

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		
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.)
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Inventor Information:

Inventor 1				
Legal Name				
Prefix	Given Name	Middle Name	Family Name	Suffix
	Francis		DACOSTA	
Residence Information (Select One)		☒ US Residency ☐ Non US Residency ☐ Active US Military Service		
City	Santa Clara	State/Province	CA	Country of Residence ⁱ US
Mailing Address of Inventor:				
Address 1	3355 Benton Street			
Address 2				
City	Santa Clara	State/Province	CA	
Postal Code	95051	Country ⁱ	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).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	27197		
Email Address	mail@cherskov.com	Add Email	Remove Email

Application Information:

Title of the Invention	Chirp Networks		
Attorney Docket Number	0357-03304	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	72	Suggested Figure for Publication (if any)	67

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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		27197						
Prefix	Given Name	Middle Name	Family Name	Suffix	<div>Remove</div>			
Registration Number								
Prefix	Given Name	Middle Name	Family Name	Suffix	<div>Remove</div>			
Registration Number								
Additional Representative Information blocks may be generated within this form by selecting the Add button.								

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Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(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				Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
		14740062	2015-06-15		
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
14740062	Claims benefit of provisional	62012196	2014-06-13		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14740062	Continuation in part of	13764008	2013-02-11	9363651	2016-06-07
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13764008	Continuation in part of	13627883	2012-09-26	8923186	2014-12-30
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
13627883	Claims benefit of provisional	61615802	2012-03-26		
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
13627883	Claims benefit of provisional	61555400	2011-11-03		

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Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
13627883	Claims benefit of provisional	61621926	2012-04-09		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14740062	Continuation in part of	13571294	2012-08-09	9172738	2015-10-27
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13571294	Continuation in part of	12696947	2010-01-29	8520691	2013-08-27
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
12696947	Claims benefit of provisional	61148803	2009-01-30		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13571294	Continuation in part of	12352457	2009-01-12	8477762	2013-07-02
Prior Application Status		Abandoned		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
14740062	Continuation in part of	13541446	2012-07-03		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14740062	Continuation in part of	14523778	2014-10-24	9730100	2017-08-08
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14523778	Continuation of	12625365	2009-11-24	8514852	2013-08-20

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Title of Invention	Chirp Networks		

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
12625365	Claims benefit of provisional	61117502	2008-11-24
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			

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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(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).

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.			

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.

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.

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Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

- ☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.
- ☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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.

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Title of Invention	Chirp Networks		

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.								
Applicant 1								
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.								
			<input type="button" value="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	MeshDynamics							
Mailing Address Information For Applicant:								
Address 1	3355 Benton Street							
Address 2								
City	Santa Clara	State/Province	CA					
Country ⁱ	US	Postal Code	95051					
Phone Number		Fax Number						
Email Address								
Additional Applicant Data may be generated within this form by selecting the Add button.								

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Assignee Information including Non-Applicant Assignee 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.

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

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Szymon M. Gurda/			Date (YYYY-MM-DD)	
First Name	Szymon	Last Name	Gurda	Registration Number	58451
Additional Signature may be generated within this form by selecting the Add button.					

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.

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN
APPLICATION DATA SHEET (37 CFR 1.76)****Title of
Invention**

CHIRP NETWORKS

As the below named inventor, I hereby declare that:

This declaration ☒ The attached application, or
is directed to:☐ United States application or PCT international application number _____
filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

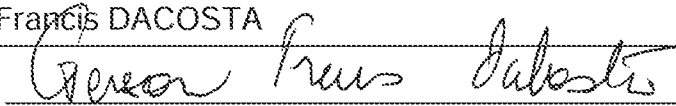
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001
by fine or imprisonment of not more than five (5) years, or both.**WARNING:**

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Francis DACOSTA

Date (Optional) : _____

Signature: 

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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

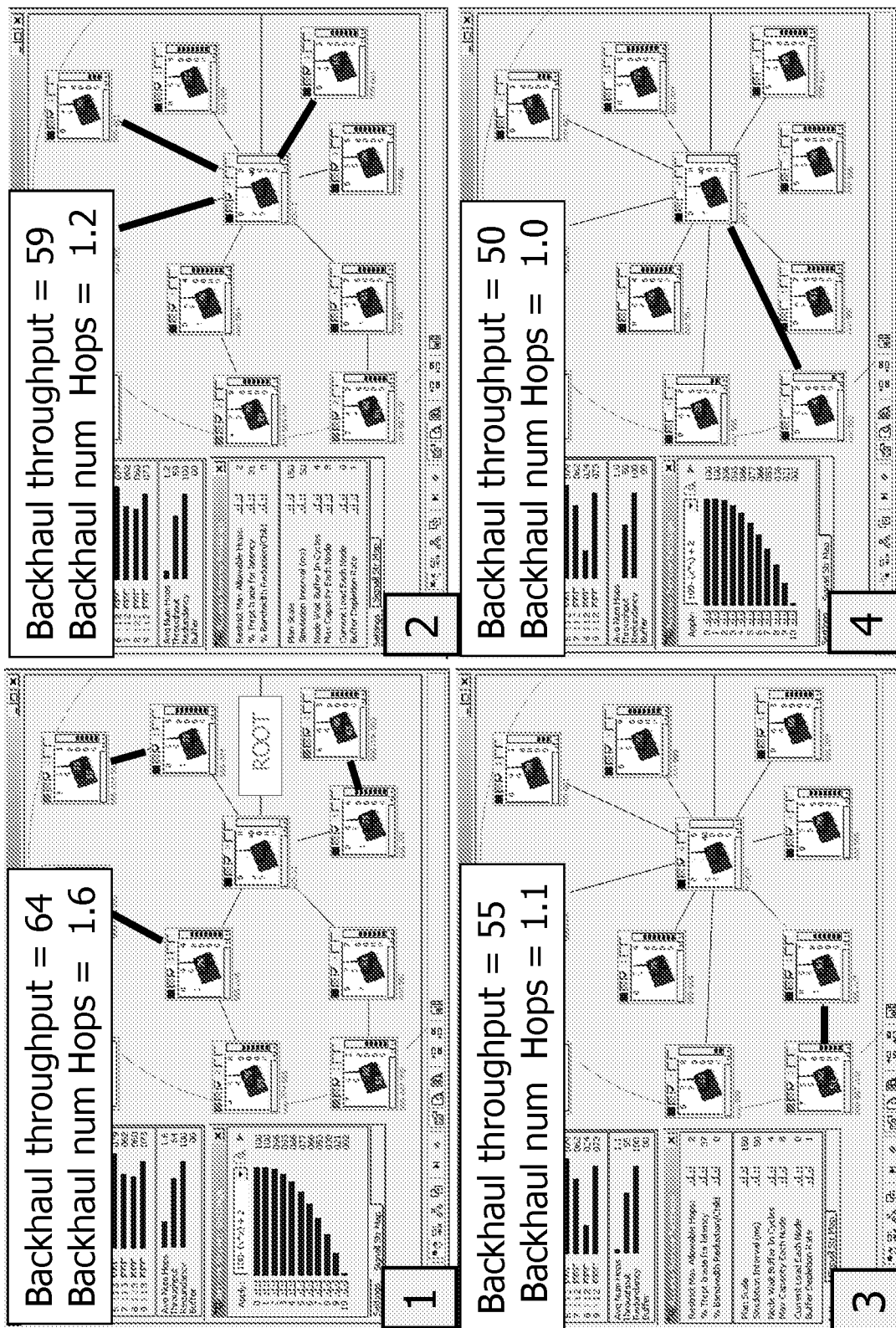


Figure 1

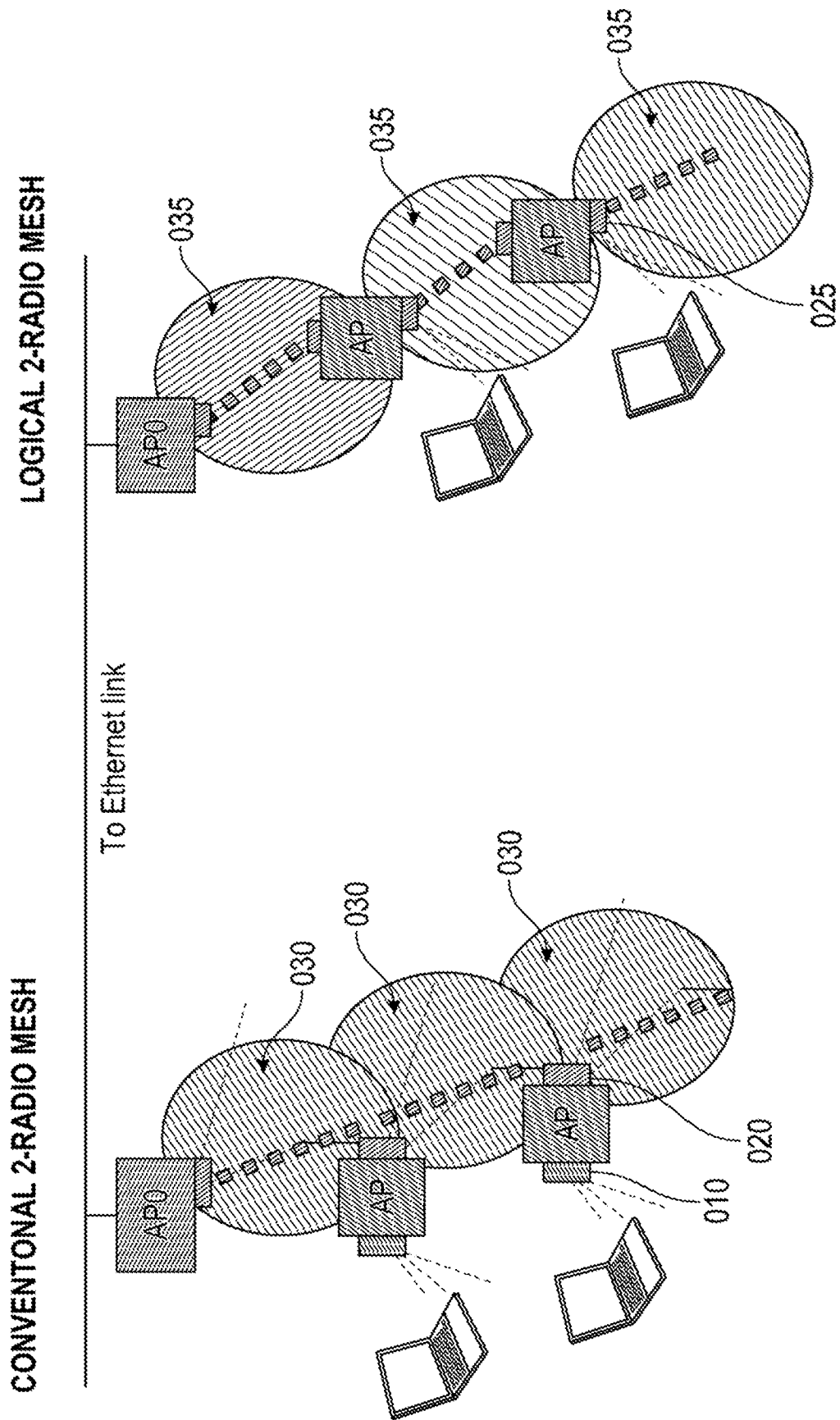


Figure 2

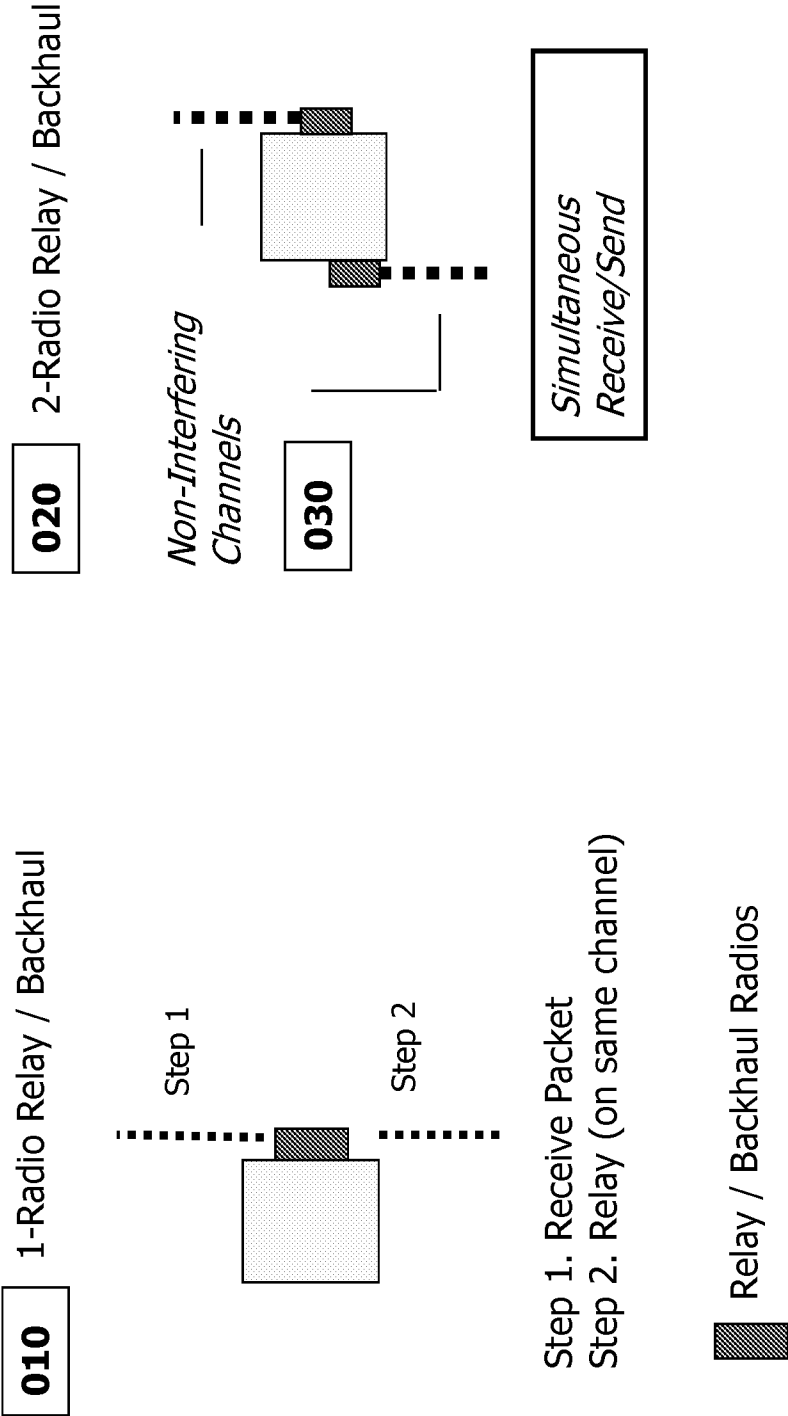
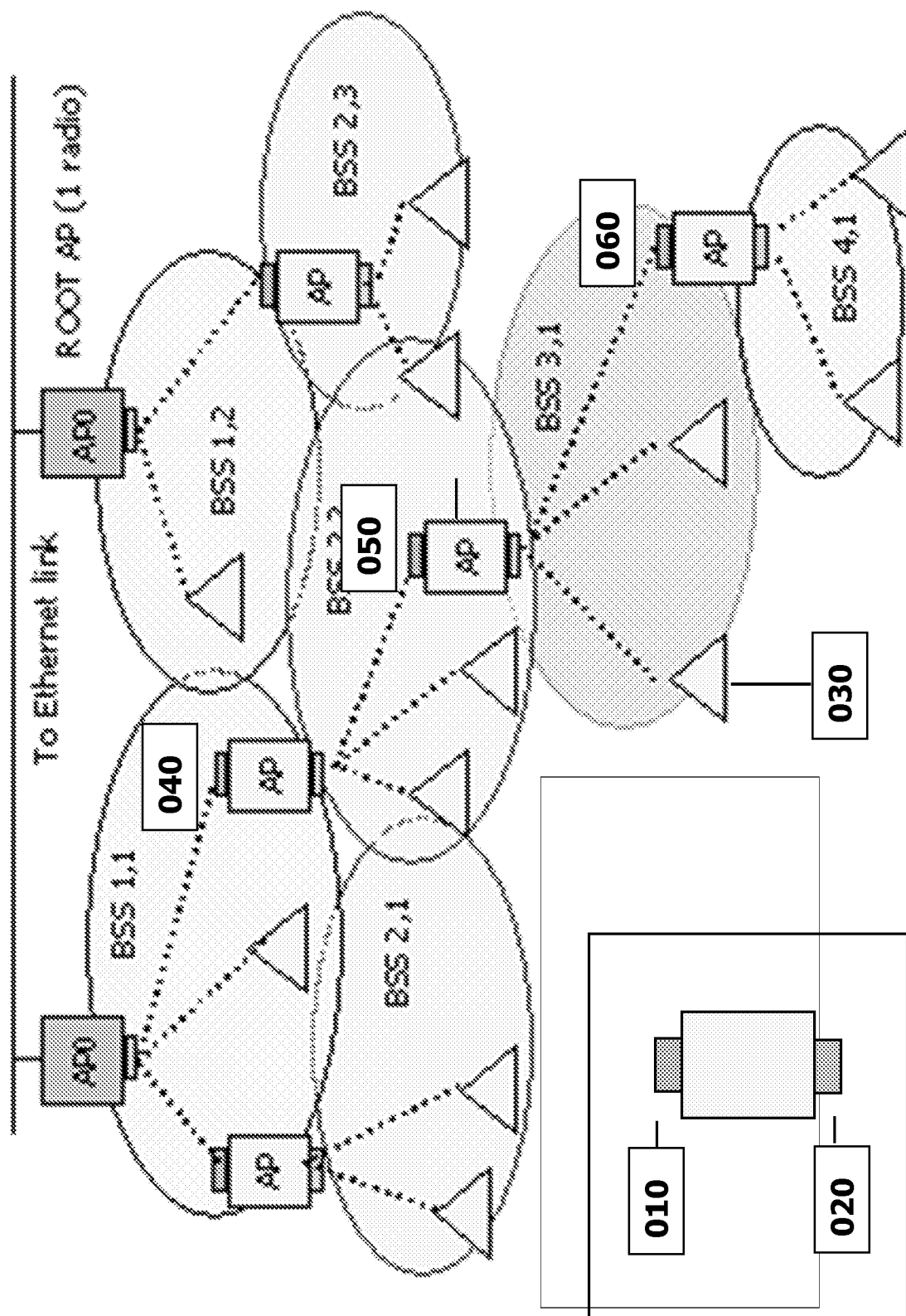


