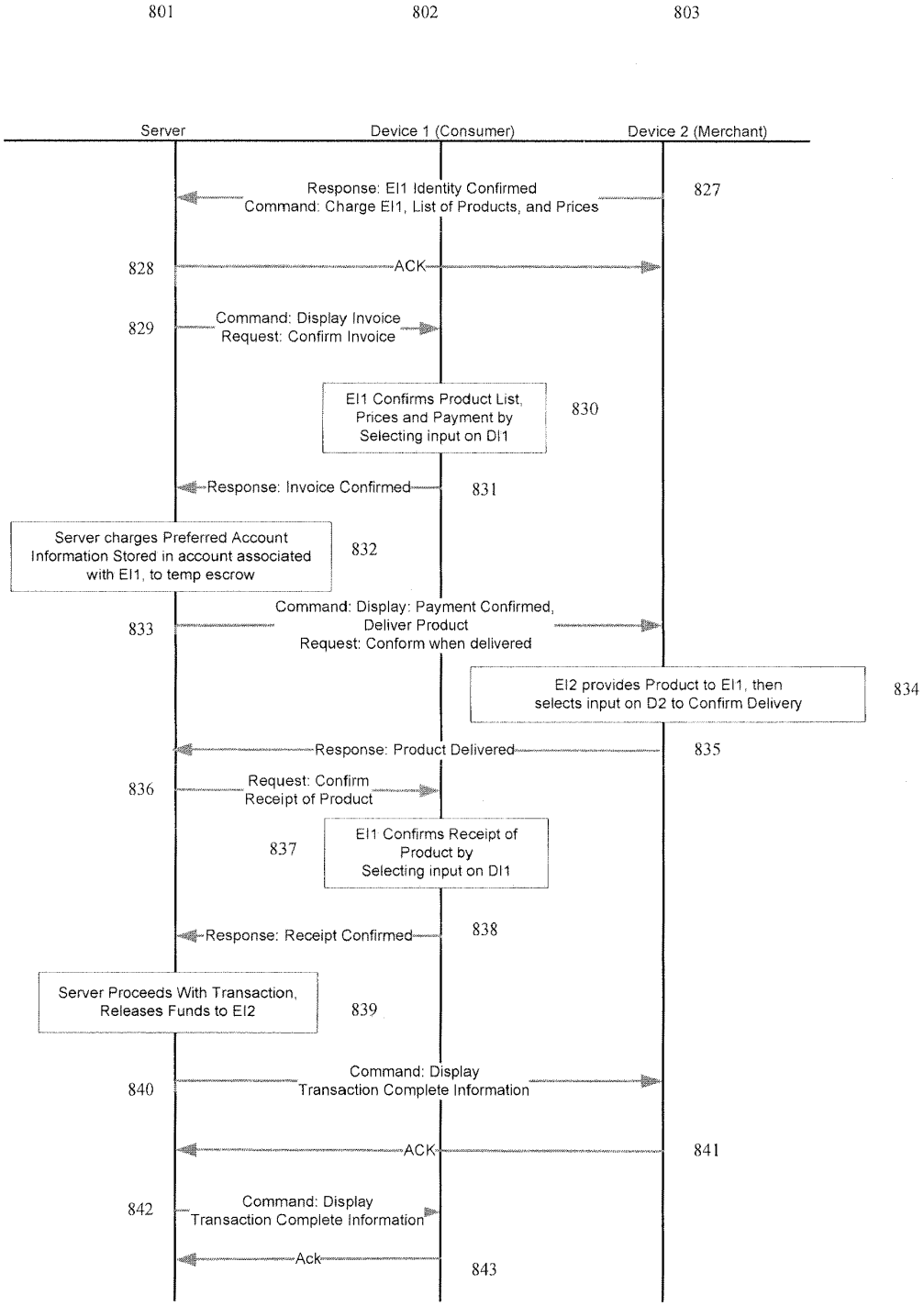


Figure 8A – E Commerce Process

Figure 8B – E Commerce Process Continued



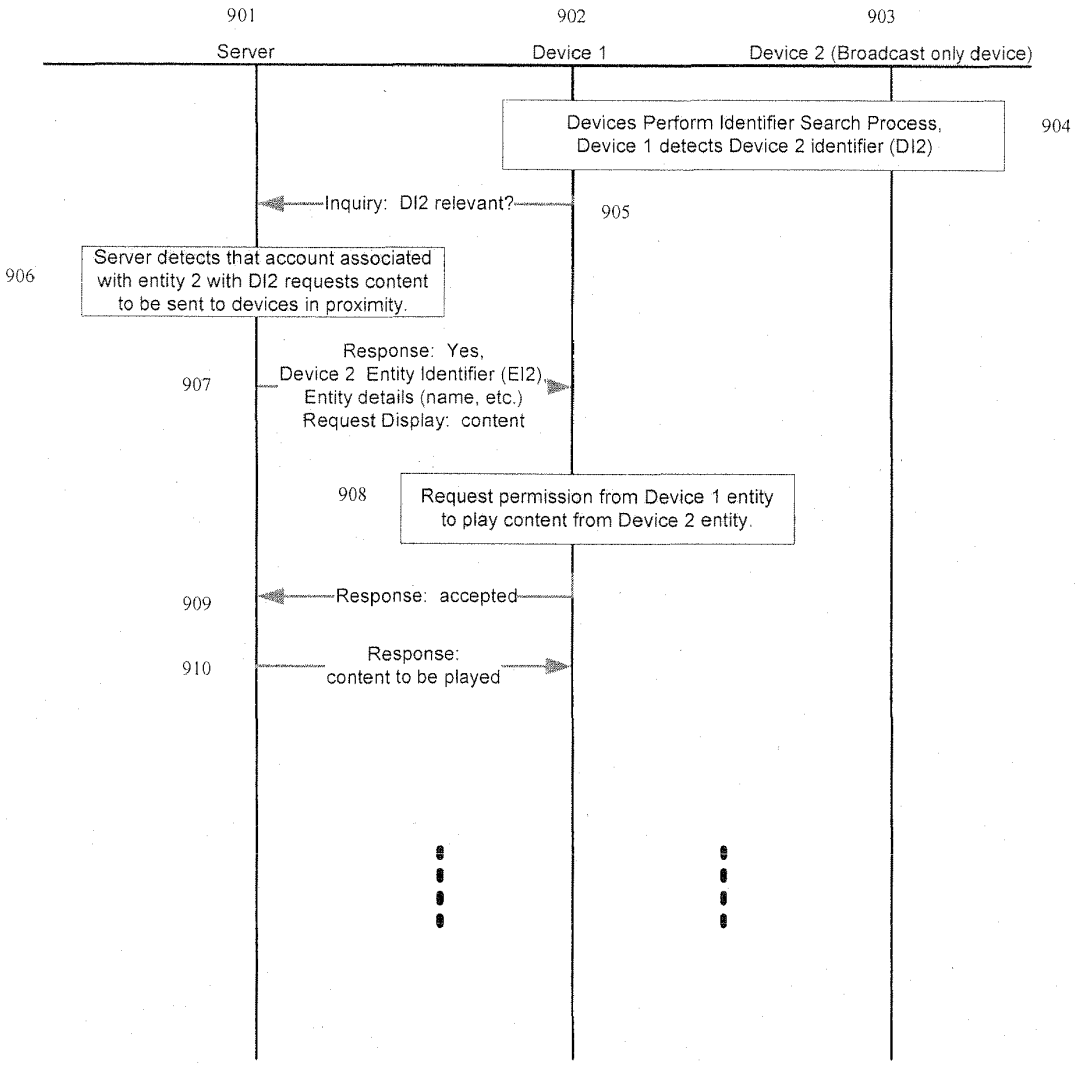


Figure 9 Broadcast and mobile device interaction

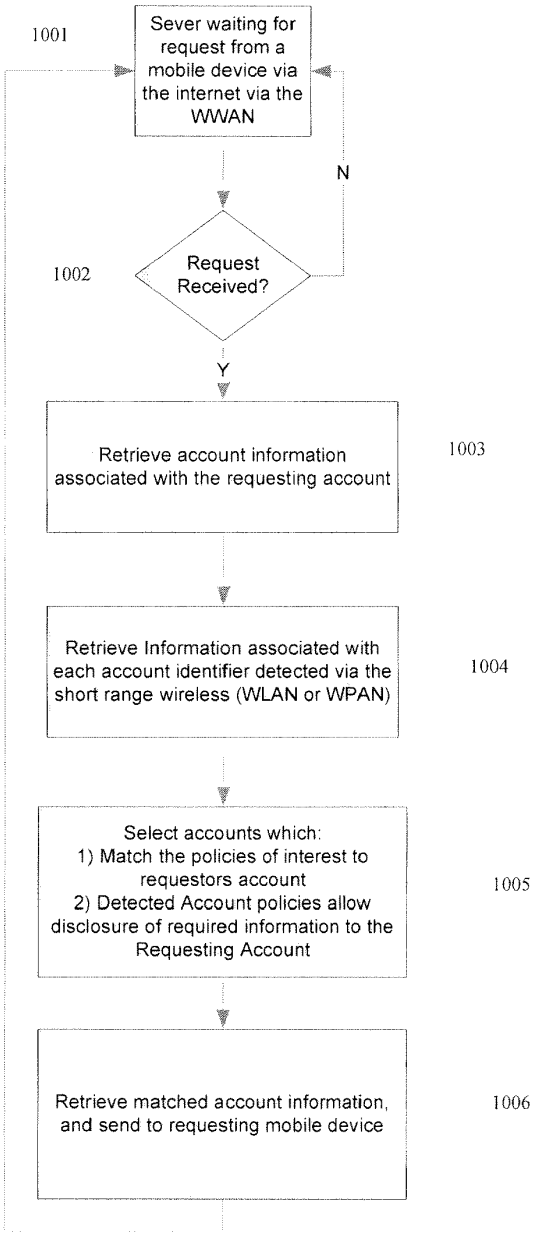


Figure 10 – Server Processing Example for Detected Device

Figure 11 – Example Individual Account Record associated with an Entity Stored in the Server

Record Index	Field	Field Information Group Disclosure Policy Assignments List
1	Account Number	[All, Explicit Approval, NONE, 1..N]
2	Identifier	
3	Identifier Type [Fixed MAC Address, Dynamic MAC Address, BSSID, Device Name]	
4	Number of Fields	
5	Field List	
6	Account User Name	NONE
7	Account Password	NONE
8	Entity Name	
9	Entity Address	
10	Entity Type [Individual, Merchant, Broadcast Entity]	
11	Billing Information	
12	Device Type	
13	Device IP Address	
14	Device SMS Phone Number	
15	Device Capabilities	
16	Entity AutoPlay Script 1	
17	Entity AutoPlay Script 2	
18	Detected AutoPlay Script 1	
19	Detected AutoPlay Script 2	
20	Entity Instant Message Address List	
21	Information Group Disclosure Policy 1 (IGDP#) [Characteristic 1 (C1), C2,.. CN, Friend List 1 (FL1), FL2, .. FLN, etc]	
22	Information Group Disclosure Policy 2	
23	Information Group Disclosure Policy 3	
24	Information Group Disclosure Policy 4	
25	Additional Personal Information Field 1 (APIF#) [Content Type/Content] (Picture, mp3, xml/AJAX, Text, Contact List, URL (MySpace, Facebook, Loopt), Login Credentials (MySpace, Facebook, Loopt, Itunes, etc.), Payment Information (Credit Card Information, PayPal Information, etc.), IM Credentials List (Username/Password))	
26	Additional Personal Information Field 2	
27	Additional Personal Information Field 3	
...		

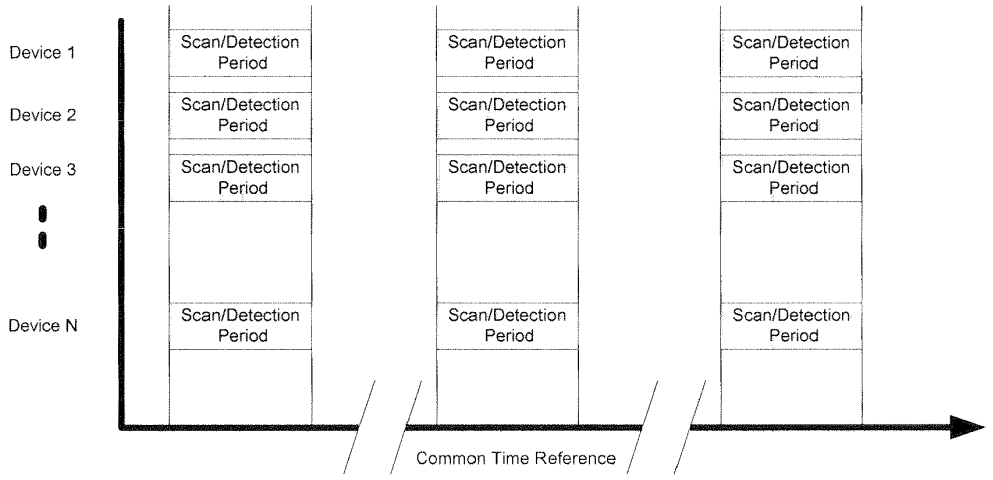


Figure 12 Use of common time reference for intermittent detection intervals

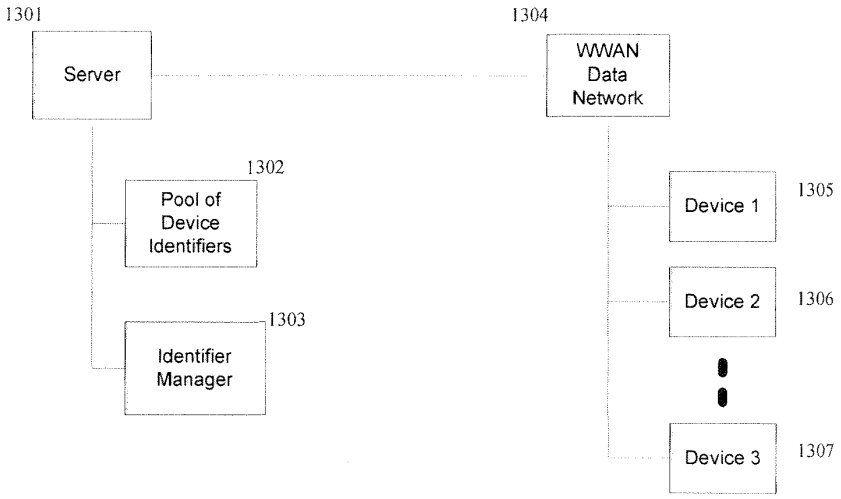


Figure 13 - Management of Device Identifiers by Identifier Manager in the Server

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
61/095,359	09/09/2008		105	PRO08-02		

CONFIRMATION NO. 9670

82506
James Arthur Proctor, Jr
258 Seaview Street
Melbourne Beach, FL 32951

FILING RECEIPT

OC000000032083356

Date Mailed: 09/17/2008

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

James Arthur Proctor JR., Melbourne Beach, FL;
James Arthur Proctor III, Indialantic, FL;

Power of Attorney: None

If Required, Foreign Filing License Granted: 09/15/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/095,359**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Central server enabled proximity based applications utilizing both short range, and wide area wireless radios

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Doc Code: **TR.PROV**
Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (04-07)
Approved for use through 06/30/2010 OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Provisional Application for Patent Cover Sheet

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)

Inventor(s)

Inventor 1 — Remove

Given Name	Middle Name	Family Name	City	State	Country
James	Arthur	Proctor Jr.	Melbourne Beac	FL	US

Inventor 2 — Remove

Given Name	Middle Name	Family Name	City	State	Country
James	Arthur	Proctor III	Indialantic	FL	US

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. — Add

Title of Invention	Central server enabled proximity based applications utilizing both short range, and wide area wireless radios
Attorney Docket Number (if applicable)	PRO08-02

Correspondence Address

Direct all correspondence to (select one):

◉ The address corresponding to Customer Number	○ Firm or Individual Name
Customer Number	82506

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

◉ No.

○ Yes, the name of the U.S. Government agency and the Government contract number are:

Doc Code: **TR.PROV**
Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (04-07)
Approved for use through 06/30/2010 OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

Entity Status

Applicant claims small entity status under 37 CFR 1.27

- (•) Yes, applicant qualifies for small entity status under 37 CFR 1.27
- ( ) No

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Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature	// James A Proctor Jr //			Date (YYYY-MM-DD)	2008-09-09
First Name	James	Last Name	Proctor	Registration Number (If appropriate)	

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **This form can only be used when in conjunction with EFS-Web. If this form is mailed to the USPTO, it may cause delays in handling the provisional application.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, t o a n other federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Figure 1

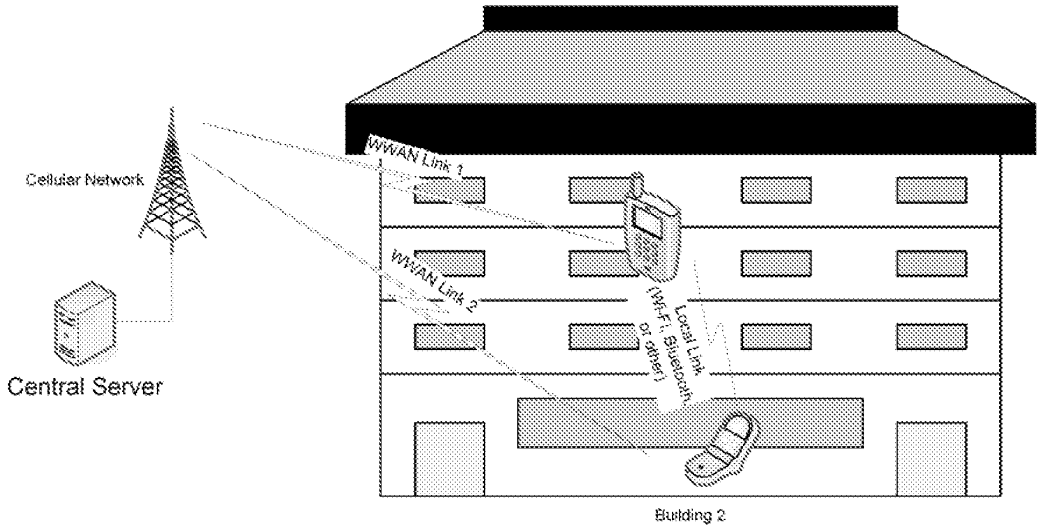

Cellular Network
WWAN Link 1
WWAN Link 2
Local Link
(Wi-Fi, Bluetooth,
or other)
Central Server
Building 2

Figure 2

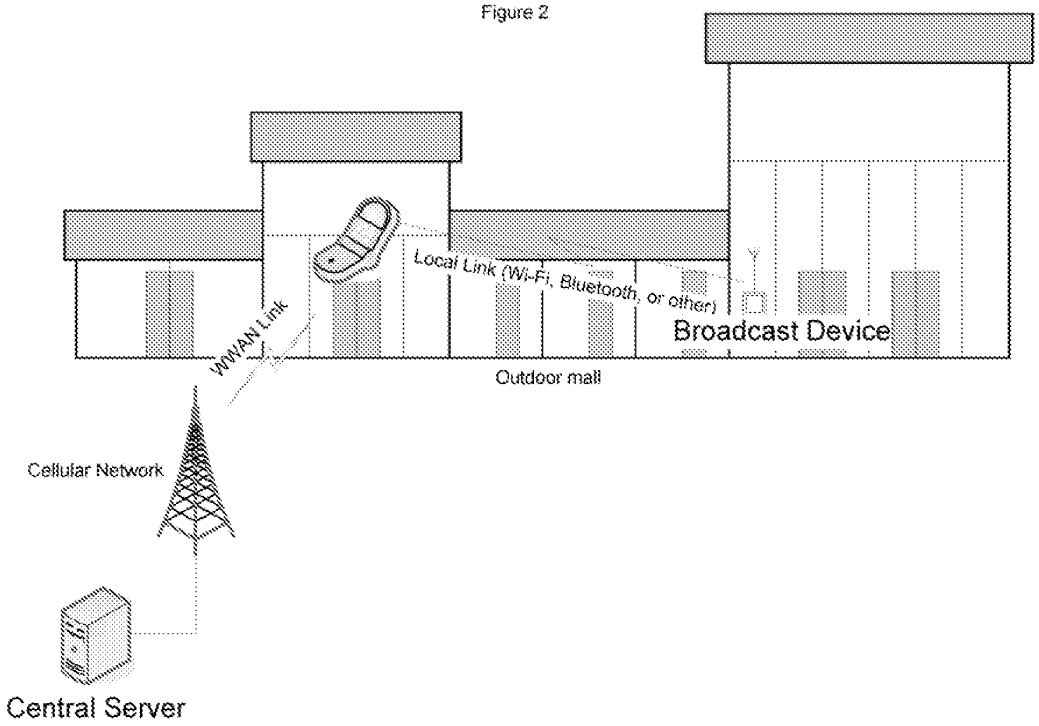

Local Link (Wi-Fi, Bluetooth, or other)
WWAN Link
Broadcast Device
Outdoor mall
Cellular Network
Central Server

Figure 3

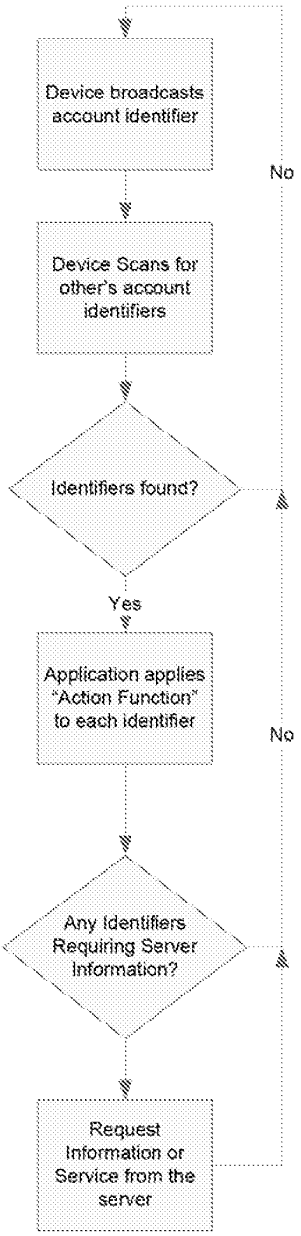
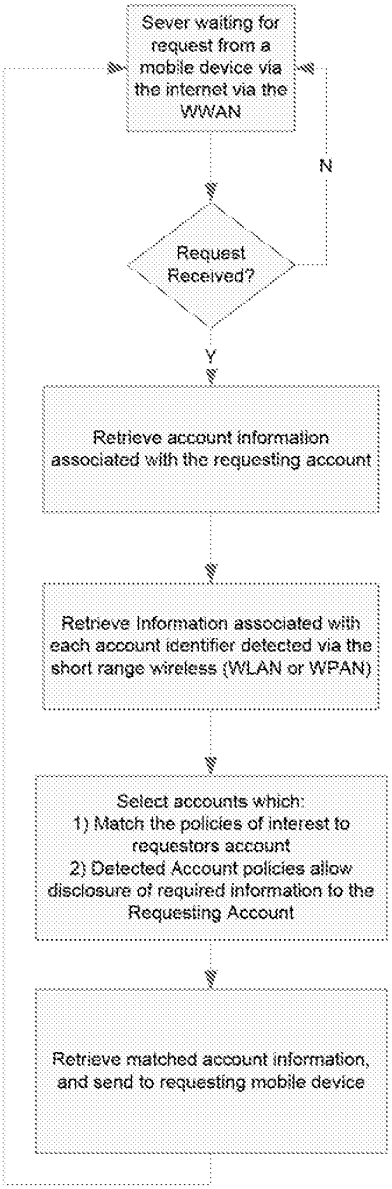

Device broadcasts account identifier
Device Scans for other's account identifiers
Identifiers found?
No
Yes
Application applies "Action Function" to each identifier
No
Any Identifiers Requiring Server Information?
Request Information or Service from the server

Figure 4 – Server Processing



Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Central server enabled proximity based applications utilizing both short range, and wide area wireless radios
First Named Inventor/Applicant Name:	James Arthur Proctor
Filer:	James Proctor
Attorney Docket Number:	PRO08-02

Filed as Small Entity

Provisional Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Provisional Application filing fee	2005	1	105	105
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**105**

Electronic Acknowledgement Receipt

EFS ID:	3909660
Application Number:	61095359
International Application Number:	
Confirmation Number:	9670
Title of Invention:	Central server enabled proximity based applications utilizing both short range, and wide area wireless radios
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	82506
Filer:	James Proctor
Filer Authorized By:	
Attorney Docket Number:	PRO08-02
Receipt Date:	09-SEP-2008
Filing Date:	
Time Stamp:	13:07:05
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$105
RAM confirmation Number	7508
Deposit Account	
Authorized User	

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Provisional Cover Sheet (SB16)	ProvisionalSB-PRO08-02.pdf	1000431 fc1b23d33b92a9c1525e26830618adf5ebbdce1c	no	3
Warnings:					
Information:					
2		PRO08-02-ASFILED-09092008-IMG.pdf	5020000 48e14c5e84c225d103caa192e7d12a5fbd6e842a	yes	28

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	24
	Drawings-only black and white line drawings	25	28

Warnings:					
Information:					
3	Fee Worksheet (PTO-06)	fee-info.pdf	29249 50ab73124b92a4dba75b8a30d54604760ba85a96	no	2
Warnings:					
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<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

James A. Proctor Jr. – Invention Disclosure

Invention Disclosure:

Inventor(s): James A. Proctor Jr.

James A. Proctor III

The following are a list of potential titles for this provisional application Invention Disclosure.

Title 1:

Central server enabled proximity based applications utilizing both short range, and wide area wireless radios

Title 2:

Wireless beacon device for transmitting a wireless identifier to facilitate proximity detection

Title 3:

Anonymity method associated with a wireless proximity detection process utilizing a central server.

Title 4:

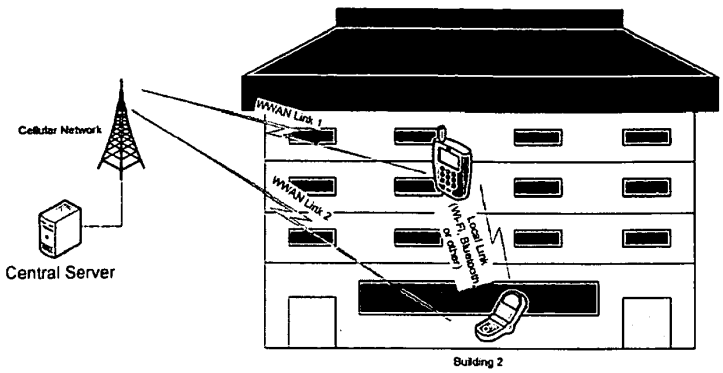
Wireless Advertising, Point of Sale, and associated infrastructure using wireless device proximity detection and a central server

Introduction:

This disclosure provides support for multiple patent applications of both a technical, and business model nature.

The present invention is generally concerned with facilitating communications between two wireless devices when they are in close proximity to each other, and using a central server to determine if one or more of the devices should be notified of the other device's presence or other related information such as advertising.

Figure 1



Description

Most mobile phones on the market today support at least two wireless standards; one for the cellular wireless wide area network connection (WWAN) and one for a wireless personal or local area network (WPAN, WLAN). The cellular connection or WWAN is utilized for voice and data and can adhere to many different standards such as CDMA (IS-2000), GSM, or W-CDMA. The WPAN or WLAN connection is typically for short range communications and is often used for wireless hands free devices, such as headsets, peripherals, or higher speed internet connections. The typical standards using for the sort range wireless communications include Bluetooth, Wi-Fi, and in some cases Ultra-Wide-Band (UWB).

Specifically, the current invention utilizes the short range wireless communication to detect the presence of other devices, and the wide area wireless network to perform communications to a central server, and perform the actual communications between the wireless devices. The distinction being that the short range wireless is ONLY used for the detection process, and to advertise a device's presence by transmitting an identifier, or receiving identifiers from other devices.

The transmitted identifiers associated with any given device are only known to the central server and the device transmitting it. These identifiers may change from time to time, making a user's or a device's identity anonymous over time. The central server and any particular device must be coordinated such that the identifier and any device is transmitting it, remains identifiable by the central server. This process is coordinated between the handset or other wireless device, and the central server utilizing the WWAN or cellular data link, carrying messaging between them. Of course, it is contemplated that the WWAN may be replaced with another internet connection such as Wireless LAN to an internet enabled gateway or access point, and the short range wireless function would be performed by Bluetooth or the like (even a wired internet connecting in some cases).

When a receiving device detects one or more identifier, it will use the WWAN link to communicate with the central server. The device will pass along a list of currently detected identifiers and request that the server provide the device with the information related to any identifier that is 1) relevant to that device, and 2) that device is authorized to receive.

The device may employ an action function, which would act as a filter that determines which of the detected identifiers should be passed to the server. This function may be omitted and all identifiers passed to the server. The idealized effect of the action function would be to reduce the number of requests to the server by not re-requesting recently requested identifiers which have already been passed to the server, for some period of time.

As an example of the overall process, a detected identifier may be relevant to the receiving device if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. If the identifiers for the individuals within the friends list have been passed to the device, the action function may make this determination. In the preferred embodiment, the server would determine the identity and the relevance of the detected identifiers, and the action function would work to reduce frequency of re-requests to the server.

To enable this process, each device or user associated with an identifier has an account on the server associated with the user and/or device, and the current identifier. There will be various information associated with each account. When the account is associated with an individual, there may be personal information such as the individuals name, contact information, information allowing communication, such as chat or IM, links to their other social networking services, and the like.

There will also be policy based permissions stored in the account and applied to any information associated with this account. The stored policy permissions will determine what information and under which situations information may be disclosed to another device or user associated with another account.

Just as in the case of an identifier being deemed relevant to a user based on a friends list, the permission of disclosing a device's presence may require being on a friends list as well. For example, when the server receives an inquiry from a device with a list of identifiers, it may only respond with information for which the users associated with the identifiers are on that device's friends list AND on each of the individual's friend lists as well. These friends' lists and policies would be stored within an account which allows for disclose of a user's presence only to individuals on this list.

Of course it is contemplated that the permissions not be an "all or nothing", but that different classes of information may be assigned different permissions and mechanisms. An example of this might be a user's presence, identity, and chart services being made available to only one set of other accounts (or users), while the presence of an anonymous individual being made available to anyone, but with other services available such as multi-player games. Additionally multiple contacts may be included in the account, each given customized permissions. An example would be any user may be notified of an anonymous user or other information based on additional policies.

As the server contains the personal information, and performs the association of an account with a particular identifier, it can inherently enforce the security of the policies.

In this way, the central server controls the process of passing information related to an account to a particular requesting device.

A device may also simply broadcast an identifier, with no WWAN connection to facilitate advertising or local information. For instance, an account associated with one or more identifiers may belong to a museum. As a museum patron walks to an exhibit, they receive an identifier. The device passes the identifier to the central server, which in-turn recognizes it as being associated with that exhibit within that museum and passes relevant information back to the user's device. Applications such as games, informative display applications, or content such as audio or video may be offered to the user's device as well. Other examples might include electronic coupons in a grocery store, menus or special offers in a restaurant. A process of steps, enabled by this proximity infrastructure invention, for performing a step by step electronic e-commerce transition with two party confirmations will be described later in this invention disclosure as well.

Main Enabling Infrastructure Concepts (more elaboration on in the key concepts to protect section, as well as invention disclosure associated with enabled applications...)

- One device transmitting a wireless identifier using a wireless protocol capable of peer to peer communication
- The wireless identifier being associated with a specific account on a server connected to the internet
- A second device receiving the wireless identifier
- The second device capable of communicating with the server over an internet connection
- The second device requesting information from the service associated with the first identifier
    - The second device having a second identifier associated with a second account on the server
    - The server providing different amounts of information related to the first account based on the parameters associated with one or both of the first and second accounts

- The identifiers associated with the accounts being updated such that the identifiers would no longer be recognized as being associated with specific accounts without past or current interaction with the server
- Using one or more of cellular network timing information, and information from the central server to coordinate the broadcast and search times amongst the devices. (to reduce power and resource consumption)

Prior Art:

To date the prior art has been concerned with several areas:

- Utilizing GPS to determine the proximity of one mobile wireless user to another to facilitate mobile social networking. An example of an existing application utilizing this approach is Loopt, which is a coordinates location based social interaction based on GPS.
- Using standards such as IEEE802.11 (Wi-Fi) or Bluetooth to facilitate peer to peer communications or Mesh Networking. These are also referred to a MANETs or Mobile Ad-hoc Networks.
- Using peer to peer networks to facilitate communication between wireless devices. Examples of such existing applications include Mobile-Cheddar, Peer-2-Me, and Flobbi.

The present invention differs from these approaches in that first, no GPS is used to determine when one device is in proximity to another, as GPS will often not operate indoors where the GPS signal is weak

Secondly, utilizing a peer to peer based network, supporting an application such as social networking, the information flow between the devices running the applications are carried over the peer to peer network itself. An example of this is a service called Flobbi, where community members can identify each other via Bluetooth transmissions, then interact with chat. The messaging in this case is carried over Bluetooth itself. This approach creates complexity in a handset, and unnecessary additional resources are utilized. Further, in most cases, it reduces or eliminates the dependency on a central server to "broker" the transaction, reducing the ability to manage security and information disclosure. This approach further eliminates the opportunity to customize the content to include elements such as advertising or other content customized to the recipient based on additional information such as known personal purchasing history, or

interests. The complexity also is increased because one of the main devices targeted by the present invention is the phone. In this case of performing peer to peer networking using Bluetooth in a phone significant resources including memory and application software processing would be required to support full IP protocol networking over such a connection. The support for IP based networking already is including for WWAN connections and as a result, communication between one device to another using the WWAN is currently supported in many devices with no modification. The use of simple detection of one or more identifiers requires significantly less resources in a phone than performing a complete peer to peer based communication network with dynamic configuration of nodes being added and dropped continuously.

Finally, Mesh networking requires that a mesh node act like a router after the reception. A node receives a packet in using a peer to peer protocol, then performs a routing function to facilitate the forwarding of packets to other wireless nodes, or to connected wired devices, then it transmits the packet with modified addressing information. In a mobile phone environment, such a topology has similar disadvantages to the case of a pure Peer to Peer topology. Using the broadcast identifiers for detection allows for no complex management of routs, or the addition and removal of addresses to other detected mobiles. It is noted that the IP address, or other user contact information allowing communication is NOT location dependent in the present invention, but IS location dependent when true Peer to Peer or Mesh topologies are used. The present invention has the advantage that communication between two devices may continue after the devices have left proximity of each other, but in the same manner as they had been conversing previously. As a result a user who detects a short range transmission of an identifier, then begins a conversation or some other interaction with that device via the wireless wide area network may continue that conversation even in the case where the two devices move out of the proximity of the each other, and are no longer within the reception range of the short range wireless communication protocol.

Additionally, since in the current invention, the server and the WWAN is involved with all mobile devices utilizing this approach, a coordination of the broadcasting periods and the searching periods for the short range radios is possible. This will allow for reduced

power consumption and other resource consumption in the devices. If no coordination is achieved, then the short range receivers in each device must be scanning of transmitted identifiers much more often and for longer durations. Utilizing the a common timing base, and the central server to notify the devices of a coordination approach for "active times" and "non-active times" will allow for the devices to minimize the power consumption they consume in the transmission of and scanning for identifiers. It will also allow for a synchronized approach for the update of each device's identifier, as described previously to enhance anonymity and security, coordinated with the central server. The "non-active times" may be used as "boundaries" over which the changing identifiers may be updated. This update may be based on either direct communication with the server, or rule and algorithm based updates previously coordinated with the central server so as to minimize server messaging, but allowing the updates to remain synchronized to the server such that the device and the server are always associating the same identifier between them. As will be recognized by an individual skilled in the area of information technology, the concept of a central server may well be implemented as a collection of servers to allow for load balancing, redundancy, and the like in a manor common to the information technology industry.