Figure 3



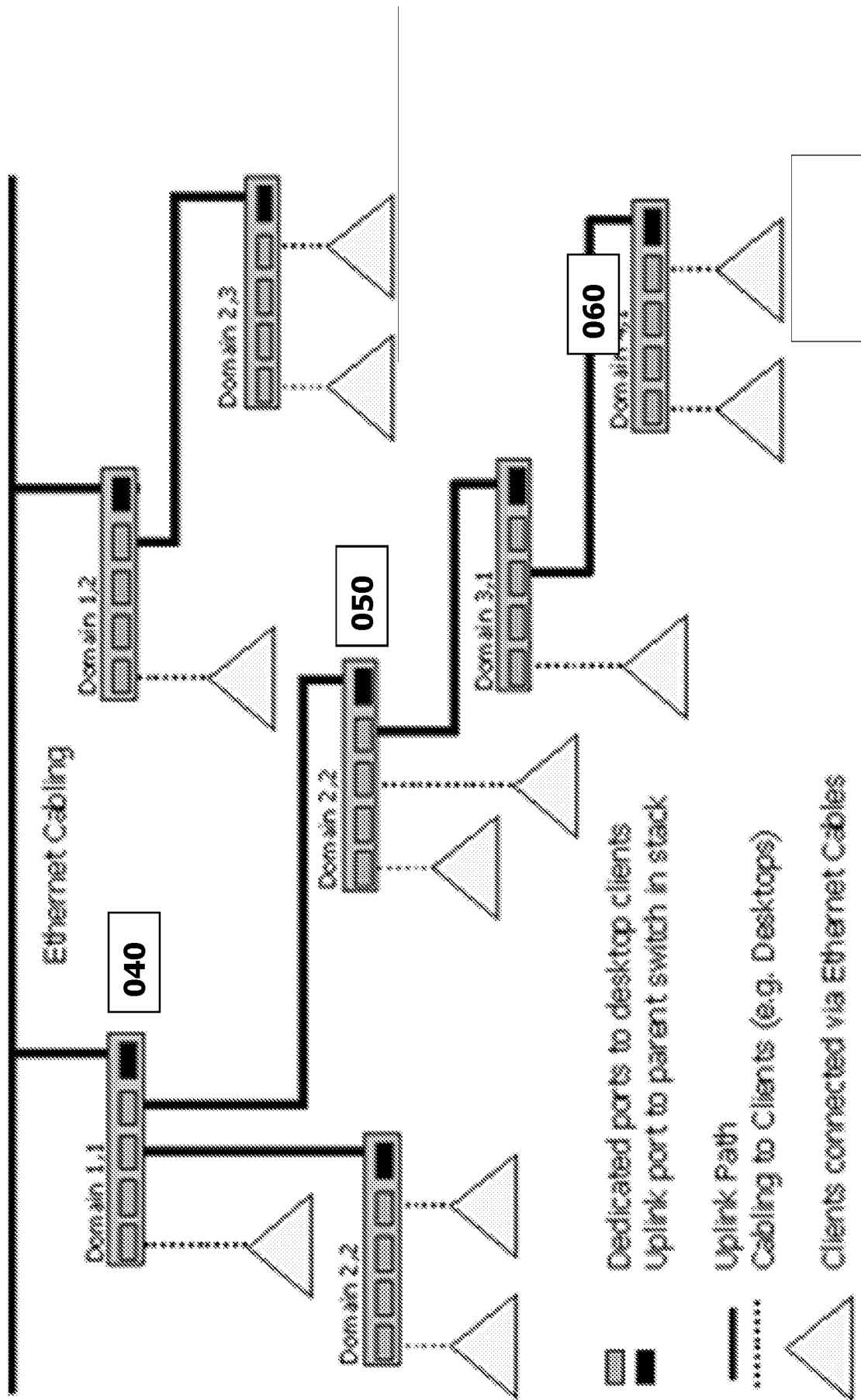


Figure 5

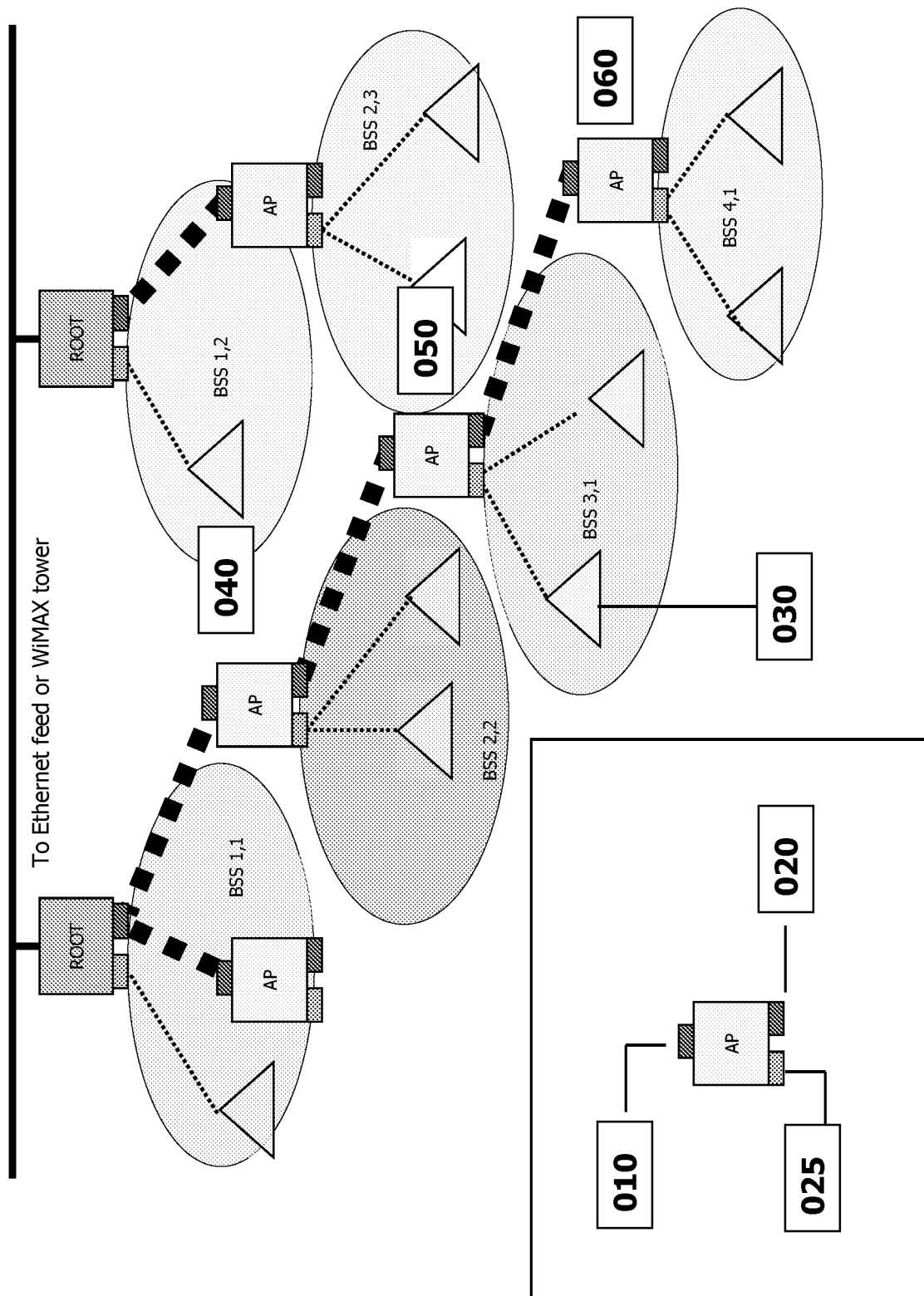


Figure 6

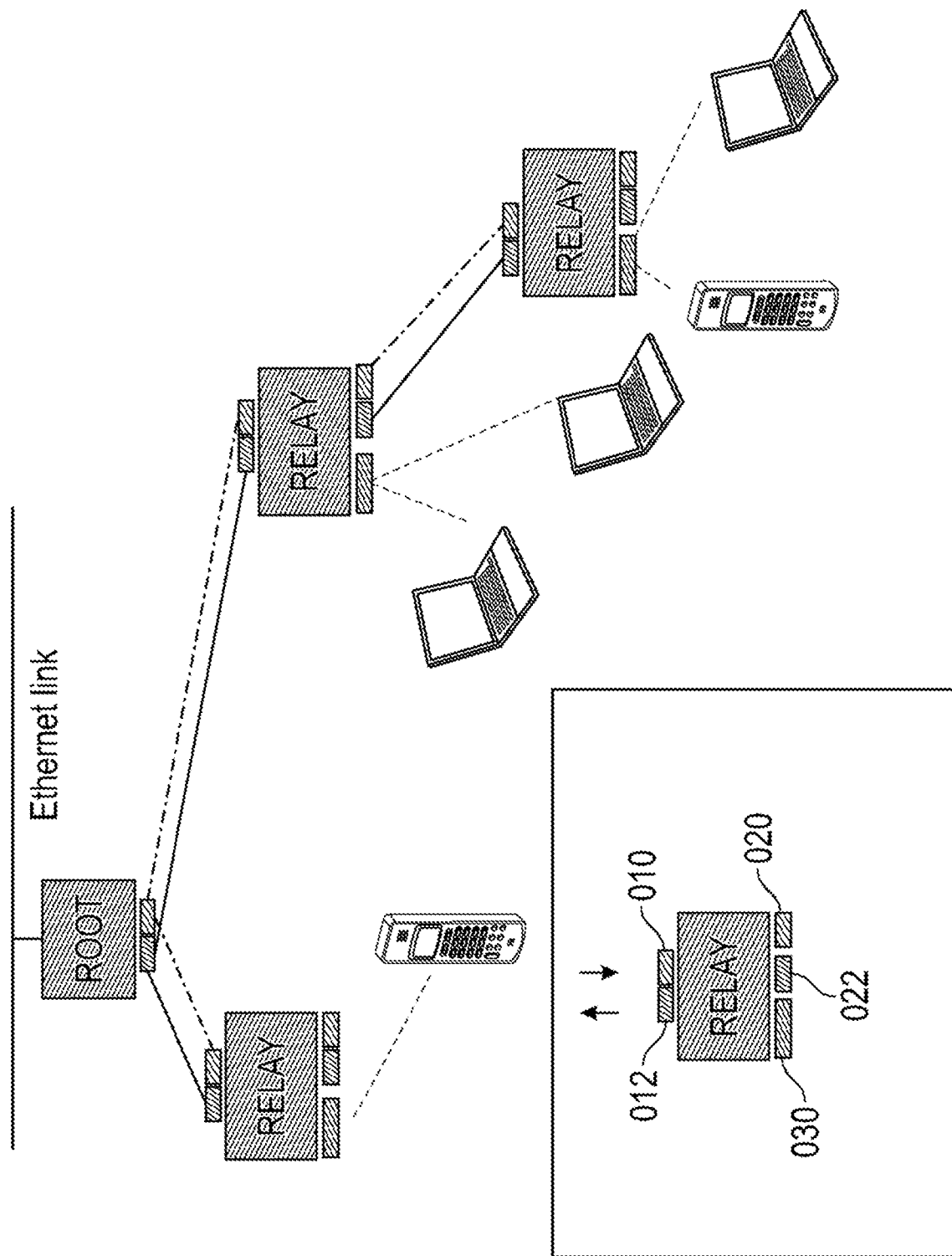


Figure 7

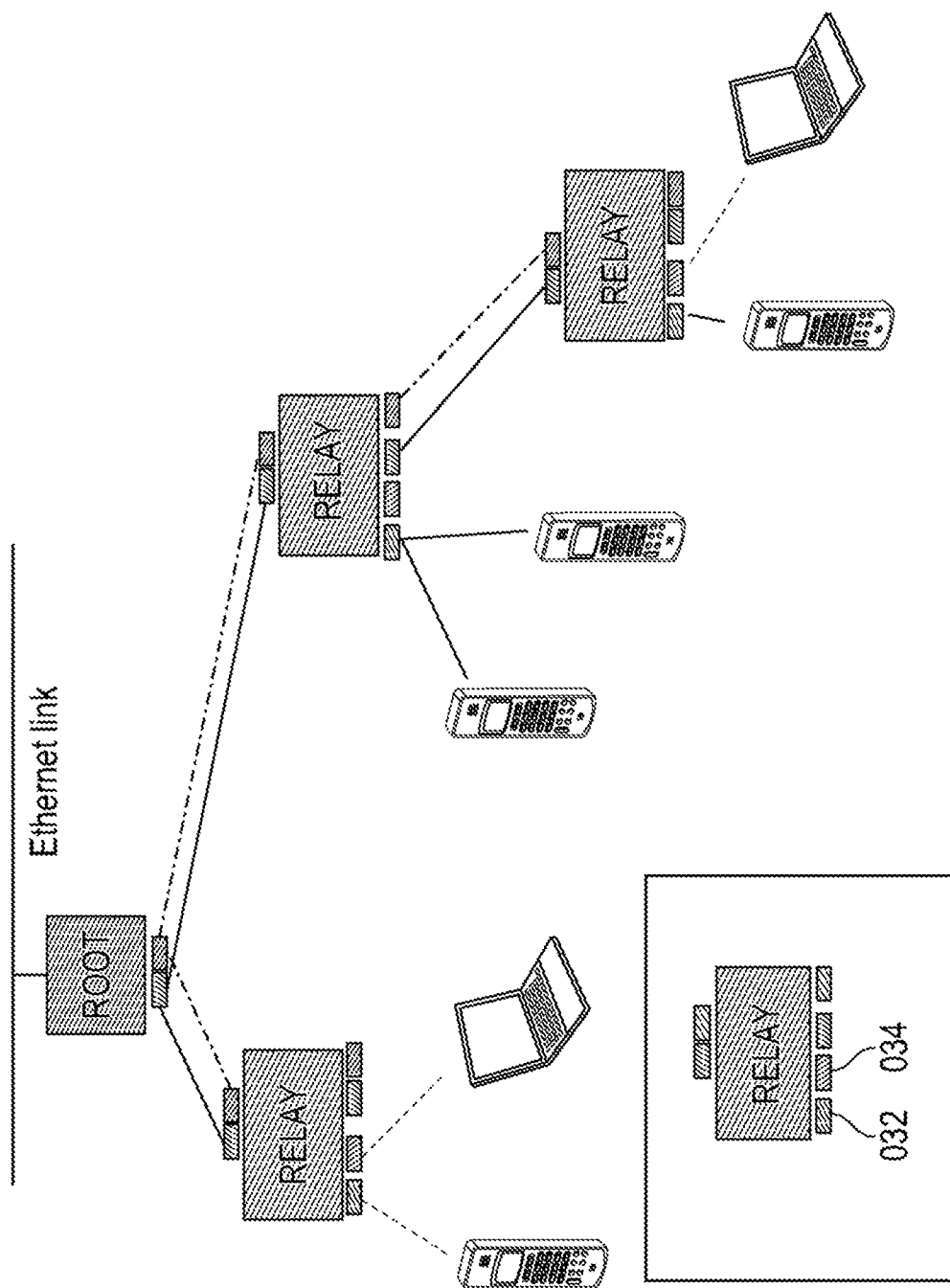


Figure 8

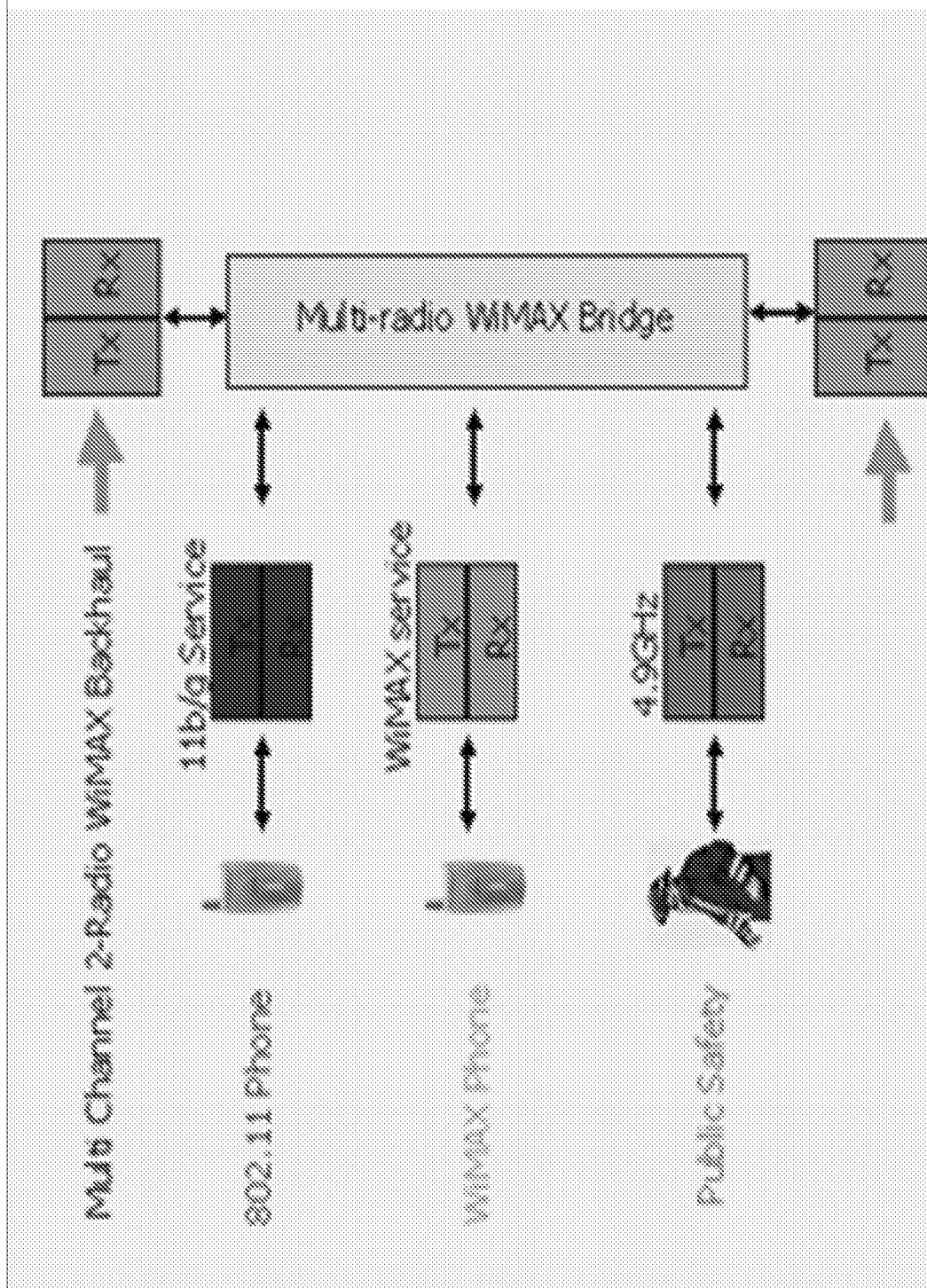


Figure 9

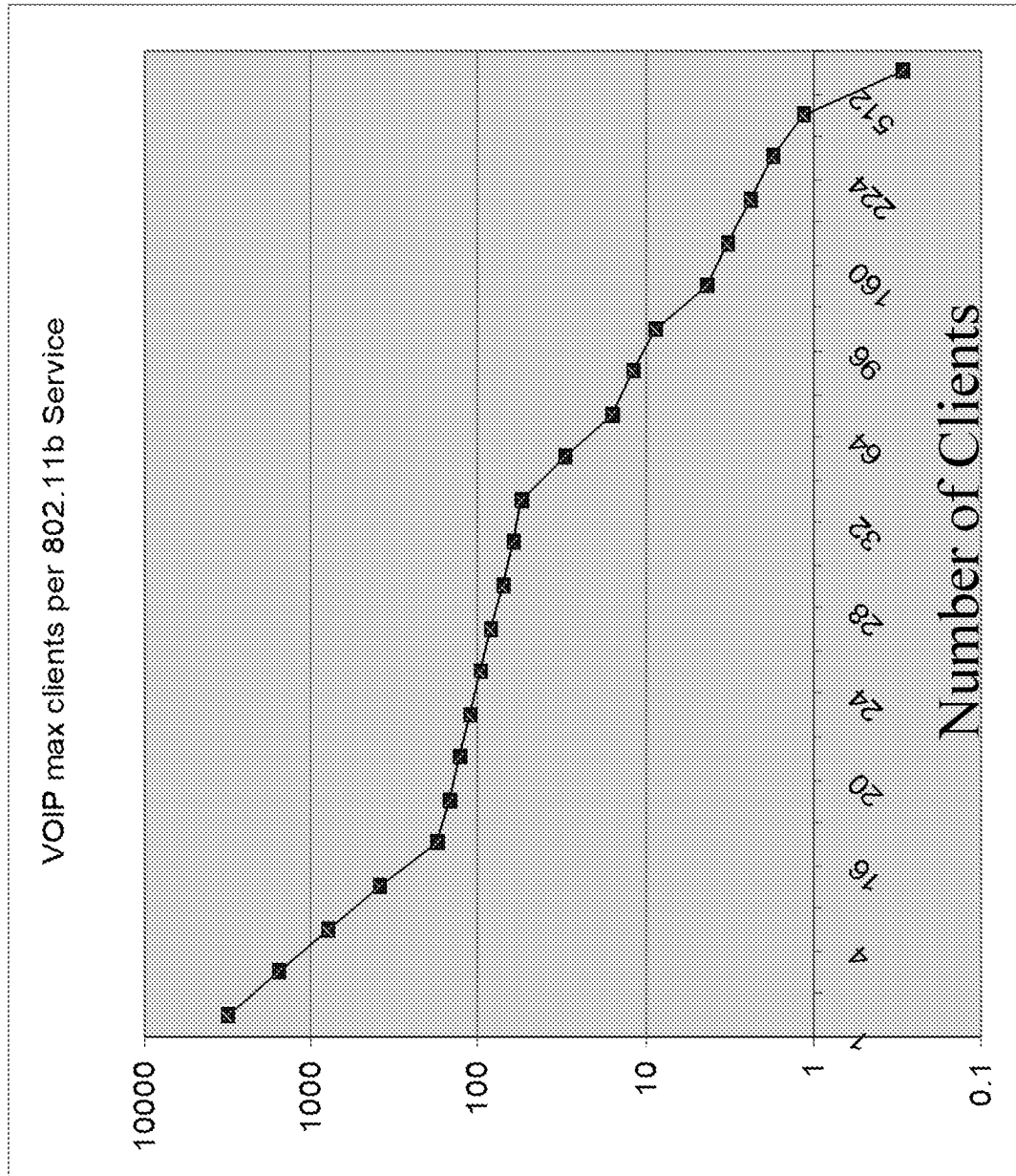


Figure 10

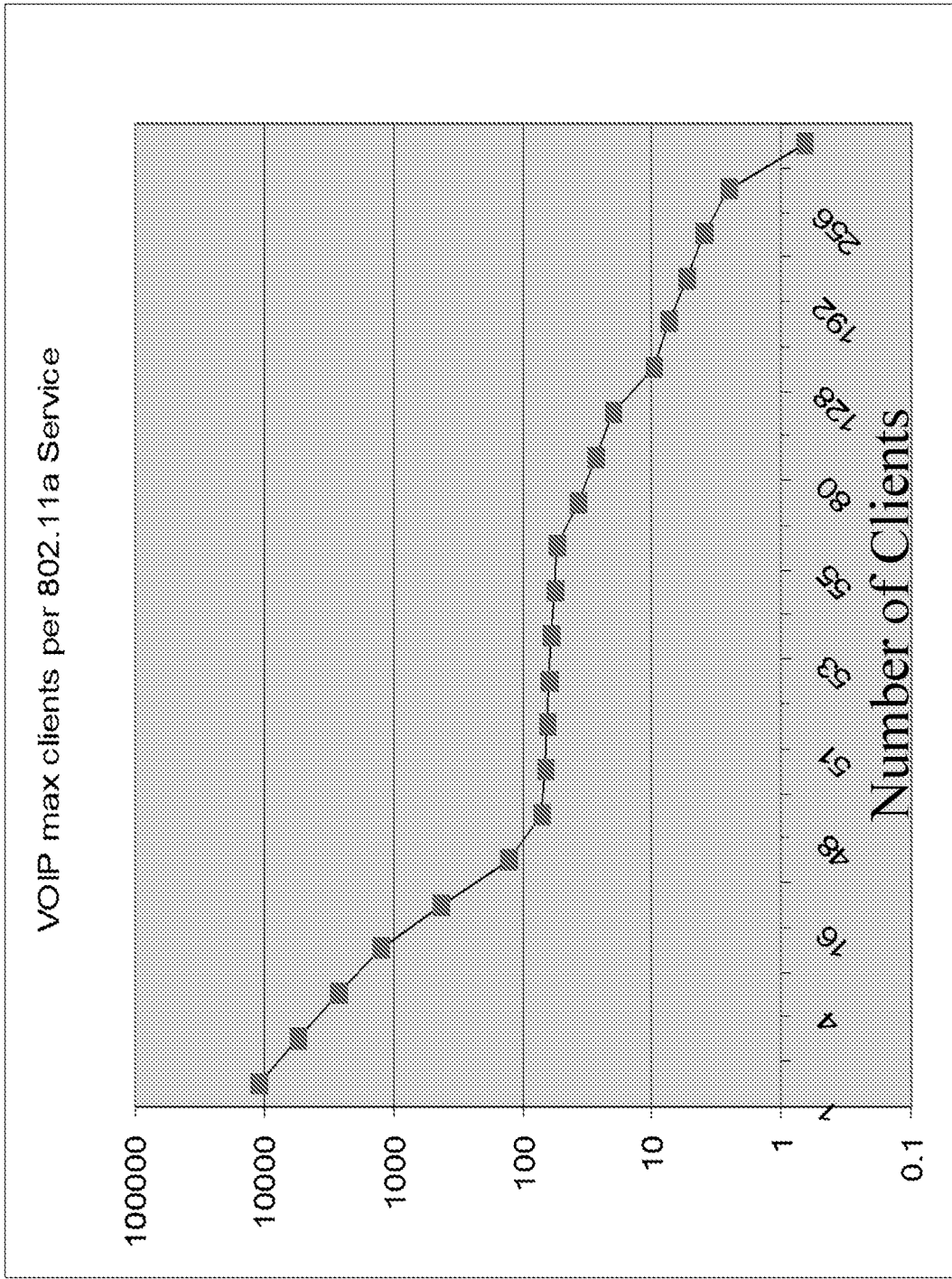


Figure 11

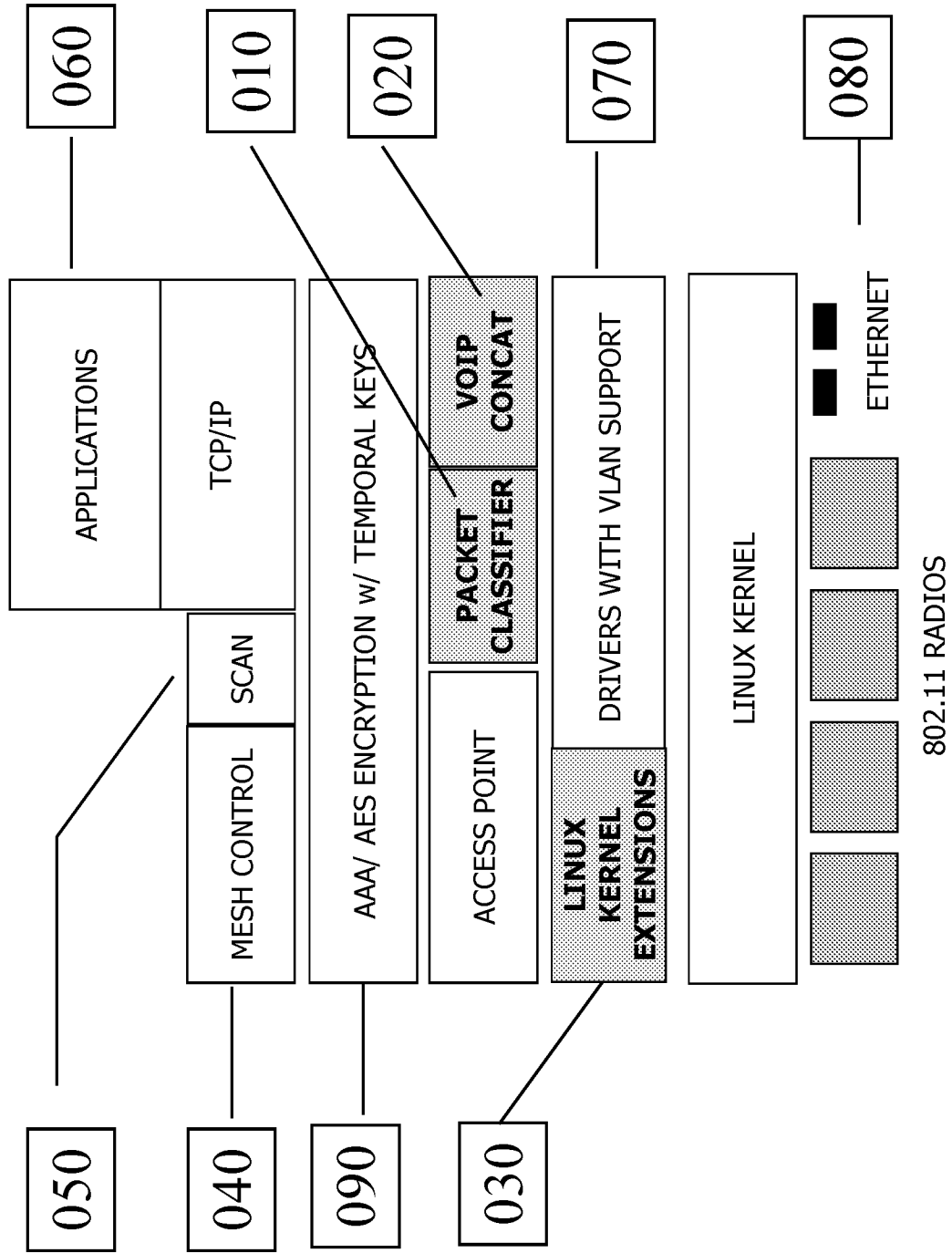


Figure 12

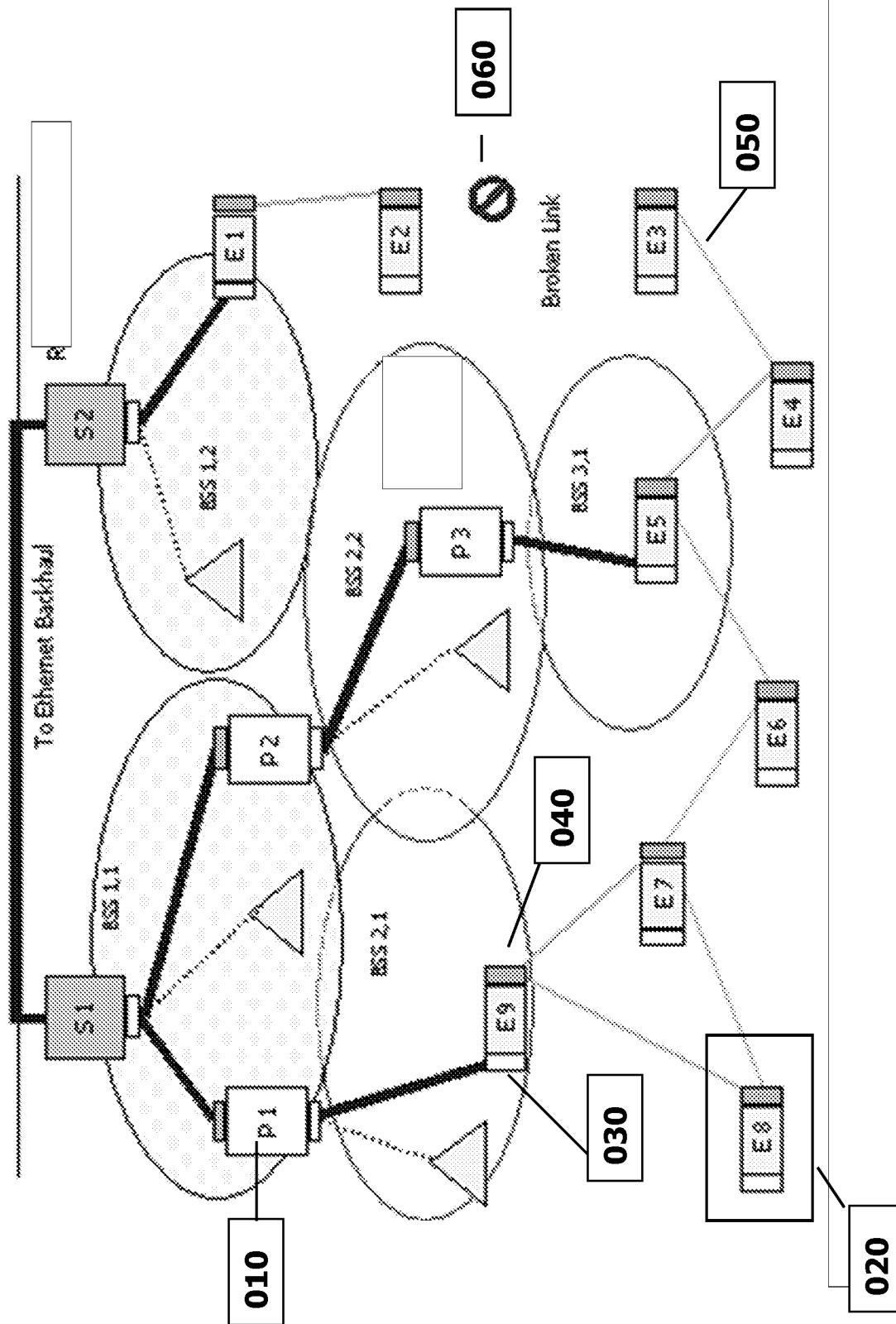


FIGURE 13

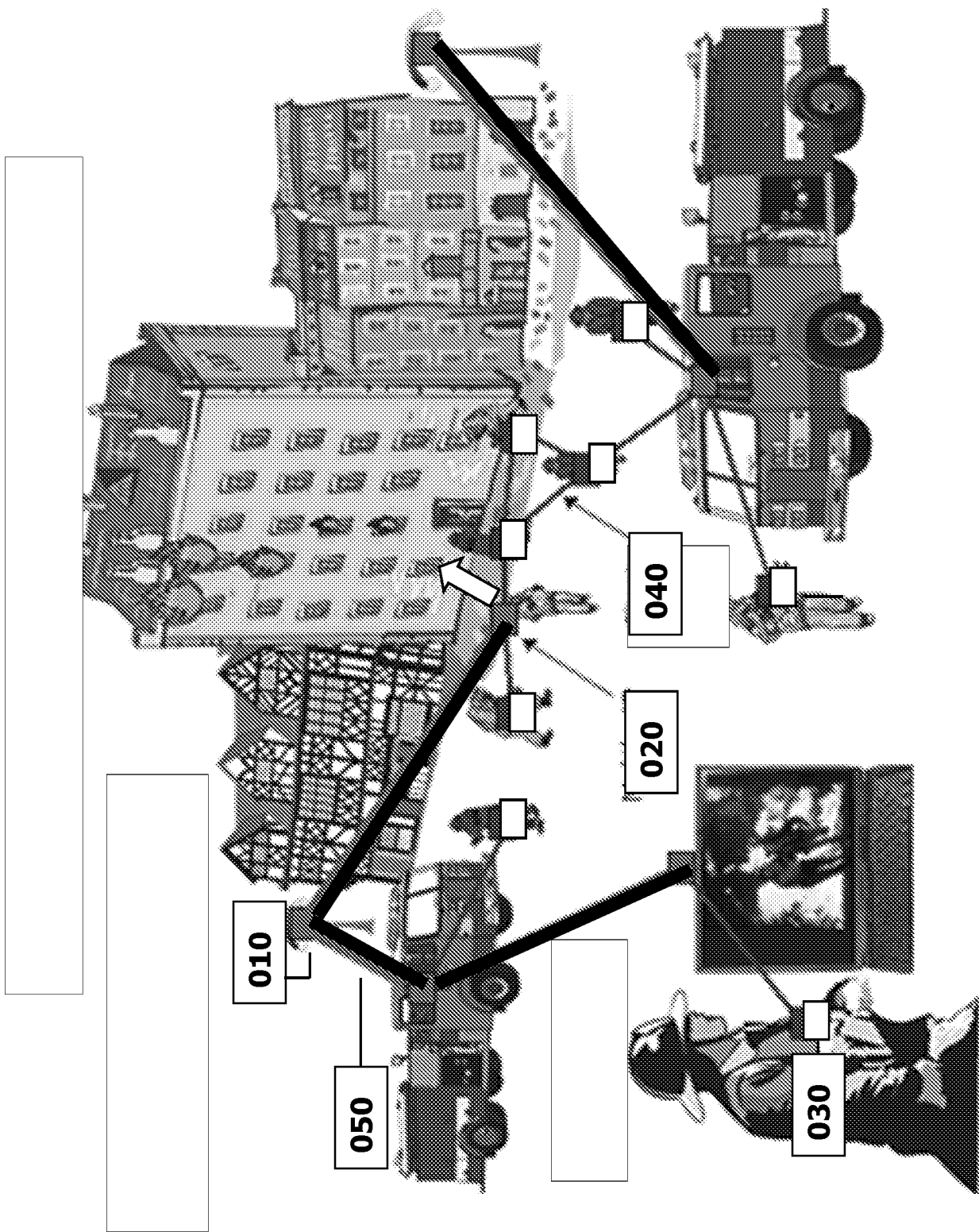


Figure 14

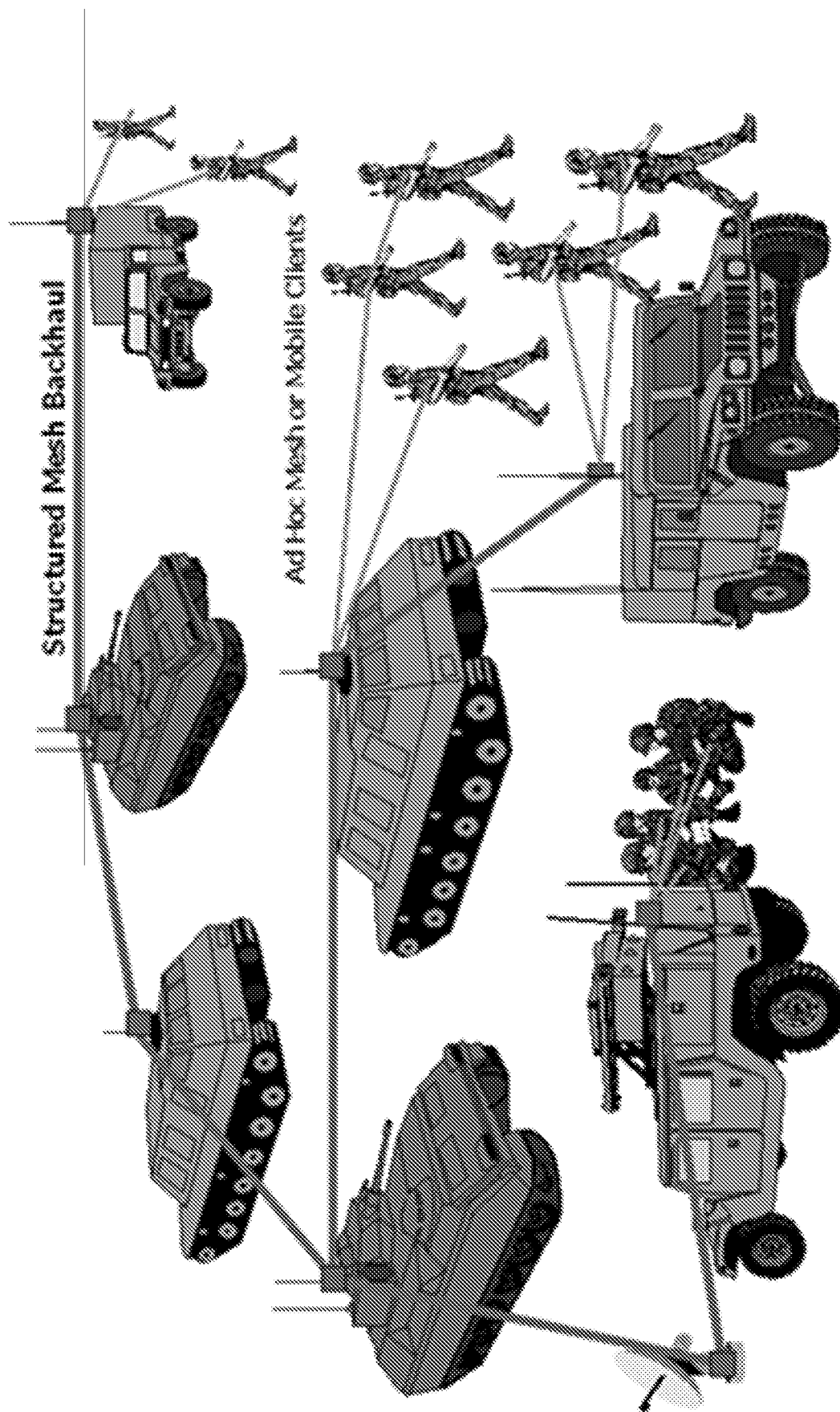


Figure 15

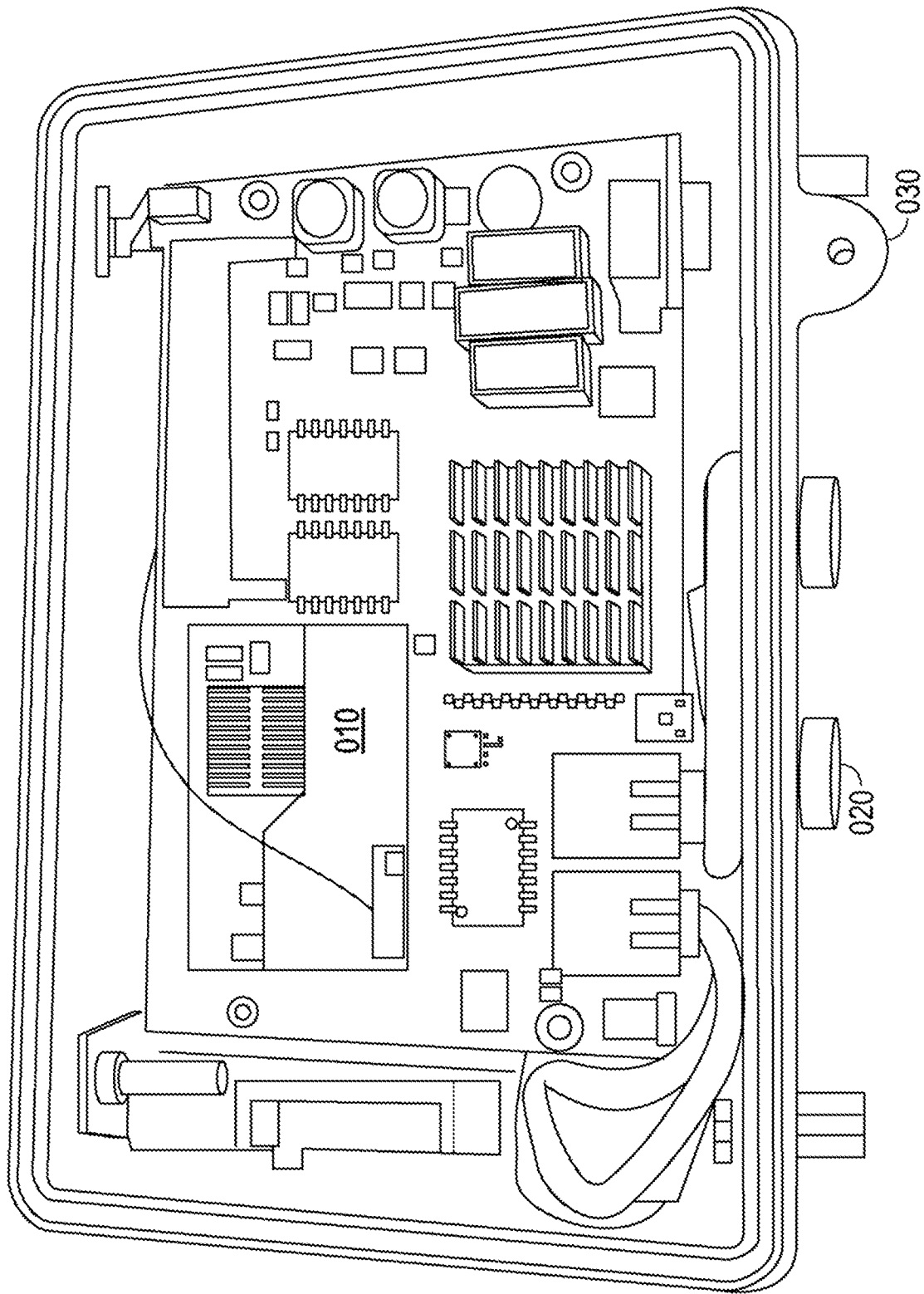


Figure 16

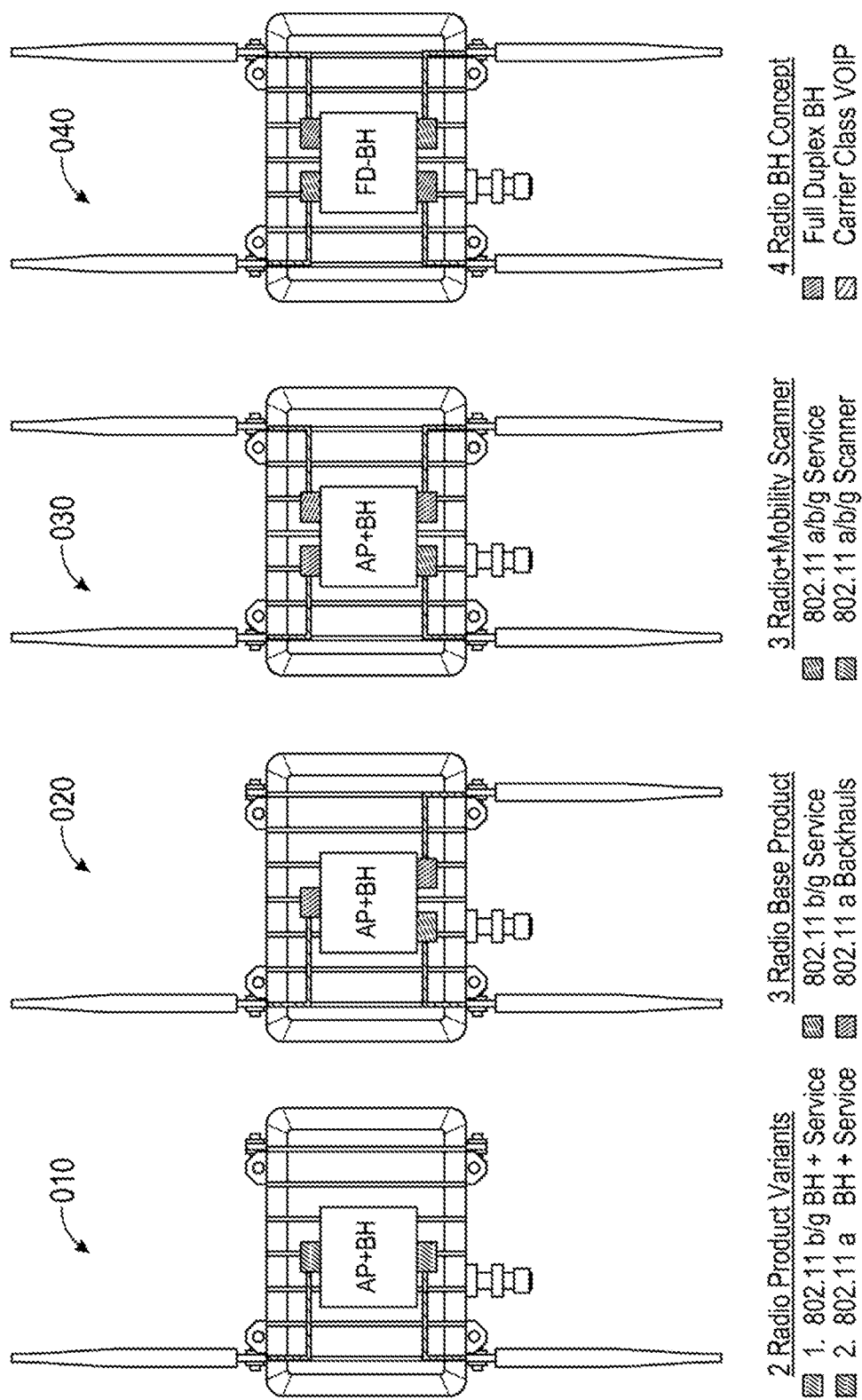


Figure 17

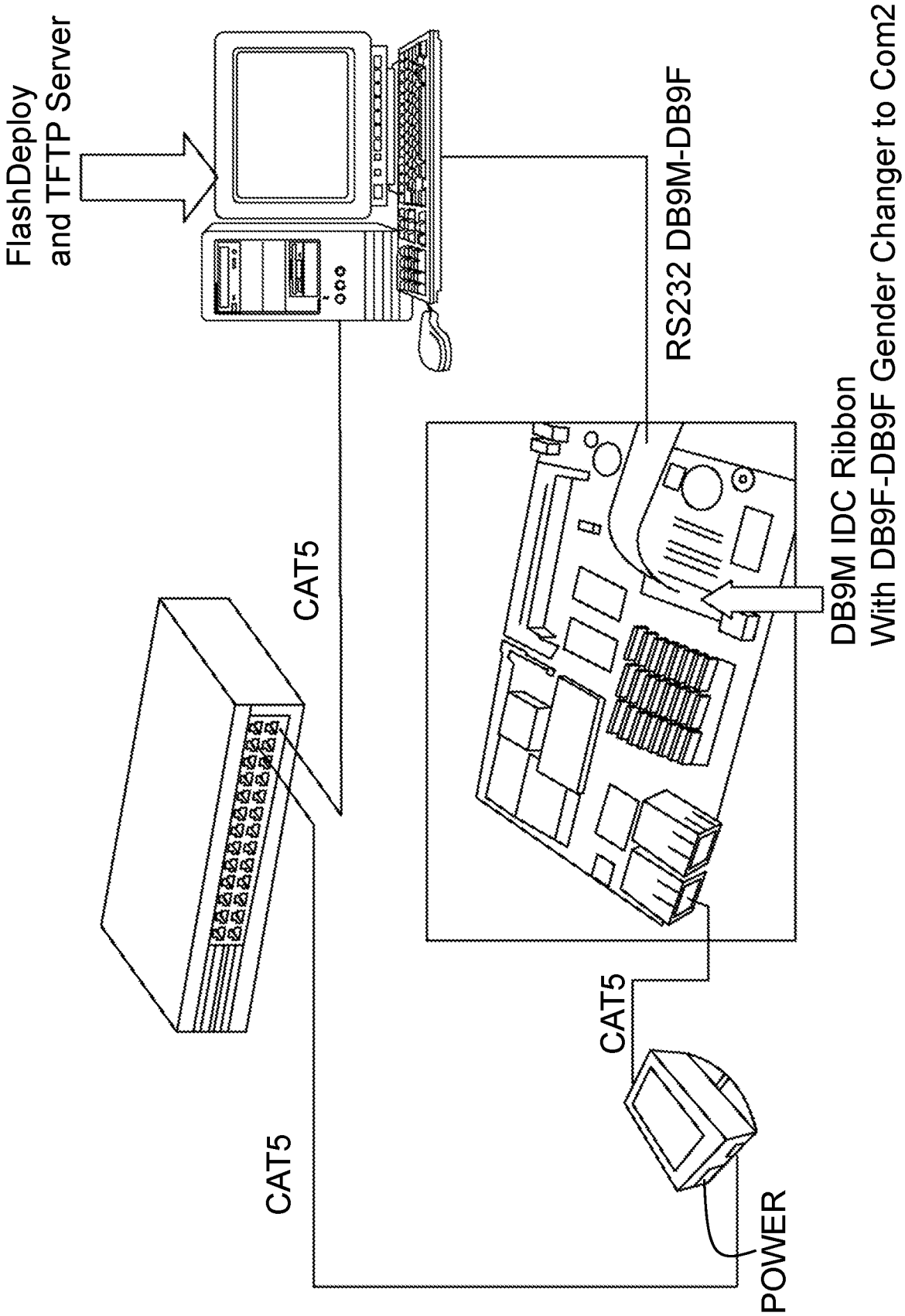


Figure 18

Serial Port

COM1

Temporary IP

192.168.250.254

TFFTP Root

c:\tfftpboot

Server IP

192.168.250.1

Save

License Information

Total Licenses

1

Next

Total Consumed

0

Previous

Vendor OUI

00:12:CE

Unit Information

Start MAC Addresses

00:12:CE:00:06:54

Unit ID

00:00:00:00:00

Addresses/Unit

5

Product ID

00:00:00

Deploy

Cancel

Elapsed Time

00:00:46

Using default protocol (TFFTP)