Requiring the brokering of the communication via a central server will also allow a mobile device to receive information associated with a "broadcast only" device, such as in the museum example discussed previously. This is important as broadcast devices can enable a vast set of new applications built upon the infrastructure developed in this application, beyond the museum like application. Some of these applications may involve an electronic commerce aspect.

Electronic Commerce Applications and Disclosure

E-commerce (e-proximity) between two mobile devices

An example is that of two individuals performing a transaction on the street, a customer and a street vendor. In this example, an individual would see a vendor and their device (enabled with the current invention) would notify them that the vendor was enabled with

a device supporting the current invention as well, and capable of electronic payments. The customer, having an account enabled with electronic payments, and wanting an item the vendor has, would walk up to the merchant and place their order. Additionally, the customer would press a button on the phone (or other device) which would indicate they would like to make a purchase and pay using their device. The customer's device would then send a message to the central server indicating the customer would like to make an electronic payment to the merchant detected by the device. In return, the server would send a picture of the merchant, their establishment, or other identifying information (even a commonly shared code in some cases) to the customer's device and ask them to confirm the identity of the merchant. In the case where the identifying information is a picture the user would look at the merchant, and press a button on the device if their picture was correct. As an alternative, the information may be a picture of the establishment, or the vendor's name for their establishment. In some cases, the identifying information might even be a password sent to the merchant, the merchant would need to provide this password to the customer to be confirmed by the server or by the user themselves, or visa versa. The picture approach is expected to be the most common approach.

Next, the server requests the list of identifiers the merchant's device has detected, and determines if one of those identifiers is associated with the customer, further confirming that the customer is near the merchant, and to reduce fraudulent activity.

Assuming the two way proximity detection, the server would send a request to the merchant's device indicating the desire for the electronic payment, and a picture of the customer associated with the account on the device. The merchant would conform, on their device, that they have identified the customer and would provide the price or the item (with the price previously inputted) to the device, which would relay this information to the server. Alternatively, a point of sale device like a cash register could be interfaced to the enabled device and receive the list of purchased items, to use for this step.

The server would them send a message to the customer's device. The customer would then conform they payment amount to be paid to the merchant, and that the inventory list is correct. The funds may likely be in a escrow like state at that point, in a manor similar to a Paypal payment or utilizing a stored credit card number, which could be reversed if the transaction were not consummated. The merchant would receive an indication from the server via their device that the payment has been made, and provide the purchased item to the customer. The merchant may optionally select an "item delivered" indication on their device, which would rely this information to the server over the internet connection. Upon charging of the customer's account by the server, the server would request a confirmation form the customer (via their device) that they have received their purchased goods or services. The customer would then select an indication they have received the purchased item(s) and the transaction would be complete. Further, if the customer does not deny the reception of the goods the funds may be paid regardless. Additionally, the server would keep track of the transactions and any negative feedback provided by any past participants in transactions for judging the character of each particular account holder. Further, the server involved in allowing the payment process between these two parties would have the capability to interface to third parties to determine if each of the parties were reputable in terms of being able to pay and consistently providing desired goods and services in an ethical way. Again, an example of such a third party would be PayPal or a credit card company, or other electronic service.

Finally, this transaction may be stored by the server, or sent to a thirdly party server for tracking spending habits of that account holder, or customers of that merchant allowing the merchant to track that specific customer's behavior and cater to them in the future with various specials delivered via email, or during their next visit via their device in the form of an electronic coupon. This process would be performed with a goal to help the merchant expose the customer to other products or services the merchant believes the customer might find desirable.

Ecommerce between a fixed broadcast device and a mobile device

Football stadium application example

In another example of an embodiment of a transaction model, enabled by the infrastructure of the present invention, would be in an event such as a concert, or sporting event (particularly when it is an indoor venue where no GPS is available). A number of the broadcast only devices would be placed through out the seating areas. The devices would be very short range, and only transmit intermittently and as a result may be battery powered and would remain active a very long time period. Each device would be placed in a known location, in a predicable manor.

An attendee at the event would have a device enabled with the present invention. The device would detect a broadcast device, and interact over the internet with the server via the WWAN connection. The server would receive an indication of the broadcast device's identifier and the identifier of the account associated with the device which detected the broadcast device. The server would retrieve content associated with the service provider's account and provide that content to the application on the requesting mobile device that this venue has a product delivery service. The user may press an indication on their device that they would like to see a menu or list of items for sale from the merchant or merchants in the venue. The application on the user's device would then allow them to see a menu for instance and select items to purchase. The user then would be asked to confirm the purchase. The server would then indicate to the merchant that a user located near a specific broadcast device has ordered something. In this case, it is expected that a delivery fee would also be charged for the enhanced service. The server would facilitate the purchasing of the goods or services from the merchant and payment from customer's account, and provide confirmation to each. Such confirmation would include an electronic receipt provided to the customer, for user upon arrival of the delivery person of the good or service. The customer would then select an indication on their device confirming receipt of the good or service via the mobile device, thereby completing the transfer of funds and the transition. Optionally, the delivery person of the good or service may have an enabled mobile device as well. In this case the identifiers

may be detected by the customer's device and reported to the server to confirm that the provider's delivery person was present. Further, the delivery person's device would be able to detect the broadcast devices identifier and reported to the server confirming the deliver person was in the correct area independently. Even further proximity confirmation may be achieved by the customer's device's transmitted identifier being detected by the delivery person's device and reported to the central server further confirming the physical proximity of the parties involved in the transaction. Upon arrival of the delivery person, the customer may be notified that the delivery person is looking for them, and has arrived. These cross confirmations would allow for the central server evidence to justify payments both in completed transactions and in disputed or failed transactions. Further, the delivery person may receive a picture of the requesting customer. Once the customer is found, the delivery person would confirm the delivery of the good or service to the customer via the user input on their mobile device, and that confirmation being reported to the central server. The customer would have the option to report confirmation or denial of the reception of the product or service as well, as in the last example.

In another embodiment, the merchant device may be fixed, but have an internet connection (wireless or otherwise). Further, in some embodiments the merchant may be an automated device such as a vending machine. In such a model, a customer may use their enabled cell phone to purchase an item such as a beverage from the machine without the need to insert currency into the machine. This would be accomplished by the customer's cell phone detecting the vending machine transmission of the identifier or visa-versa. Following the detection of either the customer's identifier by the vending machine, or the customer detecting the vending machine identifier, the respective device would notify the server, who intern would provide notification (assuming the account settings allow for notification) to the potential customer via their device. Assuming the customer selects to purchase an item from the vending machine using their account associated with their device, the customer may be presented a menu as in the example above. The customer may further be presented information to ensure the identity of the vending machine, such as a description of the machine, a machine identification number,

or a (most likely) a picture of the machine where it is located. The customer would confirm this is the machine they are interfacing with, and select to pay via their account. The customer may in one model select the item to dispense on their phone, or they may simply select to provide payment to the machine allowing them to make the selection manually as is the typical mode of operation today. The vending machine would interact with the server via it's internet connection, and participate in the transaction in a manor similar to the mode described above allowing for step by step conformations as previously described.

Electronic opinion polling, tied to a known location.

In a much simpler example, such a capability might be used to tie a survey to a known location in such a way as to provide an e-coupon to the survey taker on their device in return for completion of the survey. Alternatively, this type of interaction would enable a very large crowd to interact with a Jumbo-Tron like display to provide input to polls or to participate in group activities. Users at different locations in a audience may form teams and interact with other teams for group activities.

Key Concepts to protect:

Top level Key Concepts:

- One device transmitting a wireless identifier using a wireless protocol capable of peer to peer communication
- The wireless identifier being associated with a specific account on a server connected to the internet
- A second device receiving the wireless identifier
- The second device capable of communicating with the server over an internet connection
- The second device requesting information from the service associated with the first identifier
    - The second device having a second identifier associated with a second account on the server
    - The server providing different amounts of information related to the first account based on the parameters associated with one or both of the first and second accounts
- The identifiers associated with the accounts being updated such that the identifiers would no longer recognized as being associated with specific accounts without past or current interaction with the server
- Using one or more of Cellular network timing information, and information form the central server to coordinate the broadcast and search times amongst the devices. (to reduce power and resource consumption)

More Detailed Key Concepts to protect

1) A device capable of operating two wireless protocols simultaneously, utilizing a first wireless protocol in the device to detect the proximity of another wireless device and the second wireless protocol to communicate with a remote server, where:

    a. One or more of the devices are mobile devices
    b. Where the first wireless protocol is a local, or personal area network wireless protocol such as 802.11, Bluetooth, UWB or other local connectivity protocol
    c. Where the first wireless capability is re-purposed using a modified or enhanced protocol for
        i. Advertising the presence of the devices or,
        ii. Detecting the presence of another device
    d. Where the method of detecting or advertising the presence of another device utilizing the modified protocol involves embedding or detecting messaging in the standard based broadcasts from the standards based wireless modem, where the standards based protocol is based on, related to, or otherwise derived from IEEE802.11, Bluetooth
    e. Utilizing a wireless wide area data link from one or more of the wireless devices to:
        i. Connect to a central server
        ii. Perform user authorization functions
        iii. Perform download of information associated with account identifiers utilizing the short range wireless capability
        iv. Request forwarding of messages / packets to the other active account
    f. Utilizing the messaging with a mobile proximity based social networking capability
        i. The messaging being performed via the WWAN

g. The server providing a centrally assigned user identity, with relationship brokering or identification capability

h.

2) A central serving capability to mobile devices utilizing a wireless WAN connection to provide and exchange information between one or more application on one or more wireless devices and the central server

- where the information passed to the central server is collected by one wireless device from another wireless device via a separate local wireless reception from the other wireless device
- where the separate local wireless reception from the second wireless device contains information directly assigned by, derived from, or known to the central server associated with the identity of the second wireless device.
- Where this identity is related to certain information and preferences of an account holder associated with an application operating on the second wireless device
- Where this application is operating on both wireless devices
- Where the application operating on the first device also provides it's own identifying information to the central server as well as detected identifiers from devices with applications on them.
- The central server containing the account information registered to the applications running on each wireless device
- Where the preferences associated with the account information also contains policies related to the disclosure of one account's stored information to other accounts and hence to their application on their devises
- These policies including a classification of other accounts each classification having different policies some of these policies being:
  - no not allow notification of my presence
  - allow notification of my presence

- disclose my name/ do not disclose my name
- disclose age / do not disclose age
- disclose personal details
- allow interaction such as
    - chat
    - file exchange
    - photo push
    - Voip
    - Voip push
    - Invitations to engage in shared applications such as games
        - Games may be networked trivia games and the like
        - Using other resources on the device such as an accelerometer to play active games link ping pong or other multi player games using either the WWAN or more desirably the local wireless link to perform the inter-device interaction.
- Performing anonymous interaction
- Where an application running on each device performs point of sale transitions coordinated via the central server, over the WWAN, utilizing user input on each device as confirmation of successive steps in the transition.
    - Further, where at least one of the confirmation steps additionally involves displaying an identifying picture related to one of the devices, on the other device
    - Additionally the server performing an authorization for the transition to a third party
    - Additionally, the server providing a participant confidence indication to one of the participant in the transaction to the other participant in the transaction
        - Where the participant confidence indication is related to past transactions for the participant

        - Where the participant confidence is related to ratings by other past participants of the current participant
    - A device interacting with a point of sale device to associate an itemized list of items with a detected second device
    - The service performing a confirmation with the application on the second device requiring user input that the inventory list is correct
    - The server storing the information related to the second devices detected account identity and inventory in a database for later use

3) A device in the present invention with a wireless capability with no WWAN capability, but only with the ability to broadcast a unique identifier.

    - The server having the broadcasts device's details. And when the first device provides these detail to the server, authorized and current information about the broadcast device are provided to the first wireless device.
    - Where this information includes advertising information or information related to "e-coupons" for special offers for products or services
        - Where the content of the e-coupons are customized based on the identity of the requesting device or account holder
            - Where the content is further customized based on other information known by the server related to the user's account
            - Where the other information is related to the user's past purchasing practices or previous requests
    - A mobile device, upon detecting a broadcast device and if enabled to do so, will report that broadcast Id to the server over a WWAN, and retrieve the current content from the server associated with that device and:
        - Display it to the user on their device

        - Execute instructions associated with the information retrieved from the server.
    - Pre-authorizing difference classes of broadcast devices such that different levels of authentication are required
    - One of the levels of authentication being no authentication

4) A good or service delivery model utilizing the above described broadcast device, placed in a known location,
    a. The mobile device detecting the fixed device's identifier via the WPAM/WLAN
    b. The mobile device reporting this identifier and passing an identifier associated with itself, or the account associated with the user utilizing the device.
    c. The server determining that the detected broadcast device is associated with the broadcast device with a known location
    d. The server further determining that the identifier is associated with a service, and further associated with an account or that service
    e. The server retrieving content associated with the service provider's account and providing that content to the application on the requesting mobile device.
    f. Where that content may be a list of items for sale, services for sale, a opinion pole, food menu, or other menu style content which allows for user selection of items. This could be implemented in java code, xml, simple text, or other for example optionally including active code elements.
    g. The application on the mobile device displaying the content to the user display with the itemized list of goods, services, or other selection items.

h. A user providing selection of one or more of the items, and confirming they wish to purchase said items, and take delivery at or near the location of the fixed broadcast device
i. The server facilitating the purchasing of the goods or services from the merchant's account and the customer's account, and providing confirmation to each. Such confirmation including an electronic receipt provided to the customer, for user upon arrival of the deliverer of the good to or service.
j. The customer confirming receipt of the good or service via the mobile device, thereby completing the transfer of funds and the transition
k. The deliverer of the good or service optionally having a mobile device supporting the current invention,
    i. such that identifiers from that device may be detected by the customers device and reported to the server to confirm that the provider's delivery person was present
    ii. such that the broadcast devices identifier is detected by the delivery person's mobile device and reported to the server confirming the deliver person was in the correct area
    iii. such that the customer's device's transmitted identifier is detected by the delivery persons device and reported to the central server further confirming the physical proximity of the parties involved in the transaction
    iv. The delivery person confirming the delivery of the good or service to the customer via the user input on their mobile device, and that confirmation being reported to the central server.

5) Generating an application to operate at the application layer, which interfaces to a standard driver interface or using a proprietary modified driver on a device

- Using wi-fi 802.11 to perform the WLAN operation, but in a modified protocol.
- Where that device is a 802.11 device
- Using Bluetooth to perform the local WLAN connection, where that device is a Bluetooth device
- Where the interface is an NDIS driver or the like
- Using the fields in the NDIS driver in a non-standard way such as using the SSID of the beacons to broadcast, or advertize the presence of your associated account identifier registered to the central server
- Using 1xEVDO, HSDPA, GPRS, EDGE or the like for the WWAN interface.
- An NDIS driver interfaced to an application which will put a Bluetooth or Wi-Fi or other device into a mode in which it will broadcast it's identity, where that identity contains an account or device identifier (know to the central server), and report back all other broadcasted identifiers from other devices.
- The application then provide the reported identifiers the server, which will make decisions regarding a users interest in these detected identifiers, and policy regard privacy other identifiers.
    - The decision process may be based on priority of the identifier, the class an identifier belongs to, a list the identifier is, or is not including on, other functions currently being performed on the device such as:
        - Music being played
        - Video being played
        - A phone conversation currently being engaged in
        - The time of day
    - Based on the result of the action function, sending at least one detected identifier to the network, potentially with additional information from the action function, and retrieving information

back from the server related to that identifiers' account information stored on that server.

- The server receiving a request from a device's application, with a detected identifier
    - The server examining both the requesting and the requested identifier's identity and making a policy decision regarding the release of the requested identifiers information related to their account
    - The decision may be:
        - Implicit: always provide the information
        - Explicit: only provide the information to a specific list of other identifiers
        - Limited: only specific information may be released to specific accounts, or classes of accounts
    - The server in some cases providing a continuously or periodically changing account or device identifier to a specific application on a device to enhance the privacy of the identity of that device
        - The changing of the identifier may be effected by a rule based generation local to the application, or may be downloaded from the server directly
        - The update of the identifier being synchronized to such that it is coordinated with predetermined scanning and broadcasting periods allowing for a known update boundary.
- The information provided from the server to the application resident on the device may include:
    - The identity of the user with the specified account identifier
    - Applications that user / device is able to use
    - Capabilities of that user / device

- Actual applications which are shared with other users, for use with that user in a joint manor

6) Using the mobile device's time of day derived from the network or other reference synchronize the PAN/WLAN discovery and advertisement times to save battery life. Doing this in a synchronized way among multiple devices. Coordinating the timing information utilizing the WWAN and a central server available commonly to the devices.

   - o Synchronize the heartbeats and or ping / echo timing to save power from WWAN network parameters obtained for the server
   - o Coordinating any identifier updates to this same timing source

Business Processes to protect:

- Using the above described application to push content to the user's device.
- Providing paid advertising content to a mobile device based on a request from that device for the information associated with a detected identifier, which is associated with a broadcast device.

EXHIBIT C Claim 1 feature	Context in U.S. Patent Application 12/364,828 filed February 3, 2009	Citation to the text of the '828 Application
determining that at least one beacon transmitter device associated the proximity beacon service is in proximity to the wireless device by utilizing the identifier related information	a wireless device receives beacon transmissions from another wireless device (Fig. 6 items 604, 605, 606) the beacons (e.g., IBSS beacons) and the beacon transmissions include identifiers (e.g., a BSSID or SSID) the identifiers indicate which beacons are associated with a service the identifier related information is then used to determine which devices (or related entities or objects) are in proximity (Fig. 7 step 706 and 707)	"In an IBSS all devices participating or advertising their interest in participating in an ad-hoc network transmit identifiers called beacons" (p.17, l 10-12) "These beacons contain the MAC address of the transmitting network adapter, the basic service set identifier (BSSID), and ad-hoc network name or service set identity (SSID)" (p.12-14); "...one or more of the BSSID and the SSID may be used as the identifier." (p.17,l.21-22) "..one or both the BSSID and the SSID may be used to indicate those particular beacons are associated with a service" (p. 17, l 20-21) "Next the server retrieves the account information associated with EI2 and determines that EI1 is on a list of entities which are allowed to be notified of EI2 being present .... The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details. A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707." (p.18, l.18-26)
identifier related information associated with a proximity beacon service is received from a server using a first radio,	a device identifier is detected by a wireless device (Fig. 7, step 704); and the detected identifier is sent to the server (Fig. 7, step 705); the server then responds (Fig. 7, step 706) with information related to those detected identifers; the wireless device receives this response from the server via a first radio (Fig. 1, the WWAN link 103)	"The device identifier associated with Device 2 (703), DI2 is thereby detected. Device 1 (702) then transmits an inquiry message 705 using the WWAN (cellular data link such as GPRS, EDGE, 1×EV-DO, IS-2000, Wi-Max, LTE, or the like) to the server 701 inquiring if information related to the account and entity associated with DI2 is relevant, and available to the entity EI1 associated with Device 1 (702). ... "The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details." (p.18, l.9-26) "a given device 106, 108 ... uses the wide area wireless network connections 103, 104 such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100" (p.11, l.10-12)
the proximity beacon transmissions are received using a second radio,	the wireless device receives beacon transmissions (e.g., the IBSS beacons) from the other nearby wireless devices using a second radio the beacons are received via the second radio (e.g., the short range wireless connection 107)	"In an IBSS all devices participating or advertising their interest in participating in an ad-hoc network transmit identifiers called beacons" (p.17, l 6-12) "a given device 106, 108 uses a short range wireless link 107 such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link to detect the presence of other devices such as device 108" (p.11, l.6-8)
the proximity beacon information is derived from the proximity beacon transmissions, and	the beacons are processed to derive further information about the proximity beacon transmissions (e.g., the beacon transmissions include an associated identifier (step 704))	"..one or more of the BSSID and the SSID may be used as the identifier. (p.17, l.18-22). "delivery of the identifier in an IBSS beacon..." (p.17, l.22-23)
a proximity of a device associated with the proximity beacon service is determined by the mobile device using the identifier related information	"identifier related informaton" is the information returned from the server in step 706. That information is then used as part of a further determination that another device associated with the beacon service is in proximity (e.g., step 707 where a user application notifies the user that an entity (a particular person) associated with device 2 is in proximity)	The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details." (p.18,l 21-23) A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707. (p.18,l24-26)

Exhibit D Claim 1 feature	Context in U.S. Provisonal Patent Application 61/095,359 filed September 9, 2008	Citation to the supporting text of the '359 Application
determining that at least one beacon transmitter device associated the proximity beacon service is in proximity to the wireless device by utilizing the identifier related information	wireless device receives beacon transmissions the beacons include identifiers (e.g., an SSID) the identifiers are used to determine which devices (or related entities such as other users) are in proximity	As an example of the overall process, a detected identifier may be· relevant to the receiving device if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. If the identifiers for theindividuals within the friends list have been passed to the device, the action function may make this determination. In the preferred embodiment, the server would determine the identity and the relevance of the detected identifiers, and the action function would work to reduce frequency of requests to the server.(p. 3 last par.) For example, when the server receives an inquiry from a device with a list of identifiers, it may only respond with infomation which the users associated with the identifiers are on that device's friends list AND on each of the individual's friend lists as well. These friends' lists and policies would be stored within an account which allows r disclose of a user's presence only to individuals on this lis (p.4 third par.)
identifier related information associated with a proximity beacon service is received from a server using a first radio,	a device identifier is detected by a wireless device; and the detected identifier is sent to the server the server then responds with information related to those detected identifers; the wireless device receives this response from the server via a first radio (Figure 1, the WWAN link)	When a receiving device detects one or more identifier, it will use the WWAN link to communicate with the central server. The device will pass along a list of currently detected identifiers and request that the server provide the device with the information related to any identifier that is 1) relevant to that device, and 2) that device is authorized to receive. (p. 3, second par.) As the server contains the personal information, and performs the association of an account with a particular identifier, it can inherently enforce the security of the policies. In this way, the central server controls the process of passing information related to an account to a particular requesting device. (p. 4, last two lines, and p. 5, first two lines)
the proximity beacon transmissions are received using a second radio,	the wireless device receives beacon transmissions (e.g., the IBSS beacons) from other nearby wireless devices using a second radio the beacons are received via the second radio (Figure 1, the Bluetooth connection)	Title 2: Wireless beacon device for transmitting a wireless identifier to facilitate proximity detection (p. 1 l. 11-12) Using Bluetooth to perform the local WLAN connection, where that device is a Bluetooth device Where the interface is an NDIS driver or the like, Using the fields in the NDIS driver in a non-standard way such as using the SSID of the beacons to broadcast, or advertize the presence of associated account identifier gistered to the central server (p.22, l.3-9) An NDIS driver interfaced to an application which will put a Bluetooth or Wi-Fi or other device into a mode in which it will broadcast it's identity, where that identity contains an account or device identier (know to the central server), and report back all other broadcasted identifiers om other devices. The application then provide the reported identifiers the server, which will make decisions regarding a users interest in these detected identifiers, and policy regard privacy other identifiers. (p. 22 l. 12-16) ... the short range wireless is ONLY used for the detection process, and to advertise a device's presence by transmitting an identifier, or receiving identifiers from other devices. (p.2 last par.)
the proximity beacon information is derived from the proximity beacon transmissions, and	the beacons are processed to derive further information about the proximity beacon transmissions (e.g., the beacon transmissions include information related to an associated identifier)	Using the fields in the NDIS driver in a non-standard way such as using the SSID of the beacons to broadcast, or advertize the presence of your associated account identifier registered to the central server (p.22 l. 7-9)
a proximity of a device associated with the proximity beacon service is determined by the mobile device using the identifier related information	"identifier related informaton" is the information returned from the server. That information is then used as part of a further determination that another device is in proximity (e.g., where a mobile application called an "action function" is given a friends list)	a detected identifier may be· relevant to the receiving device if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. If the identifiers for the individuals within the friends list have been passed to the device, the action function may make this determination. (p. 3, las par.) For example, when the server receives an inquiry from a device with a list of identifiers, it may only respond with information which the users associated with the identifirrs are on that device's friends list AND on each of the individual's friend lists as well. These friends' lists and policies would be stored within an account which allows to disclose of a user's presence only to individuals on this list.(p. 4, third par.)

EXHIBIT E Claim 31 feature	Context in U.S. Patent Application 12/364,828 filed February 3, 2009	Citation to the text of the '828 Application
communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;	the wireless device communicates with a server via a first radio (Fig. 1, the WWAN link 103) "detected identifiers are sent to the server (Fig. 7, step 705); the server then responds with "identifier related informaton" (Fig. 7 step 706).	a given device 106, 108 ... uses the wide area wireless network connections 103, 104 such as IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100 (p.11, l.10-12) The device identifier associated with Device 2 (703), DI2 is thereby detected. Device 1 (702) then transmits an inquiry message 705 using the WWAN (cellular data link such as GPRS, EDGE, 1×EV-DO, IS-2000, Wi-Max, LTE, or the like) to the server 701 inquiring if information related to the account and entity associated with DI2 is relevant, and available to the entity EI1 associated with Device 1 (702). ... "The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details." (p.18, l.9-26)
receiving, at the mobile device using a second radio, proximity beacon transmissions from one or more beacon transmitter devices	the wireless device receives beacon transmissions (e.g., the IBSS beacons) from the other nearby wireless devices using a second radio (e.g., Fig. 1, the short range wireless connection 107)	"a given device 106, 108 uses a short range wireless link 107 such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link to detect the presence of other devices such as device 108" (p.11, l.6-8) "In an IBSS all devices participating or advertising their interest in participating in an ad-hoc network transmit identifiers called beacons" (p.17, l 10-12) a wireless device receives beacon transmissions from other wireless devices (Fig. 6 items 604, 605, 606)
deriving, at the mobile device, proximity beacon information from the proximity beacon transmissions; and	the beacons are processed to derive further information about the proximity beacon transmissions (e.g., the beacon transmissions include an associated identifier (step 704))	"..one or more of the BSSID and the SSID may be used as the identifier. (p.17, l.18-22). "delivery of the identifier in an IBSS beacon..." (p.17, l.22-23)
determining, at the mobile device, that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile device by utilizing the identifier related information;	the identifiers are then used to determine which devices (or related entities or objects) in proximity are have relevance (Fig. 7 step 706 and 707) That information returned from the server then further processed by the mobile device (e.g., step 707 where a user application notifies the user that an entity associated with device 2 is in proximity)	"The server having determined that EI1 wants to be notified and is allowed to be notified responds in Step 706 to Device 1 (702) with a message indicating the DI2 is relevant to EI1 and including information such as Entity Identifier EI2 and associated details. A user application on Device 1 (702) notifies the user that the entity associated with Device 2 is in proximity in step 707. (p.18, l.18-26)
wherein each of the proximity beacon transmissions comprises a MACaddress, a unique identifier, and proximity beacon service identifier;	The beacons contain a MAC address, unique identifier, and proximity beacon information	"These beacons contain the MAC address of the transmitting network adapter, the basic service set identifier (BSSID), and ad-hoc network name or service set identity (SSID)" (p.12-14); "...one or more of the BSSID and the SSID may be used as the identifier." (p.17,l.21-22)
wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service	the beacons (e.g., IBSS beacons) and the beacon transmissions include identifiers (e.g., a BSSID or SSID) the identifiers may be the same for different devices participating in the same particular service	..one or both the BSSID and the SSID may be used to indicate those particular beacons are associated with a service (p. 17, l 20-21) In the preferred embodiment, where the MAC address is used for the identifier, all the devices participating would likely have the same network name and SSID" (p.17 l.25-27)

EXHIBIT F Claim 31 feature	Context in U.S. Patent Application 61/095,359 filed September 9, 2008	Citation to the text of the '359 Application
communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;	a device identifier is detected by a wireless device; and the detected identifier is sent to the server the server then responds with information related to those detected identifers; the wireless device receives this response from the server via a first radio (Figure 1, the WWAN link)	When a receiving device detects one or more identifier, it will use the WWAN link to communicate with the central server. The device will pass along a list of currently detected identi ers and request that the server provide the device with the information related to any identifier that is 1) levant to that device, and 2) that device is authorized to receive. (p 3, second par.) As the server contains the personal information, and performs the association of an account with a particular identifier, it can inherently enforce the security of the policies. In this way, the central server controls the process of passing information related to an account to a particular requesting device. (p. 4, last two lines, and p. 5, first two lines)
receiving, at the mobile device using a second radio, proximity beacon transmissions from one or more beacon transmitter devices	the wireless device receives beacon transmissions (e.g., the IBSS beacons) from other nearby wireless devices using a second radio the beacons are received via the second radio (Figure 1, the Bluetooth connection)	Title 2: Wireless beacon device for transmitting a wireless identifier to facilitate proximity detection (p. 1 l. 11-12) Using Bluetooth to perform the local WLAN connection, where that device is a Bluetooth device Where the interface is an NDIS driver or the like, Using the fields in the NDIS driver in a non standard way such as using the SSID of the beacons to broadcast, or advertize the presence of associated account identifier gistered to the central server (p.22, l.3-9) An NDIS driver interfaced to an application which will put a Bluetooth or Wi-Fi or other device into a mode in which it will broadcast it's identity, where that identity contains an account or device identier (know to the central server), and report back all other broadcasted identifiers from other devices. The application then provide the reported identifiers the server, which will make decisions regarding a users interest in these detected identifiers, and policy regard privacy other identifiers. (p. 22 l. 12-16) ... the shorange wireless is ONLY used for the detection process, and to advertise a device's presence by transmitting an identifier, or receiving identifiers from other devices. (p.2 last par.)
deriving, at the mobile device, proximity beacon information from the proximity beacon transmissions; and	the beacons are processed to derive further information about the proximity beacon transmissions (e.g., the beacon transmissions include information related to an associated identifier)	Using the fields in the NDIS driver in a non-standard way such as using the SSID of the beacons to broadcast, or advertize the presence of your associated account identifier registered to the central server (p.22 l. 7-9)
determining, at the mobile device, that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile device by utilizing the identifier related information;	"identifier related informaton" is the information returned from the server. That information is then used as part of a further determination that another device is in proximity (e.g., where a mobile application called an "action function" is given a friends list)	a detected identifier may be· relevant to the receiving device if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. If the identifiers for the individuals within the friends list have been passed to the device, the action function may make this determination. (p. 3, last par.) For example, when the server receives an inquiry from a device with a list of identifiers, it may only respond with information which the users associated with the identifirrs are on that device's friends list AND on each of the individual's friend lists as well. These friends' lists and policies would be stored within an account which allows to disclose of a user's presence only to individuals on this list.(p. 4, third par.)

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MEMORANDUM

DATE: April 19, 2018

TO: Patent Examining Corps

FROM: Robert W. Bahr
Deputy Commissioner
for Patent Examination Policy

SUBJECT: Changes in Examination Procedure Pertaining to Subject Matter Eligibility, Recent Subject Matter Eligibility Decision (*Berkheimer v. HP, Inc.*)

The USPTO recognizes that unless careful consideration is given to the particular contours of subject matter eligibility (35 U.S.C. § 101), it could "swallow all of patent law." *Alice Corp. v. CLS Bank International*, 573 U.S. ___, ___, 134 S. Ct. 2347, 2352 (2014) (citing *Mayo Collaborative Servs.* v. *Prometheus Labs., Inc.*, 566 U.S. 66, 71, 132 S. Ct. 1289, 1293-1294 (2012)). This memorandum provides additional USPTO guidance that will further clarify how the USPTO is determining subject matter eligibility in accordance with prevailing jurisprudence. Specifically, this memorandum addresses the limited question of whether an additional element (or combination of additional elements) represents well-understood, routine, conventional activity. The USPTO is determined to continue its mission to provide clear and predictable patent rights in accordance with this rapidly evolving area of the law, and to that end, may issue further guidance in the future.

The U. S. Court of Appeals for the Federal Circuit (Federal Circuit) recently issued a precedential decision holding that the question of whether certain claim limitations represent well-understood, routine, conventional activity raised a disputed factual issue, which precluded summary judgment that all of the claims at issue were not patent eligible. *See Berkheimer v. HP Inc.*, 881 F.3d 1360 (Fed. Cir. 2018). Shortly thereafter, the Federal Circuit reaffirmed the *Berkheimer* standard in the context of a judgment on the pleadings and judgment as a matter of law.[1] While summary judgment, judgment on the pleadings, and judgment as a matter of law

[1] In *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121 (Fed. Cir. 2018), the Federal Circuit reversed a judgment on the pleadings of ineligibility, similarly finding that whether the claims in the challenged patent perform well-understood, routine, conventional activities is an issue of fact. In *Exergen Corp. v. Kaz USA, Inc.*, Nos. 2016-2315, 2016-2341, 2018 WL 1193529, at *1 (Fed. Cir. Mar. 8, 2018) (non-precedential), the Federal Circuit affirmed a district court's denial of a motion for judgment as a matter of law of patent ineligibility (thus

standards in civil litigation are generally inapplicable during the patent examination process, *Berkheimer* informs the inquiry into whether an additional element (or combination of additional elements) represents well-understood, routine, conventional activity.

I. Federal Circuit Decision in Berkheimer: In *Berkheimer*, the invention relates to digitally processing and archiving files in a digital asset management system. The patent specification explains that the system eliminates redundant storage of common text and graphical elements, which improves system operation efficiency and reduces storage costs. With respect to *Mayo/Alice* step 1 (step 2A in the USPTO's guidance), the Federal Circuit held that the claims are directed to the abstract ideas of parsing and comparing data (claims 1-3 and 9), parsing, comparing, and storing data (claim 4), and parsing, comparing, storing, and editing data (claims 5-7) based upon a comparison of these claims to claims held to be abstract in prior Federal Circuit decisions. *Berkheimer*, 881 F.3d at 1366-67. With respect to *Mayo/Alice* step 2 (step 2B in the USPTO's guidance), the Federal Circuit considered the elements of each claim both individually and as an ordered combination, recognizing that "whether a claim element or combination of elements is well-understood, routine and conventional to a skilled artisan in the relevant field is a question of fact." *Id.* at 1367-68. While observing that the specification discussed purported improvements (*e.g.*, reducing redundancy and enabling one-to-many editing as the purported improvements), the Federal Circuit held claims 1-3 and 9 ineligible because they do not include limitations that realize these purported improvements. *Id.* at 1369-70.

In contrast, the Federal Circuit held that claims 4-7 do contain limitations directed to purported improvements described in the specification (*e.g.*, claim 4 recites "storing a reconciled object structure in the archive without substantial redundancy," which the specification explains improves system operating efficiency and reduces storage costs), raising a genuine issue of material fact as to whether the purported improvements were more than well-understood, routine, conventional activity previously known in the industry. *Id.* at 1370. The Federal Circuit therefore reversed the district court's decision on summary judgment that claims 4-7 are patent ineligible, and remanded for further fact finding as to the eligibility of those claims. *Id.* at 1370-71.

Finally, the Federal Circuit drew a distinction between what is well-understood, routine, conventional, and what is simply known in the prior art, cautioning that the mere fact that something is disclosed in a piece of prior art does not mean it was a well-understood, routine, conventional activity or element. *Id.* at 1369.