Raw file loaded 0x01600000-0x016ae2ab, assumed entry at 0x01600000

RedBoot> fis create -b 0x01600000 -l 0xae2ac zImage

... Erase from 0x50040000-0x50100000:

27%

Writing zImage to flash

Exit

Figure 19

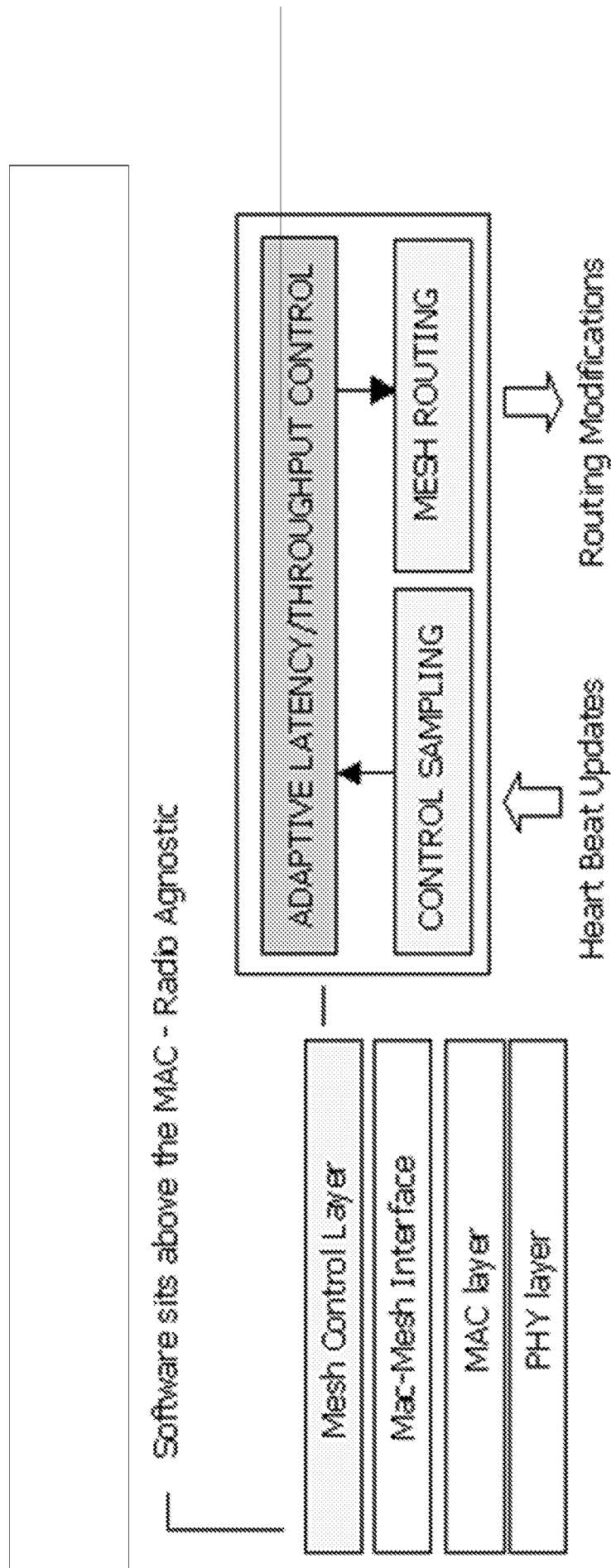


Figure 20

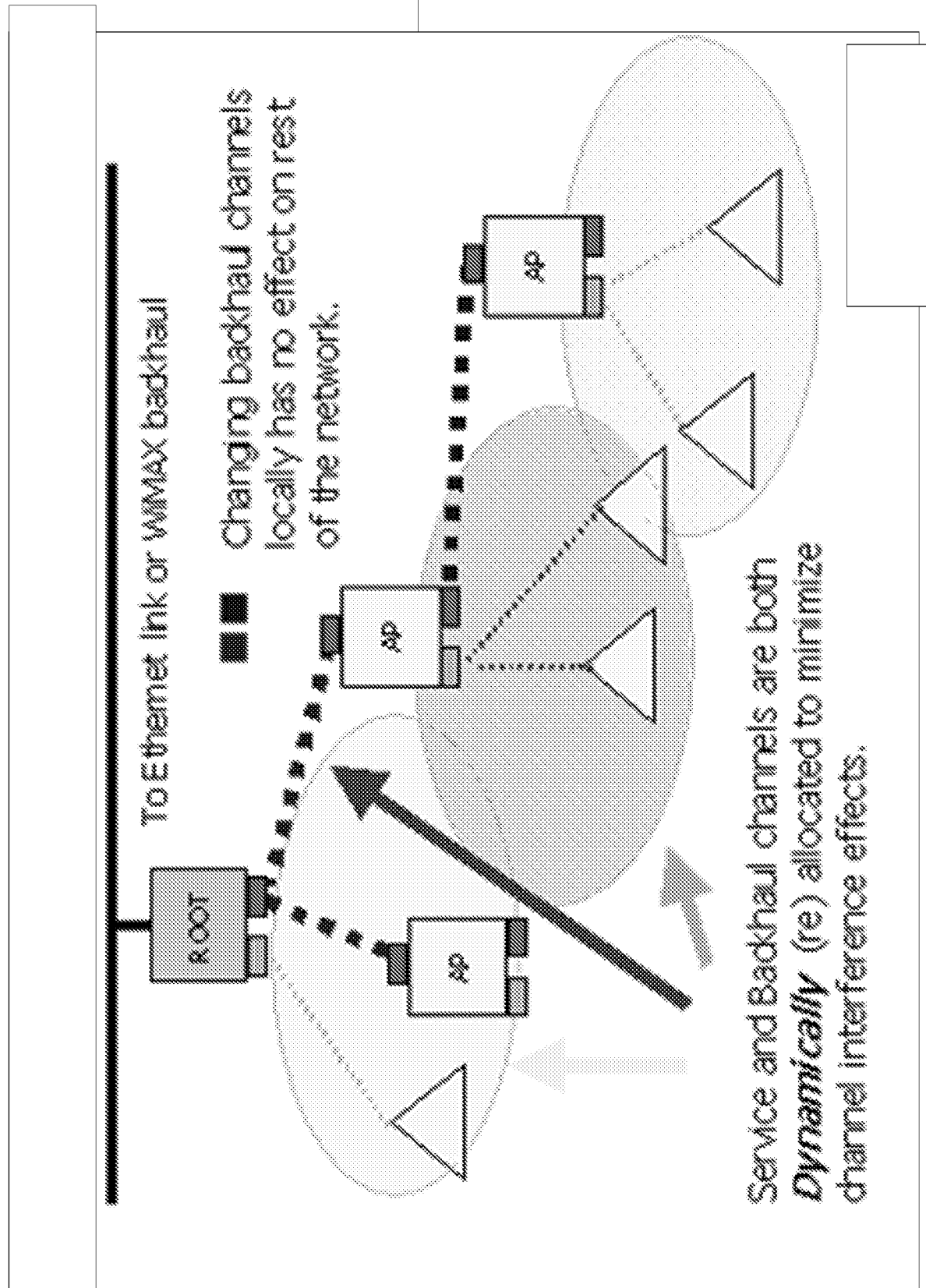


Figure 21

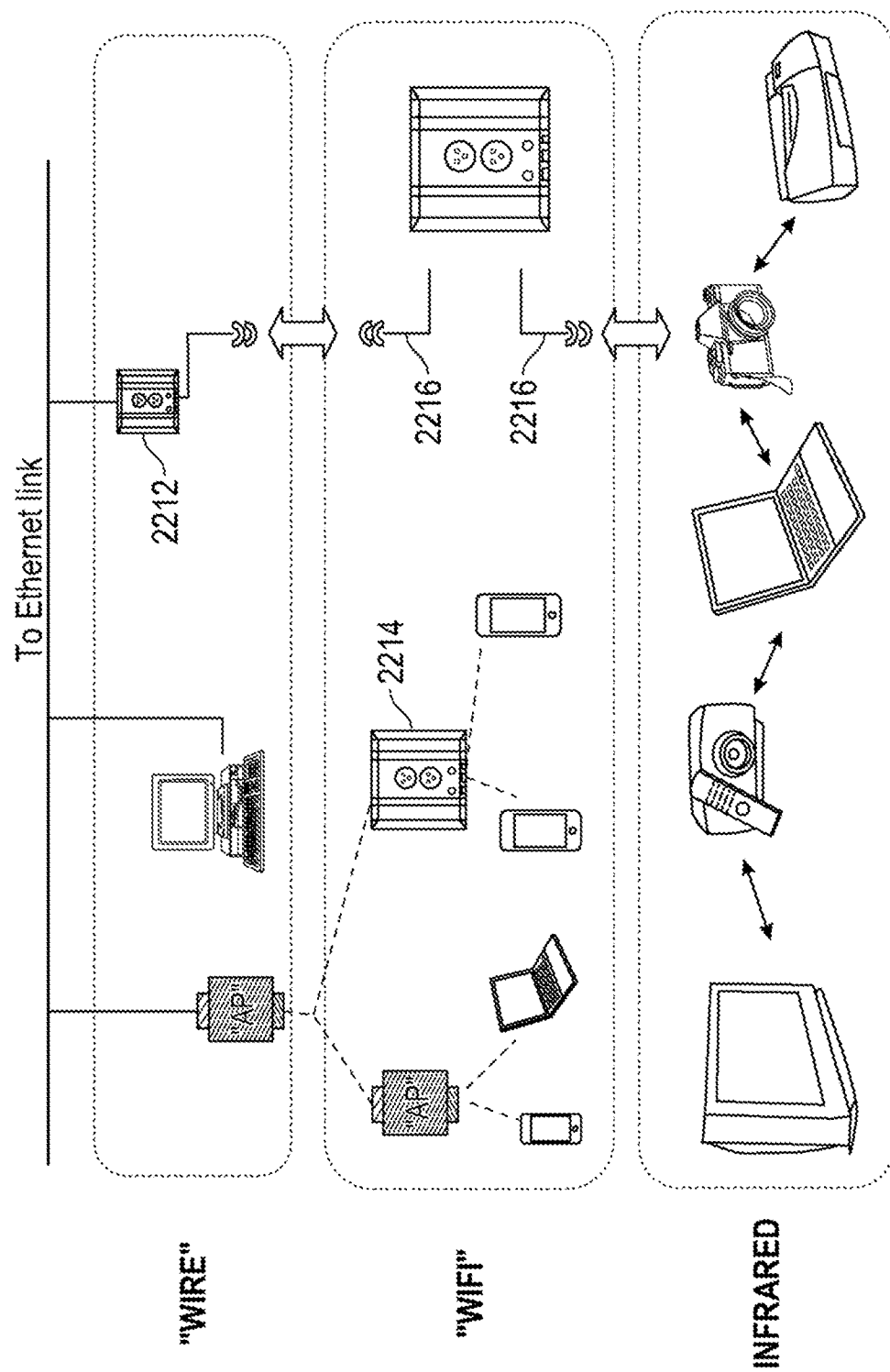
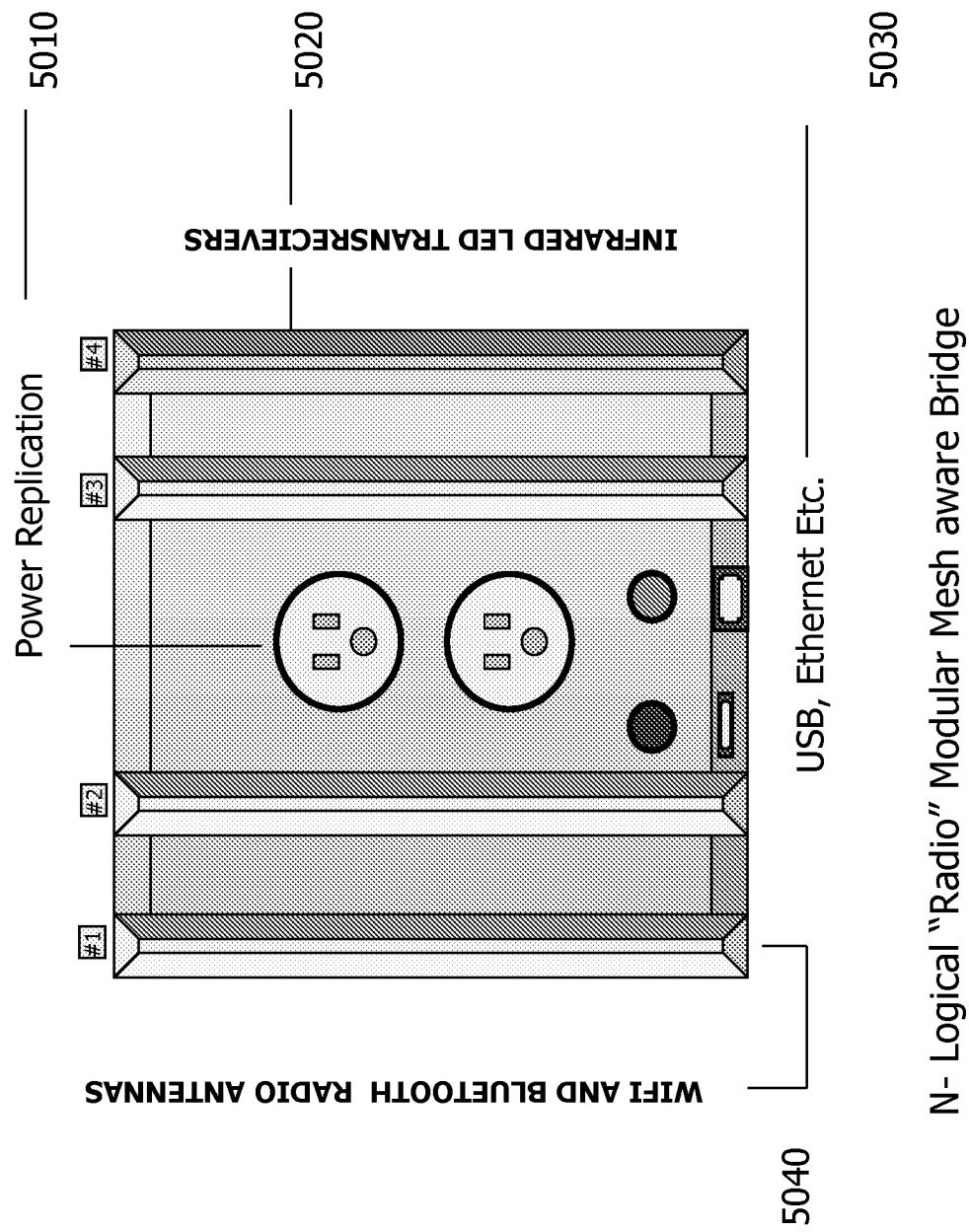


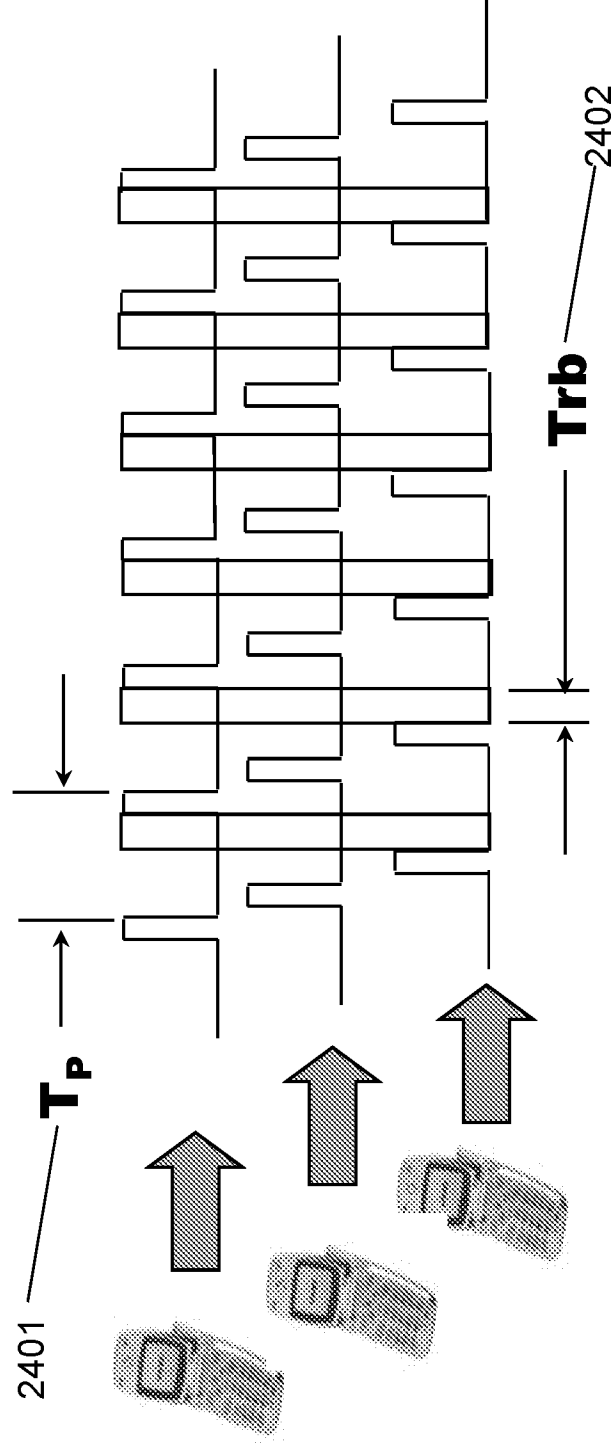
Figure 22



N- Logical "Radio" Modular Mesh aware Bridge

Figure 23

Receive Block: Time for Bulk VOIP Transmissions



□ BLOCK OF TIME RESERVED FOR RECEIVE PACKETS

- T_P : PACKETIZATION TIME: 20 ms for G.711 and G.729 CODECS
- T_{rb} : RECEIVE BLOCK: For all receive packets (from Access Point to Devices)