II. Well-Understood, Routine, Conventional Activity: While the *Berkheimer* decision does not change the basic subject matter eligibility framework as set forth in MPEP § 2106, it does provide clarification as to the inquiry into whether an additional element (or combination of additional elements) represents well-understood, routine, conventional activity. Specifically, the Federal Circuit held that "[w]hether something is well-understood, routine, and conventional to a skilled artisan at the time of the patent is a factual determination." *Id.* at 1369.

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upholding the district court's conclusion that the claims were drawn to a patent eligible invention), concluding that the district court's fact finding that the claimed combination was not proven to be well-understood, routine, conventional was not clearly erroneous.

As set forth in MPEP § 2106.05(d)(I), an examiner should conclude that an element (or combination of elements) represents well-understood, routine, conventional activity **only** when the examiner can readily conclude that the element(s) is widely prevalent or in common use in the relevant industry. This memorandum clarifies that such a conclusion must be based upon a factual determination that is supported as discussed in section III below. This memorandum further clarifies that the analysis as to whether an element (or combination of elements) is widely prevalent or in common use is the same as the analysis under 35 U.S.C. § 112(a) as to whether an element is so well-known that it need not be described in detail in the patent specification.[2]

The question of whether additional elements represent well-understood, routine, conventional activity is distinct from patentability over the prior art under 35 U.S.C. §§ 102 and 103. This is because a showing that additional elements are obvious under 35 U.S.C. § 103, or even that they lack novelty under 35 U.S.C. § 102, is not by itself sufficient to establish that the additional elements are well-understood, routine, conventional activities or elements to those in the relevant field. *See* MPEP § 2106.05. As the Federal Circuit explained: "[w]hether a particular technology is well-understood, routine, and conventional goes beyond what was simply known in the prior art. The mere fact that something is disclosed in a piece of prior art, for example, does not mean it was well-understood, routine, and conventional." *Berkheimer*, 881 F.3d at 1369.

III. Impact on Examination Procedure: This memorandum revises the procedures set forth in MPEP § 2106.07(a) (Formulating a Rejection For Lack of Subject Matter Eligibility) and MPEP § 2106.07(b) (Evaluating Applicant's Response).

A. Formulating Rejections: In a step 2B analysis, an additional element (or combination of elements) is not well-understood, routine or conventional unless the examiner finds, and expressly supports a rejection in writing with, one or more of the following:

1. A citation to an express statement in the specification or to a statement made by an applicant during prosecution that demonstrates the well-understood, routine, conventional nature of the additional element(s). A specification demonstrates the well-understood, routine, conventional nature of additional elements when it describes the additional elements as well-understood or routine or conventional (or an equivalent term), as a commercially available product, or in a manner that indicates that the additional elements are sufficiently well-known that the specification does not need to describe the particulars of such additional elements to satisfy 35 U.S.C. § 112(a). A finding that an element is

[2] *See Genetic Techs. Ltd. v. Merial LLC*, 818 F.3d 1369, 1377 (Fed. Cir. 2016) (supporting the position that amplification was well-understood, routine, conventional for purposes of subject matter eligibility by observing that the patentee expressly argued during prosecution of the application that amplification was a technique readily practiced by those skilled in the art to overcome the rejection of the claim under 35 U.S.C. 112, first paragraph); *see also Lindemann Maschinenfabrik GMBH v. Am. Hoist & Derrick Co.*, 730 F.2d 1452, 1463 (Fed. Cir. 1984) ("[T]he specification need not disclose what is well known in the art."); *In re Myers*, 410 F.2d 420, 424 (CCPA 1969) ("A specification is directed to those skilled in the art and need not teach or point out in detail that which is well-known in the art."); *Exergen Corp.*, 2018 WL 1193529, at *4 (holding that "[l]ike indefiniteness, enablement, or obviousness, whether a claim is directed to patent eligible subject matter is a question of law based on underlying facts," and noting that the Supreme Court has recognized that "the inquiry 'might sometimes overlap' with other fact-intensive inquiries like novelty under 35 U.S.C. § 102").

well-understood, routine, or conventional cannot be based only on the fact that the specification is silent with respect to describing such element.

2. A citation to one or more of the court decisions discussed in MPEP § 2106.05(d)(II) as noting the well-understood, routine, conventional nature of the additional element(s).

3. A citation to a publication that demonstrates the well-understood, routine, conventional nature of the additional element(s). An appropriate publication could include a book, manual, review article, or other source that describes the state of the art and discusses what is well-known and in common use in the relevant industry. It does not include all items that might otherwise qualify as a "printed publication" as used in 35 U.S.C. § 102.[3] Whether something is disclosed in a document that is considered a "printed publication" under 35 U.S.C § 102 is a distinct inquiry from whether something is well-known, routine, conventional activity. A document may be a printed publication but still fail to establish that something it describes is well-understood, routine, conventional activity. *See Exergen Corp.*, 2018 WL 1193529, at *4 (the single copy of a thesis written in German and located in a German university library considered to be a "printed publication" in *Hall* "would not suffice to establish that something is 'well-understood, routine, and conventional activity previously engaged in by scientists who work in the field'"). The nature of the publication and the description of the additional elements in the publication would need to demonstrate that the additional elements are widely prevalent or in common use in the relevant field, comparable to the types of activity or elements that are so well-known that they do not need to be described in detail in a patent application to satisfy 35 U.S.C. § 112(a). For example, while U.S. patents and published applications are publications, merely finding the additional element in a single patent or published application would not be sufficient to demonstrate that the additional element is well-understood, routine, conventional, unless the patent or published application demonstrates that the additional element are widely prevalent or in common use in the relevant field.

4. A statement that the examiner is taking official notice of the well-understood, routine, conventional nature of the additional element(s). This option should be used **only** when the examiner is certain, based upon his or her personal knowledge, that the additional element(s) represents well-understood, routine, conventional activity engaged in by those in the relevant art, in that the additional elements are widely prevalent or in common use in the relevant field, comparable to the types of activity or elements that are so well-known that they do not need to be described in detail in a patent application to satisfy 35 U.S.C. § 112(a). Procedures for taking official notice and addressing an applicant's challenge to official notice are discussed in MPEP § 2144.03.

B. Evaluating Applicant's Response: If an applicant challenges the examiner's position that the additional element(s) is well-understood, routine, conventional activity, the examiner should reevaluate whether it is readily apparent that the additional elements are in actuality well-

[3] *See, e.g., In re Klopfenstein*, 380 F.3d 1345 (Fed. Cir. 2004) (publicly displayed slide presentation); *In re Hall*, 781 F.2d 897 (Fed. Cir. 1986) (doctoral thesis shelved in a library); *Mass. Inst. of Tech. v. AB Fortia*, 774 F.2d 1104, 1108-09 (Fed. Cir. 1985) (paper orally presented at a scientific meeting and distributed upon request); *In re Wyer*, 655 F.2d 221 (CCPA 1981) (patent application laid open to public inspection).

understood, routine, conventional activities to those who work in the relevant field. If the examiner has taken official notice per paragraph (4) of section (III)(A) above that an element(s) is well-understood, routine, conventional activity, and the applicant challenges the examiner's position, specifically stating that such element(s) is not well-understood, routine, conventional activity, the examiner must then provide one of the items discussed in paragraphs (1) through (3) of section (III)(A) above, or an affidavit or declaration under 37 CFR 1.104(d)(2) setting forth specific factual statements and explanation to support his or her position. As discussed previously, to represent well-understood, routine, conventional activity, the additional elements must be widely prevalent or in common use in the relevant field, comparable to the types of activity or elements that are so well-known that they do not need to be described in detail in a patent application to satisfy 35 U.S.C. § 112(a).

The MPEP will be updated in due course to incorporate the changes put into effect by this memorandum.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/271,410	Filing Date 09/21/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	07/20/2018	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0	X $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
LORRAINE E. WALDEN

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/271,410	09/21/2016	James Arthur Proctor JR.	111054-0001U4C7	7653

86012 7590 09/07/2018

VLP Law Group LLP
555 Bryant Street
Suite 820
Palo Alto, CA 94301

EXAMINER
SHERR, MARIA CRISTI OWEN

ART UNIT	PAPER NUMBER
3685	

NOTIFICATION DATE	DELIVERY MODE
09/07/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@vlplawgroup.com

UNITED STATES PATENT AND TRADEMARK OFFICE

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Doc Code:
TRACK1.GRANT

Decision Granting Request for Prioritized Examination (Track I or After RCE)	Application No.: 15/271,410

1. THE REQUEST FILED July 20, 2018 IS **GRANTED.**

The above-identified application has met the requirements for prioritized examination

A. ☐ for an original nonprovisional application (Track I).
B. ☒ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination.** The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims**, or a multiple dependent claim;

C. filing a **request for continued examination**;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to Cheryl Gibson-Baylor at (571)272-3213, Office of Petitions. In his/her absence, calls may be directed to Brian W. Brown, (571)272-5338.

Cheryl Gibson-Baylor
/Cheryl Gibson-Baylor/
[*Signature*]

Petitions Paralegal Specialist
(Title)

Office of Petitions: Routing Sheet



Application No. 15271410

This application is being forwarded to your office for further processing. A decision has been rendered on a petition filed in this application, as indicated below. For details of this decision, please see the document PET.OP.DEC filed on the same date as this document.

- [X] **GRANTED**
- [ ] **DISMISSED**
- [ ] **DENIED**

Office of Petitions: Decision Count Sheet | 9

Application No. 15271410

15271410

For US serial numbers: enter number only, no slashes or commas. Ex: 10123456
For PCT: enter "51+single digit of year of filing+last 5 numbers", Ex. for PCT/US05/12345, enter 51512345

Deciding Official: GIBSON-BAYLOR, C

Count (1) - Palm Credit 15271410

Decision: GRANT

FINANCE WORK NEEDED
☐ Select Check Box for YES

GRANT

Decision Type: 643 - Track One request

643

Notes:

Count (2)

Decision: n/a

FINANCE WORK NEEDED
☐ Select Check Box for YES

Decision Type: NONE

Notes:

Count (3)

Decision: n/a

FINANCE WORK NEEDED
☐ Select Check Box for YES

Decision Type: NONE

Notes:

Initials of Approving Official (if required)

Printed on: 9/4/2018

Office of Petitions Internal Document - Ver. 5.0

PATENTS
111054–0001U4C7

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of: James A. Proctor, Jr., et al.	
Serial No.: 15/271,410	Examiner: Sherr, Cristina Owen
Filed: September 21, 2016	Art Unit: 3685
For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	Confirmation No.: 7653

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPLICANT SUMMARY OF INTERVIEW WITH EXAMINER

On November 5, 2018 the Applicant's undersigned attorney contacted Examiner Sherr by telephone to confirm that this application has been granted Track I Prioritized Examination status, and to inquire when a first action might be forthcoming.

Examiner Sherr stated that an action could be expected within approximately the next 7 to 10 days.

Respectfully submitted,
/David J. Thibodeau Jr. Reg No 31671/
David J. Thibodeau, Jr. Reg. No. 31,671
VLP LAW GROUP LLP
Telephone: (617) 925-5520
Facsimile: (617) 925-5530

November 7, 2018

Electronic Acknowledgement Receipt

EFS ID:	34233326
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
Filer:	David J. Thibodeau/Elisabeth Smith
Filer Authorized By:	David J. Thibodeau
Attorney Docket Number:	111054-0001U4C7
Receipt Date:	07-NOV-2018
Filing Date:	21-SEP-2016
Time Stamp:	09:53:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant summary of interview with examiner	20181107_111054-0001U4C7_TPO_Interview_Summary.pdf	89836 d6b155342dac34ad5998ae5258fd7aa52b3e2873	no	1

Warnings:

Information:	
Total Files Size (in bytes):	89836

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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patents@vlplawgroup.com

Office Action Summary	Application No. 15/271,410	Applicant(s) Proctor et al.	
	Examiner CRISTINA O SHERR	Art Unit 3685	AIA Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 20 July 2018.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-2,4-10,12-15,17-19,21-23,31-32 and 34-42 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-2,4-10,12-15,17-19,21-23,31-32 and 34-42 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date July 20, 2018.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED CORRESPONDENCE

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

2. This Office Action is in response to the Applicant's Amendment filed July 20, 2018. Claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42 are pending in this case. Claims 24-30 were previously canceled. Claims 3, 11, 16, 20, and 33 are currently canceled. Claims 38-41 are newly added. Claims 14, 5, 7, 8, 9, 10, 13, 15, 17, 19, 23, 31, and 37 are currently amended.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 20, 2018, has been entered.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on July 20, 2018, is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Remarks

5. Nonfunctional descriptive material does not serve to distinguish from the prior art. *In re Kao*, 639 F.3d1057, ___, 98 USPQ2d 1799, 1811-12 (Fed. Cir. 2011); *King Pharmaceuticals Inc. v. Eon Labs Inc.*, 616 F.3d1267, ___, 95 USPQ2d 1833, 1842 (Fed. Cir. 2010); *In re Gulack*, 217 USPQ 401 (Fed. Cir. 1983), *In re Ngai*, 70 USPQ2d (Fed. Cir. 2004), *In re Lowry*, 32 USPQ2d 1031 (Fed. Cir. 1994); MPEP 2111.05.

6. In claim 1, "each of the proximity beacon service transmissions including a MAC address, a unique identifier, and a proximity beacon service identifier" and "the proximity beacon service identifier indicating the proximity beacon transmissions are associated with the proximity beacon service, and the proximity beacon service identifier being the same for two or more proximity beacon transmissions associated with the proximity beacon service" are nonfunctional descriptive material.

7. Similarly, in claim 31, "wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and a proximity beacon service identifier, wherein the proximity beacon service identifier indicates the proximity beacon transmissions are associated with a proximity beacon service; and wherein the proximity beacon service identifier is the same for al two or more proximity beacon transmissions associated with the proximity beacon service" is also nonfunctional.

Response to Arguments

8. Applicant's arguments, see **REMARKS**, filed July 20, 2018, with respect to the priority date of the claims, as currently amended, have been fully considered and are persuasive. The priority date of the claims, as currently amended, has been set at January 28, 2009.

9. Applicant's further arguments filed July 20, 2018, have been fully considered but they are not persuasive.

10. Applicant argues, regarding claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42, as currently amended, that the claims recite statutory subject matter.

11. Examiner respectfully disagrees.

12. The claims, as a whole, do not amount to significantly more than the abstract idea itself. This is because the claims do not effect an improvement to another technology or technical filed; the claims do not amount to an improvement to the functioning of a computer system itself; and the claims do not move beyond a general link of the use of an abstract idea to a particular technological environment.

13. Applicant argues, regarding claim 4, as currently amended, that the claim complies with the written description requirement.

14. Examiner respectfully disagrees.

15. Claim 4 recites "occasionally change for security reasons", wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (MPEP 2163 (A)).

16. Applicant argues, regarding claim 18, as currently amended, that the claim complies with the written description requirement.

17. Examiner respectfully disagrees.

18. Claim 18 recites "is changed as well as to prevent . . .", wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (also, MPEP 2161 (1) lack of algorithm).

19. Applicant argues, regarding claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42, as currently amended, that the claims are neither vague nor unclear.

20. Examiner respectfully disagrees.

21. The claims recite multiple instances of apparatus and method steps of using the apparatus –

- Claim 2 --- "a randomly generated" (*Katz, UltimatePointer*).
- Claim 4 --- "occasionally change".
- Claim 5 --- "… change from time to time", "… making… anonymous over time…".
- Claim 6 --- "which is used…".
- Claim 15 --- "wherein . . . the mobile wireless device, upon determining…", "wherein the further communications utilize the first radio…, but remains identifiable by the wireless mobile device…", "upon determining there is a match…"

- Claim 17 --- "wherein the unique identifier… changes over time based upon an algorithm in synchronization…"
- Claim 18 --- "… and is generated algorithmically and only known to at least one of the servers… and updated based… upon a clock interval…" "wherein the MAC address … is changed as well…"
- Claim 23 --- "wherein no connection is made between the mobile wireless device …"

22. Applicant's further arguments with respect to the claims, as currently amended, have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

Claim Rejections - 35 USC § 101

23. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

24. Claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

25. Regarding claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42 –

26. Claims 1-2, 4-10, 12- 15, 17-19, 21-23, 31-32, and 34-42 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter because the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

27. The claims are directed to the abstract idea of determining distance.

<u>Subject Matter Eligibility Standard</u>

28. When considering subject matter eligibility under 35 U.S.C. 101, it must be determined whether the claim is directed to one of the four statutory categories of invention, i.e., process, machine, manufacture, or composition of matter. If the claim does fall within one of the statutory categories, it

must then be determined whether the claim is directed to a judicial exception (*i.e.*, law of nature, natural phenomenon, and abstract idea), and if so, it must additionally be determined whether the claim is a patent-eligible application of the exception. If an abstract idea is present in the claim, any element or combination of elements in the claim must be sufficient to ensure that the claim amounts to significantly more than the abstract idea itself. Examples of abstract ideas include fundamental economic practices; certain methods of organizing human activities; an idea itself; and mathematical relationships/formulas. (*Alice Corporation Pty. Ltd. v. CLS Bank International, et al* US Supreme Court, No. 13-298, June 19, 2014).

Analysis

29. In this case, claim 31 recites a method.

30. Additionally, the claim is directed to the abstract idea of determining whether a device is in proximity to an access point. (*Alice Corporation Pty. Ltd. v. CLS Bank International, et al* US Supreme Court, No. 13-298, June 19, 2014) The claim involves an algorithm that involves receiving a list of identifiers or locations, determining the location of a device, and determining that the device is in proximity to one of the locations on the list. The transaction device in this claim merely automates this algorithm, and therefore, the claim does not include additional elements that are sufficient to amount to significantly more than the judicial exception because additional claim elements do not provide meaningful limitations to transform the abstract idea into a patent eligible application of the abstract idea such that the claim amounts to significantly more than the abstract idea itself.

31. Regarding the additional element recited in the claim, such as the mobile wireless device comprising a first and second radio, one or more processors, and one or more non-transitory memory devices, we note that these elements, in combination, only serve to use a computer or mobile device as a tool to automate and/or implement the abstract idea. Merely applying instructions by reciting the computing structure as a tool to implement the claimed limitations (see MPEP 2106.05(f)) or merely

linking the use of the judicial exception to a particular technological environment or field of use (MPEP § 2106.05(h)), does not serve to provide significantly more than the abstract idea. The claims do not, for example, purport to improve the functioning of the computer itself. Nor do they effect an improvement in any other technology or technical field. Instead, the claims at issue amount to nothing significantly more than an instruction to apply the abstract idea of determining the proximity of a device using a computer. "Under our precedents, that is not 'enough' to transform an abstract idea into a patent--eligible invention." See *Alice Corp. Pty. Ltd*., 134 S.Ct. at 2360.

Conclusion

32. The claims, as a whole, do not amount to significantly more than the abstract idea itself. This is because the claims do not effect an improvement to another technology or technical filed; the claims do not amount to an improvement to the functioning of a computer system itself; and the claims do not move beyond a general link of the use of an abstract idea to a particular technological environment.

33. Accordingly, the Examiner concludes that there are no meaningful limitations in the claims that transform the judicial exception into a patent eligible application such that the claims amount to significantly more than the judicial exception itself.

34. The dependent claims 32, 34-37, and 40--42 do not resolve the deficiency of independent claims and accordingly stand rejected under 35 USC 101 based on the same rationale.

35. Independent claim 1 and its dependent claims 2, 4-10, 12- 15, 17-19, 21-23, and 38-41 merely implement the abstract idea of claim 31.

Claim Rejections - 35 USC § 112

36. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

37. The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

38. Claims 4 and 18 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for pre-AIA the inventor(s), at the time the application was filed, had possession of the claimed invention.

39. Regarding claim 4 –

40. The claim recites "occasionally change", wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (MPEP 2163 (A)).

41. Regarding claim 18 –

42. The claim recites "is changed as well as to prevent . . .". wherein the said limitation is broader than the Specification, as filed (See PgPub US 2017/0011425 at par 44), (*LizardTech Inc. v. Earth Resource Mapping Inc.*, 76 USPQ2d 1724 (Fed. Cir. 2005)) (also, MPEP 2161 (1) lack of algorithm).

43. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

44. The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

45. Claims 1-2, 4-10, 12 - 15, 17-19, 21-23, 31-32, and 34-42 rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

46. A single claim which claims both an apparatus and the method steps of using the apparatus is indefinite under 35 U.S.C. 112, second paragraph. *In re Katz* Interactive Call Processing Patent Litigation, 639 F.3d 1303 (Fed. Cir. 2011).

47. The claims recite multiple instances of apparatus and method steps of using the apparatus –

- Claim 2 --- "a randomly generated" (*Katz, UltimatePointer*).
- Claim 4 --- "occasionally change".
- Claim 5 --- "… change from time to time", "… making… anonymous over time…".
- Claim 6 --- "which is used…".
- Claim 15 --- "wherein . . . the mobile wireless device, upon determining…", "wherein the further communications utilize the first radio…, but remains identifiable by the wireless mobile device…", "upon determining there is a match…"
- Claim 17 --- "wherein the unique identifier… changes over time based upon an algorithm in synchronization…"
- Claim 18 --- "… and is generated algorithmically and only known to at least one of the servers… and updated based… upon a clock interval…" "wherein the MAC address … is changed as well…"
- Claim 23 --- "wherein no connection is made between the mobile wireless device …"

48. Regarding claim 13 –

49. The claim is directed to a device -- "upon the mobile wireless device". However the device is also used to describe a limitation -- "by the mobile wireless device", "wherein the mobile wireless

device". This is improper as the device is not fully described. In other words, the mobile wireless device is defined in terms of the mobile wireless device itself. The scope is unclear (*In re Zletz*).

50. Regarding claim 14 –

51. The claim recites "for execution upon the mobile wireless device"(referring to the device of claim 13) This is improper as the device is not fully described. The scope is unclear (*In re Zletz*).

52. Regarding claim 15 –

53. The claim recites "wherein . . . . the mobile wireless device"(referring to the device of claim 13) This is improper as the device is not fully described. In other words, the mobile wireless device is defined in terms of the mobile wireless device itself. The scope is unclear (*In re Zletz*).

54. Regarding claim 23 –

55. The claim recites "between the mobile wireless device"(referring to the device of claim 13) This is improper as the device is not fully described. In other words, the mobile wireless device is defined in terms of the mobile wireless device itself. The scope is unclear (*In re Zletz*).

56. Regarding claim 32 –

57. Note that claim 31 is already performed, and the first limitation of claim 32 says claim 31 is performed under control of an application. So executing is unclear as the first limitation suggests that it was already executed.

58. Regarding claim 34 –

59. Claim 34 recites the limitation of "performing at least a portion of the steps on one or more processor of the one or more servers." Claim 31, on which claim 34 depends, recites that all of the steps are performed at the mobile device. It is unclear to one of ordinary skill how at least a portion of the steps can be performed on a processor of a server when the steps are performed on a mobile device.

Claim Rejections - 35 USC § 103

60. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

61. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

62. Claims 1, 6-10, 12-14, 19, 31, and 34-40 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200).

63. Regarding claims 1 and 31-

64. Sundar teaches a mobile wireless device (abs) comprising:

a first radio; (par 59-60)

a second radio; (par 55-58, 65)

one or more processors: (par 59-65)

one or more non-transitory memory devices coupled to the one or more processors, (par 59-65) the one or more non-transitory memory devices storing a set of instructions that, when executed by the one or more processors cause the one or more processors to perform operations including:

receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers; (par 59-60)

receiving, using the second radio, a plurality of proximity beacon transmissions when the device is located within a detection range of one or more beacon transmitter devices, each of the proximity beacon transmissions including a proximity beacon service identifier; (par 55-58, 65)

deriving proximity beacon information from the proximity beacon, transmissions; (par 58-59, 65)

determining that at least one beacon transmitter device, associated with the proximity beacon service is in proximity to the mobile wireless device by utilizing at least the identifier related information; (par 58-59, 65) and

the proximity beacon being service identifier indicating the same for all proximity beacon transmissions are associated with the proximity beacon service and the proximity beacon service identifier being the same for two or more proximity beacon transmissions associated with the proximity beacon service. (fig 2-3, par 14, 58-59)

65. Sundar does not specifically teach each of the proximity beacon transmissions including a MAC address and a unique identifier.

66. Park teaches teach each of the proximity beacon transmissions including a MAC address and a unique identifier. (par 18, 21, 23, 41, 43).

67. It would be obvious to one of ordinary skill in the art to combine Park and Sundar in order to obtain greater transaction security.

68. Regarding claims 6 and 35 –

69. Park teaches that at least a portion of the identifier related information includes a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter of the plurality of beacon transmitter devices. (par 18, 21, 23, 41, 43)

70. Regarding claim 7 –

71. Sundar teaches that the one or more processors further execute the instructions to perform operations including further determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by comparing the downloaded unique

identifier with the portion of the proximity beacon information, the portion comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object. (par 58-59, 65)

72. Regarding claim 8 –

73. Sundar teaches that the one or more processors further execute the instructions to perform operations including further determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by utilizing an action function including one or more previously downloaded unique identifiers. (par 58-59, 65)

74. Regarding claim 9 –

75. Sundar teaches that the one or more processors further execute the instructions to perform operations including further determining that a specific beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by comparing the proximity beacon information with the identifier related information. (par 58-59, 65)

76. Regarding claim 10 –

77. Sundar teaches that the one or more processors further execute the instructions to perform operations including further determining that at least one beacon transmitter device by associated with the beacon service is in proximity to the mobile wireless device, by sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radios and receiving, in response to the sending, at least a portion of the identifier related information used in the determining step. (par 58-59, 65)

78. Regarding claim 12 –

79. Sundar teaches that the one or more processors further execute the instructions to perform operations including determining, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a predetermined location. (par 58-59, 65)

80. Regarding claim 13 –

81. Sundar teaches that the identifier related information comprises application software for execution upon the mobile wireless device, and the one or more processors further execute the instructions to perform operations including downloading the application software in reaction to sending of a unique identifier by the mobile wireless device to at least one server of the one or more servers, and wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information. (par 58-59, 65)

82. Regarding claim 14 –

83. Sundar teaches that the identifier related information comprises application software for execution upon the mobile wireless device. (par 58-59, 65)

84. Regarding claim 19 –

85. Sundar teaches that the second radio is one of a Bluetooth based radio or a Wi-Fi- based radio. (par 10)

86. Regarding claim 34 –

87. Sundar teaches performing at least a portion of the steps on one or more processors of the one or more servers. (par 59-65)

88. Regarding claim 36 –

89. Sundar teaches that the identifier related information is received in response to software residing on the mobile device sending at least one unique identifier determined from the proximity beacon information. (fig 2-3, par 14, 58-59)

90. Regarding claim 38 –

91. Sundar teaches determining that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile wireless device utilizing both the identifier related information and the proximity beacon transmissions. (fig 2-3, par 14, 58-59)

92. Regarding claim 39 –

93. Sundar teaches performing further actions based upon the proximity beacon information and the identifier related information. (par 55-58, 65)

94. Regarding claim 40 –

95. Sundar teaches that determining, at the mobile device, that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device additionally comprises utilizing an action function including one or more previously downloaded unique identifiers. (fig 2-3, par 14, 58-59).

96. Claims 2, 4-5, 15, 17-18, 21-22, and 41-42 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) and in view of Sugiyama et al (US 2006/0032901).

97. Sundar and Park teach as above.

98. Regarding claims 2 and 41 –

99. Sugiyama teaches that the MAC address is selected from a group consisting of (a) a randomly generated 48 bit number matching a format of a MAC address and (b) a Bluetooth BD ADDR. (par 26-28).

100. It would be obvious to one of ordinary skill in the art to combine Sundar and Park with Sugiyama in order to obtain greater transaction security.

101. Regarding claims 4 and 42 –

102. Sugiyama teaches that both the MAC address and the unique identifier received by the second radio from a single beacon transmitter device occasionally change; (par 26-28) and

wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices. (par 26-28)

103. Regarding claim 15 –

104. Sundar teaches that the identifier related information comprises a list of contact information, and the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is further associated with an entity included within the list of contact information based upon comparing a contact identifier information with at least the portion of the proximity beacon information, and the mobile wireless device, upon determining there is a match, engaging in further steps to allow further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, (fig 2-3, par 14, 58-59) and further

wherein the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information change from time to time, but remain identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification. (fig 2-3, par 14, 58-59).

105. Sugiyama teaches a MAC address that changes from time to time. (par 26-28)

106. Regarding claim 17 –

107. Sugiyama teaches that the unique identifier of at least a portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one sewer of the one or more servers. (par 26-28)

108. Regarding claim 18 –

109. Sugiyama teaches that the unique identifier associated with at least one beacon transmitter is associated with a single beacon transmitter and is generated algorithmically and only known to at least one of the servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval within the beacon transmitter, and further wherein, the MAC address associated with the

beacon transmitter is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices. (par 26-28)

110. Regarding claim 21 –

111. Sugiyama teaches that teaches that the MAC address is a randomly generated 48 bit BD_ADDR, wherein both the MAC address and the unique identifier change from time to time (par 26-28)

112. Sundar teaches one or more of an entity's identity associated with the at least one beacon transmitter and the at least one beacon transmitter's identity anonymous over time to other devices or entities not having permissions at the one or more servers to access the identifier related information, and with at least the portion of the identifier related information including a downloaded unique identifier or information which is used to determine a downloaded unique identifier associated with the least one beacon transmitter ; and wherein the one or more processors further execute the instructions to perform operations, including determining the proximity by comparing the downloaded unique identifier with the portion of the proximity beacon information comprising the unique identifier associated with the at least one beacon transmitter device, entity, or object. (fig 2-3, par 14, 58-59)

113. Regarding claim 22 –

114. Sundar teaches that the one or more processors further execute the instructions to perform additional operations, including determining the proximity by utilizing an action function including one or more previously downloaded unique identifiers. (fig 2-3, par 14, 58-59)

115. Claim 23 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) and in view of Landau (US 2005/0099291)

116. Sundar and Park teach as above.

117. Regarding claim 23 –

118. Landau teaches that the proximity beacon service utilizes a protocol that includes unsolicited automatically repetitive advertisements, and wherein the proximity beacon transmissions are

transmitted within the format of the unsolicited automatically repetitive advertisements, and wherein the proximity beacon service identifier is included within one or more configurable fields of the unsolicited automatically repetitive advertisements and, wherein no connection is made between the mobile wireless device and the plurality of beacons transmitter devices in order to receive the unique identifier. (par 43, 95)

119. It would be obvious to one of ordinary skill in the art to combine Sundar and Park with and Landau in order to obtain greater transaction security.

120. Claim 32 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) and in view of Sorenson et al (US 2003/0053484).

121. Regarding claim 32 –

122. Sundar and Park teach as above.

123. Sorenson teaches performing one or more steps of the method under control of an application via a software interface; and executing the application on the mobile device. (par 135)

124. It would be obvious to one of ordinary skill in the art to combine Sundar and Park with Sorenson in order to achieve a more user-friendly method.

125. Claim 37 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) and in view of Brackett et al (US 2005/0114654).

126. Sundar and Park teach as above.

127. Regarding claim 37 –

128. Sundar teaches determining the at least one beacon transmitter device is in proximity. (fig 2-3, par 14, 58-59).

129. Brackett teaches at least one server of the one or more of servers providing an identifying picture of a consumer to at least one device for confirming the picture matches an individual in proximity as a step in an electronic commerce transaction. (par 20)

130. It would be obvious to one of ordinary skill in the art to combine Sundar and Park with the facial recognition feature of Brackett in order to obtain greater transaction security.

Conclusion

131. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CRISTINA OWEN SHERR whose telephone number is (571)272-6711. The examiner can normally be reached on 8:30 - 5:30.

132. Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

133. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Calvin L Hewitt can be reached on 571-272-6709. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

134. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mohammad A. Nilforoush/
Primary Examiner, Art Unit 3685

Notice of References Cited	Application/Control No. 15/271,410	Applicant(s)/Patent Under Reexamination	
	Examiner CRISTINA O SHERR	Art Unit 3685	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
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*	B	US-20130217332-A1	08-2013	Altman; Steven R.	H04H60/90	455/41.2
*	C	US-20030053484-A1	03-2003	Sorenson, Donald C.	H04J4/00	370/468
*	D	US-20050114654-A1	05-2005	Brackett, Charles Cameron	G06F21/32	713/161
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*	F	US-20060032901-A1	02-2006	Sugiyama; Toshiharu	G07C9/00103	235/375
*	G	US-20030134650-A1	07-2003	Sundar, Rangamani	H04W48/18	455/465
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

PTO/SB/08a (02-18)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	15271410
Filing Date	2016-09-21
First Named Inventor	James Arthur Proctor
Art Unit	3685
Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6,233,565	B1	2001-05-15	Lewis et al.	
	2	7,003,283	B1	2006-02-21	Hiltunen et al.	
	3	7,010,267	B1	2006-03-07	Vanluijt et al.	
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	7	8,089,405	B1	2012-01-03	Piersol et al.	
	8	8,576,846	B1	2012-11-05	Kumar et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.O.S/

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	First Named Inventor	James Arthur Proctor
	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

	9	9,137,012	B1	2015-09-15	Bailey et al.	
	10	7,886,962	B2	2011-02-15	Vawter et al.	
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	1	20030200489	A1	2003-10-23	Hars	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

	2	20030200140	A1	2003-10-23	Hars	
	3	20040243519	A1	2004-12-02	Perttila	
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	8	20040186768	A1	2004-09-23	Wakim et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Social Serendipity: Mobilizing Social Software, Eagle et al., Pervasive Computing, 1536-1268, pp. 28- 34 (2005)	
	2	Beacon-Stuffing: Wi-Fi Without Associations, Chandra et al., IEEE Computer Society, 1550-6193, pp. 53-57 (2007)	

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EXAMINER SIGNATURE

Examiner Signature	/Cristina Owen Sherr/	Date Considered	09/25/2018

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Art Unit	3685
	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David J Thibodeau Jr. Reg No 31671/	Date (YYYY-MM-DD)	2018-07-20
Name/Print	David J. Thibodeau, Jr.	Registration Number	31671

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Doc Code: M865 or FAI.REQ.INTV

PTOL-413A (07-16)
Approved for use through 08/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Applicant Initiated Interview Request Form

Application No.: 15/271,410 First Named Applicant: James Arthur Proctor
Examiner: SHERR, MARIA CRISTI OWEN Art Unit: 3685 Status of Application: Non-Final Rejection Mailed

Tentative Participants:
(1) David J. Thibodeau, Jr. (2) James A. Proctor
(3) SHERR, MARIA CRISTI OWEN (4)

Proposed Date of Interview: January 23, 2019 **Proposed Time:** 2:00 (◉AM ◉PM)

Type of Interview Requested:
(1) ☑ Telephonic (2) ☐ Personal (3) ☐ Video Conference

Exhibit To Be Shown or Demonstrated: ☐ YES ☑ NO
If yes, provide brief description:

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) 35 USC 103	All	Sundar and Park	☐	☐	☐
(2) 35 USC 112 second	All		☐	☐	☐
(3) 35 USC 101			☐	☐	☐
(4)			☐	☐	☐

☐ Continuation Sheet Attached ☑ Proposed Amendment or Arguments Attached

Brief Description of Arguments to be Presented: The Applicant proposes focusing the discussion on (a) the rejection of the claims under 35 USC 103 in view of Sundar and Park (b) the 35 USC 112 second paragraph rejections.

An interview was conducted on the above-identified application on

NOTE: This form should be completed and filed by applicant in advance of the interview (see MPEP § 713.01). If this form is signed by a registered practitioner not of record, the Office will accept this as an indication that he or she is authorized to conduct an interview on behalf of the principal (37 CFR 1.32(a)(3)) pursuant to 37 CFR 1.34. This is not a power of attorney to any above named practitioner. See the Instruction Sheet for this form, which is incorporated by reference. By signing this form, applicant or practitioner is certifying that he or she has read the Instruction Sheet. After the interview is conducted, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible. This application will not be delayed from issue because of applicant's failure to submit a written record of this interview.

/David J Thibodeau Jr Reg No 31671/
Applicant/Applicant's Representative Signature

Examiner/SPE Signature

David J. Thibodeau, Jr.
Typed/Printed Name of Applicant or Representative

1-617-925-5520
Applicant's/Applicant's Representative's Telephone Number

31671
Registration Number, if applicable

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PTOL-413A (08-10)
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Electronic Acknowledgement Receipt

EFS ID:	34906828
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
Filer:	David J. Thibodeau/Elisabeth Smith
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Letter Requesting Interview with Examiner	20190118_111054-0001U4C7_TPO_Applicant-Initiated_Interview_Request.pdf	350623 5ea6eae53ff4f1ec7c0b943ad871ff43136 3ea9e	no	3

Warnings:

Information:					
2	Miscellaneous Incoming Letter	20190118_111054-0001U4C7_unoffical_communication.pdf	231183 d64674470dca4523f0ab5dbc3c3e4d5d243608d0	no	24
Warnings:					
Information:					
			Total Files Size (in bytes):	581806	

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of: James A. Proctor, Jr., et al.	
Serial No.: 15/271,410	Examiner: Sherr, Cristina Owen
Filed: September 21, 2016	Art Unit: 3685
For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	Confirmation No.: 7653

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

UNOFFICIAL COMMUNICATION
DRAFT RESPONSE TO OFFICE ACTION

This amendment is being filed in response to the Office Action dated November 19, 2018. Further consideration of the application is respectfully requested.

Amendments to the clams begin on page 2.

Remarks begin on page 12.

IN THE CLAIMS

The following replaces all prior listings of the claims in the application:

1. (Currently Amended). A mobile wireless device comprising:

a first radio;

a second radio;

one or more processors;

one or more non-transitory memory devices coupled to the one or more processors, the one or more non-transitory memory devices storing a set of instructions that when executed by the one or more processors cause the one or more processors to perform operations including:

receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers;

receiving, using the second radio, ~~a plurality of short range transmissions, including~~ a plurality of proximity beacon transmissions when the device is located within a detection range of one or more beacon transmitter devices associated with the proximity beacon service, each of the proximity beacon transmissions including a ~~respective~~ MAC address, a ~~respective~~ unique identifier (UID), and a proximity beacon service identifier (PBSI);

~~deriving proximity beacon information from the proximity beacon transmissions;~~

determining ~~that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile wireless device by utilizing at least the identifier related information and~~ if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) if the proximity beacon service identifier (PBSI) is present and ~~indicating~~ indicates the particular short range transmission is a proximity beacon transmission ~~are~~ associated with the proximity beacon service, ~~and the proximity beacon service identifier being the same for two or more proximity beacon transmissions associated with the proximity beacon service~~

and if so, executing instructions that include:

utilizing the identifier related information and the unique identifier to determine if an entity or object is within proximity to the mobile device.

2. (Currently Amended). The mobile wireless device of Claim 1, wherein the MAC address is a randomly generated 48 bit number matching a format of a MAC address and (b) a Bluetooth BD_ADDR.

3. (Cancelled).

4. (Currently Amended). The mobile wireless device of claim 1 wherein both the MAC address and the unique identifier received by the second radio from a single beacon transmitter device occasionally change ~~, and~~

~~wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices~~.

5-7. (Cancelled).

8. (Currently Amended). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by utilizing an action function including one or more previously downloaded unique identifiers ~~as identifier related information~~.

9. (Cancelled).

10. (Previously Presented). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by:

sending at least the unique identifier associated with the at least one beacon transmitter to at least one of the one or more servers using the first radio; and

receiving, in response to the sending, at least a portion of the identifier related information used in the determining step.

11. (Cancelled).

12. (Previously Presented). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including

determining, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a predetermined location.

13. (Currently Amended). The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device, and the one or more processors further execute the instructions to perform operations including:

downloading the application software in reaction to sending of the unique identifier by the mobile wireless device to at least one server of the one or more servers~~, and wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information~~.

14. (Cancelled)

15. (Previously Presented). The mobile wireless device of Claim 1 wherein

the identifier related information comprises a list of contact information, and the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is further associated with an entity included within the list of contact

information based upon comparing a contact identifier information with at least the portion of the unique identifier, and

the mobile wireless device, upon determining there is a match, engaging in further steps to allow further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio, and further

wherein both the MAC address and the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information change from time to time, but remain identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification.

16. (Cancelled).

17. (Currently Amended). The mobile wireless device of claim 1 ~~wherein the unique identifier of at least a portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one server of the one or more servers~~ wherein the the one or more processors further execute the instructions to perform operations including

receiving, via a second radio, the plurality of short range transmissions further includes receiving a first UID at a first time that is different from a second UID received at a second time.

18. (Currently Amended). The mobile wireless device of claim 1 wherein the one or more processors further execute the instructions to perform operations including:

~~the unique identifier associated with at least one beacon transmitter is associated with a single beacon transmitter and is generated algorithmically and only known to at least one of the servers and the one beacon transmitter, and updated based, at least in part, upon a clock interval within the beacon transmitter, and further~~

~~wherein the MAC address associated with the beacon transmitter is changed as well, so as to prevent the identity of the beacon transmitter from being determined by unauthorized devices~~

receiving, via a second radio, the plurality of short range transmissions further includes receiving a first UID and a first MAC address associated with the beacon transmitter that have initial respective values at a first time, and subsequently receiving a second UID and second MAC address from the same beacon transmitter but which that have different respective values than the initial respective values.

19-30. (Cancelled).

31. (Currently Amended) A method for facilitating use of proximity beacons, the method executing within a mobile device, and the method comprising:

communicating between the mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

receiving, at the mobile device using a second radio, a plurality of short range transmissions, including proximity beacon transmissions from one or more beacon transmitter devices associated with the proximity beacon service, each of the proximity beacon transmissions including a respective MAC address, a respective unique identifier (UID), and a proximity beacon service identifier (PBSI);

~~wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and a proximity beacon service identifier;~~

~~wherein the proximity beacon service identifier indicates the proximity beacon transmissions are associated with a proximity beacon service; and~~

~~wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service~~

determining if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) if the proximity beacon service identifier (PBSI) is present and indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service, and if so,

utilizing the identifier related information and the unique identifier to determine if an entity or object is within proximity to the mobile device.

32-34. (Cancelled).

35. (Previously Presented). The method of claim 31, wherein both the MAC address and the unique identifier received via the second radio occasionally change between proximity beacon transmissions from one of the one or more beacon transmitter devices.

36-40. (Cancelled).

41. (Previously Presented). The method of claim 31 wherein the MAC address is selected from a group consisting of (a) a randomly generated 48 bit number matching a format of a MAC address and (b) a Bluetooth BD_ADDR.

42. (Previously Presented). The method of claim 31 additionally comprising:

detecting a changed ~~wherein both the~~ MAC address and ~~the~~ unique identifier as received by the second radio from a single beacon transmitter device ~~occasionally change~~; and

wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices.

43. (New) A method for facilitating use of proximity beacons comprising:

communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

receiving, at the mobile device using a second radio, a plurality of short range transmissions, including proximity beacon transmissions from one or more beacon transmitter devices associated with the proximity beacon service, each of the proximity

beacon transmissions including a respective MAC address, a respective unique identifier (UID), and a proximity beacon service identifier (PBSI);

wherein the MAC addresses and unique identifiers associated with the received proximity beacon transmissions from each of the one or more beacon transmitter devices associated with the proximity beacon service occasionally change;

determining if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) if the proximity beacon service identifier (PBSI) is present and indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service, and if so, executing instructions that include:

utilizing the identifier related information and the unique identifier to determine if an entity or object is within proximity to the mobile device; and

wherein the instructions further comprise sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving further information relating to an object or entity associated with being within proximity to the mobile device.

44. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving the identifier related information in response for use in the utilizing step.

45. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving further information relating to an object or entity associated with being within proximity to the mobile device.

46. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission.

47. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

controlling further communications between the mobile device and at least one device or server associated with an entity or object in proximity to the mobile device.

48. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

comparing the identifier related information with the unique identifier to determine if an entity or object is within proximity to the mobile device.

49. (New) The method of Claim 31, additionally comprising:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving the identifier related information in response for use in the utilizing step.

50. (New) The method of Claim 31, additionally comprising:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving further information relating to an object or entity associated with being within proximity to the mobile device.

51. (New) The method of Claim 50, wherein the further information relates to one or more of the following:

a loyalty program;

a payment service; or

a coupon relating to an entity in proximity to the mobile device;

52. (New) The method of Claim 50, wherein the further information relates to a service for providing a menu for use by a user of the mobile device, for use in purchasing items, and allowing for the user take delivery at or near the location of a fixed proximity beacon device.

53. (New) The method of Claim 50, wherein the further information relates to a nearby user of an application on another device, in common with an application on the mobile device.

54. (New) The method of Claim 53, wherein the application is a multiuser game. additionally comprising:

preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission.

56. (New) The method of Claim 31, additionally comprising:

controlling further communications between the mobile device and at least one device or server associated with an entity or object in proximity to the mobile device.

57. (New) The method of Claim 1, wherein the instructions further comprise:

comparing the identifier related information with the unique identifier to determine if an entity or object is within proximity to the mobile device.

58. (New) The method of Claim 31, additionally comprising:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and the one or more servers performing the following steps:

associating an object or entity as being within proximity to the mobile device,

storing a user's purchasing practices or requests from the one or more servers, related to the associated object or entity information as stored proximity user behavior;

retrieving a stored user email address associated with an account associated with the mobile device; and

sending an email, addressed to the user email address containing customized content based upon the stored proximity user behavior.

REMARKS

Claim Rejections – 35 USC 101

All of the prior claims were rejected under 35 U.S.C. 101 on the asserted basis that the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

Applicant respectfully traverses the rejection. The USPTO recently made its 2019 Revised Patent Subject Matter Eligibility Guidance effective January 7, 2019 (hereafter the "2019 Guidance") for all pending applications. The 2019 Guidance acknowledges that a claim that integrates a judicial exception into a practical application that imposes a meaningful limit on the judicial exception is not "directed to" a judicial exception, thereby making the claim eligible for patenting under 35 U.S.C. 101.

Applicant respectfully submits that the claims as both previously presented and as currently amended are eligible for patenting at least because the claims integrate subject matter into a practical application, as discussed in detail below.

However, before discussing application of the 2019 Guidance in further detail, Applicant respectfully submits that the amendments accompanying this response further clarify certain aspects of the claims as being performed by a computing system that processes information received via a first radio and a second radio, which is an example of a physical machine. The current amendments also specify how a computing system operates, or how it performs the recited processes in a manner that integrates the claimed subject matter into a practical application.

For example, apparatus claim 1 as currently amended provides that one or more processors execute instructions to perform operations including determining if a particular type of radio transmission – a short range radio transmission - is of a particular type (that is, whether the short range transmission (a) includes a MAC address and (b) has a proximity beacon service identifier (PBSI) indicating that the transmission is associated with the proximity beacon service). Claim 1 as currently amended also further requires then, and only then, executing instructions to determine if an object or entity of a particular type – one associated with a proximity beacon service - is within proximity to the mobile wireless device in a specific way. That specific way requires utilizing both the identifier related information and the UID as were previously received, respectively, from a first radio and a second radio. Method claim 31 is amended similarly to claim 1.

Turning now to the 2019 Guidance, Step 1 of the eligibility inquiry asks whether the claimed subject matter is directed to a statutory category under 35 U.S.C. 101. Applicant respectfully submits that claim 1 and the claims that depend from it each recite an apparatus having a first and second radio, one or more processors, and one or more non-transitory memory devices, which is an example of a machine. Claim 31 and the claims that depend from it each recite a method having a series of steps performed by a computing system, which is an example of a process. Therefore, all pending claims recite statutory categories of subject matter under Step 1.

Prong 1 of revised Step 2A of the 2019 Guidance asks whether the claims recite a judicial exception. The 2019 Guidance offers the following three categories of judicial exceptions:

1. Mathematical concepts like mathematical relationships, formulas, and calculations;

2. Certain methods of organizing human interactions, such as fundamental economic practices commercial and legal interactions; managing relationships or interactions between people; and advertising, marketing, and sales activities; and

3. Mental processes, which are concepts performed in the human mind, such as forming an observation, evaluation, judgment, or opinion.

According to the 2019 Guidance, for each alleged judicial exception, the Examiner must

(a) identify the specific limitation(s) in the claim that the Examiner believes recites an abstract idea, and (b) determine whether the identified limitation(s) falls within the subject matter groupings of abstract ideas, as listed above. The Office action (admittedly mailed prior to publication of the 2019 Guidelines) identifies the claims as being directed to the supposed abstract idea of " determining whether a device is in proximity to an access point". The Office action characterized the claim as merely "an algorithm that involves receiving a list of identifiers or locations[1], determining the location of a device, and determining that the device is in proximity to one of the locations on the list" and that "the transaction device in this claim[2] merely automates this algorithm, and therefore, the claim does not include additional elements that are sufficient to amount to significantly more than the judicial exception because additional claim elements do not provide meaningful limitations to transform the abstract idea into a patent eligible application of the abstract idea such that the claim amounts to significantly more than the abstract idea itself." (see Par 30 of the Office Action).

Applicant respectfully submits that none of the above concepts identified by the Office action fall within the three judicial exceptions set forth by the 2019 Guidance. Specifically, the claims do not recite any mathematical concept, or method of organizing human interaction, or mental process, even under a broadest reasonable interpretation. Regarding mental processes, a human cannot on its own detect whether a first radio has

[1] The claims do recite two different types of identifiers, but do not recite or mention a "list of locations".
[2] There is no "transaction device" in independent claim 1 or claim 31 – nor has there ever been.

received a certain type of transmission or whether a second radio has also received a certain type of short range transmission. The claimed further apparatus features and process steps of determining whether an entity or object is within proximity to the mobile wireless device is also not practically performed in the human mind, because it requires a processor accessing computer memory to compare MAC addresses, unique identifiers (UID), and proximity beacon service identifiers (PBSI) received from those two radios. See e g., claim 2 of "Example 37" of "Subject Matter Eligibility Examples: Abstract Ideas" published by the Office with the 2019 Guidance.

Because the claims do not recite a judicial exception, Applicant respectfully submits that the claims are eligible for patenting under 35 U.S.C. 101 for at least this reason.

However, even if when the claims can be said to be "directed to" an abstract idea, the analysis does not end there. Prong 2 of revised Step 2A of the 2019 Guidance requires then asking whether the alleged judicial exception is "integrated into a practical application in a manner that imposes a meaningful limit on the judicial exception". Applicant respectfully submits that the claims here recite a combination of additional features, that as a whole, integrates any alleged judicial exception of the claims into a practical application.

For example, the claims recite determining that a particular type of entity or object is within proximity to the wireless device – that is, an entity or object associated with a particular proximity beacon service. The determination is also made in a very specific way. First, the first and second radio must have each received a certain type of transmission - a short range transmission (a) that includes a MAC address and (b) a proximity beacon service identifier (PBSI) indicating that the transmission is associated with the proximity beacon service. The claims as currently amended also further require then, ***and only then***, executing instructions to determine if the object or entity related to the beacon service is within proximity. Furthermore, that determination is made in a

specific way – that is by utilizing the identifier related information and the UID as were previously received from the first and the second radios[3].

Hence, the claims recite a specific manner of determining whether a device is in proximity to an entity or object associated with the beacon service.

Applicant respectfully submits that the above features, in combination with the remaining features of the claims, address a problem specifically arising in wireless communications technology and improve the functioning of a system that includes computer-connected radios. For example, as set forth by the specification, the claimed subject matter now enables advantages such as:

> The method of exchanging identifiers to confirm that the entity or object in proximity, is in fact, associated with a particular beacon service, reduces the amount of data that would otherwise be transmitted.
>
> The use of downloaded identifiers to perform the detection of a proximal device has significant power saving benefits. When a beacon is identified as being associated with the proximity beacon service for example, power consumption of the wireless devices is reduced due to reduced processing requirements for the detection of beacon transmissions and resulting processing of associated information and interaction with the server.
>
> In some embodiments as recited in the dependent claims, the invention also permits two devices to continue to communicate after they move away from each other, via the connections established with the server. Such a benefit is an innovation over pure peer to peer communication

[3] The Office Action also ignores these specialized features of the claim. The does not merely recite "a mobile wireless device comprising a first and second radio, one or more processors, and one or more non-transitory memory devices" as asserted in Par 31.

> which is limited to only communicating when the two devices are in proximity, disconnecting as they move apart.
>
> In other embodiments, as recited in the dependent claims, changing wireless identifiers permits communication between the two devices to remain secure, even after their identifiers were initially exchanged to determine proximity.

In view of the above, the claimed subject matter addresses problems specifically and only arising in computer-related technology in a manner that improves the functioning of a computer-related communication system. Therefore, the claimed subject matter does more than merely recite instructions to apply a judicial exception using a generic computer. Furthermore, because the claimed subject matter addresses a problem specifically arising in computer-related technology in a manner that improves the functioning of a computer-controlled radio, the claims impose meaningful limitations on practicing the abstract idea. For example, the claimed subject matter does not preempt other approaches that determine the proximity of two things that do not recite the specific ordered combination of features recited by the claims. Therefore, the claimed subject matter is directed to a practical application that imposes meaningful limits on practicing the judicial exception.

Even if the Examiner maintains that the claimed subject matter is not eligible for patenting under revised Step 2A, Applicant respectfully submits that the claimed subject matter is eligible under Step 2B. First, in considering the eligibility of the claims under Step 2B, the Examiner is must establish that all features of the claim individually are merely routine or conventional. Applicant respectfully submits that the Office action has not established by substantial evidence that any or all features of the claims are merely routine or conventional as required by precedential decisions, such as *Berkheimer v. HP, Inc.*, 881 F.3d 1360 (Fed Cir. 2018) CAFC Appeal No. 2017-1437.

Furthermore, even if the Examiner maintains that all features of the currently amended claims are merely routine or conventional, Applicant respectfully submits that, as an ordered combination, the subject matter of the claims provides significantly more that transforms the alleged abstract idea into patent eligible subject matter. For example, as discussed above, the claims as an ordered combination enable a wireless device that includes a computer connected to a first and second radio to determine whether an entity or object associated with a proximity beacon service is in proximity. The specification discusses numerous advantages of the claimed approach, as explained reproduced above. Applicant's claims therefore entail an unconventional technological solution to a technological problem. Accordingly, Applicant's claims are eligible for patenting under Step 2B.

In view of the above, Applicant respectfully requests that the rejection under 35 U.S.C. 101 be withdrawn in its entirety.

Claim Rejections – 35 USC 112(pre-AIA) – First Paragraph

Regarding claims 4 and 18, and as explained in the Applicant's prior submission, the specification clearly provides that the identifiers can be changed over time. As one example, support for claim 4's recitation of changing MAC addresses is found in the application at page 7, lines 3-6. There it is explained that "By using a central server, the system may coordinate the change of the identifiers from time to time such that the disclosure of an identifier by one device to another does not compromise the identity of the device."

In one example implementation using a Bluetooth local link, at paragraph (page 15, lines 23-24 of the application as filed), "the BD ADDR or MAC address of the Bluetooth device can be used as the identifier".

The specification therefore describes an embodiment where the BR ADRR or the MAC address can be changed, and that it can be used as the identifier in certain Bluetooth embodiments.

The Office Action provide no reason why those sections of the specification are inadequate support for claims 4 and 18.

Claim Rejections – 35 USC 112(pre-AIA) – Second Paragraph

The claim formats adopted by the Applicant are expressly permitted and encouraged.

The legal test for definiteness under 35 USC 112, second paragraph is actually whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification" *Orthokinetics Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576 (Fed Cir. 1986) (citations omitted).

The claims in question, certainly as now amended, also each recite a logical and operative device (in the case of claim 1) and a logical and operative method (in the case of claim 31) that are understood by one of skill in the art.

In addition, the Office Action provides no explanation for why the format adopted for claim 1 – a processor programmed to perform a series of steps - is not a proper form. For a claim in such as format has repeatedly been recognized by both the Court and the Patent Office itself.

For instance, a claim to computer storage medium programmed with attribute data objects that perform the function of facilitating retrieval, addition, and removal of

information in the intended computer system, established a functional relationship such that the claimed attribute data objects were given patentable weight. See *In re Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035, as cited in MPEP 2111.05 B(III).

The Court of Appeals for the Federal Circuit has most recently spoken on this topic in *MasterMine Software, Inc. v. Microsoft Corp.*, 2017 U.S. App. LEXIS 21479 (Fed. Cir. Oct. 30, 2017) (Newman, O'Malley, Stoll) recognizing that "apparatus claims are not necessarily indefinite for using functional language", citing to *Microprocessor Enhancement Corp. v. Texas Instruments Inc. (MEC)*, 520 F.3d 1367, 1375 (Fed. Cir. 2008), *finding that a claimed "processor" programmed "for executing instructions" was proper form, and not indefinite* (See *MasterMine*, slip op. at 14).

Claims 31-32, 35-37 and 40-41 are method claims. Lacking any specific identification or reason in the Final Office Action, these method claims must be presumed to not improperly recite functions of an apparatus.

Claim Rejections – 35 USC 103

Claims 1, 6-10, 12-14, 19, 31, and 34-40 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200).

The other, dependent claims also stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) in combination with other references such as Sugiyama et al (US 2006/0032901) or Landau (US 2005/0099291) or Sorenson et al (US 2003/0053484) or Brackett et al (US 2005/0114654).

Reconsideration and withdrawal of this rejection is respectfully requested.

Sundar teaches downloading "SSID"s to a mobile device, in order to qualify if the detected wireless access point will allow for authentication of the mobile device to the WiFi voice network using that access point.

The Office Action considers this feature of Sundar as being the same thing as the Applicant's claimed "downloading identifier related information", and "detecting the proximity of one or more beacon devices associated with the proximity beacon service." The Office Action then points to Park as teaching each proximity beacon transmission may include a MAC address and a unique identifier (referencing Park at Pars 18, 21, 23, 41, 43, Par 66 of office action) and concludes it would have been obvious to one of ordinary skill in the art to combine Park and Sundar "in order to obtain greater security."

Applicant must respectfully disagree because (A) there would be no motivation to combine Sundar and Park and (B) even if their teachings could be combined, one would not arrive at all of the features recited in the claims.

(A) Sundar and Park Cannot be Combined; or at least There Would be No Motivation to Combine them as they are Intended for Different Purposes

First, there is no indication in either Park nor Sunder that such a combination would provide any benefit to security, how that security might be achieved, or to what aspect that security addresses.

Second, and more important to observe, is that Sundar is operating in a "infrastructure mode", e.g. using an Access Point (AP) to control communication. However, Park's system (cited by the examiner at Par s18, 21, 23, 41 and 43 and relating to Fig. 3), is

instead operating in an 802.11 (WiFi) Ad-Hoc mode, and has a differing format from the beacon transmissions of Sundar. That is, Sundar's Access points cannot transmit the ad-hoc transmissions (the "auto switch request packet" of Park). Therefore for this reason alone, one could not combine Park and Sundar, and certainly would not be motivated to look to the ad-hoc network of Park when adapting the access point system of Sundar, since the transmitter of Sundar operates in a non-compatible mode of the very same wireless system (802.11) of Park (ad-hoc mode of wi-fi rather than the AP/infrastructure mode).

Third, the goals of Sundar and Park are completely different, and do not address the same problems. Sundar looks to determine if the "SSID" or network name of the communication network is one in which it can gain access to its voice services successively so as to not waste its resources attempting to access a system such is not able to gain access to the voice systems via the detected Wi-Fi network. Park, on the other hand, is directed to creating a direct ad-hoc connection between two terminals, if the intervening access point malfunctions. This is done by sending an "auto switch packet" from one terminal directly to the other to bypass the access point altogether.

Fourth, the use of downloaded SSIDs from the servers of Sundar to a mobile device would not help the two terminals achieve the establishment of an alternate direct communication link between them, and provides no benefit to security or either of the goals of Sundar or Park. This is because all of the intimation relating to the establishment of the ad-hoc direct communication link by one terminal used to send the "auto switch packet" to the other is already known to both terminals PRIOR to the need to send the cited ad-hoc packet (see Par 41 and 43). Therefore there would be no benefit to this combination in either of the objectives of Park or Sundar, or in the third objective of "security", not mentioned by either Park or Sundar.

(B) Even the Combination of Sundar and Park does not Provide All of the Elements of the Applicant's Claims

The auto-switch packet of Park *does not include both a unique identifier relating to the transmitter, and a MAC address.* It contains the transmitting MAC address, the receiving MAC address, the SSID (identifying the communication network between the two terminals), and a BSSID (identified as the targeted "corresponding device" identifier). On the other hand, the Applicants claims – certainly as now amended, utilize both the identifier and the identifier related information to determine proximity of the transmitting device, not the receiving device.

Therefore this limitation recited in claim 1 (and all other claims) is not met, even if the references could be combined, and one was motivated to do so, (which they would not).

Neither Park or Sundar touch sending a detected identifier to a server and receiving the identifier related information back in response. As this feature is recited in at least some of the claims, such as claim 10, at least those claims should be allowed.

Also, neither Sundar nor Park teach "downloading a unique identifier" (*in addition* to the SSID of Sundar) from a server, as recited in dependent claims 6 and 7:

Claims 4 furthermore requires "changing of both MAC and unique identifier". The Office Action rejected Claim 4 based upon Sundar in view of Park in further view of Sugiiyama. But Sugiiyama is related to RFID devices, *which do not include MAC addresses*. The is no mention of a MAC address in the cited paragraphs. Furthermore, the proposed combination of a WiFi access point (Sundar) with an ad-hoc mode terminal (as in Park) and using an RFID protocol is not interoperable in any straight forward way. One would not be motivated to combine these diverse wireless systems, as they are from different field of endeavors, address dissimilar problems, and use incompatible protocols.

Also, Sundar teaches encrypting an identifier. But encrypting the MAC address od Sundar would not function within the teachings of Park – because a device's MAC address must be known in order to utilize the ad-hoc communications. In other words, an encrypted MAC address, which changed over time would "break" the operation of either Park or Sundar making their individual systems inoperable. Therefore one would not be motivated to combine these references, to arrive at the claimed combination of claims 4 and 5, even if a MAC address were disclosed within Sugiiyama (which it is not).

(C) The Claims as Now Amended Certainly Distinguish over Sundar and Park

The new limitations of the independent claims below provide further distinctions over Park and Sundar. For example, claim 1 now recites the following:

> determining if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) if the proximity beacon service identifier (PBSI) is present and indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service, and if so, executing instructions that include:
>
> utilizing the identifier related information and the unique identifier to determine if an entity or object associated is within proximity to the mobile device.

Nowhere does Sundar or Park contemplate the advantage of using a PBSI together with both identifier related information and a unique identifier to determine when an object is in proximity.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/271,410	Filing Date 09/21/2016	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **01/28/2019**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 30	Minus	** 30	= 0	X $50 =	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $230 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of: James A. Proctor, Jr., et al.	
Serial No.: 15/271,410	Examiner: Sherr, Cristina Owen
Filed: September 21, 2016	Art Unit: 3685
For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	Confirmation No.: 7653

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

RESPONSE TO OFFICE ACTION

This amendment is being filed in response to the Office Action dated November 19, 2018. Further consideration of the application is respectfully requested.

Amendments to the claims begin on page 2.

Remarks begin on page 12.

IN THE CLAIMS

The following replaces all prior listings of the claims in the application:

1. (Currently Amended). A mobile wireless device comprising:

a first radio;

a second radio;

one or more processors;

one or more non-transitory memory devices coupled to the one or more processors, the one or more non-transitory memory devices storing a set of instructions that when executed by the one or more processors cause the one or more processors to perform operations including:

receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers;

receiving, using the second radio, a plurality of short range transmissions, including a plurality of proximity beacon transmissions when the device is located within a detection range of one or more beacon transmitter devices associated with the proximity beacon service, each of the proximity beacon transmissions including a respective MAC address, a respective unique identifier , and a proximity beacon service identifier (PBSI);

~~deriving proximity beacon information from the proximity beacon transmissions;~~

determining ~~that at least one beacon transmitter device associated with the proximity beacon service is in proximity to the mobile wireless device by utilizing at least the identifier related information; and~~

if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) includes the proximity beacon service identifier (PBSI) and if c) the PBSI indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service; ~~and~~

~~the proximity beacon service identifier indicating the proximity beacon transmissions are associated with the proximity beacon service, and the proximity beacon service identifier being the same for two or more proximity beacon transmissions associated with the proximity beacon service~~

then:

determining if an entity or object associated with the proximity beacon service is in proximity to the mobile wireless device, by utilizing the identifier related information and the unique identifier.

2. (Currently Amended). The mobile wireless device of Claim 1, wherein the MAC address ~~is selected from a groip consisting of (a)~~ is a randomly generated 48 bit number matching a format of ~~a MAC address and (b)~~ a Bluetooth BD_ADDR.

3. (Cancelled).

4. (Currently Amended). The mobile wireless device of claim 1 ~~wherein both the MAC address and the unique identifier received by the second radio from a single beacon transmitter device occasionally change ; and~~

~~wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices~~.

wherein the one or more processors further execute the instructions to perform operations including:

receiving, by the second radio, a first proximity beacon transmission including a first MAC address and a first unique identifier at a first time; and

receiving, by the second radio, a second proximity beacon transmission including a second MAC address and a second unique identifier at a second time, the second MAC address being different from the first MAC address and the second unique identifier being different from the first unique identifier; and

associating the first and second unique identifier with a single beacon transmitter device.

5-7. (Cancelled).

8. (Previously Presented). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device, by utilizing an action function including one or more previously downloaded unique identifiers.

9-11. (Cancelled).

12. (Previously Presented). The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform operations including

determining, based upon at least a portion of the identifier related information, that at least one beacon transmitter is a broadcast device having a predetermined location.

13. (Currently Amended). The mobile wireless device of Claim 1, wherein the identifier related information comprises application software for execution upon the mobile wireless device, and the one or more processors further execute the instructions to perform operations including:

~~downloading the application software in reaction to~~ sending of ~~a~~ the unique identifier by the mobile wireless device to at least one server of the one or more servers; and

in response to the sending of the unique identifier, downloading the application software.

~~and wherein the mobile wireless device first received the unique identifier as part of the proximity beacon information~~.

14. (Cancelled)

15. (Currently Amended). The mobile wireless device of Claim ~~1~~ 4 wherein the identifier related information comprises a list of contact information, and

the one or more processors further execute the instructions to perform operations including:

further determining that at least one beacon transmitter device associated with the beacon service is further ~~associated~~ matched with an entity included within the list of contact information based upon comparing a contact identifier information with at least the portion of the unique identifier, and

the mobile wireless device, upon determining there is a match, ~~engaging in further steps to~~ allowing further communications with the detected beacon transmitter device associated with the entity included within the list of contact information, wherein the further communications utilize the first radio~~, and further~~

~~wherein both the MAC address and the identifier associated with proximity beacon transmissions from the detected proximity beacon transmitter associated with entity included within the list of contact information change from time to time, but remain identifiable by the wireless mobile device, but anonymous to other devices not having required permissions to make such an identification~~.

16. (Cancelled).

17. (Currently Amended). The mobile wireless device of claim 1 ~~wherein the unique identifier of at least a portion of the proximity beacon transmissions changes over time based upon an algorithm in synchronization with at least one server of the one or more servers~~

wherein the one or more processors further execute the instructions to perform operations including:

receiving, via a second radio, the plurality of proximity beacon transmissions further includes receiving a first unique identifier at a first time that is different from a second unique identifier received at a second time; and

associating the first and second unique with a single beacon transmitter device.

18-30. (Cancelled).

31. (Currently Amended) A method for facilitating use of proximity beacons, the method executing within a mobile device, and the method comprising:

communicating between ~~a~~ the mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

receiving, at the mobile device using a second radio, a plurality of short range transmissions, including a plurality of proximity beacon transmissions from one or more beacon transmitter devices associated with the proximity beacon service, each of the proximity beacon transmissions including a respective MAC address, a respective unique identifier (UID), and a proximity beacon service identifier (PBSI);

~~determining, at the mobile device, that at least one beacon transmitter device associated with the beacon service is in proximity to the mobile wireless device by utilizing the identifier related information~~

~~wherein each of the proximity beacon transmissions comprises a MAC address, a unique identifier, and a proximity beacon service identifier;~~

~~wherein the proximity beacon service identifier indicates the proximity beacon transmissions are associated with a proximity beacon service; and~~

~~wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service~~

a) determining that a particular short range transmission of the plurality of short range transmissions includes a MAC address,

b) determining that the proximity beacon service identifier (PBSI) is present, and

c) determining that the PBSI indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service; and

when the three determining steps a) b) and c) are each true, then d) determining that an entity or object associated with the proximity beacon service is within proximity to the mobile device, by utilizing the identifier related information and the unique identifier.

32-34. (Cancelled).

35. (Currently amended). The method of claim 31, ~~wherein both the MAC address and the unique identifier received via the second radio occasionally change between proximity beacon transmissions from one of the one or more beacon transmitter devices~~

wherein a first one of the plurality of proximity beacon transmissions received at a first time includes a first unique identifier, and wherein a second one of the plurality of proximity beacon transmissions received at a second time includes a second unique identifier the second unique identifier being different from the first unique identifier; and

associating both the first unique identifier and the second unique identifier with a particular entity or object in proximity to the mobile device.

36-40. (Cancelled).

41. (Previously Presented). The method of claim 31 wherein the MAC address is selected from a group consisting of (a) a randomly generated 48 bit number matching a format of a MAC address and (b) a Bluetooth BD_ADDR.

42. (Currently Amended). The method of claim 31~~wherein both the MAC address and the unique identifier as received by the second radio from a single beacon transmitter device occasionally change; and~~

~~wherein the proximity beacon service identifier is the same for two or more proximity beacon transmissions associated with the proximity beacon service when transmitted from a plurality of beacon transmitter devices~~

wherein a first one of the plurality of proximity beacon transmissions is received at a first time and includes a first unique identifier and first MAC address, and the Proximity beacon Service Identifier (PBSI), and wherein a second one of the plurality of proximity beacon transmissions received at a second time includes a second unique identifier different from the first unique identifier and a second MAC address different from the first MAC address, and the proximity beacon service identifier; and

associating both the first unique identifier and the second unique identifier with the same entity or object in proximity to the mobile device.

43. (New) A method for facilitating use of proximity beacons comprising:

communicating between a mobile device and one or more servers and receiving, at the mobile device, identifier related information, using a first radio;

receiving, at the mobile device using a second radio, a plurality of short range transmissions, including proximity beacon transmissions from a beacon transmitter device associated with a proximity beacon service, each of the proximity beacon transmissions including a respective MAC address, a respective unique identifier, and a proximity beacon service identifier (PBSI);

wherein the MAC addresses and unique identifiers associated with the proximity beacon transmissions as received from the beacon transmitter device associated with the proximity beacon service occasionally change;

wherein the receiving, at the mobile device using the second radio, the proximity beacon transmissions occurs without first transmitting, by the mobile device, to the beacon transmitter device; and

when a particular short range transmission:

a) includes a MAC address; and

b) includes a proximity beacon service identifier (PBSI); and

c) the PBSI indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service,

then performing additional steps including:

determining that an entity or object associated with the proximity beacon service is within proximity to the mobile device, by utilizing the identifier related information and the unique identifier;

sending the unique identifier, using the first radio, to at least one server of the one or more servers; and

receiving further information relating to an object or entity associated with being within proximity to the mobile device.