Figure 24

Separate Voice and Data Service

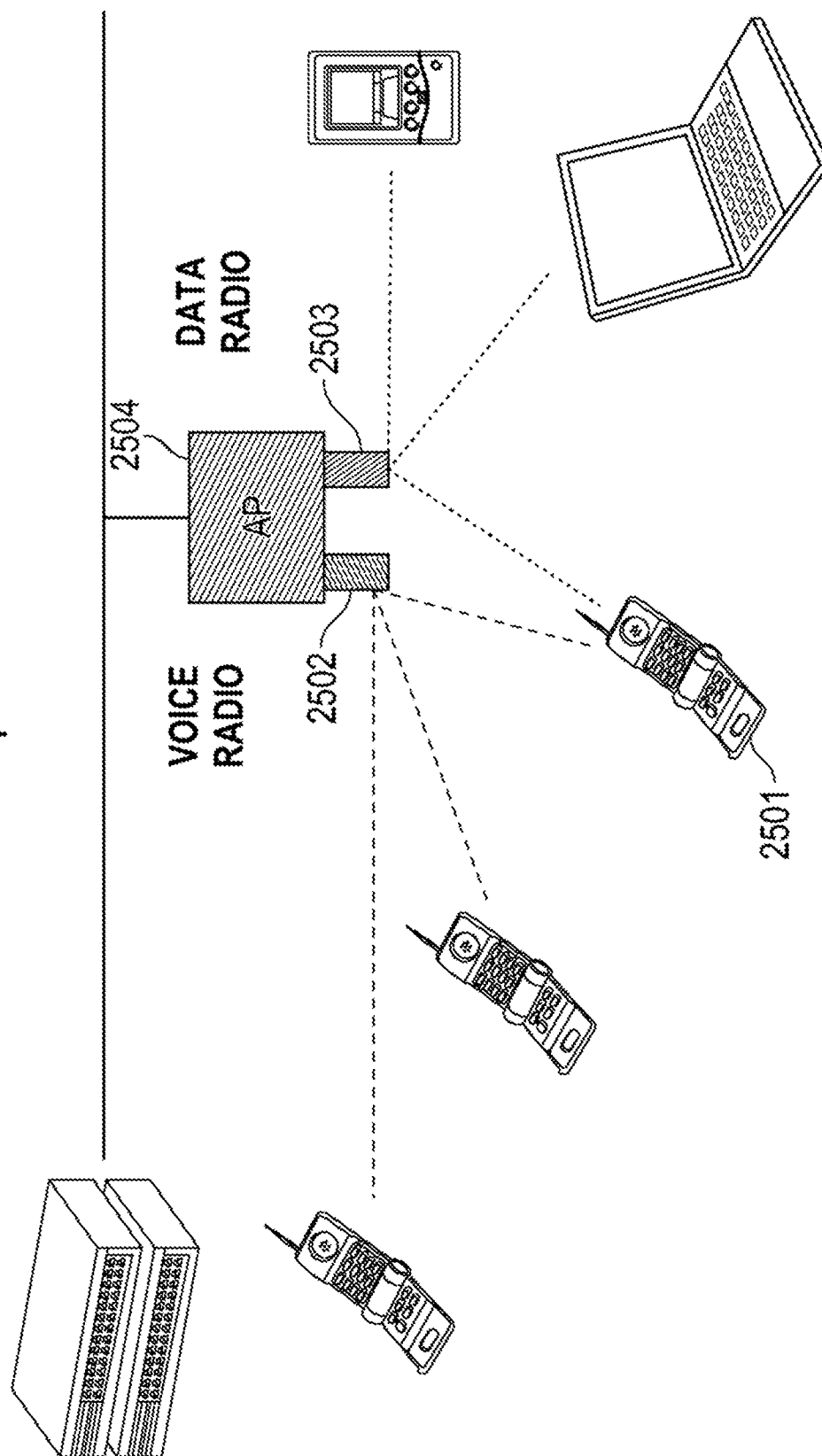


Figure 25

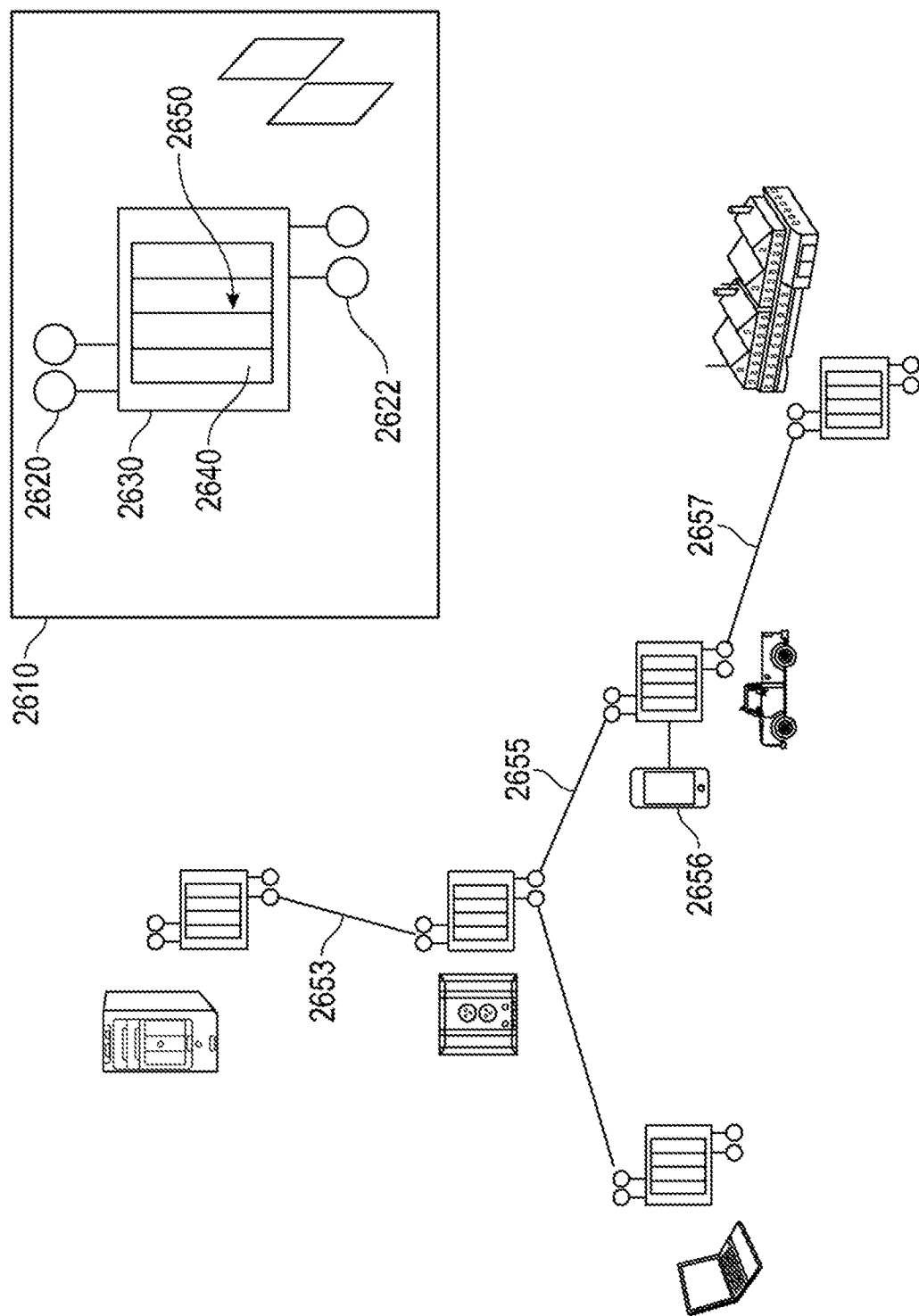
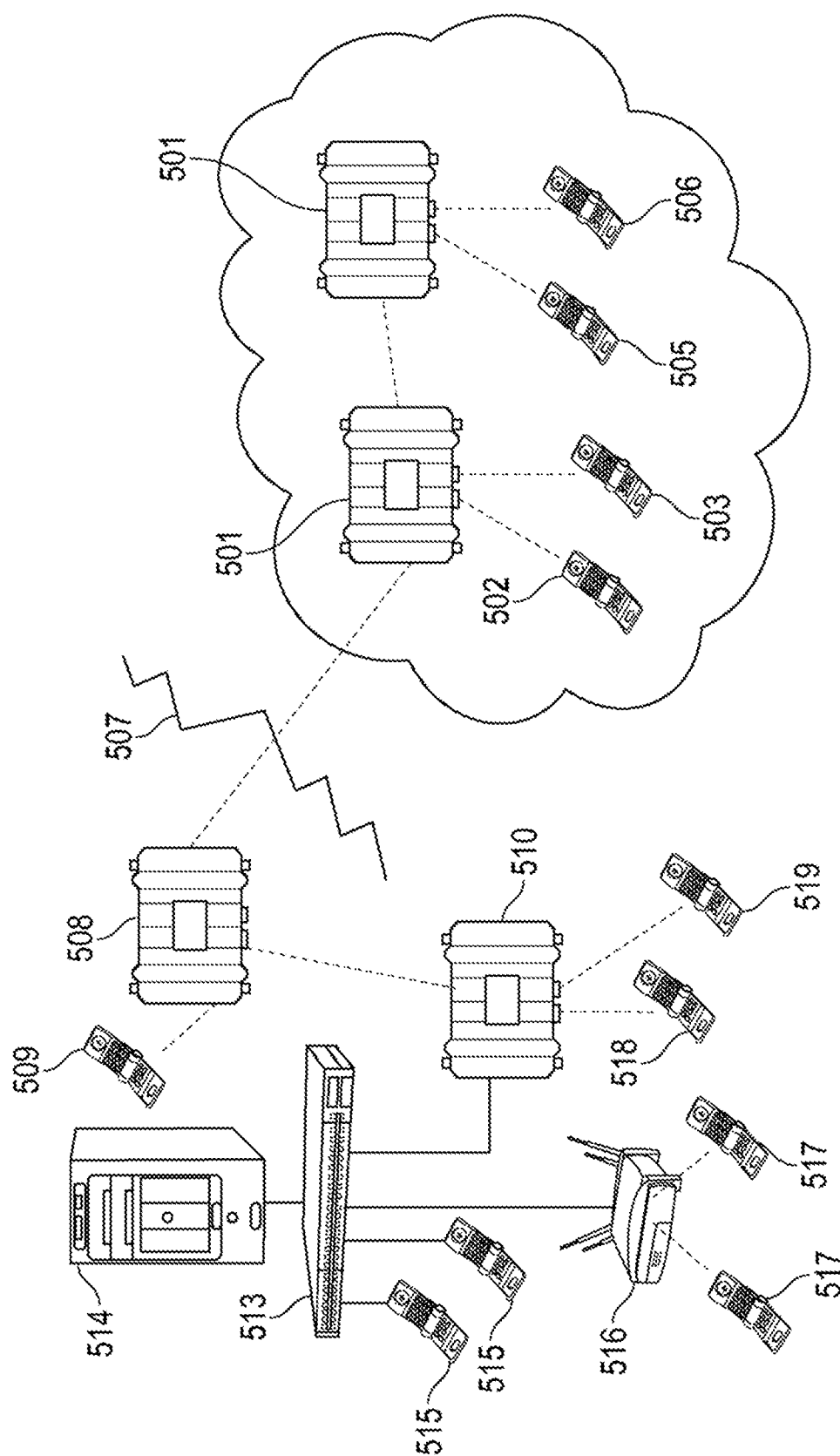


Figure 26



**External
Network**

Isolated Cluster A

Figure 27



Figure 28

DISTRIBUTED DHCP SERVICE WITH INHERENT CONFLICT RESOLUTION

ASSUME A FIXED SUBNET MASK OF *255.0.0.0* IS USED

- IP ADDRESSES OF THE FORM *A.x.y.k* where
- *A* defines the *CUSTOMER-NETWORK-ID* 16 bit (0 -255)
- *k* is *CLIENT BASED ID* 16 bit (0-255)
- *x, y* are each 16 bit : 2^{32} unique networks each with up to 255 clients possible

POLICY DIRECTIVE: SPLIT UP ADDRESS SPACE BETWEEN STATIC and MOBILE networks

- Assign 15 bits to distributed DHCP services for floating networks
- Let NODES CHOOSE A RANDOM 15-bit NUMBER '*R*' AT STARTUP and
 1. LET '*M*' BE THE DECIMAL EQUIVALENT OF THE 7-MSBs OF '*R*'
 2. LET '*N*' BE THE DECIMAL EQUIVALENT OF THE 8-LSBs OF '*R*'

THE DHCP ADDRESS SPACE OF THE NODE WOULD BE

A.255-M.N.0 to *A.255-M.N.254* where $0 \leq M \leq 127$ and $0 \leq N \leq 255$

Figure 29

Objective: Low foot print for low cost embedded system applications
Key Idea: Remove overhead of OS/Virtual Machine from the equation

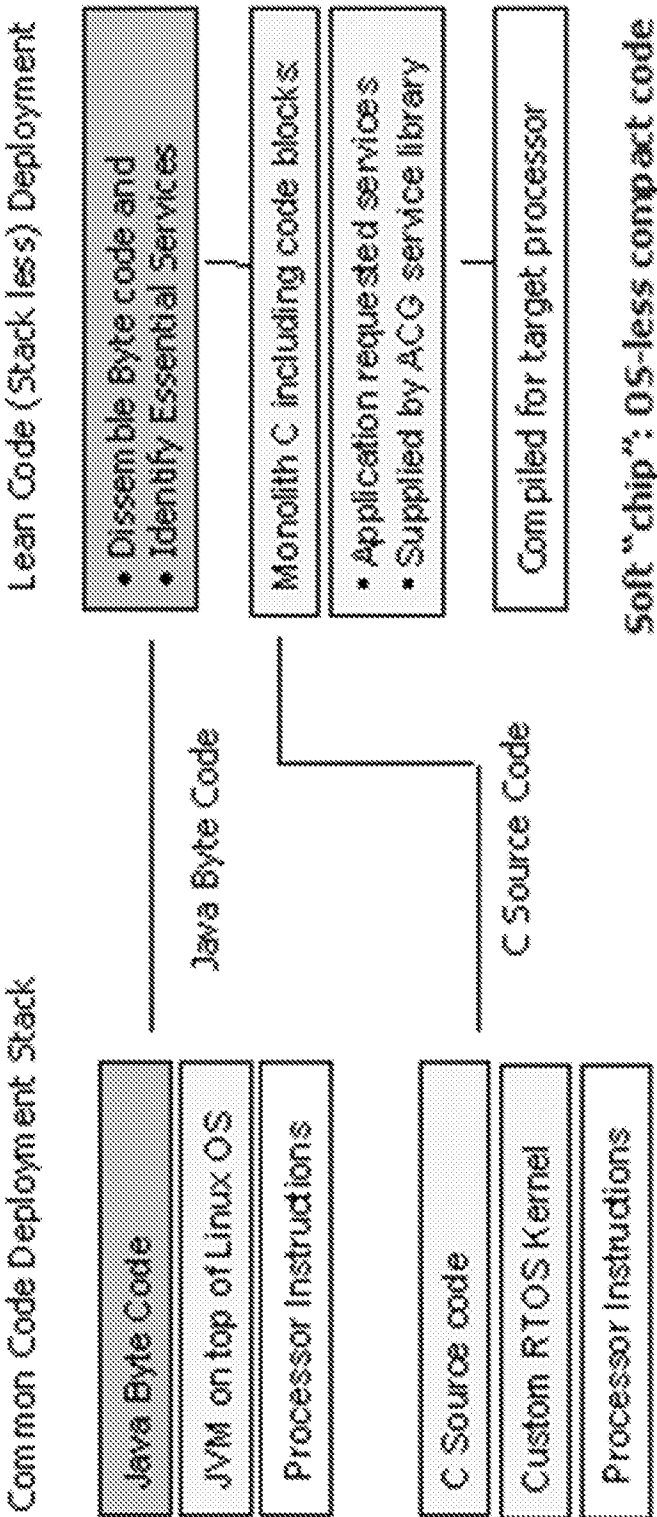
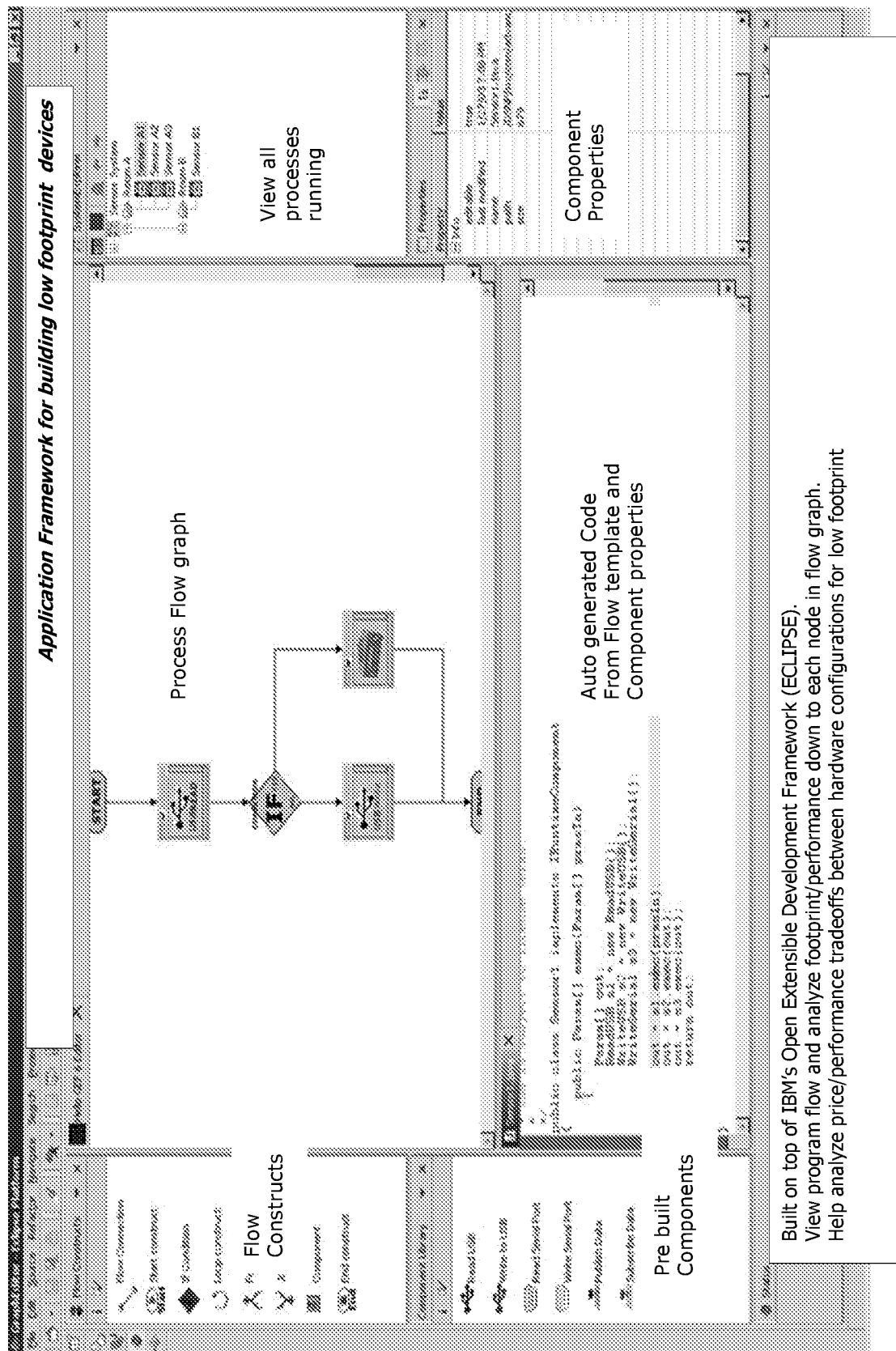