44. (New) The method of Claim 31, further comprising

preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission.

45. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and

receiving further information relating to an object or entity associated with being within proximity to the mobile device.

46. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission.

47. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise:

controlling further communications between the mobile device and at least one device or server associated with an entity or object in proximity to the mobile device.

48. (New) The method of Claim 31, further comprising:

receiving, using the first radio, access code information by the mobile device from at least one of the servers; and

utilizing the access code information to gain access to the entity or object determined to be in proximity to the mobile device.

49. (New) The method of Claim 31, wherein receiving the identifier related information, using the first radio, is performed in response to sending at least the unique identifier to at least one of the one or more servers using the first radio.

50. (New) The method of Claim 31, additionally comprising:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and

receiving further information relating to an object or entity associated with being within proximity to the mobile device.

51. (New) The method of Claim 50, wherein the further information relates to one or more of the following:

a loyalty program;

a payment service; or

a coupon relating to an entity in proximity to the mobile device; or

advertising content.

52. (New) The method of Claim 50, wherein the further information relates to a service for providing a menu for use by a user of the mobile device for use in purchasing items, and further comprising:

allowing for the user take delivery at or near the location of a fixed proximity beacon device.

53. (New) The method of Claim 50, wherein the further information relates to a nearby user of an application on another device, in common with an application on the mobile device.

54. (New) The method of Claim 53, wherein the application is a multiuser game.

55. (New) The method of Claim 31, additionally comprising:

controlling further communications between the mobile device and at least one device or server associated with an entity or object in proximity to the mobile device.

56. (New) The method of Claim 31, wherein the step of determining that an entity or object is within proximity further comprises:

comparing the identifier related information with the unique identifier or information derived from the unique identifier.

57. (New) The method of Claim 31, additionally comprising:

sending the unique identifier, using the first radio, to at least one server of the one or more servers, and wherein the one or more servers perform the following steps:

associating an object or entity as being within proximity to the mobile device;

storing a user's purchasing practices or requests from the one or more servers, related to the associated object or entity information as stored proximity user behavior;

retrieving a stored user email address associated with an account associated with the mobile device; and

sending an email, addressed to the user email address containing customized content based upon the stored proximity user behavior.

58. (New) The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform the operations for determining that an entity or object is within proximity by further:

comparing the identifier related information with the unique identifier or information derived from the unique identifier.

59. (New) The mobile wireless device of Claim 1, wherein the receiving of the identifier related information, using the first radio, is performed in response to the one or more processors executing instructions for:

sending at least the unique identifier to at least one of the one or more servers using the first radio.

60. (New) The method of Claim 31, wherein the proximity beacon transmissions are received, at the mobile device, without requiring the mobile device to first perform a step of transmitting to the one or more beacon transmitter devices from which the plurality of proximity beacon transmissions are received.

REMARKS

Interview Summary

The Applicant thanks Examiners Sherr and Nilforoush for the courtesy of the telephone interview on January 23, 2019. It was confirmed that the Examiners would be applying the 2019 Revised Subject Matter Eligibility Guidance in any further consideration of the issues raised under 35 USC 101. A discussion was also had regarding the scope of the independent claims 1 and 31 (essentially as now presented with this amendment). Examiner Nilforoush indicated that the amended claims appeared to distinguish over the prior art of record, as more fully explained below.

January 18, 2019 Unofficial Submission

The Applicant had submitted an informal version of a proposed claim amendment on January 18, 2019 for the purposes of discussion during the interview of January 23, 2019. That submission was not a formal amendment of the claims, or a formal response under 37 CFR as it was clearly marked as such and was not signed. Confirmation that it was not made of record is requested. The amendments made above are with respect to the last formal amendments made with the response filed July 20, 2018.

Status of the Claims

With entry of the foregoing amendments, claims 1, 2, 4, 8, 12-13, 15, 17, 31, 35, and 41-60 are now in the application. Claims 1, 2, 4, 13, 15, 17, 31, 34 and 42 have been amended.

New claims 43-60 are added. Support for new claims 43-60 is found in the specification as filed, and in the priority applications, and in the claims as previously presented. See the reasons stated in the Applicant's prior response for the same or analogous language of the claims and support documents filed on July 20, 2018.

Support for certain other new claims 44, 46-48, 50-54 and 56-58 is further discussed in detail in the attached Appendix A. The citations in Appendix A should be considered to non-limiting examples as other support for these and other new claims is also present.

No new matter has been added.

Claim Rejections – 35 USC 101

All of the prior claims were rejected under 35 U.S.C. 101 on the asserted basis that the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) "without significantly more".

Applicant respectfully traverses the rejection. The USPTO recently made its 2019 Revised Patent Subject Matter Eligibility Guidance effective January 7, 2019 (hereafter the "2019 Guidance") for all pending applications. The 2019 Guidance acknowledges that a claim that integrates a judicial exception into a practical application that imposes a meaningful limit on the judicial exception is not "directed to" a judicial exception, thereby making the claim eligible for patenting under 35 U.S.C. 101.

Applicant respectfully submits that the claims as both previously presented and as currently amended are eligible for patenting, at least because the claims integrate subject matter into a practical application, as discussed in detail below.

However, before discussing application of the 2019 Guidance in further detail, Applicant

respectfully submits that the amendments accompanying this response further clarify certain aspects of the claims as being performed by a computing system that processes information received via a first radio and a second radio, which is an example of a physical machine. The current amendments also specify how a computing system operates, or how it performs the recited processes in a manner that integrates the claimed subject matter into a practical application.

For example, apparatus claim 1 as currently amended provides that one or more processors execute instructions to perform operations including determining if a particular type of radio transmission – a short range radio transmission - is of a particular type (that is, whether the short range transmission (a) includes a MAC address and (b) has a proximity beacon service identifier (PBSI) indicating that the transmission is associated with the proximity beacon service). Claim 1 as currently amended also further requires then, and only then, executing instructions to determine if an object or entity of a particular type – one associated with a proximity beacon service - is within proximity to the mobile wireless device in a specific way. That specific way requires utilizing both the identifier related information and the UID as were previously received, respectively, from a first radio and a second radio. Method claim 31 is amended similarly to claim 1.

Turning now to the 2019 Guidance, Step 1 of the eligibility inquiry asks whether the claimed subject matter is directed to a statutory category under 35 U.S.C. 101. Applicant respectfully submits that apparatus claim 1, and the claims that depend from it, each recite an apparatus having a first and second radio, one or more processors, and one or more non-transitory memory devices, which is an example of a machine. Method claims 31 and 43, and the claims that depend from them, respectively, each recite a method having a series of steps performed by a computing system, which is an example of a process. Therefore, all pending claims recite statutory categories of subject matter under Step 1.

Prong 1 of revised Step 2A of the 2019 Guidance asks whether the claims recite a judicial

exception. The 2019 Guidance offers the following three categories of judicial exceptions:

> 1. Mathematical concepts like mathematical relationships, formulas, and calculations;
>
> 2. Certain methods of organizing human interactions, such as fundamental economic practices commercial and legal interactions; managing relationships or interactions between people; and advertising, marketing, and sales activities; and
>
> 3. Mental processes, which are concepts performed in the human mind, such as forming an observation, evaluation, judgment, or opinion.

According to the 2019 Guidance, for each alleged judicial exception, the Examiner must: (a) identify the specific limitation(s) in the claim that the Examiner believes recites an abstract idea, and (b) determine whether the identified limitation(s) falls within the subject matter groupings of abstract ideas, as listed above.

Here, the Office action (admittedly mailed prior to publication of the 2019 Guidelines) identifies the claims as being directed to the supposed abstract idea of " determining whether a device is in proximity to an access point". The Office action then characterizes the claim as merely being "an algorithm that involves receiving a list of identifiers or locations[1], determining the location of a device, and determining that the device is in proximity to one of the locations on the list" and that "the transaction device in this claim[2] merely automates this algorithm. The Office Action goes on to conclude that therefore, the claim does not include additional elements that are sufficient to amount to significantly more than the judicial exception because additional claim elements do not provide meaningful limitations to transform the abstract idea into a patent eligible

[1] The claims do recite two different types of identifiers, but do not recite or mention a "list of locations".

[2] There is no "transaction device" in independent claim 1 or claim 31 – nor has there ever been.

application of the abstract idea such that the claim amounts to significantly more than the abstract idea itself." (see Par 30 of the Office Action).

Applicant respectfully submits that none of the above concepts identified by the Office action fall within the three judicial exceptions set forth by the 2019 Guidance. Specifically, the claims do not recite any mathematical concept, or method of organizing human interaction, or mental process, even under a broadest reasonable interpretation. Regarding mental processes, a human cannot on its own detect whether a first radio has received a certain type of transmission or whether a second radio has also received a certain type of short range transmission. The claimed further apparatus features and process steps of determining whether an entity or object is within proximity to the mobile wireless device is also not practically performed in the human mind, because they require a processor accessing computer memory to compare components of radio transmissions, including MAC addresses, unique identifiers (UID), and proximity beacon service identifiers (PBSI) received from those two radios. See e g., claim 2 of "Example 37" of "Subject Matter Eligibility Examples: Abstract Ideas" published by the Office with the 2019 Guidance.

Because the claims do not recite a judicial exception, Applicant respectfully submits that the claims are eligible for patenting under 35 U.S.C. 101 for at least this reason.

However, even if when the claims can be said to be "directed to" an abstract idea, the analysis does not end there. Prong 2 of revised Step 2A of the 2019 Guidance requires then asking whether the alleged judicial exception is "integrated into a practical application in a manner that imposes a meaningful limit on the judicial exception". Applicant respectfully submits that the claims here recite a combination of additional features, that as a whole, integrates any alleged judicial exception of the claims into a practical application.

Consider that the claims recite determining that a particular type of entity or object is within proximity to the wireless device – that is, an entity or object associated with a particular proximity beacon service. The determination is also made in a very specific way. First, the first and second radio must have each received a certain type of transmission - a short range transmission (a) that includes a MAC address and (b) a proximity beacon service identifier (PBSI) indicating that the transmission is associated with the proximity beacon service. The claims as currently amended also further require then, ***and only then***, executing instructions to determine if the object or entity related to the beacon service is within proximity. Furthermore, that determination is made in a specific way – that is, by utilizing the identifier related information and the UID as were previously received from the first and the second radios[3].

Hence the claims recite a specific manner of determining whether a device is in proximity to an entity or object associated with the beacon service.

Applicant respectfully submits that the above features, in combination with the remaining features of the claims, address a problem specifically arising in wireless communications technology and improve the functioning of a system that includes computer-connected radios. For example, as set forth by the specification, the claimed subject matter now enables advantages such as:

> The exchanging of identifiers to confirm that the entity or object in proximity, is in fact, associated with a particular beacon service, reduces the amount of data that would otherwise be transmitted.
>
> The use of the proximity beacon service identifier, and downloaded identifiers in some embodiments within the scope of the independent claims, to perform the detection of a proximal device has significant power saving benefits. When a beacon is identified as being associated with the proximity beacon service for example, power consumption of the

[3] The Office Action also ignores these specialized features of the claim. The does not merely recite "a mobile wireless device comprising a first and second radio, one or more processors, and one or more non-transitory memory devices" as asserted in Par 31.

> wireless devices is reduced due to reduced processing requirements for the detection of beacon transmissions and resulting processing of associated information and reduced interaction with the server.
>
> In some embodiments as recited in the dependent claims, the invention also permits two devices to continue to communicate after they move away from each other, via the connections established with the server. Such a benefit is an innovation over pure peer to peer communication which is limited to only communicating when the two devices are in proximity, disconnecting as they move apart.
>
> In other embodiments, as recited in the dependent claims, changing wireless identifiers permits communication between the two devices to remain secure, even after their identifiers were initially exchanged to determine proximity.

In view of the above the claimed subject matter addresses problems specifically and only arising in computer-related technology in a manner that improves the functioning of a computer-related communication system. Therefore, the claimed subject matter does more than merely recite instructions to apply a judicial exception using a generic computer. Furthermore, because the claimed subject matter addresses a problem specifically arising in computer-related technology in a manner that improves the functioning of a computer-controlled radio, the claims impose meaningful limitations on practicing the alleged abstract idea. For example, the claimed subject matter does not preempt other approaches that determine the proximity of two things that do not recite the specific ordered combination of features recited by the claims. Therefore, the claimed subject matter is directed to a practical application that imposes meaningful limits on practicing the alleged judicial exception.

Even if the Examiner maintains that the claimed subject matter is not eligible for patenting under revised Step 2A, Applicant respectfully submits that the claimed subject matter is eligible under Step 2B. First, in considering the eligibility of the claims under Step 2B, the Examiner must establish that all features of the claim individually are merely routine or conventional. Applicant respectfully submits that the Office action has not established by substantial evidence that any or all features of the claims are merely

routine or conventional as required by precedential decisions, such as *Berkheimer v. HP, Inc.*, 881 F.3d 1360 (Fed Cir. 2018) CAFC Appeal No. 2017-1437.

Furthermore, even if the Examiner maintains that all features of the currently amended claims are merely routine or conventional, Applicant respectfully submits that, as an ordered combination, the subject matter of the claims provides significantly more that transforms the alleged abstract idea into patent eligible subject matter. For example, as discussed above, the claims enable a wireless device that includes a computer connected to a first and second radio to determine whether an entity or object associated with a proximity beacon service is in proximity. The specification discusses numerous advantages of the claimed approach, as explained and reproduced above. Applicant's claims therefore entail an unconventional technological solution to a technological problem. Accordingly, Applicant's claims are eligible for patenting under Step 2B.

The rejection under 35 U.S.C. 101 should be withdrawn in its entirety.

Claim Rejections – 35 USC 112(pre-AIA) – First Paragraph

Regarding claim 4, and as explained in the Applicant's prior submission, the specification clearly provides that, in some embodiments, the identifiers will be changed over time. As one example, support for claim 4's recitation of changing MAC addresses is found in the application at page 7, lines 3-6. There it is explained that *"....the system may coordinate the change of the identifiers from time to time such that the disclosure of an identifier by one device to another does not compromise the identity of the device."*

In one example implementation using a Bluetooth local link, at paragraph (page 15, lines 23-24 of the application as filed), "the BD ADDR or MAC address of the Bluetooth device can be used as the identifier".

The specification therefore describes an embodiment where the BR ADRR or the MAC address can be changed, and that it can be used as the identifier in certain Bluetooth embodiments.

Claim 4 has also been amended to properly recite this feature as one or more processors that execute program code to perform steps including:

> "receiving, by the second radio, a second MAC address and a second unique identifier at a second time, the second MAC address being different from the first MAC address and the second unique identifier being different from the first unique identifier; and
>
> associating the first and second unique identifier and the first and second MAC address with a single beacon transmitter device".

Claim 18 has been cancelled.

Claim Rejections – 35 USC 112(pre-AIA) – Second Paragraph

The claim formats adopted by the Applicant are expressly permitted and encouraged by both the courts and the Patent Office.

The legal test for definiteness under 35 USC 112, second paragraph is actually whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification" *Orthokinetics Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576 (Fed Cir. 1986) (citations omitted).

The claims in question, certainly as now amended, also each recite a logical and operative device (in the case of apparatus claim 1) and a logical and operative method (in the case of claims 31 and 43) that are understood by one of skill in the art.

In addition, the Office Action provides no explanation for why the format adopted for claim 1 – a processor programmed to perform a series of steps - is not a proper form. For a claim in such as format has repeatedly been recognized by both the Court and the Patent Office itself.

For instance, a claim to computer storage medium programmed with attribute data objects that perform the function of facilitating retrieval, addition, and removal of information in the intended computer system, established a functional relationship such that the claimed attribute data objects were given patentable weight. See *In re Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035, as cited in MPEP 2111.05 B(III).

The Court of Appeals for the Federal Circuit has most recently spoken on this topic in *MasterMine Software, Inc. v. Microsoft Corp*., 2017 U.S. App. LEXIS 21479 (Fed. Cir. Oct. 30, 2017) (Newman, O'Malley, Stoll) recognizing that "apparatus claims are not necessarily indefinite for using functional language", citing to *Microprocessor Enhancement Corp. v. Texas Instruments Inc. (MEC)*, 520 F.3d 1367, 1375 (Fed. Cir. 2008), (finding that a claimed "processor" programmed "for executing instructions" was proper form, and not indefinite). See *MasterMine*, slip op. at 14.

Claim 31 and the claims that depend from it are method claims. Lacking any other specific identification or reason in the Office Action, these method claims must be presumed to not be in improper form.

Nonetheless:

Claim 2 is merely further defining the type of MAC address received.
Claim 4 has been amended to remove the "occasionally change" language.
Claims 5 and 6 are cancelled.
Claim 15 is amended to remove the "occasionally change" language.

Claim 17 is amended to recite "receiving a first unique identifier at a first time that is different from a second unique identifier received at a second time."

Claim 18 is cancelled.

Claim 23 is cancelled.

Claim 13 is amended to positively recite the "sending" and "downloading" steps in sequence.

Claim 14 is cancelled.

Claim 15 is amended to depend from claim 4, and now positively recites the "determining" there is a match, and then "allowing further communications".

Claim 23 is cancelled.

Claims 32 and 34 are cancelled.

Claim Rejections – 35 USC 103

Previously presented claims 1, 6-10, 12-14, 19, 31, and 34-40 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200).

Other claims were also rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Sundar et al (US 2003/0134650) in view of Park (2006/0104200) in combination with other references such as Sugiyama et al (US 2006/0032901) or Landau (US 2005/0099291) or Sorenson et al (US 2003/0053484) or Brackett et al (US 2005/0114654).

Reconsideration and withdrawal of this rejection is respectfully requested, especially in view of the amendments above.

(A) Sundar and Park Cannot be Combined; or at least There Would be No Motivation to Combine them as they are Intended for Different Purposes

Sundar teaches downloading "SSID"s to a mobile device, in order to qualify if the detected wireless access point will allow for authentication of the mobile device to the WiFi voice network using that access point.

The Office Action considers this feature of Sundar as being the same thing as the Applicant's claimed "downloading identifier related information", and "detecting the proximity of one or more beacon devices associated with the proximity beacon service." The Office Action then points to Park as teaching each proximity beacon transmission may include a MAC address and a unique identifier (referencing Park at Pars 18, 21, 23, 41, 43, Par 66 of office action) and concludes it would have been obvious to one of ordinary skill in the art to combine Park and Sundar "in order to obtain greater security."

Applicant must respectfully disagree because (A) there would be no motivation to combine Sundar and Park and (B) even if their teachings could be combined, one would not arrive at all of the features recited in the claims.

First, there is no indication in either Park or Sunder that such a combination would provide any benefit to security, how that security might be achieved, or to what aspect that security addresses.

Second, Sundar's system is for use BEFORE a connection of a terminal to an 802.11 access point, while Park's system is for use AFTER a connection to a WiFi access point has been made. The infrastructure mode beacons of Sundar and 802.11 in general are for use by terminals to discover the presence of the Wi-Fi network prior to connecting to that network. This is why Sundar teaches downloading SSIDs to qualify if a mobile device should attempt connecting in order to be able to access Voice Over IP (voip) services. However, Park's system (cited by the examiner at Pars18, 21, 23, 41 and 43 and relating

to Fig. 3), is for use in establishing a fall back, "ad-hoc", mode of communication once a 802.11/Wi-Fi network has already been joined. (See Park at Par. 42 *"controller 120 generates an auto-switch request packet packetized with the Ad-Hoc information and transmits the auto-switch request packet to the corresponding terminal while terminals are communicating with each other through an access point based on the infrastructure communication mode"*). The ad-hoc information in the form of a "auto-switch request" (Park Fig, 3, and Par. 43) is sent (using the infrastructure mode) but related to establishing an 802.11 (WiFi) ***Ad-Hoc*** mode as a fall back, direct communication approach if the link to the AP (an intermediary between the two devices – see Park Par 42) fails.

Park thus teaches away from the combination of the beacons of Sundar and the auto-switch request packets at least because:

a) the terminals of Park are ***already connected*** to the access point (and have already used the beacons of Sundar), when any auto-switch request packet of Park could be sent,

b) The "auto switch request" packet contains the "address" of the "corresponding terminal" of Park (*"Referring to FIG. 3, the auto-switch request packet 300 includes Ad-Hoc information such as the MAC address of a transmitting terminal 310,* ***the MAC address of a receiving terminal 320, that is, the MAC address of a corresponding terminal,*** *a SSID 330, a BSSID 340, and a signal channel number 350." Park Par. 43*).

The purpose of beacons in Sundar (and 802.11 / Wi-Fi in general) is to broadcast the presence of the Wi-Fi access point's communication services prior to the connection to that AP by a terminal. Therefore combining a "directed" transmission (used after connecting to the AP, and containing the address of the corresponding terminal on that network) with a beacon used for discovering the presence of the network, prior to connecting to it would not be possible, or logical. Indeed, the format of the

infrastructure mode beacons of Sundar are set by the 802.11 standard, and cannot be modified and remain compatible with the 802.11 standard which is used by both Sundar and Park. Simply put, the auto-switch packet of Park is not a beacon, has an incompatible format, and is addressed to a specific recipient (unlike the beacons of Sundar).

Third, the goals of Sundar and Park are completely different, and do not address the same problems. Sundar looks to determine if the "SSID" or "network name" of the communication network is one in which a device can gain access to voice services successfully in place of a cellular connection for voice services. The primary goal is to not waste a device's resources attempting to access a WiFi network which cannot provide access to the voice systems. Park, on the other hand, is directed to creating a direct ad-hoc connection between two terminals, if the intervening access point malfunctions. This is done by sending the "auto switch packet" from one terminal directly to the other to bypass the access point altogether, as discussed above. These are disjoint goals.

Fourth, the use of downloaded SSIDs from the servers of Sundar to a mobile device would not help the two terminals achieve the establishment of an alternate direct communication link between them, and provides no benefit to security or either of the goals of Sundar or Park. This is because all of the information relating to the establishment of the ad-hoc direct communication link by one terminal used to send the "auto switch packet" to the other is already known to both terminals PRIOR to the need to send the cited ad-hoc packet (see Park at Pars. 41 and 43). This is because, as discussed above, Park is used after the SSID of a Wi-Fi network has already been used to connect with a particular network (and after any benefit is Sundar). Therefore there would be no benefit to this combination in either of the objectives of Park or Sundar, or in the third objective of "security", not mentioned by either Park or Sundar.

(B) Even the Combination of Sundar and Park does not Teach or Suggest All of the Elements of the Applicant's Claims

The new limitations of the independent claims below provide further distinctions over Park and Sundar. For example, claim 1 now recites the following (among other features):

> receiving, using the first radio, identifier related information associated with a proximity beacon service, from one or more servers; receiving, using the second radio, a plurality of short range transmissions….[and a processor executing code for]
>
> determining if a particular short range transmission of the plurality of short range transmissions a) includes a MAC address, and b) includes the proximity beacon service identifier (PBSI) and c) if the PBSI indicates the particular short range transmission is a proximity beacon transmission associated with the proximity beacon service, and if so, executing instructions that include:
>
> determining if an entity or object associated with the proximity beacon service is in proximity to the mobile wireless device, by utilizing the identifier related information and the unique identifier.

In other words, in the Applicant's invention as now claimed, the first radio receives identifier related information which is used in determining the proximity of an entity or object associated with a proximity beacon service. The claimed invention also receives short range transmissions, via a second radio, that include a MAC address and a PBSI, and a unique identifier. The Applicant's claim 1 then checks that a MAC address and a PBSI is present and *to see if it is of particular format* – that is, "*if the PBSI … is a proximity beacon transmission associated with the proximity beacon service*". Only then, after completing these three "determining steps" does the Applicant's claim 1 go on to perform a fourth determining step – to determine if an entity or object is in proximity, by using the identifier related information and the unique identifier.

Nowhere does Sundar or Park disclose or suggest determining if an identifier is of a particular format that is, anything like the Applicant's claimed determining "if the PBSI … is a proximity beacon transmission associated with the proximity beacon service".

Additionally, nowhere does Sundar or Park contemplate the advantage of using both identifier related information and a unique identifier to determine when an object (or entity) is in proximity.

As mentioned above, Sundar does use an SSID to identify the Access Points that belong to a voice network for which the mobile devices would be able to gain access, authenticate and receive VoIP services – namely so that the mobile device can match the SSID against a list of SSIDs for networks that can deliver the desired voice service. Sundar also does send an SSID in a "beacon frame", as required in standard WiFi transmissions. Sundar does also have two radios, both a cellular radio and a WiFi radio. However the cellular radio in Sundar is not being used to communicate identifier related information which can be used with a received "unique identifier" to determine if an entity or object is within proximity to the mobile device. Park does not cure this deficiency.

Therefore these limitations recited in claim 1 (and the same or analogous limitations in all other claims) are not found in Sundar and Park, even if those references could be combined (which they cannot be, as discussed), and one was motivated to do so (which they would not).

Claims 1, 6-10, 12-14, and 19 depend from claim 1 and thus include all limitations of claim 1. These claims are thus allowable for the same reasons.

Method claim 31, and its dependent claims 35 and 41-42 recite analogous limitations. These claims are thus allowable for the same reasons.

Claim 4, as now amended, furthermore requires "the second MAC address being different from the first MAC address and the second unique identifier being different from the first unique identifier". The Office Action rejected claim 4 based upon Sundar in view of

Park in further view of Sugiiyama. But Sugiiyama is related to RFID devices, *which do not include MAC addresses*. The is no mention of a MAC address in the cited paragraphs. Furthermore, the proposed combination of a WiFi access point (Sundar) with an ad-hoc mode terminal (as in Park) and using an RFID protocol is not interoperable in any straight forward way. One would not be motivated to combine these diverse wireless systems, as they are from different field of endeavors, address dissimilar problems, and use incompatible protocols.

Regarding claims, such as claim 13, neither Park or Sundar teach sending a detected identifier to a server and receiving something in response.

New independent claim 43 contains analogous limitations as claims 1 and 31 and is therefore allowable for the same reasons stated above.

New claims 44-60 depends from an allowable based claim 1, 31 or 43.

Conclusion

With entry of the foregoing amendments, all of the claims presented should be in condition for allowance.

January 28 2018

Respectfully submitted,

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Electronic Acknowledgement Receipt

EFS ID:	34982399
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
Filer:	David J. Thibodeau/Elisabeth Smith
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20190128_111054-0001U4C7_Response_Final.pdf	244131 a7978f917428b4314e70ac90655178a51c9b96eb	yes	30

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	12
	Applicant Arguments/Remarks Made in an Amendment	13	30
Warnings:			
Information:			
	Total Files Size (in bytes):	244131	

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

CLAIM LANGUAGE	SUPPORT IN US2017/0011425A1 AS PUBLISHED
44. (New) The method of Claim 31, further comprising preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission. 46. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise: preventing the sending of the unique identifier, using the first radio, to the one or more servers, based upon previous detections of the respective unique identifier associated with the proximity beacon transmission.	[0047] **[..] If identifiers are found in 302, the device may employ an action function 303, which would act as a filter that determines which of the detected identifiers should be passed to the server.** This function may instead be omitted and all identifiers passed to the server **100**. **The idealized effect of the action function would be to reduce the number of requests to the server by not re-requesting recently requested identifiers which have already been passed to the server, for some period of time.** [..] [0049] [..] In the preferred embodiment, the server would determine the identity and the relevance of the detected identifiers, and **the action function 303 would work to reduce frequency of re-requests to the server.** FIG. 7 describes an example of how to use this ...
47. (New) The mobile wireless device of Claim 1, wherein the instructions further comprise: controlling further communications between the mobile	Fig. 3, step 303, Fig. 7, Step 707/708 Fig. 9, step 908 [0043] More particularly, a given device **106**, **108** uses a short range wireless link **107** such as a Bluetooth (IEEE802.15.1) or Wi-Fi (IEEE802.11) link to detect the presence of other devices such as device **108**, **and uses the wide area wireless network connections 103, 104 such as**

device and at least one device or server associated with an entity or object in proximity to the mobile device.	**IS-2000, WCDMA, GPRS, EDGE, LTE, Wi-Max (IEEE802.16), or the like to perform communications to central server 100, and to perform the actual substantive communications between the wireless devices 106 and 108. Device 108 typically uses the short range wireless link 107 and wide area wireless link 103 in a similar manner to locate and initiate communicate with device 106.** [0054] There can also be policy based permissions associated with each account and applied to any information associated with that account. The stored policy permissions can be used to determine what information and under which situations information may be disclosed to another device or user associated with another account. For example, the entity (person in this case) associated with device **202** may have set a policy in their account to not receive any unsolicited information from a broadcast device so as to not be disturbed. However, the person associated with **202** may see the broadcast device and a sign stating a discount is available, and provide input to their device to request any broadcast information on a one time exception basis. The messaging associated with an example mobile and broadcast device process will be described in more detail to follow associated with FIG. 9. See also [0058], [0061] "Chat Example", [0062] "E-Commerce Example", and Fig. 8A and 8B.
48. (New) The method of Claim 31, further comprising: receiving, using the first radio, access code information by the mobile device from at least one of the servers; and utilizing the access code information to gain access to the entity or object determined to be in proximity to the mobile device.	[0068] The present invention can be extended to facilitate other types of transactions as well. … **The Consumer device and/or Merchant device would send a message to an application running on the Server requesting that a person associated with an account for the Consumer be granted access to a specific vehicle (e.g., an "object") that is in the vicinity of and associated with the Merchant device. A set of confirmatory messages (such as to exchange access codes,** to confirm the location of the vehicle, the per-use fee due, and payment for the same, etc.), are then typically also exchanged between the Consumer and the Merchant device with the assistance of the Server and the long range wireless network. **Upon confirmation of the necessary transaction information, the Server sends a message to the Merchant device to unlock the vehicle requested (which may be sent over the second long range wireless network or a yet another network, such as a satellite network).**

50. (New) The method of Claim 31, additionally comprising: sending the unique identifier, using the first radio, to at least one server of the one or more servers, and receiving further information relating to an object or entity associated with being within proximity to the mobile device. 51. (New) The method of Claim 50, wherein the further information relates to one or more of the following: a loyalty program; a payment service; or a coupon relating to an entity in proximity to the mobile device; or advertising content.	Fig. 3 [0046] An example of an application using this infrastructure follows. The device **204** will simply broadcast an identifier, with no WWAN connection but may **facilitate advertising or local information**. For instance, an account associated with one or more identifiers may belong to a museum. As a museum patron walks to an exhibit, the patron's device **202** will receive an identifier sent from museum broadcast device **204** operated by the museum. The patron device **202** passes the identifier or museum device **204** to the central server **100**, which in-turn recognizes it as being associated with that exhibit within that museum and passes relevant information back to the user's device **202**. A distinguishing feature of this approach relative to prior art is that the patron device **202** in this example may move out of proximity of broadcast device **204**, yet continue to view the content being provided by the server **100** related to the detected broadcast device **204**. Content may include text, pictures, web pages, application software such as games, informative display applications, or other content such as audio or video to be offered to the user's device as well. Other examples might include **electronic coupons (such as in a grocery store), menus or special offers in a restaurant.** [0067] Finally, the transaction details may be stored by the server, or sent to a thirdly party server for tracking spending habits of that account holder, or customers of that merchant allowing the merchant to track that specific customer's behavior and cater to them in the future with various specials delivered via email, or during their next visit via their device in the form of an electronic coupon. **This process can be performed with a goal to help the merchant expose the customer to other products or services the merchant believes the customer might find desirable.** [0071]

	As previously mentioned, several key distinctions of this embodiment include that the user of device **902** may walk away out of range form the broadcast device **903** and continue to receive the content using their cellular link, or may choose to play the content at a later time having stored the detected like in a favorites list. Additionally, **the content stored in the account associated with the broadcast device 2 (903) is relevant to the placement of the device and the products near it.** Further, as the content is stored in the server **901** rather than in the broadcast device **903**, the content may be updated, modified, or deleted at anytime. For example the server **901** knowing that the consumer has never been detected previously, **may customize the electronic coupon** to provide a deeper discount than a regularly detected consumer. In the case where the devices are used for electronic commerce as in FIG. 8, **knowledge of the user's past purchases may be used to induce the consumer to try a new product.** Alternatively if the consumer is a regular purchaser a **loyalty program** may provide a **coupon** upon a particular number of repeated purchases. [0017] A distinction from such peer to peer approaches is the use of a central server to "broker" the transactions between peers, enhancing the ability to manage security and information disclosure. Such use allows for the opportunity to customize delivered content to include elements such as **advertising or other content customized to the recipient** based on additional information such as known **personal purchasing history**, or interests. [0046] Other examples might include **electronic coupons (such as in a grocery store), menus or special offers in a restaurant.**

52. (New) The method of Claim 50, wherein the further information relates to a service for providing a menu for use by a user of the mobile device for use in purchasing items, and further comprising: allowing for the user take delivery at or near the location of a fixed proximity beacon device.	Fig. 8A, Step 821 "list of products to be purchased" [0085] **The content may indicate that the venue has a product delivery service. The user may then press an indication on their device that they would like to see a menu or list of items for sale from the merchant(s) in the venue.** The application on the user's device would then allow them to **see a menu**, for instance, and **select items to purchase**. The user then would be asked to confirm the purchase. **The server would then indicate to the merchant that a user located near a specific broadcast device has ordered something. …** Upon arrival of the delivery person, the customer may be notified that the delivery person is looking for them, and has arrived. [0111] "5. In still further embodiments, a good or service delivery model utilizing the above described broadcast device**, is placed in a known location**, and further .. " .. f. Where that content may be a list of items for sale, services for sale, a opinion pole, food menu, or other menu style content which allows for user selection of items, which can be implemented in java code, xml, simple text, or other for example optionally including active code elements; g. The application on the mobile device displaying the content to the user display with the itemized list of goods, services, or other selection items; h. A user providing selection of one or more of the items, and **confirming they wish to purchase said items, and take delivery at or near the location of the fixed broadcast device**; Fig. 8B at 830, 834

53. (New) The method of Claim 50, wherein the further information relates to a nearby user of an application on another device, in common with an application on the mobile device. 54. (New) The method of Claim 53, wherein the application is a multiuser game.	[0074] It is contemplated that the permissions not be an "all or nothing" decision, but that different classes of information may be assigned different permissions and mechanisms. An example of this might be a user's presence, identity, and cart services being made available to only one set of other accounts (or users), while the presence of an anonymous individual being made available to anyone, **but with other classes services available such as multi-player games** being treated differently. Additionally multiple contacts may be included in the account, each given customized permissions. An example can be that any user may be notified of an anonymous user or other information based on additional policies. [0047] FIG. 3 is a block diagram with further detail of this operation. A device **106**, **108**, or **202** after performing a search (FIG. 3, step **301**) for identifiers on the WPAN or WLAN, will subsequently use the WWAN link to communicate with the central server **100**. If the device does not find identifiers **302** it will either continue to search, or search at a later time **301**. **If identifiers are found in 302, the device may employ an action function 303, which would act as a filter that determines which of the detected identifiers should be passed to the server**. This function may instead be omitted and all identifiers passed to the server **100**. **The idealized effect of the action function would be to reduce the number of requests to the server by not re-requesting recently requested identifiers which have already been passed to the server, for some period of time.** In step **304**, if no identifiers require server information, searching is continued in step **301**. [0111] "A central serving capability is provided to mobile devices utilizing a wireless WAN connection to provide and exchange information between one or more application on one or more wireless devices and the central server where .. "this identity is related to certain information and preferences of an account holder **associated with an application** operating on the second wireless device; "the application is operating on both wireless devices;"

	"the application operating on the first device also provides its own identifying information to the central server as well as detected identifiers from devices with applications on them" "The central server contains **account information registered to the applications running on each wireless device**;"
56. (New) The method of Claim 31, wherein the step of determining that an entity or object is within proximity further comprises: comparing the identifier related information with the unique identifier or information derived from the unique identifier. 58. (New) The mobile wireless device of Claim 1, wherein the one or more processors further execute the instructions to perform the operations for determining that an entity or object is within proximity by further: comparing the identifier related information with the unique identifier or information derived from the unique identifier.	[0049] [..] As an example of the overall process, a **detected identifier may be relevant to the receiving device** if the user associated with the detected identifier is listed in a "friends list" for the owner of the receiving device. **If the identifiers for the individuals within the friends list have been passed to the device, the action function 303 may make this determination**. [..] [0064] **The server than generates a message 825 to Device 2 (803) indicating that Ell is relevant**, and the transaction participant is present [0065] **The server performs this confirmation in step 824 may matching the device 1 identifier DI1 with the information stored in the account associated with Entity 1 (EI1)** also referred to as the Consumer.

57. (New) The method of Claim 31, additionally comprising: sending the unique identifier, using the first radio, to at least one server of the one or more servers, and wherein the one or more servers perform the following steps: associating an object or entity as being within proximity to the mobile device; storing a user's purchasing practices or requests from the one or more servers, related to the associated object or entity information as stored proximity user behavior; retrieving a stored user email address associated with an account associated with the mobile device; and sending an email, addressed to the user email address containing customized content based upon the stored proximity user behavior.	[0017] "A distinction from such peer to peer approaches is the use of a central server to "broker" the transactions between peers, enhancing the ability to manage security and information disclosure. Such use allows for the opportunity to customize delivered content to include elements such as **advertising or other content customized to the recipient** based on additional information such as known **personal purchasing history**, or interests." [0067] Finally, the **transaction details may be stored by the server, or sent to a thirdly party server for tracking spending habits** of that account holder, or customers of that merchant allowing the merchant to track that specific customer's behavior and cater to them in the future with various **specials delivered via email**, or during their next visit via their device in the form of an electronic coupon. This process can be performed with a goal to help the merchant expose the customer to other products or services the merchant believes the customer might find desirable.

Electronic Acknowledgement Receipt

EFS ID:	34988632
Application Number:	15271410
International Application Number:	
Confirmation Number:	7653
Title of Invention:	EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED
First Named Inventor/Applicant Name:	James Arthur Proctor
Customer Number:	86012
Filer:	David J. Thibodeau/Elisabeth Smith
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	20190129_111054-0001U4C7_TPO_Suppl_Response_Transmittal.pdf	71357 adfb89a98d1a337a03da68c66c1c3eec6f3617d6	no	1

Warnings:

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2	Supplemental Response or Supplemental Amendment	20190129_111054-0001U4C7_TPO_Exhibit_A.pdf	123382 a73d7f4efa81d36206c2cff53818fe15a84bcf22	no	8
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			Total Files Size (in bytes):	194739	

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PATENTS
111054–0001U4C7

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re The Application of: James A. Proctor, Jr., et al.	
Serial No.: 15/271,410	Examiner: Sherr, Cristina Owen
Filed: September 21, 2016	Art Unit: 3685
For: EXCHANGING IDENTIFIERS BETWEEN WIRELESS COMMUNICATION TO DETERMINE FURTHER INFORMATION TO BE EXCHANGED OR FURTHER SERVICES TO BE PROVIDED	Confirmation No.: 7653

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

SUPPLEMENTAL RESPONSE TO OFFICE ACTION

Enclosed herewith is a copy of Exhibit A that was inadvertently omitted from the response filed January 28, 2019.

January 29, 2018

Respectfully submitted,

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
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Application Number	15271410
Filing Date	2016-09-21
First Named Inventor	James Arthur Proctor
Art Unit	3685
Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

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	Attorney Docket Number	111054-0001U4C7

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	2	Golle et al. "Universal re-encryption for mixnets". In: Topics in Cryptology–CT-RSA 2004. Springer, 2004, pp. 163–178	
	3	U.S. Provisional Application No. 61/054,162 filed on May 18, 2008 by Mark Braverman for System And Method For Electronic Payment	
	4	"Simple Pairing Whitepaper", Bluetooth Special Interest Group, V10r00, (2006)	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	James Arthur Proctor
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	Examiner Name	SHERR, MARIA CRISTI OWEN
	Attorney Docket Number	111054-0001U4C7

	5	Mettala, R., "Bluetooth Protocol Architecture", Bluetooth White Paper, Document No. 1.C.120/1.0, 3-20 (1999)	
	6	Duflot, et al., "A Formal Analysis of Bluetooth Device Discovery", School of Computer Science, University of Birmingham, 1-16	
	7	Wg, Hid, "Device Identification Specification", V12r00, 1-20 (2006) NEED PUBLICATION DETAILS	
	8	U.S. Provisional Application No. 61/122,240 filed on December 12, 2008 by Rajiv Patel for System And Method For Electronic Payment	
	9	Bluetooth White Paper 1.1, AU-System, 1-25 (2000)	
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	11	Weis et al. "Security and privacy aspects of low-cost radio frequency identification systems". In: Security in pervasive computing. Springer, 201–212 (2004)	

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See attached certification statement.

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Signature	/David J Thibodeau Jr Reg No 31671/	Date (YYYY-MM-DD)	2019-02-27
Name/Print	David J. Thibodeau, Jr.	Registration Number	31671

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Art Unit	3685
Examiner Name	SHERR, MARIA CRISTI OWEN
Attorney Docket Number	111054-0001U4C7

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6901270	B1	2005-05-31	Beach	
	2	7039358	B1	2006-05-02	Shellhammer et al.	
	3	6580700	B1	2003-06-17	Pinard et al.	
	4	7039027	B2	2006-05-02	Bridgelall	
	5	6990587	B2	2006-01-24	Willins et al.	
	6	6587034	B1	2003-07-01	Heiman et al.	
	7	6067297	B1	2000-05-23	Beach	
	8	6188681	B1	2001-02-13	Vesuna	

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	9	7773995	B2	2010-08-10	Rappaport et al.	
	10	6909399	B1	2005-06-21	Zegelin et al.	
	11	7412246	B2	2008-08-12	Lewis et al.	
	12	7826425	B2	2010-11-02	Sekhar	
	13	6259898	B1	2001-07-10	Lewis	
	14	7030761	B2	2006-04-18	Bridgelall	
	15	7126926	B1	2006-10-24	Bjorklund et al.	
	16	7173922	B2	2007-02-06	Beach	
	17	6712274	B2	2004-03-30	Dvorkis et al.	
	18	6002918	A	1999-12-14	Heiman et al.	
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	20	6715681	B2	2004-04-06	Dvorkis	
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	23	6616049	B1	2003-09-09	Barkan et al.	
	24	7403120	B2	2008-07-22	Duron et al.	
	25	7280836	B2	2007-10-09	Fuccello et al.	
	26	8204039	B2	2012-06-19	Beach et al.	
	27	7440781	B2	2008-10-28	Beach et al.	
	28	6845338	B1	2005-01-18	Willins	
	29	7822000	B2	2010-10-26	Sekhar	
	30	6236674	B1	2001-05-22	Morelli et al.	

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	31	7030812	B2	2006-04-18	Bekritsky et al.	
	32	7005968	B1	2006-02-28	Bridgelall	
	33	7729326	B2	2010-06-01	Sekhar	

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	2	20050266868	A1	2005-12-01	Fuccello	
	3	20050243781	A1	2005-11-03	Vesuna	
	4	20080025282	A1	2008-01-31	Hong	
	5	20080002641	A1	2008-01-03	Hong et al.	
	6	20070281634	A1	2007-12-06	Rao et al.	

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	7	20060264212	A1	2006-11-23	Sekhar	
	8	20070025287	A1	2007-02-01	Goren et al.	
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	10	20050180367	A1	2006-07-13	Dooley et al.	
	11	20060153085	A1	2006-07-13	Willins et al.	
	12	20040264404	A1	2004-12-30	Zegelin	
	13	20050213553	A1	2005-09-29	Wang	
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	18	20060268765	A1	2006-11-30	Bajic et al.	
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	29	20050054350	A1	2005-03-10	Zegelin	
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	40	20070178907	A1	2007-08-02	Gopalan et al.	
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	45	20070060105	A1	2007-03-15	Batta	
	46	20070230441	A1	2007-10-04	Sethi et al.	
	47	20060045042	A1	2006-03-02	Sethi et al.	
	48	20060270412	A1	2006-11-30	Willins et al.	
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	51	20050136891	A1	2005-06-23	Wang et al.	
	52	20050185615	A1	2005-08-25	Zegelin	
	53	20030021250	A1	2003-01-30	Willins et al.	

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	1	101233722	CN	A	2008-07-30	Sekhar		
	2	1098477	EP	B1	2009-12-23	Hughes et al.		
	3	1207654	EP	A2	2002-05-22	Beach et al.		
	4	2752347	FR	A1	1998-02-13	Swift et al.		
	5	2003152739	JP	A	2003-05-23	Beach et al.		
	6	2564287	CA	C	2010-08-24	Heiman et al.		

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	7	2218268	CA	C	2007-01-16	Heiman et al.		
	8	2506121	CA	C	2010-09-21	Pinard et al.		
	9	2798749	FR	A1	2001-03-23	Klein et al.		
	10	2007047181	WO	A2	2007-04-26	Bolluck et al.		
	11	1908235	EP	B1	2018-01-24	Meyer		
	12	101036061	CN	A	2007-09-12	Ha et al.		
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Name/Print	David J. Thibodeau, Jr.	Registration Number	31671

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Mobile unit algorithms for use in a cellular local area wireless network

Abstract

A communication network comprising a cellular local area wireless network includes a plurality of access points connected to a housed computer and each other, and a plurality of mobile units each mobile unit being arranged for association with an access point. The mobile units are arranged to periodically scan for and identify the most eligible access point for association on the basis of the criteria of best quality signal strength and loading factor. In order to identify when mobile units are being removed from a predetermined area, access points having directional antennae are situated adjacent exit points to detect when mobile units are in a vicinity. Each mobile unit may include paging facilities, including the capability of transmitting information in a coded form known both to the unit and to a host, and power-saving facilities.

Classifications

Y02D70/10 Techniques for reducing energy consumption in wireless communication networks according to the Radio Access Technology [RAT]

View 1 more classifications

CA2218268C

Canada

Find Prior Art Similar

Other languages: French

Inventor: Frederic Heiman, Patrick Pinard, Andrew Werback, Michael Shiba, Robert Beach

Current Assignee : Symbol Technologies LLC

Worldwide applications

1997 CA

Application CA002218268A events

1996-11-08 Priority to US08/747,034

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1997-10-15 Application filed by Symbol Technologies LLC

1997-10-15 Priority claimed from CA2564287A

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2017-10-15 Anticipated expiration

2019-02-24 Application status is Expired - Lifetime

Info: Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, CIPO, Discuss

Claims (29)

1. An arrangement for maximizing battery life in each of a plurality of portable, battery-powered, mobile units, each of the mobile units being in wireless communication with a plurality of spaced-apart, stationary access points of a communications network, the arrangement comprising:

a) a radio in each of the mobile units, the radio having a transceiver for transmitting data to and from the access points within a predetermined working range in a powered mode of network operation;

b) a processor in each of the mobile units, the processor having a controller operatively connected to the transceiver; and c) a timer in each of the mobile units, for powering the radio only during the powered mode of network operation, and for reducing power to the radio to prevent data transmission by the transceiver during a power-saving mode of operation.

2. In a communications network including a plurality of spaced-apart stationary access points each of the access points being capable of wireless communication with portable, battery-powered, mobile units when within a working range from the access points, an arrangement for maximizing battery life in each of the mobile units, the arrangement comprising:

a) a radio section in each of the mobile units, the radio section having a transceiver for transmitting data to and from the access points in a powered mode of network operation;

b) a processor section in each of the mobile units, the processor section having electronic components including a control processor operatively connected to the transceiver; and c) a timer in each of the mobile units, for powering the radio section only during the powered mode of network operation.

3. The arrangement according to claim 2, wherein the control processor reduces battery power to the processor section in a suspended mode, and wherein the control processor controls the timer to reduce battery power to the transceiver when the processor section is in the suspended mode.

4. The arrangement according to claim 2, wherein the timer is operative for reducing power to the transceiver to prevent the transceiver from transmitting data in a power-saving mode of operation.

5. The arrangement according to claim 4; and further comprising an interface between the radio and processor sections of each of the mobile units, the transceiver of a respective radio section being operation for transmitting control data to and from the control processor via the interface.

6. The arrangement according to claim 5, wherein the network includes a host computer, each of the mobile units desiring access to the host computer being operative for selecting a most eligible access point from among the access points based on the control data received by the transceiver of the respective radio section.

7. The arrangement according to claim 6, wherein the mobile unit desiring access to the host computer transmits a probe message to the access points, receives response messages from the access points, and selects the most eligible access point based on the received response messages; and wherein the timer powers the radio section to the power-saving mode for each mobile unit not associated with an access point.

8. The arrangement according to claim 4, wherein one of the electronic components is a clock for timing the control processor, and wherein the timer is operative for halting the clock in the power-saving mode.

9. The arrangement according to claim 4, wherein each access point repeatedly transmits a broadcast beacon at predetermined intervals, and wherein the control processor controls the timer to power the radio section back to the powered mode upon receipt of the beacon.

10. The arrangement according to claim 9, wherein the radio section is powered to the powered mode upon receipt of every beacon.

11. The arrangement according to claim 9, wherein the radio section is powered to the powered mode upon receipt of every other beacon.

12. The arrangement according to claim 9, wherein the radio section is powered to the powered mode upon receipt of a predetermined number of beacons.

13. The arrangement according to claim 9, wherein the radio section is powered to the powered mode based on the number of transmissions of the data in a given time period.

14. The arrangement according to claim 9, wherein the radio section is powered to the powered mode upon elapse of a fixed time interval after receipt of the beacon.

15. The arrangement according to claim 9, wherein the radio section is powered to the powered mode upon elapse of a variable time interval after receipt of the beacon.

16. In a communications network including a plurality of spaced-apart stationary access points each of the access points being capable of wireless communication with portable, battery-powered, mobile units when within a working range from the access points, a method maximizing battery life in each of the mobile units, the method comprising the steps of:

a) transmitting data to and from the access points in a powered mode of network operation by providing a transceiver in each of the mobile units;

b) providing a processor section in each of the mobile units, the processor section having electronic components including a control processor, and operatively connecting the control processor to the transceiver; and c) powering the radio section with a timer only during the powered mode of network operation.

17. The method according to claim 16, wherein the control processor reduces battery power to the processor section in a suspended mode, and further comprising the step of controlling the timer to reduce battery power to the transceiver when the processor section is in the suspended mode.

18. The method according to claim 16, wherein the powering step is performed by reducing power to the transceiver to prevent the transceiver from transmitting data in a power-saving mode of operation.

19. The method according to claim 18, and further comprising the step of transmitting control data to and from the control processor via an interface provided between the radio and processor sections of each of the mobile units.

20. The method according to claim 19, wherein the network includes a host computer, each of the mobile units desiring access to the host computer being operative for selecting a most eligible access point from among the access points.

21. The method according to claim 20, wherein the mobile unit desiring access to the host computer transmits a probe message to the access points; and receives response messages from the access points, and selects the most eligible access point based on the received response messages, and further comprising the step of powering the radio section to the power-saving mode for each mobile unit not associated with an access point.

22. The method according to claim 18, wherein one of the electronic components is a clock for timing the control processor, and further comprising the step of halting the clock in the power-saving mode.

23. The method according to claim 18, wherein each access point repeatedly transmits a broadcast beacon at predetermined intervals, and further comprising the step of controlling the timer to power the radio section back to the powered mode upon receipt of the beacon.

24. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode upon receipt of each beacon.

25. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode upon receipt of every other beacon.

26. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode upon receipt of a predetermined number of beacons.

27. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode based on the number of transmissions of the data in a given time period.

28. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode upon elapse of a fixed time interval after receipt of the beacon.

29. The method according to claim 23, and further comprising the step of powering the radio section to the powered mode upon elapse of a variable time interval after receipt of the beacon.

Similar Documents

Publication	Publication Date	Title
US4759051A	1988-07-19	Communications system

US6633769B2	2003-10-14	Wireless access point software system
US5815811A	1998-09-29	Preemptive roaming in a cellular local area wireless network
US20040014474A1	2004-01-22	Wireless network connection switching management system and method
EP0655872A2	1995-05-31	Paging message processing
US20030181215A1	2003-09-25	Frequency beacon to broadcast allowed frequency
WO1992002104A1	1992-02-06	Cellular radio
US20030104832A1	2003-06-05	Mobile telephone with receive only mode
US6002918A	1999-12-14	Power-saving arrangement and method for mobile units in communications network
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EP0698976A1	1996-02-28	Wireless local area network system
US6993329B2	2006-01-31	Apparatus and method for automatically switching communication/communication suppression mode of wireless communication terminal
CN1183702A	1998-06-03	Mobile station having enhanced stadby mode
US20070298790A1	2007-12-27	Cellular network acquisition method and apparatus
US6600922B1	2003-07-29	Mobile station with intelligent control of scan time between home band scans when roaming
US20030040312A1	2003-02-27	Cellular telephone equipment and cell search method used therefor
EP0350007A2	1990-01-10	Diversity antenna communication system
US7096018B2	2006-08-22	Group communication system having group number specified by mobile unit to permit intergroup calls
US20030092375A1	2003-05-15	Mobile communication terminal, broadcast information storing method, cell transfer method, and mobile communication system
JPH10117166A	1998-05-06	Mobile body communication system
JPH11259783A	1999-09-24	Emergency relief system
JPH1118130A	1999-01-22	Mobile communication system and mobile station and radio base station for mobile communication system
JPH1098770A	1998-04-14	Detection system for portable information communication equipment
JPH0556472A	1993-03-05	Variable position registration system

Priority And Related Applications

Priority Applications (2)

Application	Priority date	Filing date	Title
US08/747,034	1989-06-29	1996-11-08	Power-saving arrangement and method for mobile units in communications network
US747,034		1996-11-08	

Applications Claiming Priority (1)

Application	Filing date	Title
CA2564287A	1997-10-15	Mobile unit algorithms for use in a cellular local area wireless network

Legal Events

Date	Code	Title	Description
2002-07-15	EEER	Examination request	
2017-12-18	MKEX	Expiry	**Effective date**: 20171016

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Patents

Preemptive roaming in a cellular local area wireless network

Abstract

A data communications network including a number of stationary access points and a number of mobile units. Each mobile unit is configured to scan for and select a most eligible access point for association therewith on the basis of received access point signal quality and loading factors at the access point. A physical area is defined within which all mobile units must be kept and access points are provided adjacent the exit point(s) from the physical area.

CA2506121C
Canada

Find Prior Art Similar

Other languages: French

Inventor: Patrick Pinard, Frederic Heiman

Current Assignee : Symbol Technologies LLC

Worldwide applications

1996 CA

Application CA2506121A events

1995-10-27 Priority to US549,051
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2010-09-21 Publication of CA2506121C
2016-10-01 Anticipated expiration
2019-02-24 Application status is Expired - Lifetime

Info: Cited by (2), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, CIPO, Discuss

Claims (2)

1. A data communications network, comprising:

a) a plurality of stationary access points operatively connected to a host, a plurality of mobile units, each of the mobile units using frequency hopping spread spectrum radio frequency communications, one of the mobile units including a transmitter for broadcasting a probe packet to all of the access points in a predetermined range from said one of the mobile units that is broadcasting the probe packet, b) said access points within said range including respective receivers for detecting the probe packet being broadcast, and for responsively sending probe response packets back to said one of the mobile units, c) a selector for selecting a most eligible one of the access points from the plurality of the access points on the basis of received signal quality at said one of the mobile units and loading factor at each of the access points, d) a physical area within which all mobile units are kept, said area having an exit adjacent which one of the access points is located.

2. A network as claimed in claim 1 in which said one of the access points at the exit includes a directional antenna for transmitting an alarm signal in the vicinity of the exit.

Description

PREEMPTIVE ROAMING IN A CELLULAR LOCAL
AREA WIRELESS NETWORK

This is a division of copending Canadian Patent Application Serial No. 2,186,923 that was filed on October 1, 1996.

BACKGROUND OF THE INVENTION
Field of the invention The invention relates generally to preemptive roaming among cells in a cellular network. In particular the invention relates to a local area wireless network including a plurality of mobile units and a plurality of access points.

2. Description of the Related Art Wireless local area networks (LAN'S) are used in business applications such as inventory, price verification mark-down, portable point of sale, order entry, shipping, receiving and package tracking. Such systems are often proprietary systems wherein the operator carries a mobile unit such as a hand-held computer communicating with a house computer via one of a plurality of access points connected to the house computer and to one another, each access point interacting with the house computer to create a wireless cell.
In order to achieve inter-operability of the various proprietary systems a draft standard IEEE 802.11 has been proposed (the IEEE 802.11 draft specification is available for public inspection).
The draft standard includes features such as 1Mbps and 2Mbps data rates, carrier sense multiple access/collision avoidance (CSMA/CA), a power-save mode for battery-operated mobile stations, seamless roaming in a full cellular network, high throughput operation, diverse antenna systems designed to eliminate "dead spots", and an easy interface to existing network infrastructures.
The term "roaming" relates to the scanning by each mobile unit of all access points to identify and associate with an eligible access point. Roaming between cells provides great flexibility and is particularly advantageous in locations that are difficult to wire, for simple relocation of work stations, and for portable work stations. The IEEE 802.11 protocols supports either direct-sequence or frequency-hopping spread-spectrum systems, as well as infrared communications. Each access point executes a unique hopping pattern across 79 non-overlapping frequencies at a rate of one hop every 100 milliseconds, 66 hopping patterns being specified in the IEEE 802.11 draft standard and being selected to minimise the possibility of interference.' Frequency hopping spread-spectrum systems are preferred by the majority of users as they allow increased capacity and decreased interference.

Although the IEEE 802.11 draft specification provides the basic packet types which can enable roaming it does not actually set the roaming algorithm.
According to the draft specification the mobile unit determines the access point with which it will associate and the access point must accept the mobile unit unless it is defective or certain alarm conditions exist, such as memory full. There is, however, no suggestion of how, or by what criteria, other than those mentioned above, the mobile unit might select an appropriate access point, or the optimum access point.
US 5,276,680 relates to a communication system including a plurality of portable units and a plurality of controllers wired to a network. Each portable unit polls all of the controllers to establish whether it can associate with any controller and receives a response from any controller having less than a predetermined number of portable units already associated therewith.
SUMMARY OF THE INVENTION
1. Objects of the Invention It is an object of the present invention to provide a communication system allowing improved selection by a mobile unit of an access point for association.
It is a further object of the present invention to provide a communication system allowing selection by a mobile unit of an access point to provide optimum operation of the system.
It is a further object of the present invention to provide a communication system providing information concerning the physical location of a mobile unit.
It is a further object of the present invention to provide a communication system adapted to prevent mobile units from being taken outside a given physical area.
2. Features of the Invention Certain exemplary embodiments can provide a data communications network, comprising: a) a plurality of stationary access points operatively connected to a host, a plurality of mobile units, each of the mobile units using frequency hopping spread spectrum radio frequency communications, one of the mobile units including a transmitter for broadcasting a probe packet to all of the access points in a predetermined range from said one of the mobile units that is broadcasting the probe packet, b) said access points within said range including respective receivers for detecting the probe packet being broadcast, and for responsively sending probe response packets back to said one of the mobile units, c) a selector for selecting a most eligible one of the access points from the plurality of the access points on the basis of received signal quality at said one of the mobile units and loading factor at each of the access points, d) a physical area within which all mobile units are kept, said area having an exit adjacent which one of the access points is located.
Accordingly, a simple and reliable arrangement is provided enabling preemptive roaming and optimum selection of an access point for association with a mobile unit.

Each mobile unit may select a group of eligible access points and select the most eligible access point from that group. The received access point signal quality may be represented by the received signal strength indication (RSSI) . The loading factor may be defined by the number of mobile units associated with a given access point. The cellular communications network may comprise a 1Mbps frequency-hopping spread-spectrum wireless LAN conforming to the IEEE 802.11 draft specification.

4a Each mobile unit may send out a probe message packet to all access points wherein the probe packet has no destination address but a mobile unit specific source address. The probe packet may include an identification of the access point with which the mobile unit is currently associated. Each access point that detects the probe packet may send a probe response packet containing the following information:

5 access point address;
access point frequency hopping pattern;
access point present channel;
time remaining in present channel;
loading factor.
The mobile unit may carry out its selection on the basis of the signal quality of, and information contained in the received probe response packets or the access point signal quality may be determined from a beacon signal sent by the access point independently of a probe response packet.
Each mobile unit may store the RSSI value for each access point and calculate an average value over a predetermined period, and RSSI values outside a predetermined range may be omitted from the averaging calculation.
Each mobile unit may carry out a full scan of all available frequency channels on power-up and thereafter at regular intervals. The full scan may be carried out at approximately thirty second intervals. Each mobile unit may carry out a partial scan of known access points at regular intervals more frequently than a full scan is carried out, for example at approximately five second intervals.
Each mobile unit not associated with an access point may identify on scanning all access points with signal quality equal to or above a threshold value and select for association the access point having the lowest loading factor; when two or more access points have an equal lowest loading factor the access point having the highest RSSI value may be selected. The threshold value may be set at six counts below the highest detected RSSI
value.
A mobile unit associated with an access point and experiencing an unacceptably low communication level may roam excluding the current access point from selection. The unacceptably low communication level may be achieved when more than 50% retries, CRC errors or missed beacons are experienced. The excluded access point may be re-included for selection when its RSSI value has increased by a predetermined limit. If no eligible access points are identified for re-association the mobile unit may continue to associate with the current access point.
A mobile unit associated with an access point and achieving a satisfactory level of communication may make a scanning decision at predetermined intervals. A satisfactory communication level may be achieved when 50%
or less retries, CRC errors or missed beacons are experienced. An eligible group may be selected comprising all access points with signal quality above a predetermined threshold, the group including the current access point when its signal quality is above a further predetermined threshold, and the access point may be selected having the lowest loading factor; access points having a loading factor of more than a given proportion of the current access point loading factor may be excluded and where two or more access points have the same loading factor, the access point having the highest signal quality may be selected. The eligible group threshold value may be six counts below the highest received RSSI value, the current access point further threshold value may be eleven counts below that RSSI

value, and access points having a loading factor of more than 75% of the current access point loading factor may be excluded.
Each mobile unit may carry out a partial scan of known access points at predetermined intervals and may carry out the roaming decision immediately after the partial scan.
The communications network may be included in one of an inventory, price verification, mark-down, portable point of sale, order entry, shipping, receiving and package tracking systems.
According to the invention there is further provided a mobile unit for use in a cellular communications network comprising a plurality of access points, the mobile unit including a communications system for association with an access point and a selection system for scanning all access points, selecting a group of eligible access points for association and selecting from that group a most eligible access point, selection being carried out according to the following criteria:
a received access point signal quality; and loading factor.
According to the invention there is further provided a cellular communications network comprising a plurality of mobile units and a plurality of access points, the mobile unit being arranged to roam and associate with a selected access point, the mobile unit including a selection system for selecting a group of eligible access points for association and selecting from that group the most eligible access point, selection being carried out according to the following criteria:
received access point signal quality; and loading factor.
According to the invention there is further provided a method of operation of a cellular communications network, the network including a plurality of access points in communication with each other and a plurality of mobile units wherein:

each mobile unit scans for and associates with the most eligible access point at predetermined intervals, each mobile unit selecting a group of eligible access points, and from that group, selecting the most eligible access point according to the following criteria:
received access point signal quality; and loading factor.
According to the invention there is yet further provided a data communications network including a plurality of stationary access points and a plurality of mobile units wherein:
each mobile unit scans for and selects as eligible access point for association therewith on the basis of received access point signal quality and loading factor at the access point and wherein:
a physical area is defined within which all mobile units must be kept and access points are provided adjacent the or each exit point from the physical area.
The access point at the exit point may include a directional (horn) antenna providing a strong signal in the vicinity of the exit point.
in accordance with other aspects of the present invention there is provided a data communications network including a plurality of stationary access points operatively connected to a host and a plurality of mobile units, said network comprising: a) each of the mobile units using frequency hopping spread spectrum radio frequency communications, and 8a including a transmitter for broadcasting a probe packet to all of the access points in a predetermined range from one of the mobile units that is broadcasting the probe packet, b) said access points within said range including respective receivers for detecting the probe packet being broadcast, and for responsively sending probe response packets back to said one of the mobile units, and c) a selector in each of the mobile units to select a most eligible one of the access points from said probe response packets, and to associate said one of the mobile units with the most eligible one of the access points at predetermined intervals, the most eligible one of the access points being selected according to received signal quality at said one of the mobile units, and a loading factor at each of the stationary access points.
In accordance with another aspect of the present invention there is provided a method of operating a cellular communications network including a plurality of access points in communication with each other and operatively connected to a host, and a plurality of mobile units, comprising the steps of: a) broadcasting a probe packet to all of the access points in a predetermined range from one of the mobile units that is broadcasting the probe packet, each of the mobile units using frequency hopping spread spectrum radio frequency communications; b) detecting the probe packet being broadcast, and responsively sending probe response packets from the access points within said range back to said one of the mobile units; c) minimizing interference among 8b the probe response packets; d) scanning the plurality of the access points at predetermined intervals; and e) selecting a group of eligible ones of the access points from the plurality of the access points, by selecting a most eligible one of the access points from the group according to received signal quality at said one of the mobile units and loading factor.
in accordance with yet another aspect of the present invention there is provided a data communications network, comprising: a) a plurality of stationary access points operatively connected to a host, a plurality of mobile units, each of the mobile using frequency hopping spread spectrum radio frequency communications, one of the mobile units including a transmitter for broadcasting a probe packet to all of the access points in a predetermined range from said one of the mobile units that is broadcasting the probe packet, b) said access points within said range including respective receivers for detecting the probe packet being broadcast, and for responsively sending probe response packets back to said one of the mobile units, c) a selector for selecting a most eligible one of the access points from the plurality of the access points on the basis of received signal quality at said one of the mobile units and loading factor at each of the access points, and d) a physical area within which all the mobile units are kept, said area having an exit adjacent which one of the access points is located.

8c The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment, when read in conjunction with the accompanying drawings. It is to be under.stood that the invention may be carried into practice in a number of ways, and the described embodiment is not intended to be limiting.

BRIEF DESCRIPTION OF THE DRAWING(S) Fig. 1 is a schematic illustration showing the communication system of the present invention in operation;
Fig. 2a is a block diagram illustrating the steps carried out by a mobile unit during the roaming process;
Fig. 2b is a flow chart illustrating the steps carried out by a mobile unit for selection of the most eligible access point;
Fig. 3 shows a probe response message typically sent by an access point according to the present invention;
and Fig. 4 is a schematic illustration showing a further embodiment of the communication system of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT
Referring to Fig. 1 one application of a cellular wireless communication system is in the field of inventorying. One or more operators 1 each carry a mobile unit 2, such as a portable computer. Information concerning the items 3 to be inventoried is entered into the mobile unit 2, for example by scanning bar code symbols on the items 3. In order to communicate the information obtained to a backbone house computer 4 a plurality of access points 5 are provided each connected to the house computer 4 and one to another, each access point 5 together with the backbone house computer 4 forming a cell. Depending on the location of the operator 1 it is desirable that the mobile unit should select the optimum access point; in addition, if conditions change, for example if the operator 1 changes position, it is desirable that the mobile unit 2 should, if necessary, re-associate with a new access point if the current access point 5 does not allow a satisfactory performance or the new access point offers an improved performance. The mobile unit 2 and access points 5 are arranged for wireless communication at radio frequencies, 5 for example, 2.4GHz in the industrial scientific medical (ISM) band. The steps carried out by a mobile unit 2 which is not currently associated to an access point in selecting an access point are shown in Figs. 2a and 2b.
As shown in the block diagram of Fig. 2a the mobile unit 10 (MU) firstly sends out a probe packet (6) to all access points (AP). The probe packet, contains the mobile unit source address but has no destination address and hence any access point that detects the probe packet must send a response. Accordingly, the probe packet is detected by all access points within range (7) and each of those access points sends out a probe response packet (8) The form of the probe response packet is shown in Fig. 3. The information contained therein includes the access point address, the hopping pattern, the present channel, time left in the present channel, the loading factor

(discussed in more detail below) and any other timing information that may be required. Returning to Fig. 2a the mobile unit associates with the most eligible access point based on the probe response packets that it receives.

Referring to Fig. 2b the mobile unit selects the most eligible access point in the following manner:

As each probe packet response (PPR) is received (10) the signal quality of the response is measured by determining the received signal strength indication (RSSI) (11). For reference, RSSI values generally vary from 25 to 60, with good communications experienced above approximately 35. In practice, rather than relying on a single instantaneous value, the RSSI information for each access point is placed in a table in the memory of the mobile unit and is updated each time a probe response packet is received from that access point. In order to minimise fluctuation the RSSI value for each access point in the table is averaged over a predetermined number of responses. It has been found that large variations in the RSSI values for a given access point have been recorded even when measured by a stationary mobile unit, varying by as much as 15 counts over one minute, and in order to reduce the range of values and minimise "slow thrashing" (when "thrashing", a mobile unit associates with a first access point, then roams to a second access point after a short period of time and then further access points in a random manner without any long attachment to a single access point and "slow thrashing"

may be interpreted accordingly) the averaging calculation may include the step of discarding values outside a given range, for example ten or more counts below the average RSSI value.

Once the RSSI values have been calculated, an "eligible group" of access points is selected (12), including all access points having an RSSI value no more than six counts below the best detected RSSI value. From that group the access point having the lowest load factor (LF) is determined (13,14). The load factor is a measure of how many mobile units are currently associated with a given access point; in the present case the load factor is represented by a simple numerical value representing the exact number of associated mobile units. The access point thus selected is the most eligible access point and the mobile unit then selects that access point for association. If more than one access points within the eligible group exhibit the same load factor then, of those, the access point having the highest RSSI value is selected as the most eligible access point and the mobile unit associates with that access point.

The mobile units are programmed to carry out an update probe at predetermined intervals. In the present embodiment each mobile unit carries out a full scan, probing all seventy nine channels, upon power up and every thirty seconds. Full scans last approximately looms. In addition partial scans, covering known access points, are performed every five seconds. The probe response packet transmitted by an access point contains all necessary synchronisation information for a mobile unit to latch on to the current channel of the access point and follow the hopping pattern at any stage. In an alternative arrangement the RSSI value for the access point is calculated not from the strength of the probe response signal but from the strength of the "beacon packet" issued by the access'po'int. Each access point issues a beacon packet every 100 milliseconds containing, in addition to other information, timing information similar to that contained in the probe response packet.