Figure 30



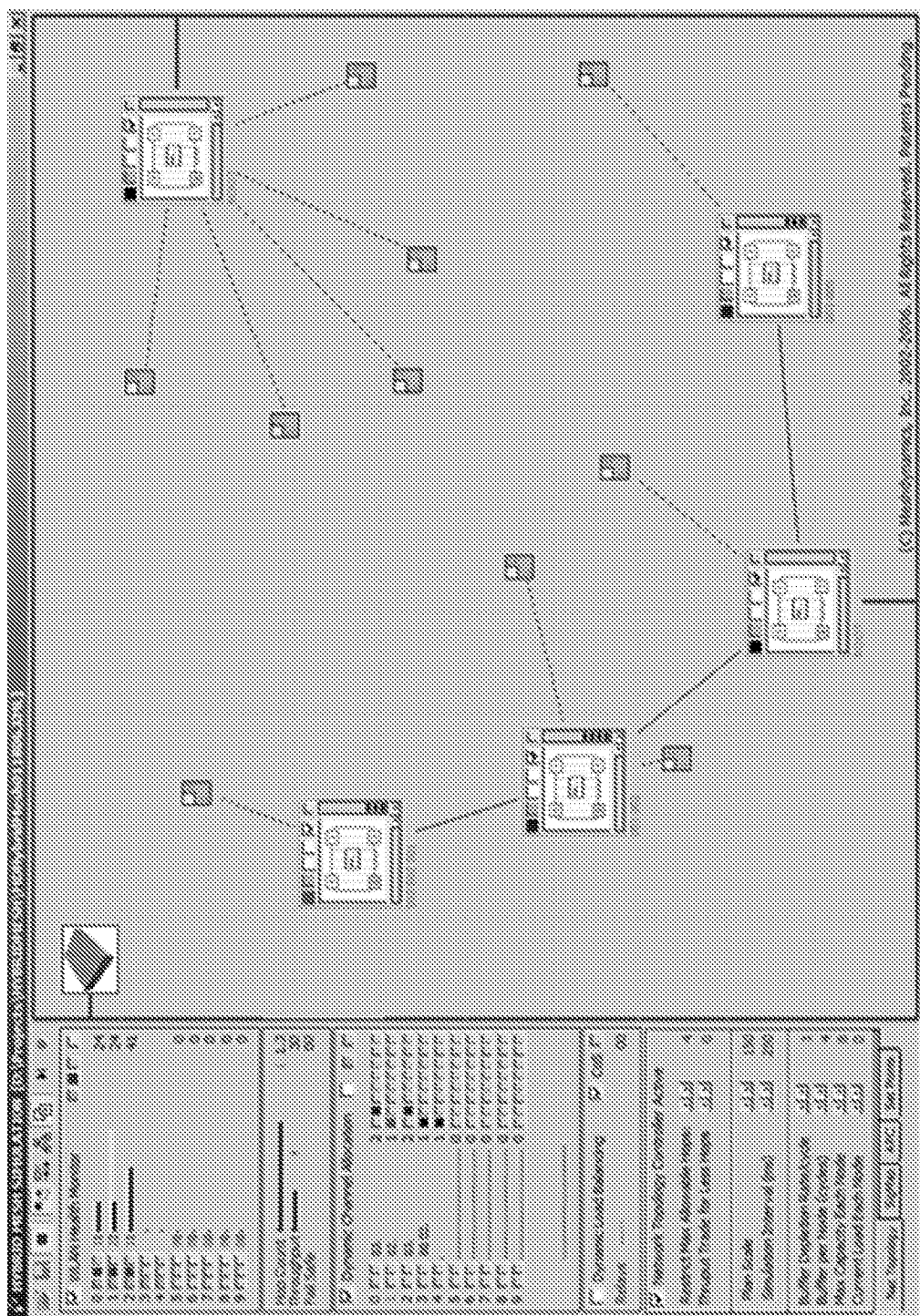


Figure 32

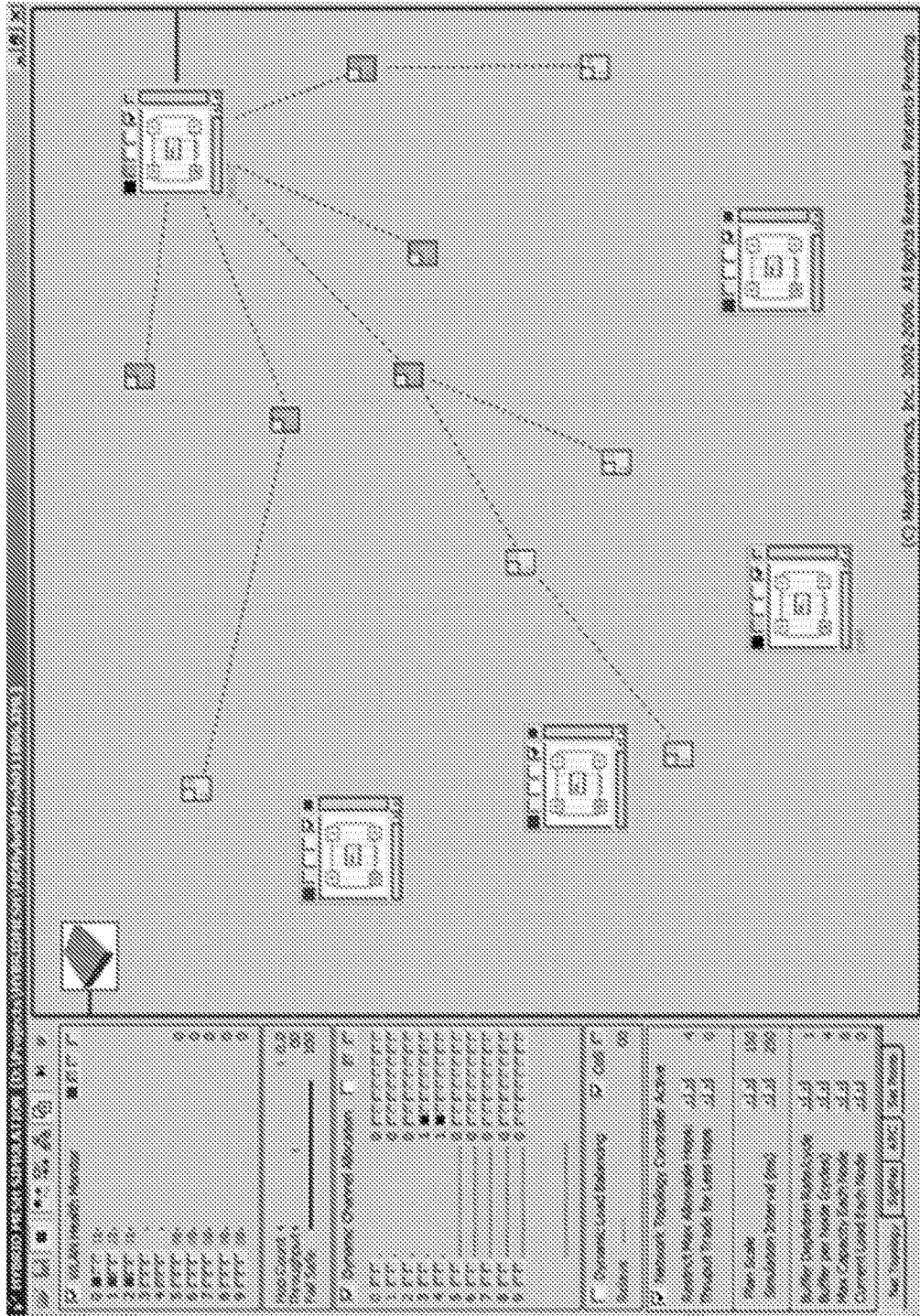


Figure 33

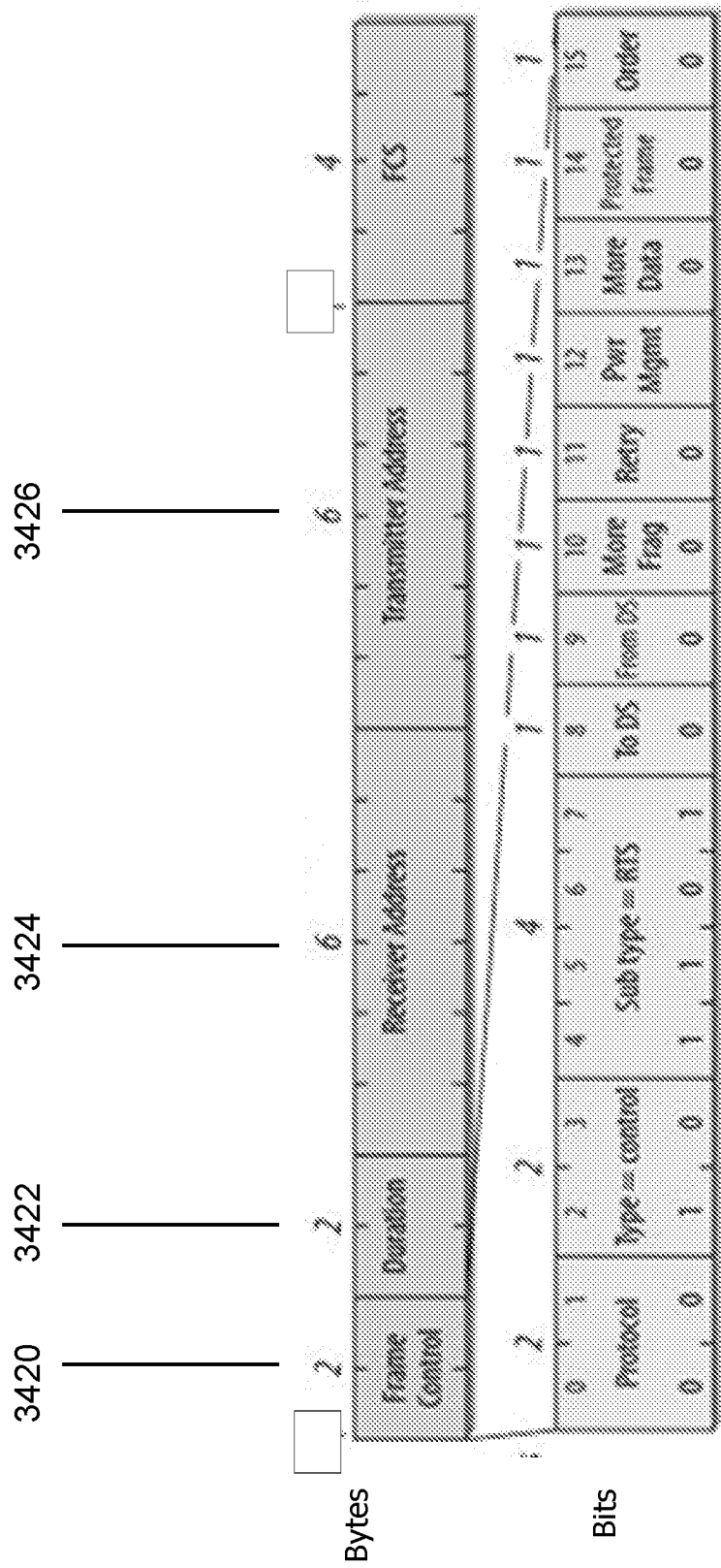


Figure 34

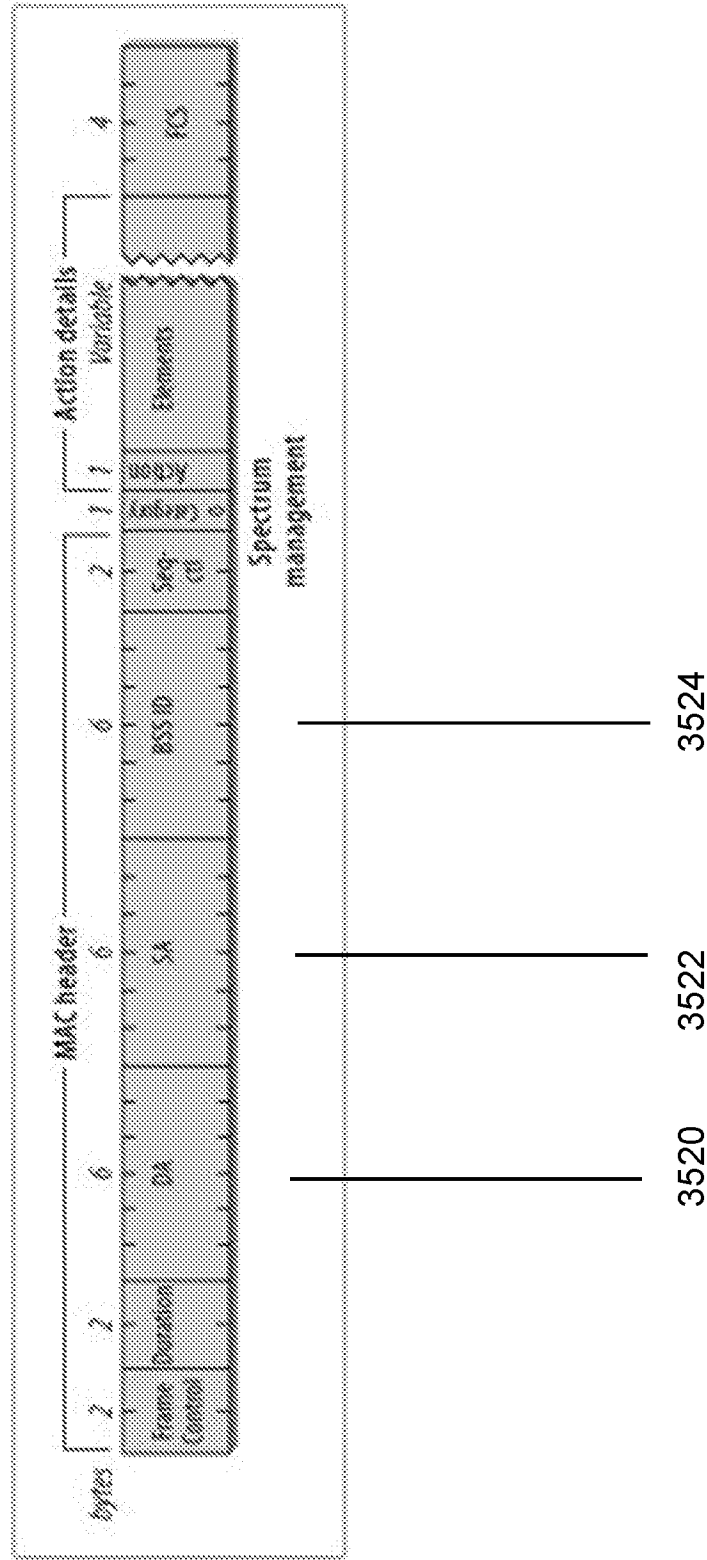


Figure 35

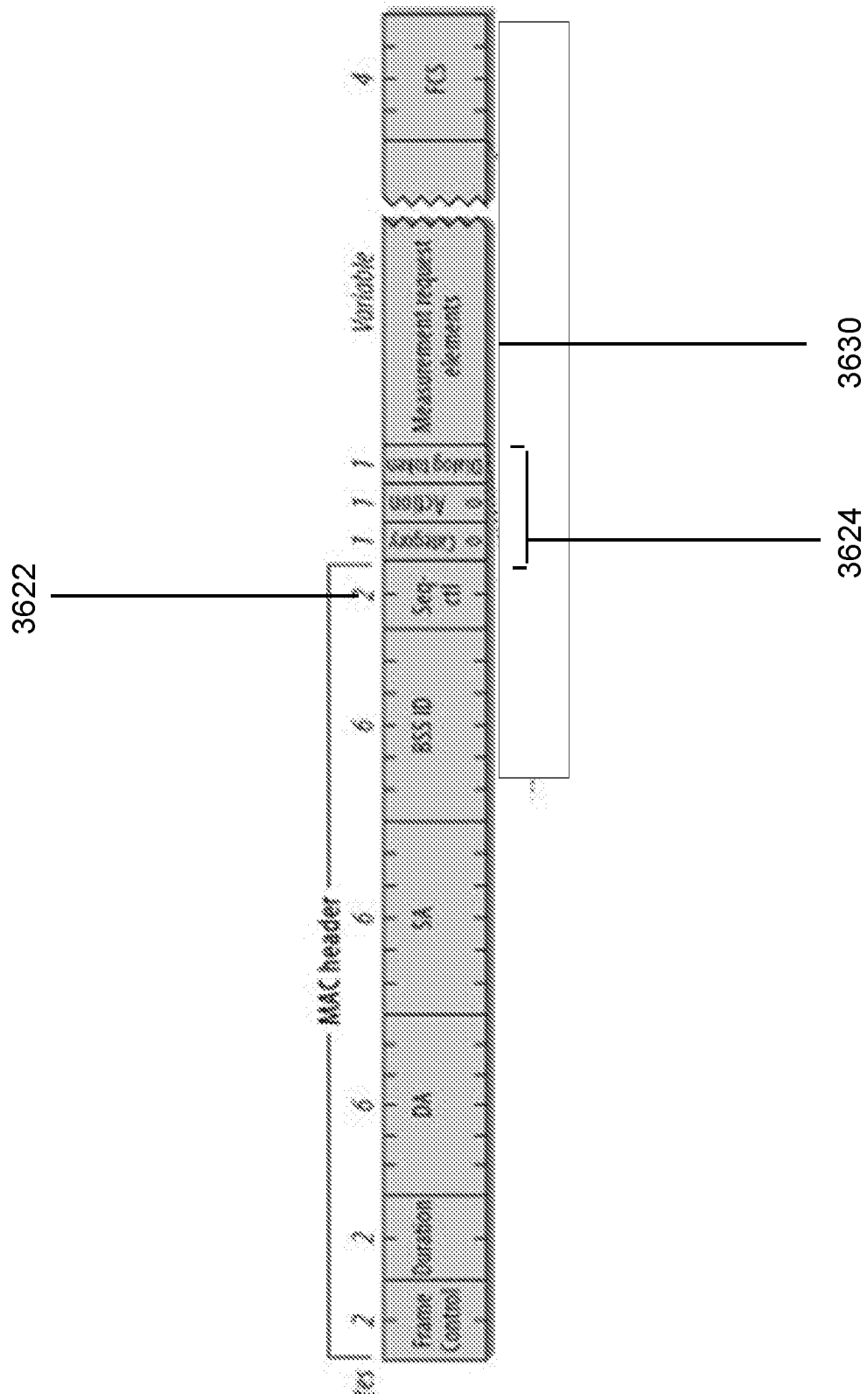


Figure 36

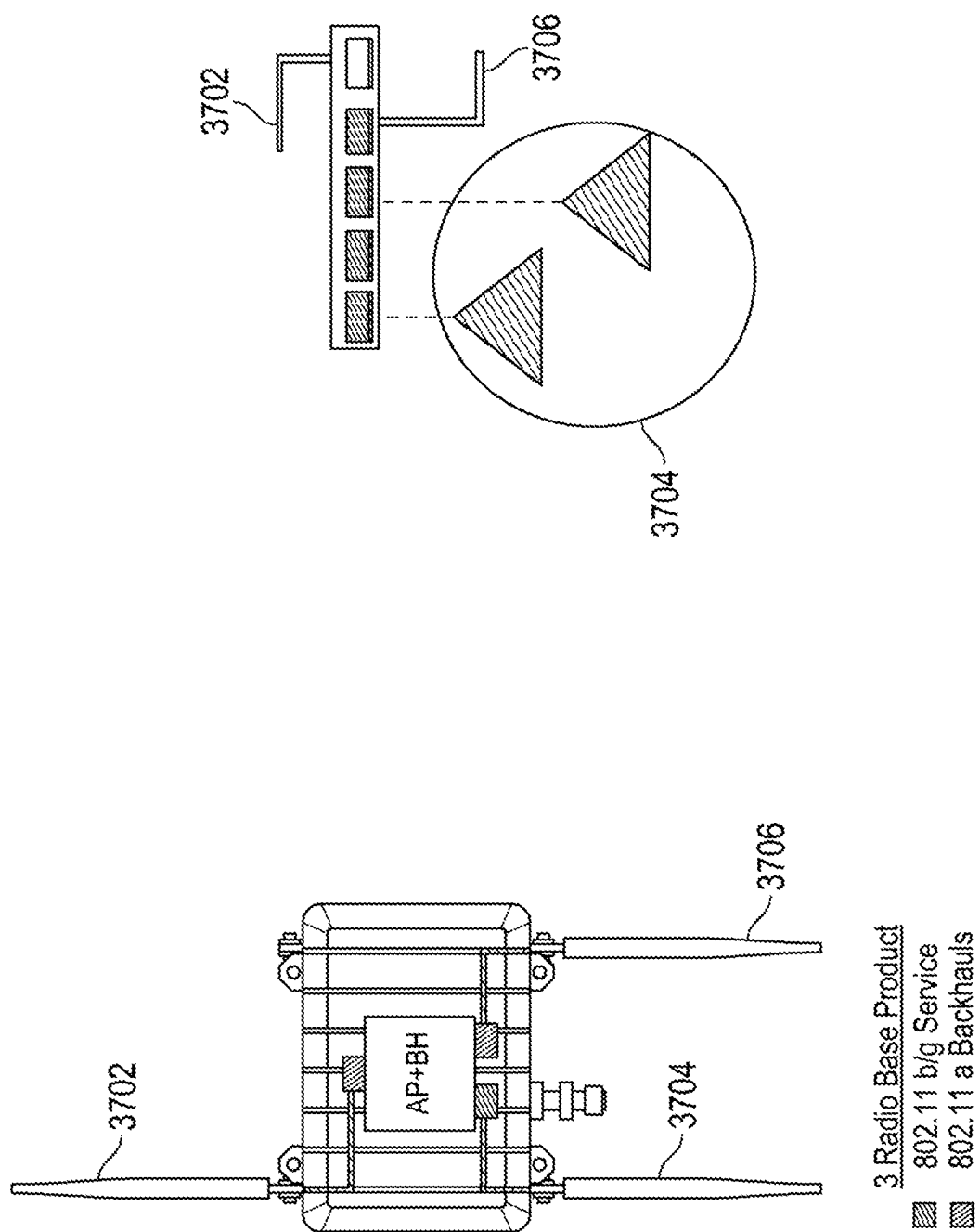


Figure 37

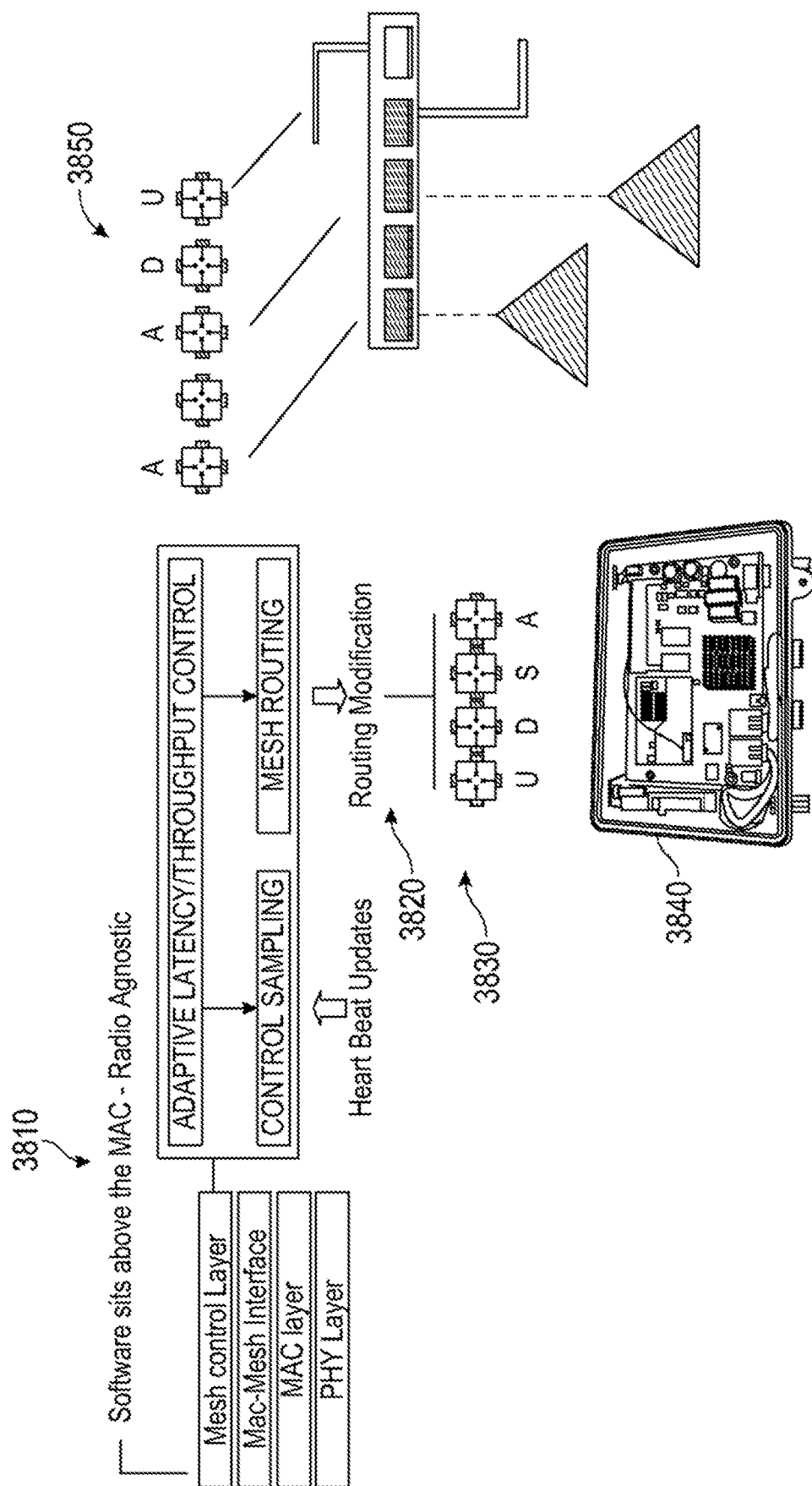


Figure 38

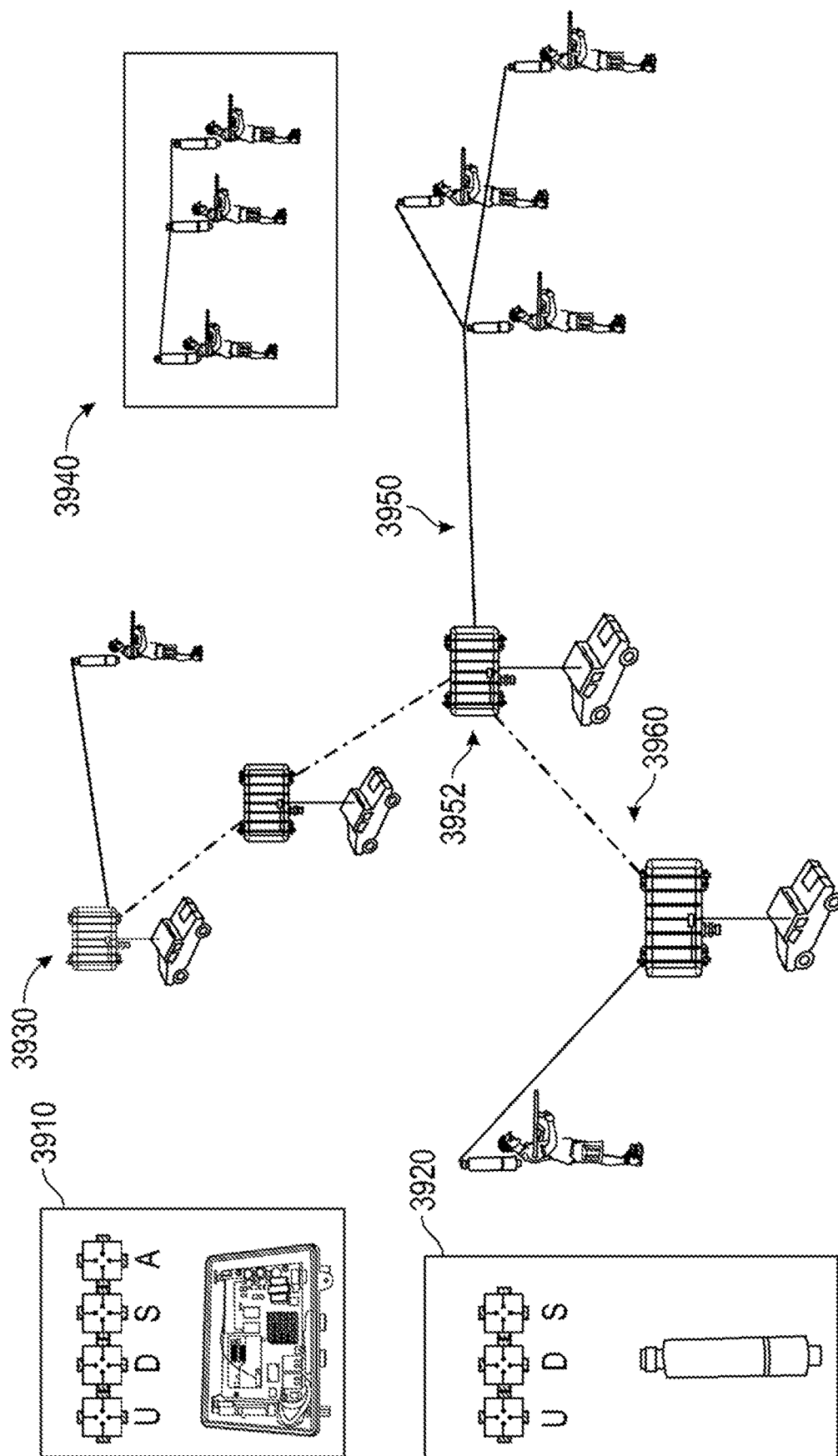
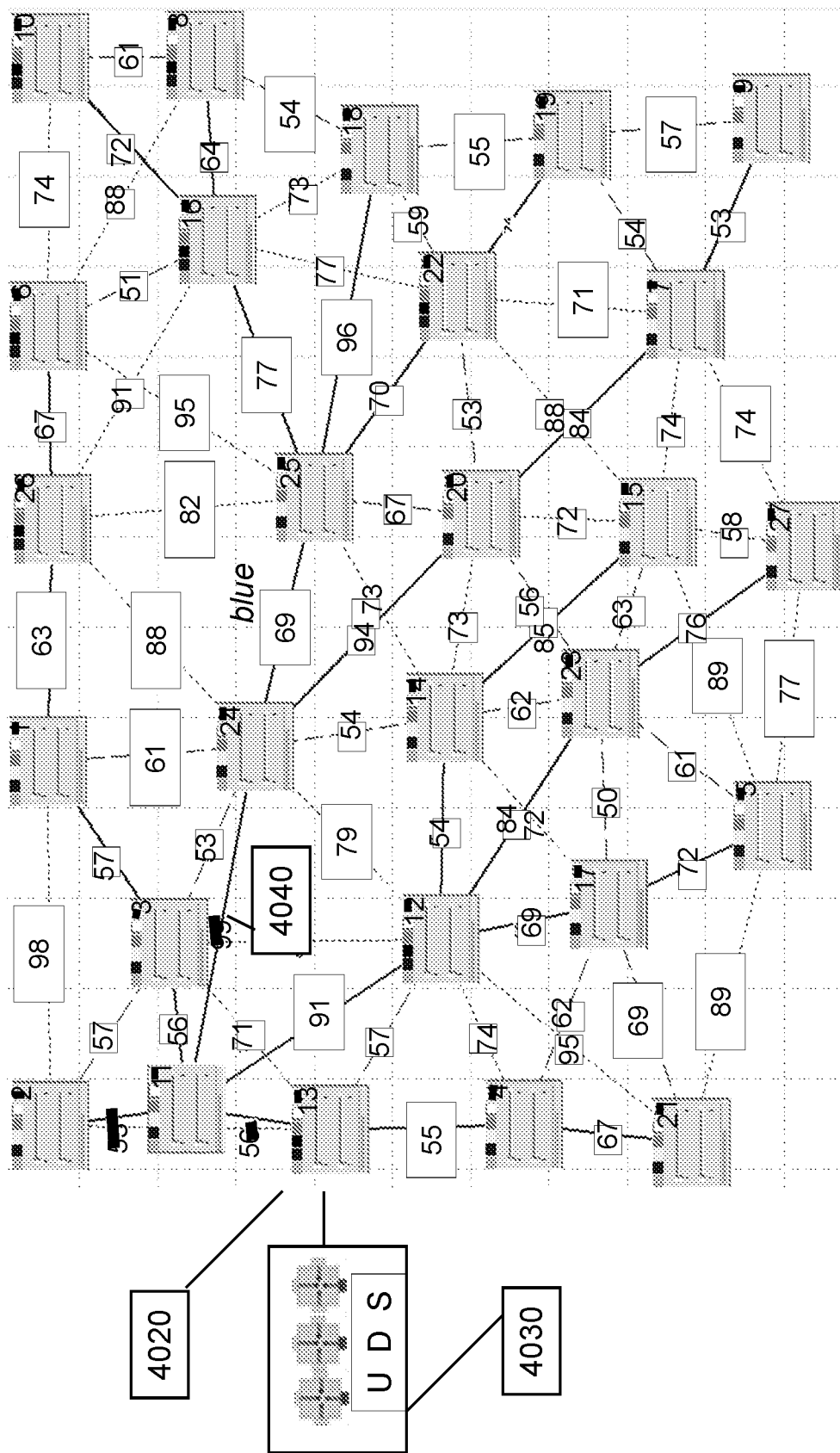


Figure 39



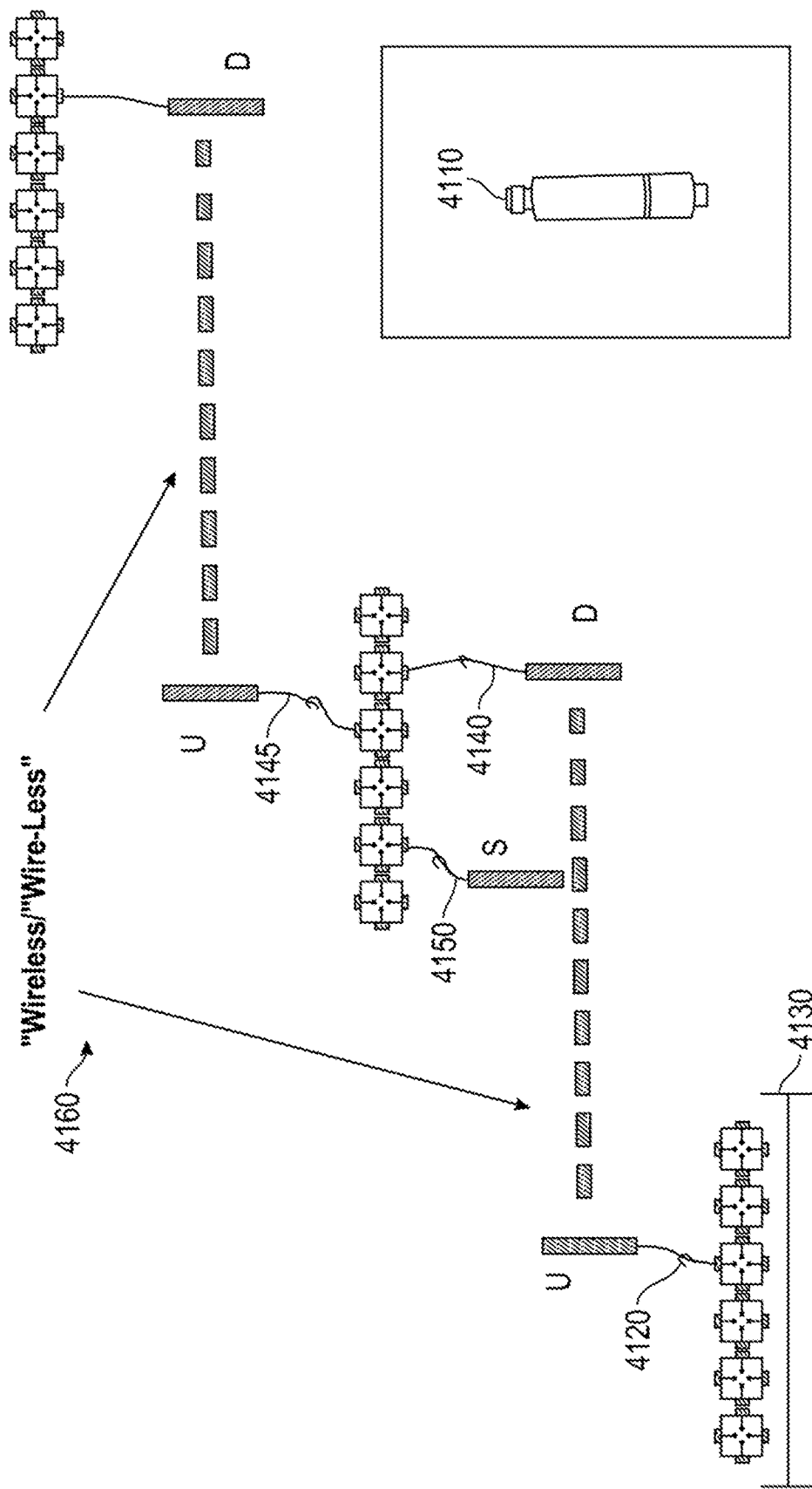


Figure 41

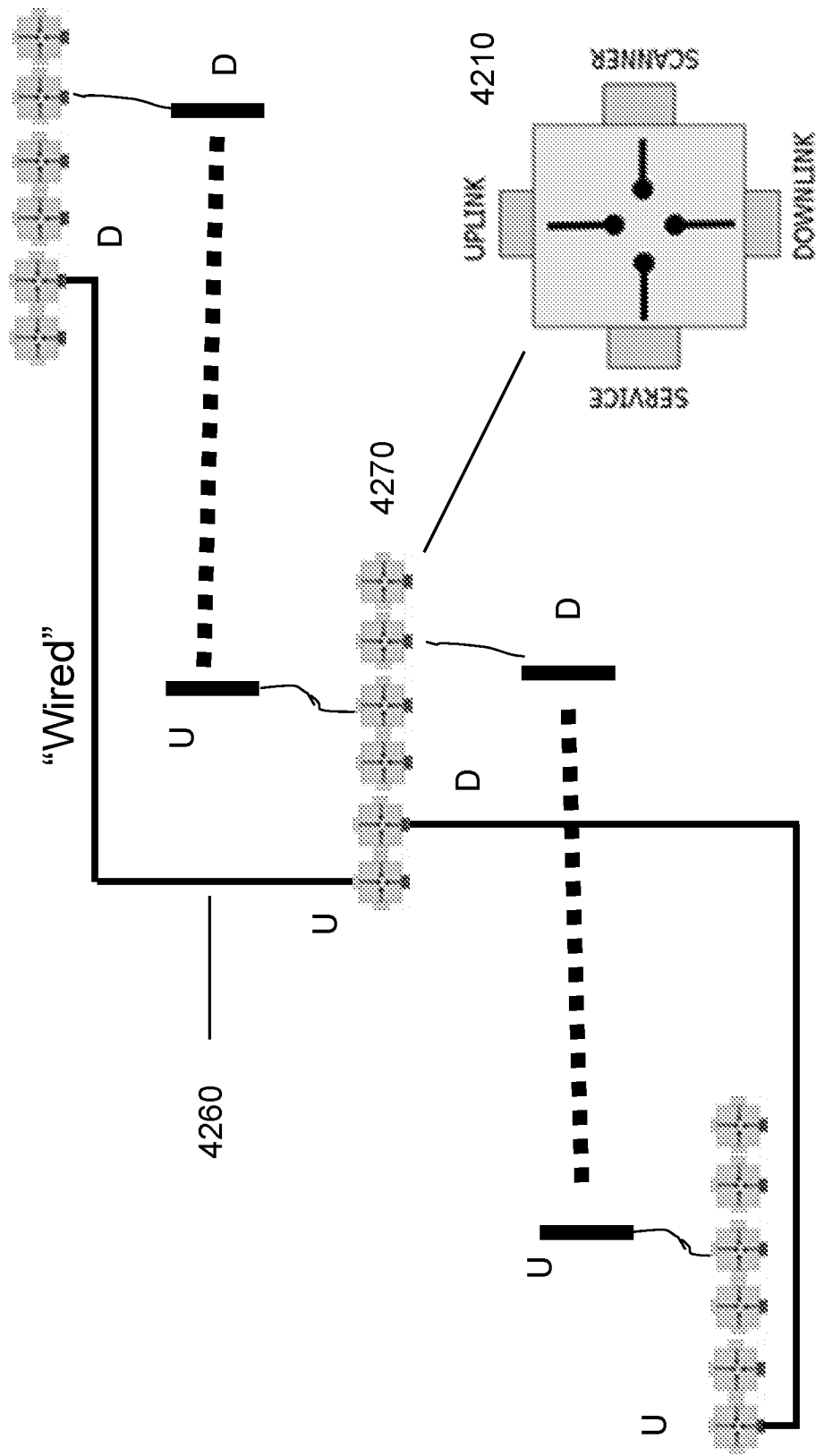


Figure 42

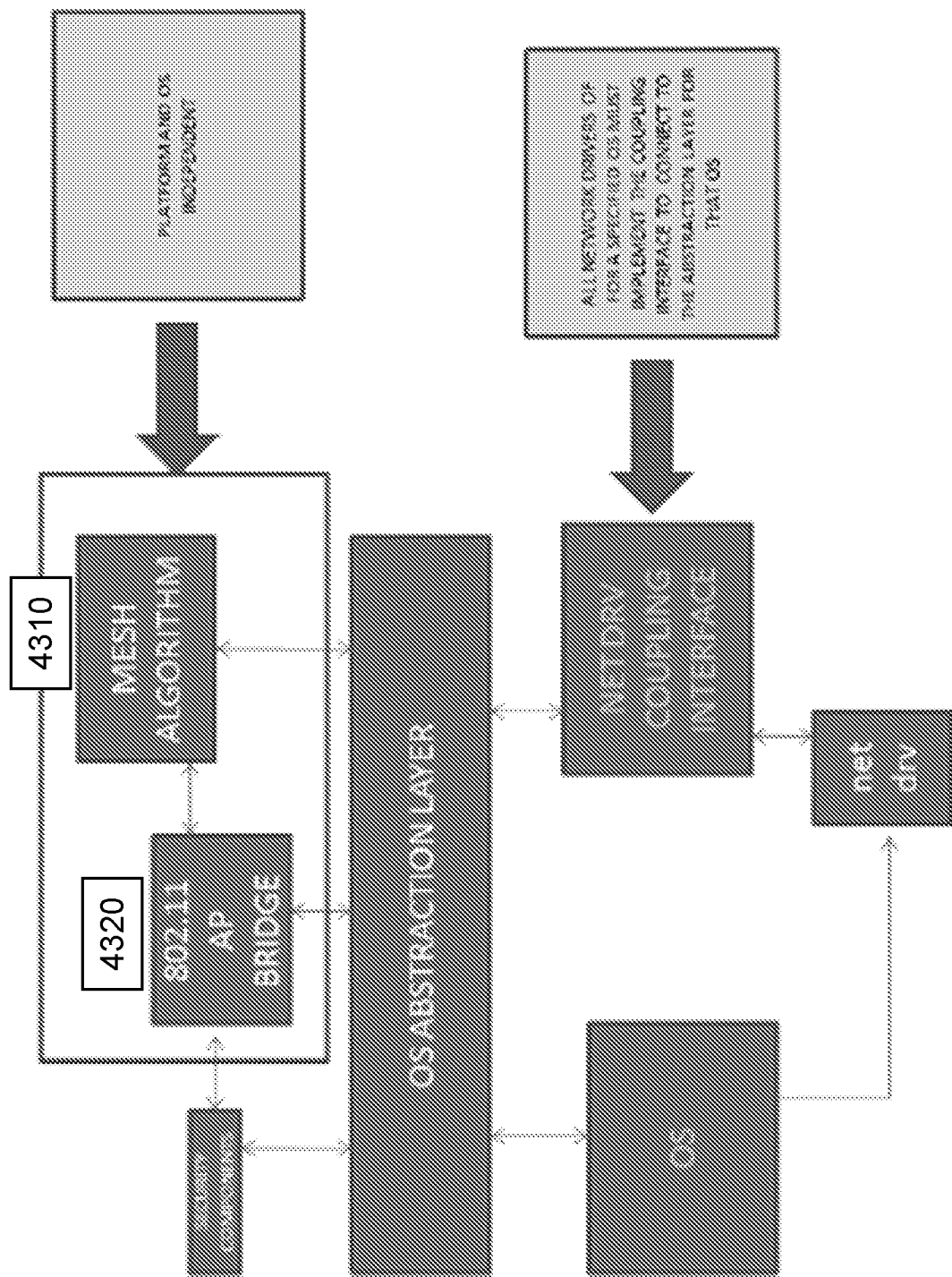


Figure 43

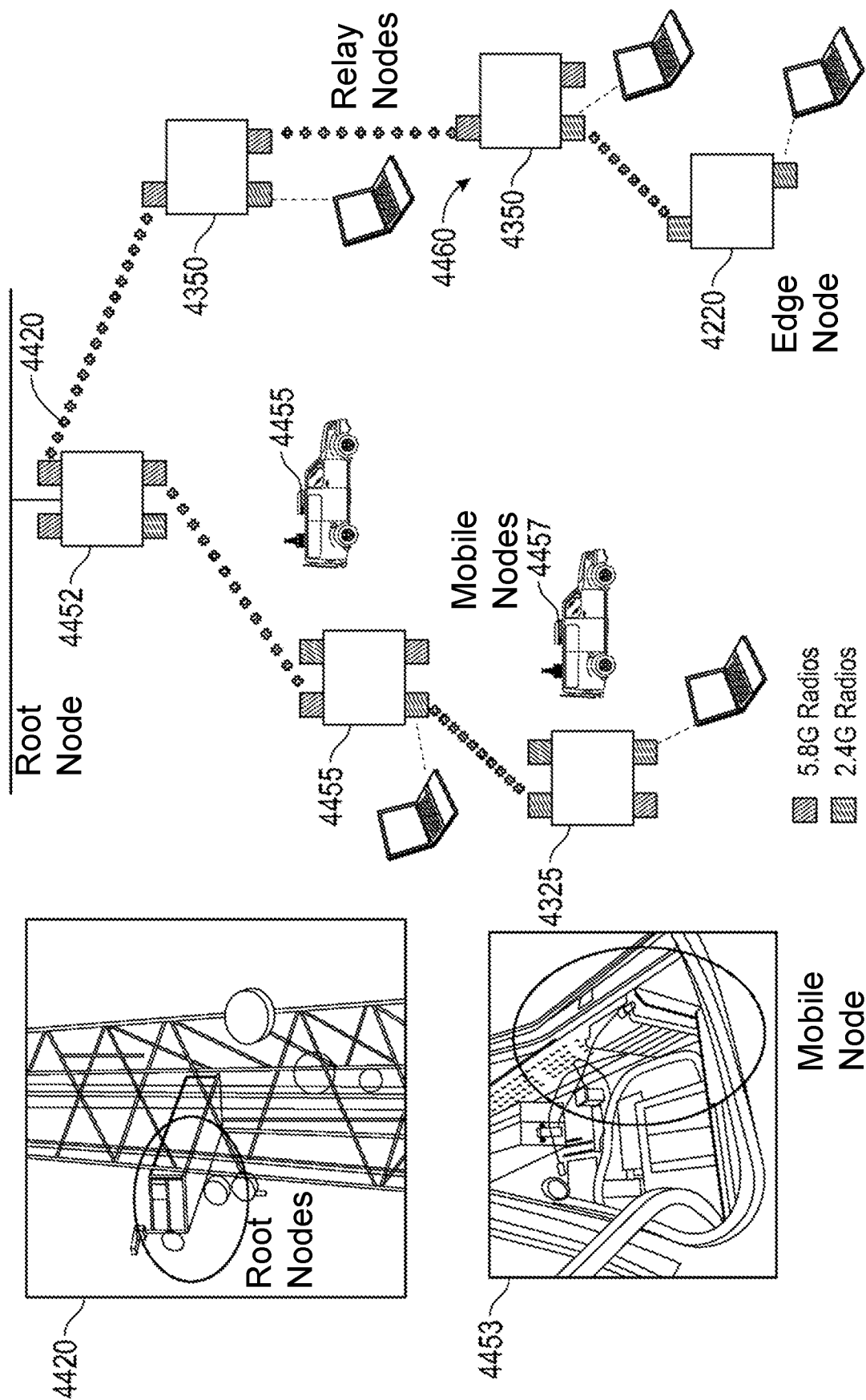


Figure 44

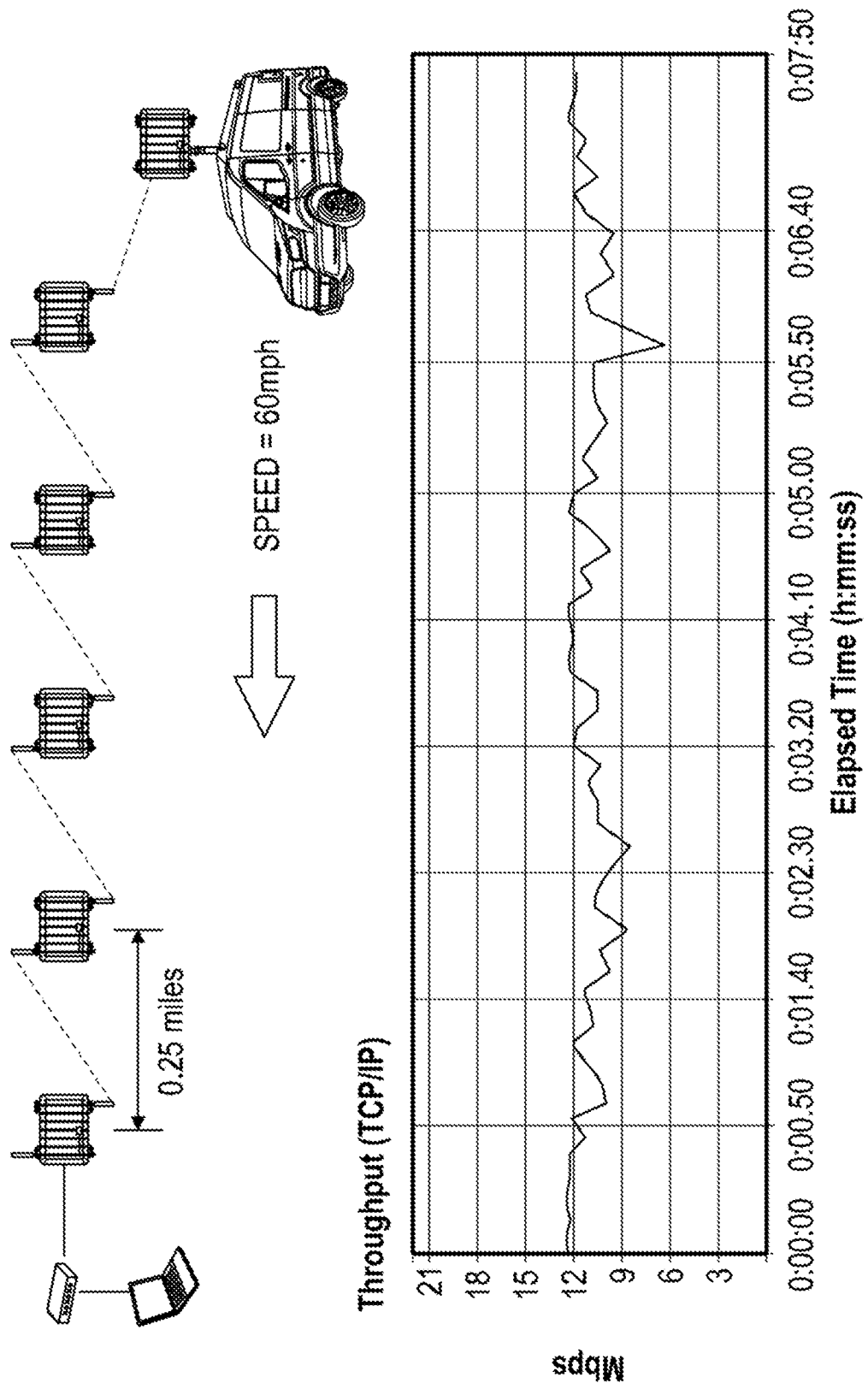
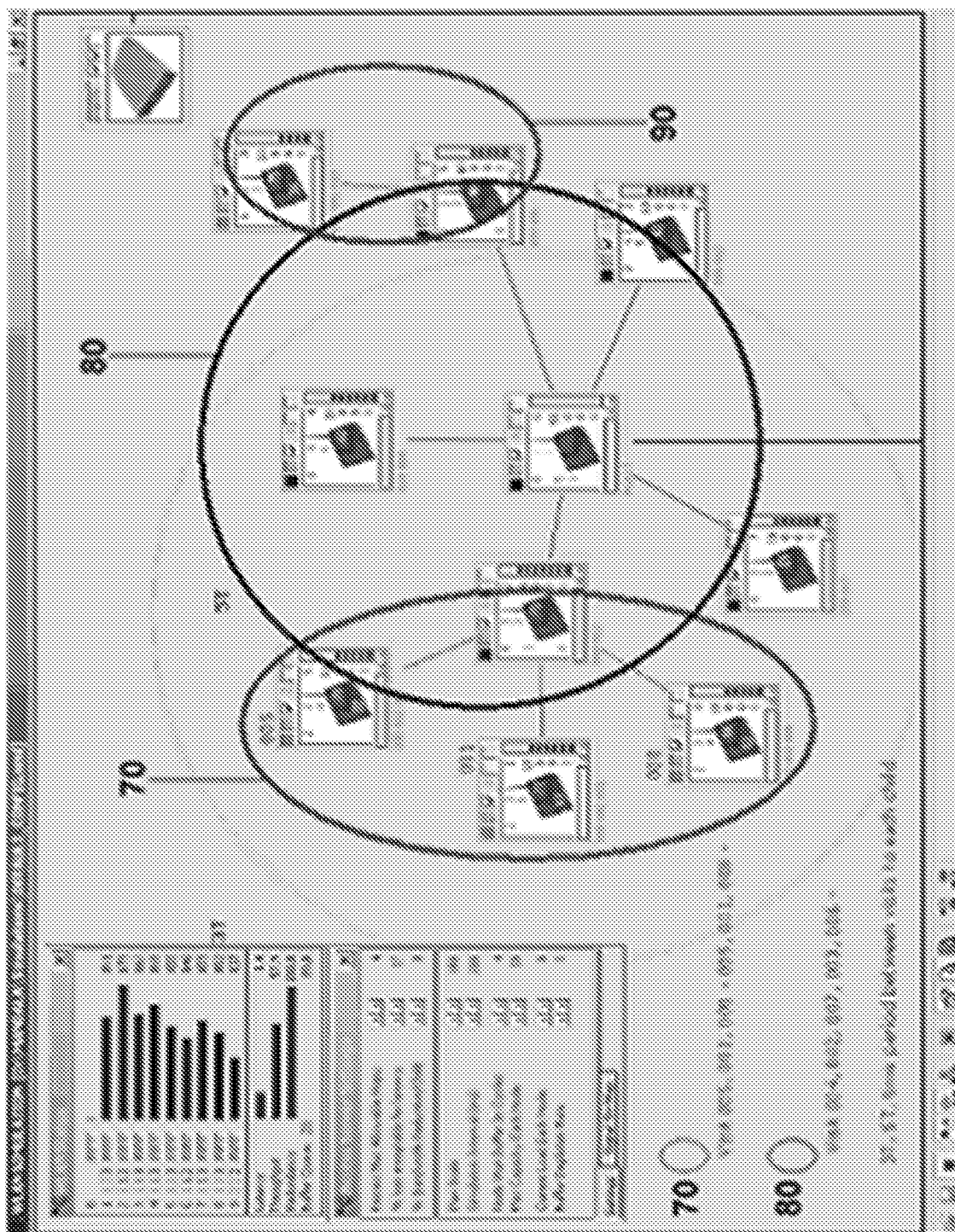
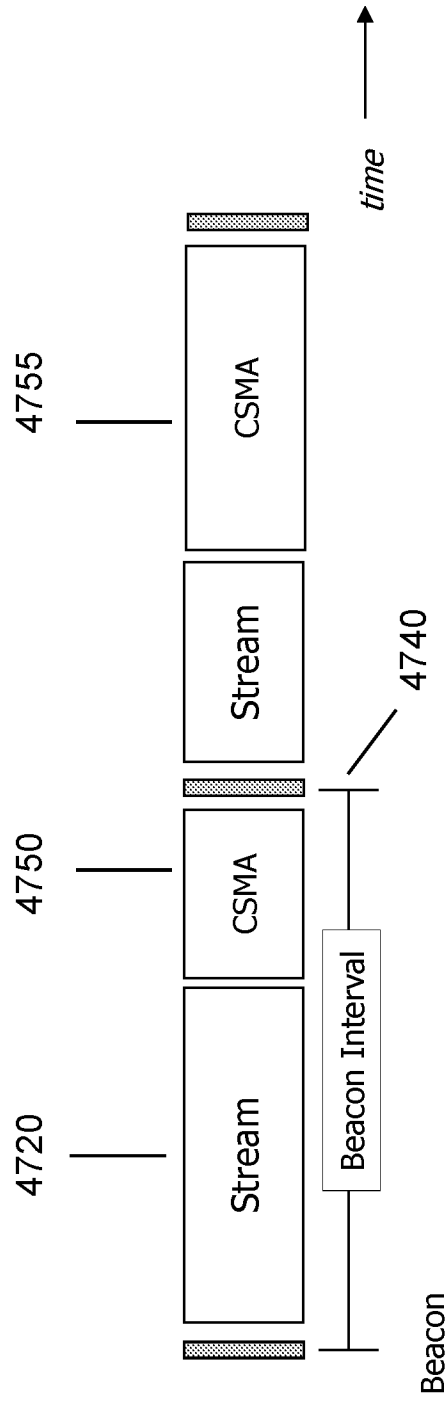


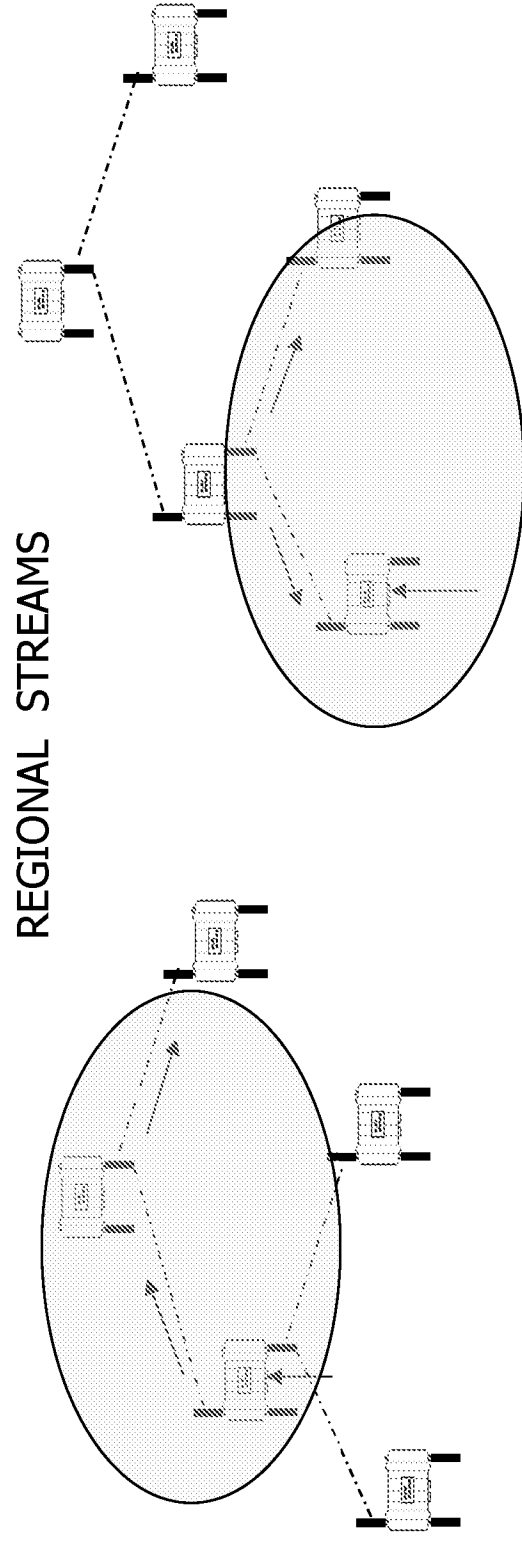
Figure 45





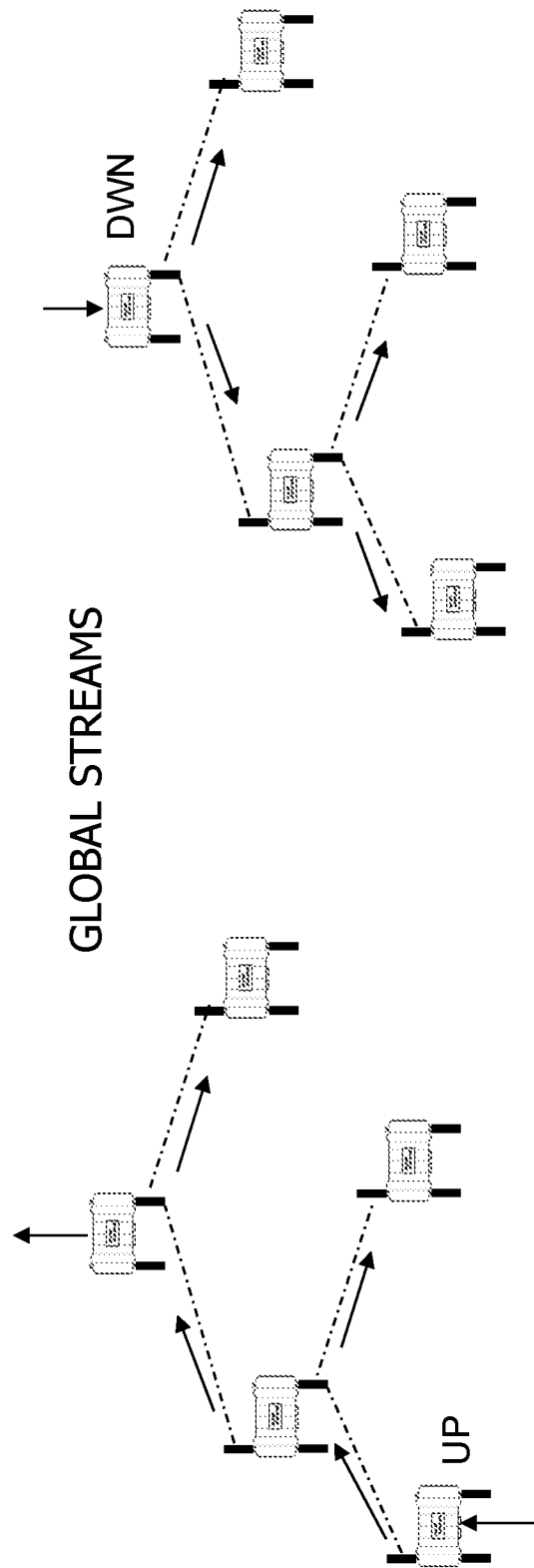
- CLIENTS SILENT IN ALLOCATED TIME SLOT FOR STREAMING.
- CSMA TIME SLOT IS ADJUSTABLE AFTER STREAM TIME SLOT ALLOCATION

Figure 47



- REGIONAL STREAMS TRAVERSE ONLY THE SPECIFIED DIRECTIONS AND/OR REGION
 - REGIONS CAN BE GPS BOUNDARIES, OR NUMBER OF HOPS / SUBTREES
 - DIRECTIONS CAN BE a) UP OR DOWN OR b) TURN-BY-TURN etc.
 - RELEVANT FOR DATA IMPORTANT LOCALLY ONLY (e.g. Sibling Devices)
 - DOES NOT AFFECT BACKHAUL BANDWIDTH OUTSIDE SPECIFIED REGION

Figure 48



- GLOBALS STREAMS TRAVERSE THE ENTIRE NETWORK
 - AT THE MINIMUM GOES UP TO THE LOGICAL "ROOT"/PARENT/AGENT
 - THEY CAN ORIGINATE FROM ANY WHERE ON THE NETWORK
 - IF FROM ROOT: DOWNWARD ONLY (worst case).
 - IF FROM NODE : UPWARDS AND DOWNWARDS (worst case).
 - IF FROM CLIENT : UPWARDS AND DOWNWARDS, includes Siblings (worst case)

Figure 49

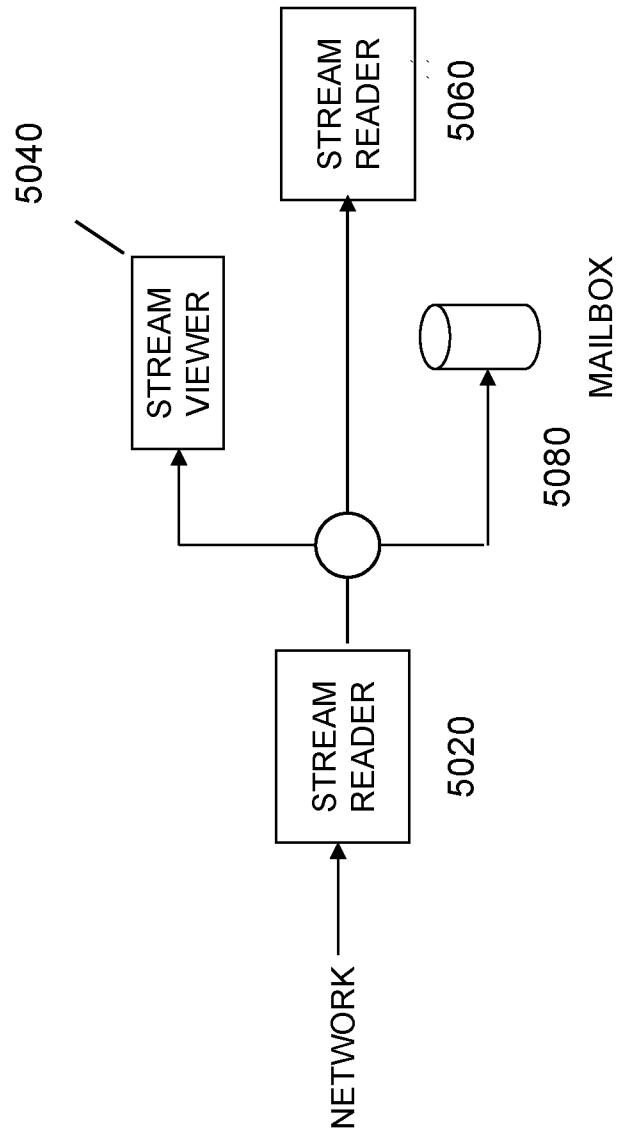


Figure 50

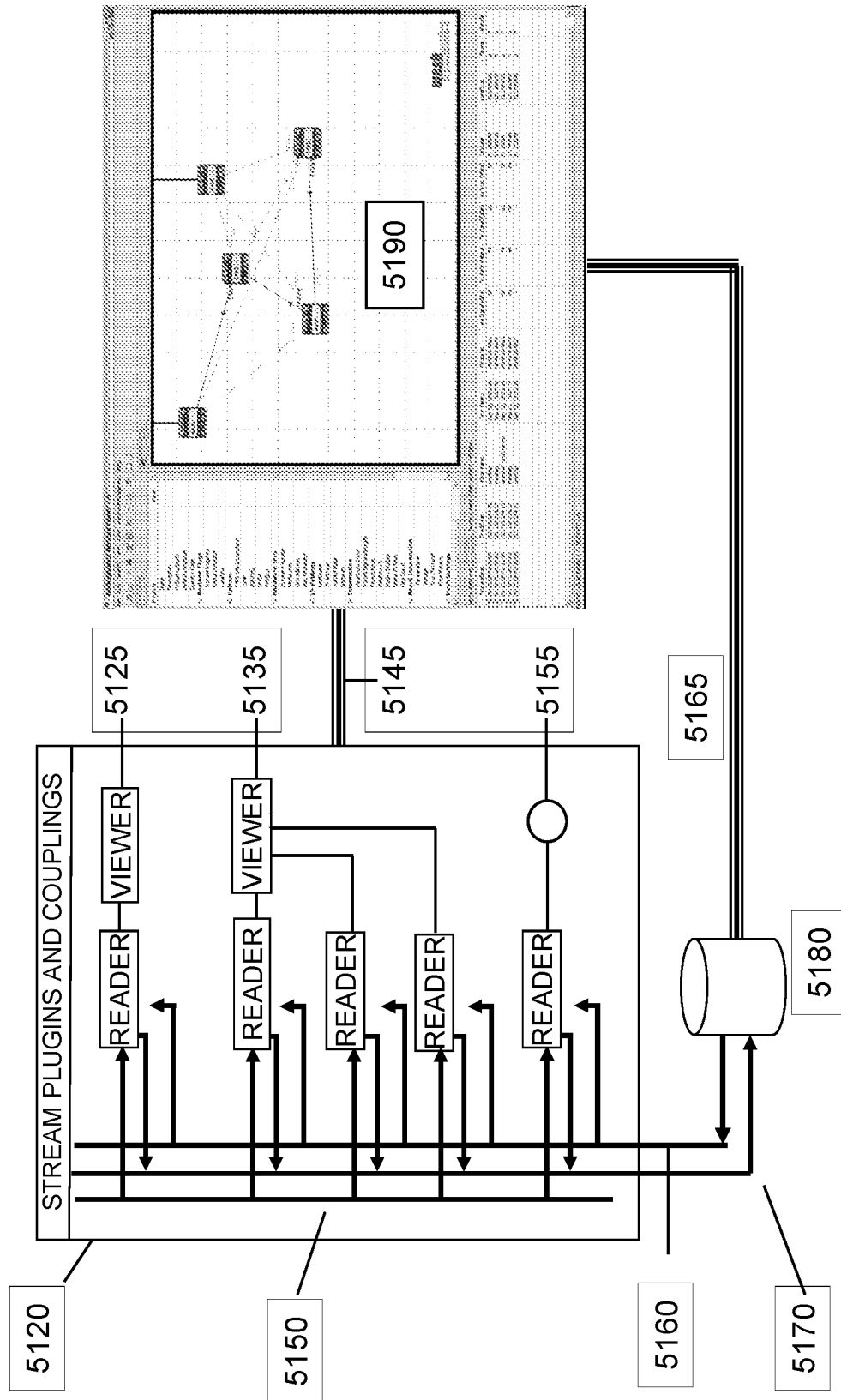


Figure 51

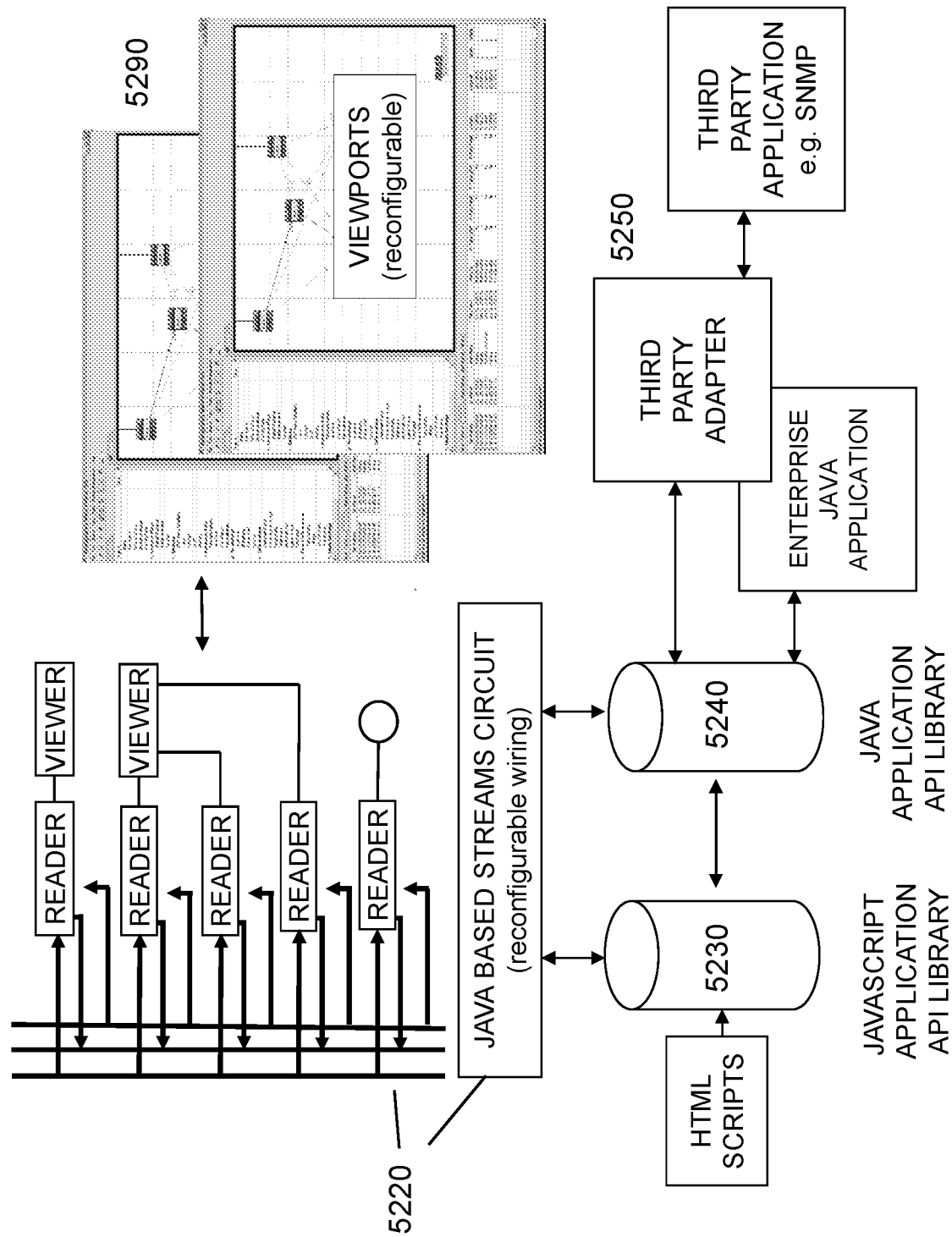


Figure 52

[illegible]

646-506-9

Interface Summary

NMS.ConnectedDevice	Defines the properties of all devices connected to a <i>Node</i> .
NMS.NeighborNode	Defines the properties of all neighbor nodes detected by a <i>Node</i> .