A slightly different approach- is taken where a mobile unit is currently associated with an access point but at a communication level that is unsatisfactory. An unsatisfactory communication level may be identified, for example, when more than fifty per cent retries, cyclic redundancy code (CRC) errors or missed beacons are detected. In that case the mobile unit will re-associate using the steps illustrated in Figs. 2a and 2b except that the access point with which the mobile unit was experiencing poor communications will be excluded from the eligible group of access points (see step (12) of Fig. 2b). The in-eligible access point can, however, in due course be re-admitted to the eligible group after a succession of acceptable RSSI values have been observed.

It should be noted that a mobile unit experiencing poor communication will re-associate only if an eligible access point is identified.

In cases where a mobile unit is not experiencing an unsatisfactory communications level (as defined above) it makes a roaming decision every five seconds after a partial scan. Once again the steps described above with reference to Fig. 2b are carried out, but with the following modifications:

1. The current access point is included in the eligible group if its RSSI value is no more than eleven counts below the best RSSI value.
2. When choosing the access point having the lowest loading factor in the group, access points having a loading factor which is more than 75% of the loading factor of the current access point loading factor are excluded.

The additional steps enable the mobile unit to avoid "frivolous roaming" that is to say, re-association with new access points when the current access point is in fact satisfactory.

The system thus allows preemptive roaming providing for dynamic load balancing, that is, a mobile unit may re-associate with a new access point although it is not experiencing poor communications with a current access point, but the newer access point will offer considerably improved communications. The possibility of a mobile unit losing contact with an access point altogether and experiencing periods where it is not communicating with any access points, may thus be avoided.

In addition, the system has been improved by adjusting the sensitivity so that a mobile unit will not tend to roam from a current associated access point to another at the rate that it would otherwise, where the signal strengths of various access points are similar in magnitude. Accordingly, greater stability is achieved.

In a further modification the probe packet may include an identification of the access point that the mobile unit is currently associated with for example, the BSS ID. Such an arrangement would be more reliable than the messages passed between access points relaying re-association events.

A further embodiment of the invention is shown in Fig. 4. In some cases it may be desirable to provide information concerning the physical location of a mobile unit. For example the information may be provided to a system administrator 20 who may take action based on the information. Alternatively the house computer 4 may take action automatically on the basis of certain information.

For example, mobile units are often used in stock exchanges by traders for receiving orders and executing trades, as it is illegal to execute trades outside the building. In order, therefore, to determine whether a mobile unit is being removed from the building, access points 5 are provided adjacent each exit door 21. Each access point 5 is equipped with a directional (horn) antenna 22 designed to provide a strong signal over a narrow pattern in the vicinity of and covering the whole of the doorway.

According to the roaming operation of the mobile units discussed above, any mobile unit will associate with an access point having high signal quality and which is lightly loaded and hence any mobile unit passing an access point 5 over an exit door 21 (when a mobile unit is being taken through the door) will associate with that access point. Once the system has detected that a mobile unit has associated with an access point over an exit door 21 the necessary steps can be taken by a house computer. For example an alert can be sounded which may in addition disable operation of the mobile unit. It is, of course, possible to identify which exit door the mobile unit was being taken through by identifying the physical location of the associated 5 access point.

In the embodiment shown in Fig. 4 a cellular communications network is in use in a self-checkout retail system where wireless mobile units are provided to customers for the purpose of scanning their own 10 purchases, for example, using bar code symbols. In that case an access point 5 provided over an exit 21 could be used to alert the store management 20 that a scanner was leaving the premises and to sound an alarm at the door.

Without further analysis, the foregoing will so 15 fully reveal the gist of the present invention that others can readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generical or specific aspects of this invention and, therefore, such adaptions should and are intended to be comprehended without the meaning and range of equivalence of the following claims.

Cited By (2)

Publication number	Priority date	Publication date	Assignee	Title
Family To Family Citations				
DE102008032872A1	2008-07-14	2010-01-21	Wincor Nixdorf International Gmbh	Security system for merchandisers
KR20150019892A *	2013-08-16	2015-02-25	삼성전자주식회사	Data communication method and apparatus using a wireless communication

* Cited by examiner, † Cited by third party, ‡ Family to family citation

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Publication	Publication Date	Title
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US6275703B1	2001-08-14	Controlling handover in a mobile communication network
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Guan et al.	2006	Genetic approach for network planning in the RFID systems
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US20040203762A1	2004-10-14	Operating an ad-hoc wireless network in one or more regulatory regions
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US5355522A	1994-10-11	Frequency selection method and apparatus
US20020176386A1	2002-11-28	Software for installation and configuration management of network nodes

Priority And Related Applications

Priority Applications (3)

Application	Priority date	Filing date	Title
US549,051		1995-10-27	
US08/549,051	1989-06-29	1995-10-27	Preemptive roaming in a cellular local area wireless network
CA 2186923	1995-10-27	1996-10-01	Preemptive roaming in a cellular local area wireless network

Legal Events

Date	Code	Title	Description
2005-05-30	EEER	Examination request	
2016-12-05	MKEX	Expiry	**Effective date**: 20161003

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Patents

Mobile unit algorithms for use in a cellular local area wireless network

Abstract

A wireless communications network comprising a mobile unit and a base unit, a first one of said units being arranged to transmit a message to a second one of said units, said message having associated with it a coded portion representative of possible responses to the message, and said second unit being arranged to decode said coded portion and to offer to a user a plurality of options corresponding to said possible responses.

CA2564287C

Canada

Find Prior Art Similar

Other languages: French

Inventor: Frederic Heiman, Patrick Pinard, Andrew Werback, Michael Shiba, Robert Beach

Current Assignee : Symbol Technologies LLC

Worldwide applications

1997 CA

Application CA2564287A events

1996-11-08	Priority to US08/747,034
1996-11-08	Priority to US747,034
1997-10-15	Application filed by Symbol Technologies LLC
1997-10-15	Priority to CA002218268A
1998-05-08	Publication of CA2564287A1
2010-08-24	Application granted
2010-08-24	Publication of CA2564287C
2017-10-15	Anticipated expiration
2019-02-24	Application status is Expired - Lifetime

Info: Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, CIPO, Discuss

Claims (20)

1. A wireless communications network comprising a mobile unit and a base unit, a first one of said units being arranged to transmit a message to a second one of said units, said message having associated with it a coded portion representative of possible responses to the message, and said second unit being arranged to decode said coded portion and to offer to a user a plurality of options corresponding to said possible responses.

2. A wireless communications network according to claim 1, wherein said second unit includes a screen for display of said message.

3. A wireless communications network according to claim 2, wherein said screen also displays said plurality of options.

4. A wireless communications network according to claim 3, wherein said screen is touch-sensitive, and in which said second unit is arranged to display said plurality of options on said screen for selection by said user touching said screen.

5. A wireless communications network according to claim 3, wherein said second unit includes a plurality of data-entry keys, said user selecting one of said plurality of options by pressing one of said keys.

6. A wireless communications network according to claim 5, wherein said data-entry keys comprise an alpha-numeric keyboard.

7. A wireless communications network according to claim 1, wherein said first unit includes a first information store and said second unit includes a second information store, said first and second stores holding first common information for encoding and decoding said coded portion of messages between said first and second units.

8. A wireless communications network according to claim 7, wherein said information stores are arranged to contain user-definable and updatable information.

9. A wireless communications network according to claim 7, wherein said second unit is a mobile unit and said second unit is a base unit, said network further including a third, mobile, unit having a third information store; and said first and third stores holding second common coding information for encoding and decoding said coded portion of messages between said first and third units, said second common coding information differing from said first common coding information.

10. A wireless communications network according to claim 1, wherein said second unit is arranged to transmit a coded response back to said first unit on said user selecting one of said plurality of options.

11. A wireless communications network according to claim 1, wherein said coded portion further includes information representative of text, said text being displayed to said user after said second unit decodes said coded portion.

12. A wireless communications network according to claim 1, wherein said first unit is arranged to transmit a composite message having a tree-like structure.

13. A wireless communications network according to claim 12, wherein said coded portion includes information allowing said user to traverse said tree-like structure.

14. A wireless communications network according to claim 13, wherein said second unit includes a screen for display of said message, said tree-like structure being displayed by means of a series of linked menus having user-selectable options.

15. A wireless communications network according to claim 1, wherein said mobile unit comprises a portable computer terminal.

16. A wireless communications network according to claim 1, wherein said mobile unit includes a bar-code scanner.

17. A wireless communications network according to claim 1, wherein said mobile unit is arranged to communicate with said base unit via one of a plurality of spaced access points, communication between said mobile unit and said access points being by wireless telegraphy.

18. A wireless communications network according to claim 17, wherein said communications network is a cellular communications network.

19. A wireless communications network according to claim 1, wherein said base unit includes a cradle for holding said mobile unit when not in use.

20. A wireless communications network according to claim 19, wherein said cradle and said mobile unit include electrical connections for downloading information stored within said mobile unit to said base unit.

Description

MOBILE UNIT ALGORITHMS FOR USE IN A CELLULAR LOCAL
AREA WIRELESS NETWORK
This is a division of co-pending Canadian Patent Application No. 2,218,268 filed on October 15, 1997.
s BACKGROUND OF THE INVENTION
1. Field of the invention The invention relates generally to cellular networks. In particular the invention relates to a local area wireless network including a plurality of mobile units and a plurality of access points.

2. Description of the Related Art Wireless local area networks (LAN's) are used in business applications such as inventory, price verification mark-down, portable point of sale, order entry, shipping, receiving and package tracking. Such systems are often proprietary systems wherein the operator carries a mobile unit such as a hand-held computer communicating with a house computer via one of a plurality of access points connected to the house computer and to one another, each access point interacting with the house computer to create a wireless cell.

In order to achieve inter-operability of the various proprietary systems a draft standard IEEE 802.11 has been proposed (the IEEE 802.11 draft specification is available for public inspection).
The draft standard includes features such as 1 Mbps and 2Mbps data rates, carrier sense multiple access/collision avoidance (CSMA/CA), a power-save mode for battery-operated mobile stations, seamless roaming in a full cellular network, high throughput operation, diverse antenna systems designed to eliminate "dead spots", and an easy interface to existing network infrastructures.
The term "roaming" relates to the scanning by each mobile unit of all access points to identify and associate with an eligible access point. Roaming between cells provides great flexibility and is particularly advantageous in locations that are difficult to wire, for simple relocation of work stations, and for portable work stations. The IEEE 802.11 protocols support either direct-sequence or frequency-hopping spread-spectrum systems, as well as infrared communications. Each access point executes a unique hopping pattern across 79 non-overlapping frequencies at a rate of one hop every 100 milliseconds, 66 hopping patterns being specified in the IEEE 802.11 draft standard and being selected to minimize the possibility of interference. Frequency hopping spread-spectrum systems are preferred by the majority of users as they allow increased capacity and decreased interference.
Although the IEEE 802.11 draft specification provides the basic packet types which can enable roaming it does not actually set the roaming algorithm.
According to the draft specification the mobile unit determines the access point with which it will associate and the access point must accept the mobile unit unless it is defective or certain alarm conditions exist, such as memory full.
There is, however, no suggestion of how, or by what criteria, other than those mentioned above, the mobile unit might select an appropriate access point, or the optimum access point.
U.S. Patent No. 5,276,680 relates to a communication system including a plurality of portable units and a plurality of controllers wired to a network.
Each portable unit polls all of the controllers to establish whether it can associate with any controller and receives a response from any controller having less than a predetermined number of portable units already associated therewith.
SUMMARY OF THE INVENTION
According to the present invention, there is provided a wireless communications network comprising a mobile unit and a base unit, a first one of said units being arranged to transmit a message to a second one of said units, said message having associated with it a coded portion representative of possible responses to the message, and said second unit being arranged to decode said coded portion and to offer to a user a plurality of options corresponding to said possible responses.
Typically, the network will include a central base station or house computer which is in communication with a number of hand-held units, such as portable computer terminals or bar code scanners. In the preferred embodiment, messages may be transmitted from the central computer to one of the mobile units by transmitting an addressed message by wireless telegraphy. That message may include text and/or graphics, along with a coded portion defining several possible answers to the message. The receiving mobile unit decodes the coded portion, and displays not only the message but also the possible options on a screen. The user may then select the option, for example by touching a touch-sensitive screen, to reply. The response then goes back to the base unit in coded form, thereby reducing the amount of data that has to be transmitted across the wireless portion of the network.
Both the base unit and the mobile unit preferably include an information store, such as a hard disk and/or a random access memory.
The stores contain common information enabling coded messages to be sent and decoded in a previously-agreed way. In addition to the encoded information representing possible responses to messages, it may also s represent textual data records which are present in both the store of the mobile and the store of the base unit.
In addition, in a further preferred embodiment, messages may be transmitted using a tree-like data structure. Encoded portions of the message, understood both by the mobile unit and the base unit, may define t o the manner in which the tree is built up. When the mobile unit decodes these portions, it may display to the user, for example on a screen, the full structure of the message. This may conveniently be done by displaying to the user a nested sequence of menus, each menu having several user-selectable options. Some or all of these options may not only allow the user to select a sub-menu, but may also activate a coded response back from the mobile unit to

the base unit, thereby providing the base unit with information on which options have been selected by the user.
The common information stored within the base unit and within the mobile unit may be user-definable and updatable. One way of achieving 2 o this is to provide a cradle, attached to the base unit, into which the mobile unit may be placed when it is not in usc_ Electrical connections on the mobile unit and on the cradle allow information within the mobile unit to be downloaded into the base unit. Similarly, information may be uploaded from the base unit to the mobile unit.
2 s Alternatively, the information store within the mobile unit may be removable (for example a removable read-only memory). The read-only memory containing one particular set of encoding information may then be replaced, at will, with another read-only memory containing another set.
In that way, the mobile unit may easily be re-programmed for a variety of different applications_ There may be several mobile units on the network, each having a s different set of encoding information. All of the various sets may be maintained simultaneously at the base unit, and the communication between the base unit and any given mobile unit is then encoded according to its own individual information set.
According to a further aspect of the invention there is provided a ~ o mobile unit for use with a wireless communications network, said unit including a radio transmitter/receiver and a timer for instructing said radio to enter a power-saving mode after a period of no message traffic; said radio automatically reverting to normal powered operation when a radio signal is received or is to be sent by said radio. The invention also 15 extends to a corresponding method of operating a mobile unit within a wireless communications network.
According to the invention there is also provided a data communications network including a plurality of stationary access points and a plurality of mobile units, a mobile unit being capable of 2 o communicating with at least two access points in a predetermined range therefrom, comprising:
means in the mobile unit to scan for and associate the mobile unit with the most eligible access point at predetermined intervals, the most eligible access point being selected according to each of the following 2 5 Criteria;
(a) received access point signal quality; and (b) loading factor at the access point.

Accordingly, a simple and reliable arrangement is provided enabling preemptive roaming and optimum selection of an access point for association with a mobile unit. Each mobile unit may select a group of eligible access points and s select the most eligible access point from that group. The received access point signal quality may be represented by the received signal strength indication (RSSI). The loading factor may be defined by the number of mobile units associated with a given access point. The cellular communications network may comprise a IMbps frequency-hopping s o spread-spectrum wireless LAN conforming to the IEEE 802.11 draft specification.
Each mobile unit may send out a probe message packet to all access points wherein the probe packet has no destination address but a mobile unit specific source address. The probe packet may include an 1s identification of the access point with which the mobile unit is currently associated. Each access point that detects the probe packet may send a probe response packet containing the following information:
access point address;
access point frequency hopping pattern;
2 o access point present channel;
time remaining in present channel;
loading factor.
The mobile unit may carry out its selection on the basis of the signal quality of, and information contained in the received probe response 2 s packets or the access point signal quality may be determined from a beacon signal sent by the access point independently of a probe response packet.
Each mobile unit may store the 1ZSSI value for each access point and calculate an average value over a predetermined period, and RSSi values outside a predetermined range may be omitted from the averaging calculation.
Each mobile unit may carry out a full scan of all available frequency s channels on power-up and thereafter at regular intervals. The full scan may be carried out at approximately thirty second intervals_ Each mobile unit may carry out a partial scan of known access points at regular intervals more frequently than a full scan is carried out, for example at approximately five second intervals.
1 o Each mobile unit not associated with an access point may identify on scanning all access points with signal quality equal to or above a threshold value and select for association the access point having the lowest loading factor; when two or more access points have an equal lowest loading factor the access point having the highest R~SI value may ~ 5 be selected. The threshold value may be set at six counts below the highest detected RSSI value.
A mobile unit associated with an access point and experiencing an unacceptably low communication level may roam excluding the current access point from selection. The unacceptably low communication level 2 0 may be achieved when more than 50% retries, CRC errors or missed beacons are experienced. The excluded access point may be re-included for selection when its RSSI value has increased by a predetermined limit.
If no eligible access points are identified for re_association the mobile unit may continue to associate with the current access point.
2 s A mobile unit associated with an access point and achieving a satisfactory level of communication may make a scanning decision at predetermined intervals. A satisfactory communication level may be CA 02564287 2006-11-03 ---' ---achieved when ~0% or less retries, CRC errors or missed beacons are experienced_ An eligible group may be selected comprising all access points with signal quality above a predetermined threshold, the group including the current access point when its signal quality is above a further s predetermined threshold, and the access point may be selected having the lowest loading factor; access points having a loading factor of more than a given proportion of the current access point loading factor may be excluded and where two or more access points have the same loading factor, the access point having the highest signal quality may be selected.
s o The eligible group threshold value may be six counts below the highest received RSSI value, the current access point further threshold value may be eleven counts below that RSSI value, and access points having a loading factor of more than 75% of the current access point loading factor may be excluded.
15 Each mobile unit may carry out a partial scan of known access points at predetermined intervals and may carry out the roaming decision immediately after the partial scan.
The communications network may be included in one of an inventory, price verification, mark-down, portable point of sale, order entry, 2 o shipping, receiving and package tracking systems.
According to the invention there is further provided a mobile unit for use in a cellular communications network comprising a plurality of access points, the mobile unit including a communications system for association with an access point and a selection system for scanning all 2 s access points, selecting a group of eligible access points for association and selecting from that group a most eligible access point, selection being carried out according to the following criteria:

lo a received access paint signal quality; an,d loading factor.
According to the invention there is fvtther provided a r~lular communications network comprisir~~ a plurality of mobile onus and a plurality of access points, the mobile unit being arranged eo roam and associate with a selected across point, the mobile unit including a selecrion systsm for selecting a group of eligible access points for association and selrctiug from that group the most eligible access paint, selection being carried out according to the fallo~,~~l,~g c"ittria:
1o received access point signal quality; anu leading factor.
According to tb.e invention there is further provided a method of operation of s cellular communications not<vorlC, the network including a plurality of access points in communication with cacti other and a plurality ~.s of mobile units wherein:
each mobile unit scans for and associates with the must eligible access point at predetermined intemals, each mobile unit selecting a group i
of eligible access points and, from thax group, selecting the mast eligible acocss point according to the following criteria:
a o x~coived access point signal quality; and loading factor.
According to the invention there is yet further provided a data communications network including a plurality of Stativnaty access points and a plurality of mok~ile units wherein:

2 5 each mobile unit scans for and 5eiocts as aligibir access point for assxiation therewith on the basis of received access point signal quality and loading factor at the access point and wherein;

a physical area is defined within which all mobile units must be kept and access points are provided adjacent the or each exit point from the physical area.
The access point at the exit point may include a directional (horn) antenna providing a strong signal in the vicinity of the exit point.
The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The invention itself however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment, when read in conjunction with the accompanying drawings. It is to be understood that the invention may be carried into practice in a number of ways, and the described embodiment is not intended to be limiting.
In accordance with one aspect of the present invention there is provided a wireless communications network comprising a mobile unit and a base unit, a first one of said units being arranged to transmit a message to a second one of said units, said message having associated with it a coded portion representative of possible responses to the message, and said second unit being arranged to decode said coded portion and to offer to a user a plurality of options corresponding to said possible responses.
BRIEF DESCRIPTION OF THE DRAWINGS
Fig. 1 is a schematic view of a radio terminal suitable for use in a preferred 2 0 embodiment of the present invention;
Fig. IA shows an exemplary structured message that may be received by the unit of Fig. I;
Fig. 1B shows one preferred form in which the message of Fig. IA may be transmitted over the wireless link;
Fig. 2 shows an alternative embodiment to that shown in Fig. 1;
Fig. 2B shows, schematically, the functional elements that make up the radio terminals shown in Figs. 1 and 2;

Ila Fig. 3 is a schematic illustration showing the communication system of the preferred embodiment in operation;
Fig. 4 is a block diagram illustrating the steps carried out by a mobile unit during the roaming process;
Fig. 5 is a flow chart illustrating the steps carried out by a mobile unit for selection of the most eligible access point;
Fig. 6 shows a probe response message typically sent by an access point according to the present invention; and Fig. 7 is a schematic illustration showing a further embodiment of the communication system of the present invention.
DETAB.ED DESCRIPTION OF THE PREFERRED EMBODIMENT
1 o Turning first to Fig. 1, there is shown a portable radio terminal suitable for use as a mobile unit in a preferred embodiment of the invention. The radio terminal or mobile unit 30 has a housing 32 of a suitable size either to be hand-held, or to be attached to a user's wrist or forearm by means of a rear strap (not shown). The front of the housing has a touch sensitive screen 34 which is used not only to display information, but also to input data, for example by pressure of the user's finger or of a pen on the screen surface. The unit includes a radio transmitter/receiver 35 and a laser-based oprical scanning mechanism, both contained within a generally spherical rotational housing 36. The optical 2 o scanning mechanism produces a one-dimensional or two-dimensional pattern of scanning laser light, which leaves the housing 36 via an aperture 38. The laser light impinges upon an indicia to be read (not shown), for example a bar code, and is reflected back to the mobile unit 30 where it is detected. The radio transmitter/receiver is arranged to communicate with 2 s a base unit or backbone house computer 4, shown schematically in Figure 3. 1he house .computer 4 may include one or more data entry terminals or screens 4a, and a hard disk or other data storage device 4b.

The mobile unit 30 remains in wireless communication with the house computer 4 via the radio- transmitter/receiver 35. This may receive and transmit not-only textual data, entered via the touch-sensitive screen 34, but also data representing a bar code which has been scanned by the optical s scanning mechanism 37.
In the preferred embodiment of the invention, the mobile unit 30 includes a fixed or removable memory 49; if the memory is designed to be removable, a slot 48 in the housing is provided for that purpose. The unit also includes an electrical connection 46 aliowiag the information in 1 o the memory 49 to be downloaded to the house computer 4 when the unit is returned to a docking station 4c (Fig. 3). Additionally, the information stored in the memory 49 may at that stage be updated under control of the house computer 4.
in addition, the mobile unit 30 includes an LED 40, and a miniature 1 s speaker 42.
Fig. 2 shows an alternative embodiment which differs from the embodiment of Fig. 1 merely by having a series of truc buttons, or a keyboard 44'.
Fig. 2B shows, in purely schematic form, the major structural 2 o elements that go to making up a mobile unit of the type shown in Fig. 1 or Fig. 2. Each of the elements is known per sc, and it will be evident to a skilled man in the art how to link them into a unit which operates as described.
As shown in Fig. 2B, the mobile unit has two basic portions, a radio 2 s section generally indicated at 50 and a terminal section generally indicated at ~2. These two sections communicate with each other via an interface 54.

The radio section 50 incorporates a radio transmitterlreceiver 56 and an ariel 58 for communicating with a remote access point 5 (Fig. 3).
The terminal section 52 includes a random access memory 60, a screen 62, a CPU 64 and an optional keyboard 66. In addition, for s scanning operations, the section is provided with a scanning mechanism 68 and a laser and optics assembly 70 for producing an outgoing scanning laser beam 72. The reflector beam is detected by a photodiode 74. All of these devices are operated by a main battery 76.
The CPU 64 includes a clock 78. A further CMOS clock 80 is also 1 o provided, which has its own battery 82. Accordingly, the unit is capable of keeping track of the time even when the CPU 64 is powered down.
In the preferred embodiment, the mobile unit 30 may double as a personal pager, with messages and other information being transmitted to and from the house computer 4. In a typical prior art pager, messages are ~ s transmitted in textual form, both to and (if the pager has the capability) from the remote unit. The embodiment shown in Fig. 1 however, has an additional capability which may significantly reduce the amount of information that has to be transmitted across the wireless link.
In the preferred embodiment, common coded information is stored 2 o both within the memory 49 of the mobile unit, and centrally on the house computer 4, for example on the hard disk 4c. This enables textual information to lx transmitted by way of short codes, with both the transmitting unit and the receiving unit being party to the same code protocol.
2 5 For example, if a user wishes to send a message from the house computer 4 to a mobile unit 30, he simply types the message to be sent on the terminal 4a. Attached to the message may be a series of codes A,B,C

which represent possible responses to the message. in the example shown in Fig. 1, the message is "please confirm meeting time", with the possible V responses being A-6pm; B-7pm; - C-8pm. On receipt of the codes A,B,C, the mobile unit decodes them using information stored within the memory s 49, and displays the corresponding text on the screen 34. In addition, the screen may also display virtual "buttons" 44 that the user may press to respond to the message. For instance, if the user wishes to confirm that the meeting time is 6pm, he simply presses the screen at the position shown by the virtual "button" A, which instructs the radio-i o transmitter/receiver 35 to send a coded A signal back to the house computer 4.
It will of course be understood that in a practical embodiment, the codes A,B,C will be encoded bit-wise for wireless transmission. The three buttons shown accordingly require the transmission of just two bits of 15 information across the wireless link. It is of course envisaged that there may be more or fewer than three buttons, and that the number of buttons may be selected by the person sending the message. In a further development, the message sent may be represented by a tree-like data structure; this is shown in Figure 1A. in that example, the message 2 0 appearing on the user's screen is "is the meeting still on?", along with two options. A-YES and B-NO. if the user selects A, a further message appears - "please confirm time" - along with three further options: C-7pm, D-8pm and E-9pm. The user then selects either C,D or E and a coded message is sent back to the house computer which is there decoded 2 5 according to the information stored on the hard disk 4b. On the other hand,. the user may

select option B, in which case the coded message is sent back informing the house computer that the meeting has been cancelled.

Fig. 1B shows one form in which the message structure shown in Fig. 1A may be transmitted from the house computer 4 to the mobile unit 30. The message 100 starts with a header 101, an identifier 102 which identifies the particular mobile unit that the message is directed to, followed by the first textual part of the message 103. Linking information 104 follows, which defines where the textual part 103 is linked to the options to be presented to the user at that point. That is followed by coded information A 105 and B 106, representing respectively "YES" and "NO". Further linking information 107 follows, which indicates how the next textual message 108 is to be linked to the data structure previously defined. Further linking information 109 follows, specifying how the textual information 108 is to be linked to the subsequent codes C 110, D
111 and E 112.

Other equivalent message structures could of course be devised by those skilled in the art.

In a practical embodiment, there will of course be several individual mobile units 30, each with its own identifier. Messages transmitted by the wireless system may be addressed to a particular unit by means of the ID 102 (Fig. 1B). Since each unit decodes only messages which are intended for it, it is possible for different units to use a different series of codes A,B,C and so on when communicating with the house computer 4. The house computer 4 in that event maintains information simultaneously on several different encoding protocols, and chooses the appropriate protocol according to the particular mobile unit that is to be addressed, or from which a message has been received.

Fig. 2 shows an alternative mobile unit 30' , which is identical with the unit of Fig. 1 except that the user responds by pressing one of a series of true buttons 44' on the housing 32. In this embodiment, the screen 34 needs to indicate specifically to the user which button represents which response. The buttons 44' may be in addition to or may comprise a form of the numeric keyboard.

Referring now to Fig. 3, there is shown a fizrther application of a s cellular wireless communication system, in the field of inventorying. One or more operators 1 each carry a mobile unit 2, such as a portable computer (or a unit as shown in Fig.l or Fig. 2). Tnformation conee-rning the items 3 to be inventoried is entered into the mobile unit 2, for example by scanning bar code symbols on the items 3_ In order to communicate the 1 o information obtained to a backbone house computer 4 a plurality of access points 5 are provided each connected to the house computer 4 and one to another, each access point 5 together with the backbone house computer 4 forming a cell. The house computer 4 may include a screen 4a and a hard disk or other data storage device 4b. One or more docking stations 4c may 15 also be provided for receiving unit 2 and for downloading the information stored therein. Depending on the location of the operator 1 it is desirable that the mobile unit should select the optimum access point; in addition, if conditions change, for example if the operator 1 changes position, it is desirable that the mobile unit 2 should, if necessary, re-associate with a 2 o new access point if the current access point S dots not allow a satisfactory performance or the new access point offers an improved performance. The mobile unit 2 and access points 5 are arranged for wireless communication at radio frequencies, for example, 2.4GHz in the industrial scientific medical (IS11~ band. The steps carried out by a mobile unit 2 which 2 5 is not currently associated to an access point in selecting an access point are shown in Figs. 4 and S. As shown in the block diagram of Fig. 4 the mobile unit (MI1) firstly sends out a probe packet (6) to all access points (AP). The probe packet contains the mobile unit source address but has no destination address and hence any access point that detects the probe packet must send a response. Accordingly, the probe packet is detected by all access points within range (7) and each of those access points sends out a probe response packet (8).

The form of the probe response packet is shown in Fig. 6. The information contained therein includes the access point address, the hopping pattern, the present channel, time left in the present channel, the loading factor (discussed in more detail below) and any other timing information 1 o that may be required. Returning to Fig. 4 the mobile unit associates with the most eligible access point based on the probe response packets that it receives.

Referring to Fig. 5 the mobile unit selects the mast eligible access point in the following manner:

i s As each probe packet response (PPR) is received (10) the signal quality of the response is measured by determining the received signal strength indication (RSSI) (11). For reference, RSSI values generally vary from 25 to 60, with good communications experienced above approximately 35. In practice, rather than relying on a single instantaneous 2 o value, the RSSI information for each access point is placed in a table in the memory of the mobile unit and is updated each time a probe response packet is received from that access point. In order to minimise fluctuation the RSSI value for each access point in the table is averaged over a predetermined number of responses. It has been found that large variations 25 in the RSSI values for a given access point have been recorded even when measured by a stationary mobile unit, varying by as much as 15 counts over one minute, and in order to reduce the range of values and minimise "slow thrashing". When "thrashing", a mobile unit associates with a first access point, then roams to a second access point after a short period of time and then further access points in a random manner without any long attachment to a single access point; the expression "slow thrashi..ag" may s be interpreted accordingly. The averaging calculation may include the step of discarding values outside a given range, for example ten or more counts below the average RSSI value.

Once the RSSI values have been calculated, an "eligible group" of access points is selected (12), including all access points having an RSSI
1 o value no more than six counts below the best detected RSSI value. From that group the access point having the lowest load factor (LF) is determined (13,14). The load factor is a measure of how many mobile units are currently associated with a given access point; in the present case the load factor is represented by a simple numerical value representing the exact 15 number of associated mobile units, The access point thus selected is the most eligible access point and the mobile unit then selects that access point for association. If more than one access points within the eligible group exhibit the same load factor then, of those, the access point having the highest RSSI value is selected as the most eligible access point and the 2 o mobile unit associates with that access point.

The mobile units are programmed to carry out an update probe at predetermined intervals. In the present embodiment each mobile unit carries out a full scan, probing all seventy nine channels, upon power up and every thirty seconds. Full scans last approximately 100ms. In addition 2 s partial scans, covering known access points, are performed every five seconds. The probe response packet transmitted by an access point contains all necessary synchronisation information for a mobile unit to latch on to the current channel of the access point and follow the hopping pattern at any stage. in an alternative arrangement the RSSI value for the access point is calculated not from the strength of the probe response signal but from the strength of the "beacon packet" issued by the access point. Each 5 access point issues a beacon packet every 100 milliseconds containing, in addition to other information, timing information similar to that contained in the probe response packet. A slightly different approach is taken where a mobile unit is currently associated with an access point but at a communication level that is unsatisfactory. An unsatisfactory i o communication level may be identified, for example, when more than fifty per cent retries, cyclic redundancy code (CRC) errors or missed beacons are detected. In that case the mobile unit will re-associate using the steps illustrated in Figs. 4 and 5 except that the access point with which the mobile unit was experiencing poor communications will be excluded from i 5 the eligible group of access points (see step (12) of Fig. S). The ineligible access point can, however, in due course be re-admitted to the eligible group after a succession of acceptable RSSI values have been observed.

It should be noted that a mobile unit experiencing poor communication will re-associate only if an eligible access point is identified.

2 o In cases where a mobile unit is not experiencing an unsatisfactory communications level (as defined above) it makes a roaming decision every five seconds after a partial scan. Once again the steps described above with reference to Fig. 5 are carried out, but with the following modifications 2 5 1. The current access point is included in the eligible group if its RSSI value is no more than eleven counts below the best RSSI value.

2. When choosing the access point having the lowest loading factor in the group, access points having a loading factor which is more than 75°/a of the loading factor of the current access point loading factor are excluded.

The additional steps enable the mobile unit to avoid "frivolous roaming" that is to say, re-association with new access points when the current access point is in fact satisfactory.

The system thus allows preemptive roaming providing for dynamic load balancing, that is, a mobile unit may re-associate with a new access 1 o point although it is not experiencing poor communications with a current access point, but the newer access point will offer considerably improved corzununications. The possibility of a mobile unit losing contact with an access point altogether and experiencing periods where it is not communicating with any access points, may thus be avoided.

1 s In addition, the system has been improved by adjusting the sensitivity so that a mobile unit will not tend to roam from a current associated access point to another at the rate that it would otherwise, where the signal strengths of various access points are similar in magnitude.
Accordingly, greater stability is achieved.
2 o In a flu~ther modification the probe packet may include an identification of the access point that the mobile unit is currently associated with for example, the BSS ID. Such an arrangement would be more reliable than the messages passed between access points relaying re-association events.
2 s The mobile units may incorporate a number of power-saving features, aimed at maximising battery life. These features (known as "power-saving protocols" (PSP), will now be described in more detail.

With reference to Fig.2B, there are generally two reasons why the radio section 50 and the CPU 64 may need to be active. The first reason is to be able to send and receive network messages via the ariel S0. The second is to allow the radio section ~0 to communicate with the terminal s section (sometimes caned the "host terminal") ~2 via the interface 54. In particular, access may be needed to the protocol stack, typically stored in the RAM 60, which is required for operating the PSP.
The PSP makes use of a number of different algorithms, all of which are based on the approach of turning off of the radio 56 and halting the 1 o CPU clock 78 while waiting for the next message from the access point.
It will be recalled that the basic message control system is defined in IEEE
802.11 protocol specification, and involves the use of beacon messages with tragic indicator maps and a poll message to request transmission of the data.
1 s The various PSP algorithms are defined in such as way as to allow a user-definable tradeoff between performance and the level of power saving.
The first algorithm is a static algorithm that wakes up the radio 56 just irr rime to receive every broadcast beacon. Even though the CPU
a o clock 78 has been powered down, the system still maintains a record of the time using the CMOS clock 80, which is powered by its own miniature battery 82. A similar second algorithm wakes up the radio 56 in time to receive every other beacon. ~Similarly, algorithms 3 to 10 switch on the radio in time to receive, respectively, every third to every tenth beacon.
2 5 An eleventh algorithm is dynamic, and permits the wakeup signals to be based on the actual message traffic. Whenever the radio section 50 sends a message; or whenever it receives a message, it sets the wakeup interval to a minimum value (usually to wake up in time to receive each expected beacon). This provides for a fast response as long as the traffic is continuous, 'or almost so. If no activity is detected, the algorithm provides for the wakeup interval to be gradually reduced, typically linearly, up to a maximum value of 10; in other words, at that point the radio is woken up just in time to receive every tenth beacon. Alternatively, instead of the delay increasing linearly (intervals of 1, 2, 3...), the algorithm may remain on maximum for a predefined period, with the delay increasing to a maximum value only once that period has been reached.
Io Yet a further algorithm, known as algorithm number 12, provides for even higher performance. In this algorithm, a record is kept of message traffic (based for example on the number of payload bytes or on the number of messages), and when a threshold is exceeded the radio 56 is then switched into continuous mode. As long as significant traffic is being processed, either outgoing or incoming, the radio will stay in continuous mode. However, if the traffic falls below the predefined threshold for a certain number of second (for example 5 seconds), the system then reverts back to algorithm number 11.
For all of the algorithms previous mentioned, the time of the next 2 o beacon is of course precisely known, and may be computed so that the radio can be turned on just in time to receive the beacon_ If the beacon is displayed in the access point 5 (due for example to pre-existing traffic), then the radio 56 will stay awake for some predesned period of time to ensure that the beacon is received.
2 5 Preferably, all mobile units respect the expected time of the beacon and do not transmit messages that might cause the timing of the beacon to be delayed.

2~
If a mobile unit misses a beacon (either because it is not heard, or because it is received with an error), then the unit automatically schedules a wakeup for the next beacon, even if it would not normally expect to wake-up for that particular beacon based on the current algorithm in use.
This permits fast recovery from message errors, and also helps to detect that the access point 5 is or is not transmitting beacons in a minimum amount of time.
The mobile unit is capable of going into a number of operating states or modes for managing the status of the radio 56 and the interface ~4. To 1 o minimise power, the radio 56 is turned on only if radio activity is required, even though the radio unit 50 itself may need to be powered up to allow communications with the terminal section 52. If the radio section 50 powers up to communicate with the terminal section, and it becomes time to receive or to transmit a message, then the radio 56 is automatically 1 s powezed up. Whenevez the radio is no longer needed, but the interface 54 remains active, the radio may be powered down in order to save power.
When the radio section 50 has no requirement to communicate either via the interface 54 or via the aerial 58, all elements of the radio are powered down, as is the CPU clock 78. The system then awaits a wakeup call z o either from the beacon timer or from the terminal section 52 (for example because the user has activated the scanning mechanism 68).
If the mobile unit is unassociatcd with an access point, it may remain in power save mode. In that mode, it automatically wakes up to search for an access point periodically (for example every second), thereby 25 minimising use of power but still providing a reasonable capability of finding an access point with which the unit can associate fairly rapidly.
Once the mobile unit has associated with an access point, it needs to wake up only in order to receive beacon messages.
The mobile unit preferably provides close coupling between the radio section ~0 and the terminal section 52, in order to provide appropriate network support with minimum power usage. The units typically have an s active mode (either full power or power-save mode), a suspend mode (all unnecessary items are off but the CPU can resume at any time), and a power-off mode (minimum power, with no internal activity except for the CMOS clock 80, but still able to resume from where it ieR off before the power was cut).
1 o The radio section ~0 is tightly integrated with the terminal section - 52 in several ways, thereby permitting joint power saving modes. Firstly, the radio section may be set to remain in its prescribed operating mode whenever the terminal section 52 is active. Second, when the terminal section 52 goes into suspend mode, the radio section 50 is placed in a low i s power mode automatically. This may for example be the PSP algorithm number 10, described above. In this mode, the radio section is capable of receiving messages directed to the terminal section 52. Options exist to allow either directed packets only, or directed and broadcast/multicast packets. These options allow the customization of the network to 2 o minimize power by minimizing wakeup events. When a qualified packed is received, the radio section places the data in a buffer within the ram 60, and wakes up the terminal section 52. As the terminal section may require some time to wakeup, radio section may buffer received packets until such time as the terminal section is able to process them.
2 s While in the suspend mode, the radio section has the option of powering itself down if no activity has been detected for a programmable amount of time, for example 1 hour. This allows a mobile unit that has been left inactive, or has gone out of range, to limit battery consumption to a reasonable amount.
If the terminal has been turned "off" (left in a powered but fully inactive state), the radio section 50 is automatically put to sleep, the lowest s level of power consumption. In this mode, it does not respond to messages or to wakeup commands. When the terminal sections is then powered up ("Resume"), the radio section itself then automatically powers up and resumes from its present state.
If the terminal section loses power (for example if the battery 76 is 1 o removed), the radio section is automatically switched off or otherwise powered down. In that mode, the battery 82 may act as a backup battery, able to sustain the operating state of the terminal section. Alternatively, a separate backup battery (not shown) may be provided. When the battery 76 is reinserted or an alternative power source such as the mains becomes 1S available, the terminal section is able to resume with no loss of data, automatically powering itself up and reconfiguring the radio section with no intervention required by the operator. After the radio section has been reconfigured, it scans in the normal way for access points and re-establishes association with the network.
2 o The terminal section and the radio section may also be provided with further functionality to prevent a lockup state occurring between the two sections during a suspend or power-down operation. Here, the terminal section interrupts the radio section and commands that no wakeup operaxions be generated for a minimum interval

(for example 1 second).
a s During that interval, the terminal section can then safely suspend or power-down. After that interval has elapsed, the radio section is free to wakeup the terminal section when a message is received.

The terminal section and the radio section may coordinate communications using a command register and an interrupt. In one embodiment, the radio section 50 may include a programmable wakeup timer 99. The radio section 50 may then be woken up either by that timer, or by a message via the aerial ~0, or by a command received from the terminal section 52 via the interface 54.
In order to synchronize the interface 54, the terminal section may generate one of three commands, with the radio section responding with a ready flag. The three commands are Awake for Host, Resume, and Sleep.
1o These cause the radio section to execute different actions, as described below.
In response to the Awake for Host command, the radio section sets the ready flag. This allows the terminal section to communicate directly with the radio section, to receive messages, to send messages and to i s process commands. In response to the Resume command, the radio section turns off the ready flag to indicate that it is in an uncoordinated state, and the radio section can power down whenever it decides that it has finished with communications both with the radio Sb and with the terminal section 52. Tn this mode, the radio section will wakeup whenever a signal is 2 o received from the wakeup timer 99.
In response to the Sleep command, the radio section stops whatever operations it may have been carrying out, in the minimum amount of time, and then goes to a low power suspend mode. When the radio section receives a Resume message, it then reverts back to normal PSP mode.
2 s A further embodiment of the invention is shown in Fig. 7. In some cases it may be desirable to provide information concerning the physical location of a mobile unit. For example the information may be provided to a system administrator 20 who may take action based on the information.
Alternatively the house computer 4 nmay take action automatically on the basis of certain information.
For example, mobile units are often used in stock exchanges by traders for receiving orders and executing trades, as it is illegal to execute trades outside the building. In order, therefore, to determine whether a mobile unit is being removed from the building, access points 5 are provided adjacent each exit door 21. Each access point S is equipped with a directional (horn) antenna 22 designed to provide a strong signal over a 1 o narrow pattern in the vicinity of and covering the whole of the doorway.
According to the roaming operation of the mobile units discussed above, any mobile unit will associate with an access point having high signal quality and which is lightly loaded and hence any mobile unit passing an access point 5 over an exit door 21 (when a mobile unit is being taken i s through the door) will associate with that access point. Once the system has detected that a mobile unit has associated with an access point over an exit door 21 the necessary steps can be taken by a house computer. For example an alert can be sounded which may in addition disable operation of the mobile unit. It is, of course, possible to identify which exit door the 2 o mobile unit was being taken through by identifying the physical location of the associated access point.
In the embodiment shown in Fig. 7 a cellular communications network is in use in a self-checkout retail system where wireless mobile units are provided to customers for the purpose of scanning their own 2 5 purchases, for example, using bar code symbols. In that case an access point 5 provided over an exit 21 could be used to alert the store management 20 that a scanner was leaving the premises and to sound an alarm at the door.
Without further analysis, the foregoing will so fully reveal the gist of the presentw invention that others can readily adapt it for various applications without omitting features that, from the standpoint of prior art.
s fairly constitute essential characteristics of the generical or specific aspects of this invention and, therefore, such adaptions should and are intended to be comprehended without the meaning and range of equivalence of the following claims.

Similar Documents

Publication	Publication Date	Title
US20030104848A1	2003-06-05	RFID device, system and method of operation including a hybrid backscatter-based RFID tag protocol compatible with RFID, bluetooth and/or IEEE 802.11x infrastructure
US20050219120A1	2005-10-06	Power saving mobility aware system and method
US6725060B1	2004-04-20	Method and apparatus for conserving power in an integrated electronic device that includes a PDA and A wireless telephone
US5657317A	1997-08-12	Hierarchical communication system using premises, peripheral and vehicular local area networking
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US6078826A	2000-06-20	Mobile telephone power savings method and apparatus responsive to mobile telephone location
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US7412246B2	2008-08-12	Method and system for improved wlan location
US6707867B2	2004-03-16	Wireless local area network apparatus
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US7583643B2	2009-09-01	Enhanced passive scanning
US6901275B1	2005-05-31	Communication system, and communication device and communication method for use in the communication system
US6236674B1	2001-05-22	Transceiver control with sleep mode operation

US20080247377A1	2008-10-09	Independent medium access control for discovering wireless networks
US20070021065A1	2007-01-25	Methods and apparatus for operating an ensemble of wireless electronic devices based on user activity
US7295827B2	2007-11-13	Mobile station dynamic power saving control
US20040014474A1	2004-01-22	Wireless network connection switching management system and method
US5566366A	1996-10-15	Method of power conservation in a data communications system
US6326926B1	2001-12-04	Method of operating a wireless and a short-range wireless connection in the same frequency

Priority And Related Applications

Priority Applications (3)

Application	Priority date	Filing date	Title
US08/747,034	1989-06-29	1996-11-08	Power-saving arrangement and method for mobile units in communications network
US747,034		1996-11-08	
CA002218268A	1996-11-08	1997-10-15	Mobile unit algorithms for use in a cellular local area wireless network

Legal Events

Date	Code	Title	Description
2006-11-03	EEER	Examination request	
2017-12-18	MKEX	Expiry	**Effective date:** 20171016

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Patents

Virtual wireless local area networks

Abstract

translated from Chinese

A method of operating a plurality (12) The method of virtual wireless networks using a common distribution system. A plurality of radio network side through a single access point (24) attached to a plurality of wired networks. In this way a message may be a mobile device (22) and a transmission between a LAN (10). LAN and mobile device associated with the identifier, the identifier is used for routing a message to be transmitted. Message transmitted from the mobile device to the corresponding access point, an access point identifier in its memory of the mobile device identifier is compared and assigned label message according to the destination LAN. Message has been allocated the label thereupon transmitted from the access point to the distributed system, the system routes the message to a respective inlet and a local area network.

Classifications

H04W48/18 Selecting a network or a communication service

View 2 more classifications

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Claims (8)

translated from Chinese

A distributed system using a common method for a plurality of virtual wireless networks in operation, comprising: providing an inlet to a plurality of distributed system from the LAN server, each entry associated with a local area network for recognizing a message tag is associated; providing at least one access point coupled to the distributed system, the access point comprising a memory; a wireless service group identifier to each of said local area network associated with the inlet; providing the mobile device service group identifier of the mobile device and one of said inlet associated with; providing the service group identifier and the tag associated with the inlet of the access point associated memory data; operating the moving means so that said at least one access point associated with the associated service group identifier comprises transmitting from the mobile device to the access point; operating the moving means so as to transmit data to the access point associated with the transmission of the service group identifier comprises the mobile device; and operating the access point so that the number of Message from a mobile device associated with said forwarded to the distributed system through the inlet, the inlet of the local area corresponding to the service group identifier associated with said transfer group comprises a verification of the identification whether the service local message tag of said message to said access point associated memory.

2. The method according to claim 1, characterized in that, further comprising operating the access point transmits a beacon so that it has a single primary service group identifier, the access point and operating it with one having primary service group identifier and the mobile device one or more secondary service group identifier associated with the primary service group identifier and the one or more service group identifier to each of the local access point a message memory associated with the tag.

3. The method according to claim 1, characterized in that, by the access point comprises the forwarding made so that each of the transfer label message corresponding to the access point associated with the memory the tag contains a service group identified in the message from the mobile device included with.

4. A method of using a plurality of common operating system virtual distributed wireless network comprising: providing a distributed system from the inlet to the plurality of local area network server, LAN tag associated with the message associated with a respective inlet for identifying ; providing at least one access point coupled to the distributed system, the access point comprising a memory; a domain identifier to each of said, said inlet is associated with a local area network; providing a mobile device having and a domain identifier of the mobile device associated inlet; providing the domain identifier and data associated with the tag associated with the inlet of the access point stored in said memory; operating the mobile reacted with at least one device associated with the access point, the association comprises a domain identifier from the mobile device to transmit to the access point; associated with operating the mobile device to the access point it, and one of said mobile device and the access point in the memory associated with the entry associated with the label; and operating the access point so that the message data Mobile device via the associated distributed system transferred to the inlet that corresponds to the service group associated with the identification of the local area network, comprising the transfer inlet and the associated mobile device the message in a local area network tag.

5. A method for providing a plurality of virtual wireless network system comprising: a distributed system; an inlet coupled to a plurality of distributed systems, each corresponding to at least one network, each associated with an inlet for identifying at least one network message associated with the label; a plurality of mobile devices, each having a said mobile device and a service group identifier associated with the network; access distributed to the at least one coupling system point, the access point comprises a data memory with the service group identifier and the label associated with; wherein said moving means is arranged so that the associated service group identifier comprises at least one access point associated with transmitting from the mobile device to the access point, and to transmit data to the access point associated with the transfer of the

service group identifier comprises the mobile device; and wherein said access point is arranged tag it with a local message, the associated data message from the mobile device via the distributed system transferred to the service group corresponding to the identification phase An inlet associated with LAN, and is arranged to check whether the service group identifier and the message of the access point in the local memory associated with the tag message.

6. The system of claim 5, wherein said access point is arranged so that it transmits a beacon having a single primary service group identifier, wherein the access point is arranged so that the primary service having a the mobile device group identifier and one or more secondary service group identifier associated with the primary service group identifier and the one or more service group identifier associated with each of the access points in a local memory associated message tag .

7. The method according to claim 5, wherein said access point is arranged so that in each of the memory from the mobile device corresponding to said access point forwarding the message comprises a tag associated with the label of the service group identifier contained in the message.

8. A method for providing a plurality of virtual wireless network system comprising: a distributed system; an inlet coupled to a plurality of distributed systems, each corresponding to at least one network, each associated with an inlet for identifying network message to the at least one associated label; a plurality of mobile devices, each having a field identifying the mobile device and the network associated with one of: at least one access point coupled to the distributed system the access point comprises a data memory with the domain identifier tag associated with; wherein said moving means is arranged so that the association of at least one access point is associated with a domain identifier comprises from the said mobile device transmits to the access point, and transmitting data to the associated access point; and wherein said access point is arranged so that with a local message tag, the data from the associated the mobile device corresponding to the memory access entry point of the local area network domain identifier associated with a distributed system transferred to.

Description

translated from Chinese

Virtual wireless local area network

(1) Technical Field The present invention relates to wireless local area networks. More specifically, the present invention relates to a wireless local area network, wherein on a common hardware to be compatible with the system to provide a plurality of virtual wireless LAN.

(2) Background follow IEEE Standard 802.11 wireless data communication protocol communication systems have well known. in these systems, a mobile device and a central computer or other data processing device in data communication through the access point. Access point may communicate with a computer on Ethernet (Ethernet) wired network. Each mobile device and the access point is associated.

In some cases, the system may require the use of a plurality of local area networks and wireless local area networks on the same physical space. Such demand may occur in the airport environment, where multiple users may include airport operations, police or security and airline. Such demand may also occur in the case of cooperation reorganization, when the two companies to temporarily occupy the same physical space. In these cases, for mounting a plurality of systems in order to avoid repetition of the access point, the communication data needs to be routed through the same access point.

Known virtual local area networks (VLANs) can serve multiple users using the same hardware. IEEE 802.1Q standard defines an internal frame recorded in a data packet to identify the VLAN membership.

It is therefore an object of the present invention is to provide a public access points by a mobile communication device and a plurality of service systems methods and apparatus.

(3) According to the present invention, there is provided a distributed system using a common method for operating a plurality of virtual wireless networks. The distributed system is coupled to a plurality of local area network server through the inlet. Each entry is associated with a tag that is associated with a local area network identification message. Each entry is associated with a local area network associated with a wireless service group identifier. At least one access point, which includes a memory coupled to the distributed system, and can be used for communication with the mobile device. Mobile device system has a service group identifier, each mobile device will be associated with a respective inlet that a LAN. Providing data to the access point memory, the service group identifier associated with the tag corresponding to the inlet. The mobile device by the service group identifier transferred from the mobile device to the access point to connect the at least one access point. Once associated with an access point, the mobile device can transmit data to the access point associated with a data service includes a group identifier of the mobile device. Then the data access point by the mobile device to the inlet of a distributed system-area network services forwarding group identifier associated. Transfer of such data would include checking whether the service group identifier and the label information of the local access point in the corresponding memory.

In the preferred distribution, the operation of the access point transmits a beacon so that it has a single primary service group identifier. There is a primary access point service group identifier and one or more secondary service group identifier, each of the access points in a local memory with information associated with the tag. The access point identifier or service group containing a primary or a secondary device comprising a mobile communication service group identifier. In the preferred arrangement, the access point transferring data according to each transponder tag information, the service group identifier associated with the information from the mobile device comprising the tag.

In another embodiment of the present invention, a plurality of common operating a distributed system comprising a virtual wireless network to provide access to a distributed system from a plurality of local area network server. Each entry corresponds to a local area network identification tag message for associating. At least one access point having a memory coupled to the distributed system. Each entry is associated with a local area network identifier associated with one domain. The mobile device also has a field identifying the mobile device and the inlet associated with one. Data access point identifier domain memory tag entry corresponding to the relevant contact. Operation of the mobile device and associate it with a domain identifier transmitted from the access point to the access point the mobile device. In association, the mobile device associated with the access point to a memory corresponding to the inlet of Tags. Then the access point the mobile device the message data associated with a distributed system transferred to the associated service group identifier and the LAN corresponding to the inlet. Forwarding data corresponding to the inlet comprises a mobile device associated with a local area network tag message.

According to the present invention, there is provided a system for providing a plurality of virtual wireless networks. The system comprises a distributed system inlet and a plurality of coupling to the distributed system, each entry corresponding to at least one network. Each entry with a message identifying the respective network associated with the label used. Each mobile device having a mobile device and a service group identifier associated with a network. The at least one access point coupled to the distributed system, and includes a memory containing the data service group identifier associated with the tag. The mobile device is arranged so as to associate at least one access point. This association comprises transmitting the service group identifier from the mobile device to the access point. The access point arranged so that data messages from the mobile device and transferred to the associated service group identifier inlet LAN associated with a local message distribution system through the tag, and checks whether the group identification of the message service bureau associated with the tag field of the message.

In the preferred embodiment, it is arranged so that the access point transmits a beacon having a single service group identifier. And the access point so that the mobile device having a group identifier of the primary service and one or more secondary service group identifier associated with the arrangement. Primary and secondary

service group identifier and the access point in a local memory associated with the tag message. Each access point may be arranged so that the transfer message service group identifier corresponding to the tag associated with the message from the mobile device included in a tag contains.

According to the present invention, there is provided a plurality of virtual wireless networks may be provided in the system, the system comprising a distributed system to the inlet system and distributed to a plurality of coupled, each entry corresponding to at least one network. Each tag entry associated with a network message associated with the identification of at least one. The system provides a plurality of mobile devices, each mobile device has a domain identifier in the network device associated with one of the moved. The at least one access point coupled to the distribution system and including a memory and the data field identification tag associated with. The mobile device is arranged so that it transmits the domain identifier and associated with an access point to the access point. it is arranged by a local access point label message, the data message from a mobile device associated to the LAN and transferred to a corresponding domain identifier associated with the mobile device through the inlet of a distributed system.

For a better understanding of the present invention together with other and further objects, reference will be made in conjunction with some reference to the following description, while the scope of the invention will be pointed out that the appended claims.

(4) FIG. 1 is a block diagram of a virtual wireless network in public distribution system of the present invention is used.

FIG 2 is a flowchart illustrating a service group identifier using the message transmitted from the mobile device to process the respective inlet.

FIG 3 is a flowchart illustrating the use of the domain identity message from the mobile set to the corresponding inlet flow.

(5) DETAILED DESCRIPTION Referring to Figure 1, shows a virtual wireless network according to embodiments of the present invention, which provides data communication between a local area network, e.g., a computer 20, telephone interface 18 or the server 16 and the mobile device 22. System uses access points 24 to provide radio packet data with the mobile communication device 22 using a communication protocol, such as IEEE Standard 802.11, whereby the radio modules to monitor the polling signal in the access point 22 the mobile device 24 and sent to a purpose of data communication with the access point 24 is associated. For example, radio module and an access point for those mobile devices 24 using system developed by the assignee of the spectrum may be the same.

In the system of FIG. 1, each local area network, such as the computer 20, telephone interface 18 and the server 16 or a service group identifier assigned to a particular network or a mobile device and an identifier associated with the domain. Each of these local area networks, respectively through the inlet 14 is coupled to the distributed system 12. 12, the mobile device issued by a distributed system data message routing label contained in the message to the appropriate entry by, for example, specified by the standard 802.IQ label. An inlet disposed so that the reception message issued distributed system, while the inlet will have an associated label message transferred to the inlet coupled to the LAN.

Each mobile device 22 having a group identifier or a service identifier field, the identifier corresponding to the domain identifier or mobile device intends to communicate with the LAN. In one such arrangement described in standard 802.11, the service group identifier (SSID) as an identifier of a wireless communication environment. A different SSID associated with each virtual LAN, wireless in the art such that, on a data message identified by the SSID identifies a wired distribution system by the 802.IQ label.

According to an alternative arrangement may be associated with a virtual LAN each associated with an identifier, such as a draft specification 802.11i provided. Note that the term "domain" as used herein is not limited to the corresponding domain 802.11i standard, but will include other similar properties can be used with a virtual network tag and uniquely identify a mobile device or a data packet identifier. The initial packet switching means comprising a field identifying the mobile. Domain identifier associated with the organization. Access point may accordingly be determined in the domain of the mobile device associated with the process, and then by the message received by the mobile device to provide the appropriate VLAN tag. In this way, each mobile device 22 transmits an identifier to the access point 24, the identifier associated with the mobile device provides a virtual LAN. A memory in the access point identifier corresponding to the mobile device is verified, while the local virtual LAN identifier associated with that message. Then the access point 24 can transfer data to the inlet 14 and the LAN identifier associated with the mobile device corresponding to a distributed system.

In the example shown in FIG. 2, each set of the mobile device gave a service group identifier, which many LAN device using a common distribution system 12 and a common access point 24 associated with one of the mobile . When a mobile device is initialized and the operation need to be associated with an access point, the mobile device monitors the access point beacon messages 24, while a selection is to be an access point associated with the request. The mobile device 30 transmits a request together with the associated service group identifier of the mobile device to the access point 30. in step 32, the access point receives the association request while the service group identifier identifying the service group with the access point in the memory of the mobile device is compared. If one of the service group identifier identifying the service group with the access point in the memory of the mobile device corresponds to the association in step 34 the mobile device is allowed. After the mobile device transmits a data message with a corresponding service group identifier 36 to the access point. Then the access point identifier for the service group and its memory is compared to a service group identifier, while assigning a label for the message in step 38. Tag has been assigned in step 40 to the message is then transmitted through the respective inlets distributed system.

Using the example of Figure 3 domain characteristics similar to the standard 802.11i provided, which sends a domain identifier in the initialization packet exchange between the mobile device and the step 50 of the access point. Domain may advantageously be a tissue or a virtual network associated with a distributed system and therefore the associated inlet. Receiving access point in the domain in step 52 the association request, and the request for the domain associated with the access point in the memory corresponding to the inlet 14 and routing messages in a distributed system to the inlet 14 by tag compare . Optionally, the association request by the access point may be transferred to an authentication server as shown in FIG. 53, the authentication server to verify whether the other safety features corresponding to the mobile device and the virtual network domain or carried. If the memory of the access point and the mobile device domain identifier associated with the inlet corresponds to the label, the correlation step 54 is allowed, the device will identify the tag associated with the domain identifier while moving. In step 56 the mobile device then transmits data messages with the mobile device identifier to the access point. Comparing the mobile device identifier with the mobile device identifier of the access point the access point in step 58, and then sends messages to tag message distributed system. Receiving a message with the label distributed system in step 60 and it is routed to the respective inlet.

The system of the present invention may provide different security configuration message for each virtual LAN. Associated with the mobile device uses the SSID of the VLAN can be mapped as a SSID inlet / / security. Access point by checking the valid key index usage message and decrypting effective to enhance security scheme selected. Security program may be open (Open), shared key (Shared Key) WEP, Kerberos, radial (Radius) and EAP / TLS.

The term access point used herein refers to a composition comprising a cell controller and radio frequency (RF), as in copending Serial No. 09 / 528,697, filed on March 17, 2000, filed as described, which application is assigned the same assignee as the present application, incorporated herein by reference. In such a system, the access point function may be implemented in monolithic form or in the form of assembly by the cell controller.

While have been described herein what are considered preferred embodiments of the present invention, those skilled in the art will find without departing from the spirit of the present invention may be made of other and further changes and modifications, all hereby declare such changes and modifications are within the true scope of the invention.

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Priority And Related Applications

Priority Applications (2)

Application	Priority date	Filing date	Title
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US60/445,381		2003-02-06	

Legal Events

Date	Code	Title	Description
2006-04-12	C06	Publication	
2006-06-07	C10	Entry into substantive examination	
2010-01-20	C14	Grant of patent or utility model	
2016-12-07	C56	Change in the name or address of the patentee	
2017-02-01	C41	Transfer of patent application or patent right or utility model	

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Patents

System and method for battery conservation in wireless stations

Abstract

Described are a system and method for battery conservation in a wireless station. Initially, a wireless station switches, according to a predetermined time schedule, from a first communications mode into a second communications mode. The station is capable of at least one of receiving and transmitting data packets only when the station is in the second communications mode. The first mode is a power conservation mode. When the station is in the second mode, a wireless access point obtains a priority access to a radio channel. Then, the access point reserves the radio channel for wireless communications between the access point and the station. Wireless communications are conducted between the access point and the station over the radio channel. Upon a termination condition, the station switches into the first mode.

CN101036061A
China

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Other languages: Chinese

Inventor: 普光, 日A·王

Worldwide applications

2005 CN

Application CN 200580030126 events

2004-08-05 Priority to US59914204P

2005-07-07 Application filed by 讯宝科技公司

2007-09-12 Publication of CN101036061A

Info: Cited by (6), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, Discuss

Claims (19)

translated from Chinese

A method for wireless communication, the method comprising: (a) in accordance with a predetermined schedule, the wireless station switches from the first communication mode to the second communication mode, in which only the station in the first when the second mode to perform packet reception and transmission of at least one of the first mode to the power saving mode; (b) when the station is in the second mode, obtain the radio channel through the wireless access point priority access; (c) after step (b), the radio channel reserved by the access point for wireless communication between the access point and the station; (d) through the radio channel performing wireless communication between the access point and the station; and (e) upon termination condition is satisfied, the station will be switched to the first mode.

2. The method according to claim 1, wherein said termination condition is one of the following: (a) with the end of service period (EOSP) packet indicator, (b) with indicator EOSP null packet, (c) confirm the package with an empty data field, (d) a predetermined time expires, and transmitting a predetermined number of data packets (e) between the station and the access point.

The method according to claim 1, characterized in that, to obtain priority access to the radio channel at the access point using the PIFS.

4. The method according to claim 1, wherein said step comprises the substeps of retention: a transmission opportunity granted to the access point and the one of the station.

5. The method according to claim 4, wherein the transmission opportunity includes a time period during which the access point and the station transmits one of a group of data packets through the radio channel.

6. The method according to claim 5, wherein the time period is determined according to the number of the set of data packets in the packet.

7. The method according to claim 5, wherein the period of time represented by the duration field of the data packet transmitted by the access point.

8. The method according to claim 1, wherein said step (a) to (e) is performed during the contention.

9. A method for wireless communication, the method comprising: (a) when addressed to the radio station has a wireless access point of the first data packet, the communication station switches from the first mode to the second communication mode, the station only when it is in said second mode to receive and transmit data packets to at least one of the first mode to the power saving mode; (b) when the station has available radio channel, by the station by using the radio channel to the access point transmits the first data packet; (c) by the access point receives the first data packet; (c) by the access point station sends an acknowledgment to the packet, the acknowledgment packet indicating that the access point receives the first packet and one of the following: (1) addressed to the present station and the second packet (2) a second packet addressed to the station is not present; (d) if (1) indicating the presence of said acknowledgment packet and the second packet (2) of the station to the access point has addressed other establishment of a data packet, performing the following sub-steps: (i) obtaining priority access to the radio channel by the access point; (i i) after sub-step (i), by the access point of the radio channel reserved for wireless communication between the access point and the station; and (iii) the radio channel through the wireless communication between the access point and the station; and (e) upon termination condition is satisfied, the station will be switched to the first mode.

10. The method according to claim 9, wherein, when said acknowledgment packet indicating the absence of the second data packet, the acknowledgment packet includes null data field.

11. The method according to claim 10, wherein said termination condition is one of the following: (a) the service period ends with the packet indicator, (b) acknowledgment packet with an empty data field , (c) a predetermined time expires, and transmitting a predetermined number of data packets (d) between the station

and the access point.

12. The method according to claim 9, wherein the priority radio channel access is obtained when using PIFS the access point.

13. The method according to claim 9, wherein said sub-step comprises the sub-steps Reserved: a transmission opportunity granted to (1) the access point and (2) a station.

14. The method according to claim 13, wherein the transmission opportunity includes a time period during which the access point and the station transmits one of a group of data packets through the radio channel.

15. The method according to claim 14, wherein the time period is determined according to the number of the set of data packets in the packet.

16. The method according to claim 14, wherein the period of time represented by the duration field of the data packet transmitted by the access point.

17. The method according to claim 9, wherein said step (a) to (e) is performed during the contention.

18. A system, the system comprising: a wireless station; and the station in communication with the wireless access point; wherein the schedule table in accordance with a predetermined communication mode switching from a first to a second communication mode, the table only when it is in said second mode to receive and transmit data packets to at least one of said first mode is a power saving mode when the station is in the second mode, the access point given priority access to the radio channel of the access point of the radio channel reserved for wireless communication between the access point and the station, the radio communication through the radio channel in the access carried out between the point and the station, and upon termination condition is met, i.e., the station switches to the first mode.

19. A system, comprising: a wireless station; and a wireless access point of the communication station, wherein said radio station having a first communication mode from a first data packet addressed to the access point switching to the second communication mode, the station can be performed only when it is in said second mode and transmitting the received packet data in at least one of said first mode is a power saving mode when the station has available radio channel when the station using the radio channel transmits the first packet to the access point, the access point receives the first data packet acknowledgment to the transmitting station, the acknowledgment packet indicating said access point receives the first packet and one of the following, namely (1) the presence of a second station addressed to the packet and (2) the absence of a second station addressed to said data packet , if one of the following is satisfied, i.e., (1) indicates the presence of said acknowledgment packet and the second packet (2) of the station has further data packet addressed to the access point, then (i) the said access point to obtain access to the priority radio channel and (ii) retaining the radio Channels for wireless communication between the access point and the station and for wireless communication, and upon termination condition is satisfied, the station switches between the access point and the station via the radio channel to the first mode.

Description

translated from Chinese

For battery saving system and method in a wireless station

US provisional patent application claims priority to the requirements of the August 5, 2004, filed, entitled "(Automatic Power Save Delivery 802.11e network) Automatic Power-Save Deliveryin 802.11e Networks" Application Serial No. 60 / 599,142 of priority. The entire disclosure of this application is regarded as the front part of the disclosure of the accompanying application, and expressly incorporated herein by reference.

Background Many wireless station ("STA") (eg, a cellular phone, PDA, scanner, laptop computers, handheld PC, etc.) to wirelessly connect to the Internet, such as a LAN, intranet and other computer networks. Thus, the STA without any wired connection can achieve its function. Typically use batteries to power the STA to herein, as they can provide absolute freedom of movement to its users. Alternatively, the power adapter may be used with the STA power electrical outlet. However, this method requires the use of cord fixed to STA tethered to a power supply, which reduces the mobility and practicality. Thus, to maintain the mobility of the user and reduce power consumption of the STA and the manufacturer's primary concern.

When the STA is connected to a network access point ("AP") generally to wireless communications using known communication protocols (e.g., IEEE 802.11 standard). Recognizing the power consumption and battery life is very important for users and manufacturers of the STA, the 802.11 standard includes a power saving mechanism. To be transmitted to STA packets are buffered at the AP According to these mechanisms, the STA is in sleep mode (i.e., power saving mode). Once the wake-up from sleep mode, AP will send the buffered data packet to the STA. Thus, the STA need not be in a permanent awake mode (i.e., battery power consumption) can receive data packets.

For real-time applications is expected to have a quality of service ("QoS") requirements (eg, VoIP, video streaming, etc.), the development of the 802.11e standard to support these applications. The reaction requires the ability QoS STA and the AP providing a consistent packet delivery to ensure a certain degree. 802.11e standard is also provided by an automatic power save delivery mechanism for saving ("APSD"). Using APSD, two types of service time period is possible: non-scheduled (unscheduled) and schedule (scheduled) a. Non-scheduled service period is only using the enhanced dispersion channel access ("EDCA") access channel QoS- enhanced wireless station ("QSTA") defined. The scheduled service period is defined using EDCA QSTA or hybrid coordination function ("HCF") channel access ("HCCA") controlled. However, the 802.11e standard for the two service time period and the scheduling and non-scheduling, the QSTA is awake for a longer time, because it must contention access as a medium for transmission of wireless radio channel. Although standard 802.11e APSD intended to reduce power consumption, but the requirements of the AP and QSTA contention access channel may have side effects such as increased battery power consumption, resulting in a delay jitter, and / or increasing the system overhead.

Battery saving in a wireless station used in the system and method according to the present Invention Summary of the Invention. First, the radio station according to a predetermined schedule, switching from the first communication mode to the second communication mode. The station only data packets transmitted and received at least when it is in a second communication mode. The first mode is a power-saving mode. When the station is in the second mode, the wireless access point to obtain access to the priority radio channel. Then, the access point of the radio channel reserved for wireless communication between the access point and the station. Wireless communication between the access point and the station via the radio channel. A termination condition is satisfied, i.e., the station switches to the first mode.

In another exemplary embodiment, when the wireless station has a first data packet addressed to the wireless access point, the station switches from the first communication mode to the second communication mode. The station only data packets transmitted and received at least when it is in a second communication mode. The first mode is a power-saving mode. When the station has available radio channel, the station by using the radio channel data packet to the first access point. The access point receives the first data packet. The access point transmitting the acknowledgment packet to the station. Acknowledgment packet indicating that the access point receives the first packet and one of the two, i.e., (1) presence and (2) the absence of a second packet addressed to the station. If both of the following one, i e., (1) a second acknowledgment packet indicating the presence of packet data and (2) also sets the packet addressed to another access point, the access point is given priority access to the radio channel into. Then, the access point of the radio channel reserved for wireless communication between the access point and the station. Wireless communication between the access point and the station via the radio channel. Upon termination condition is satisfied, the station switches to the first mode.