NMS.Network	The <i>Network</i> interface defines all properties and actions associated with a mesh network.
NMS.NetworkInterface	The <i>NetworkInterface</i> interface is used to receive events on a mesh network.
NMS.Node	The <i>Node</i> interface defines all the properties and actions that can be carried out on a mesh node.
NMS.ThreadRunnable	The <i>Runnable</i> interface is implemented by any class whose instances are executed by a thread.

NMS	NMS is the primary class for using the Methodynamics Network Management System
NMS.ACLConfiguration	Defines the Access Control List configuration for a node.
NMS.ACLEntry	Defines an Access Control List entry.
NMS.EfficientRule	Defines a Efficient QoS rule.
NMS.GeneralConfiguration	Defines all Node level fields used by a <i>Node</i> .
NMS.Hashable	The Hashable class provides an implementation of a Hashable of generic Object keys.
NMS.InterfaceConfiguration	Defines the interface level settings for a <i>Node</i> .
NMS.ObjectArray	The ObjectArray class provides an interface to a growable array that stores object references.
NMS.ShortArray	Defines an array of short integers.
NMS.Thread	The <i>Thread</i> class provides multi-threading functionality to scripting platforms.
NMS.VlanConfiguration	Defines the settings for a Virtual LAN in a <i>Node</i> .
NMS.WiFiSecurity	Defines the information used by the IEEE 802.11 Wired Equivalent Privacy (WEP) set
NMS.WPAEnterpriseSecurity	Defines the information used for the Wifi Protected Access security setting by a Node's
NMS.WPAPersonalSecurity	Defines the information used for the Wifi Protected Access (WPA) security setting by a

Figure 53

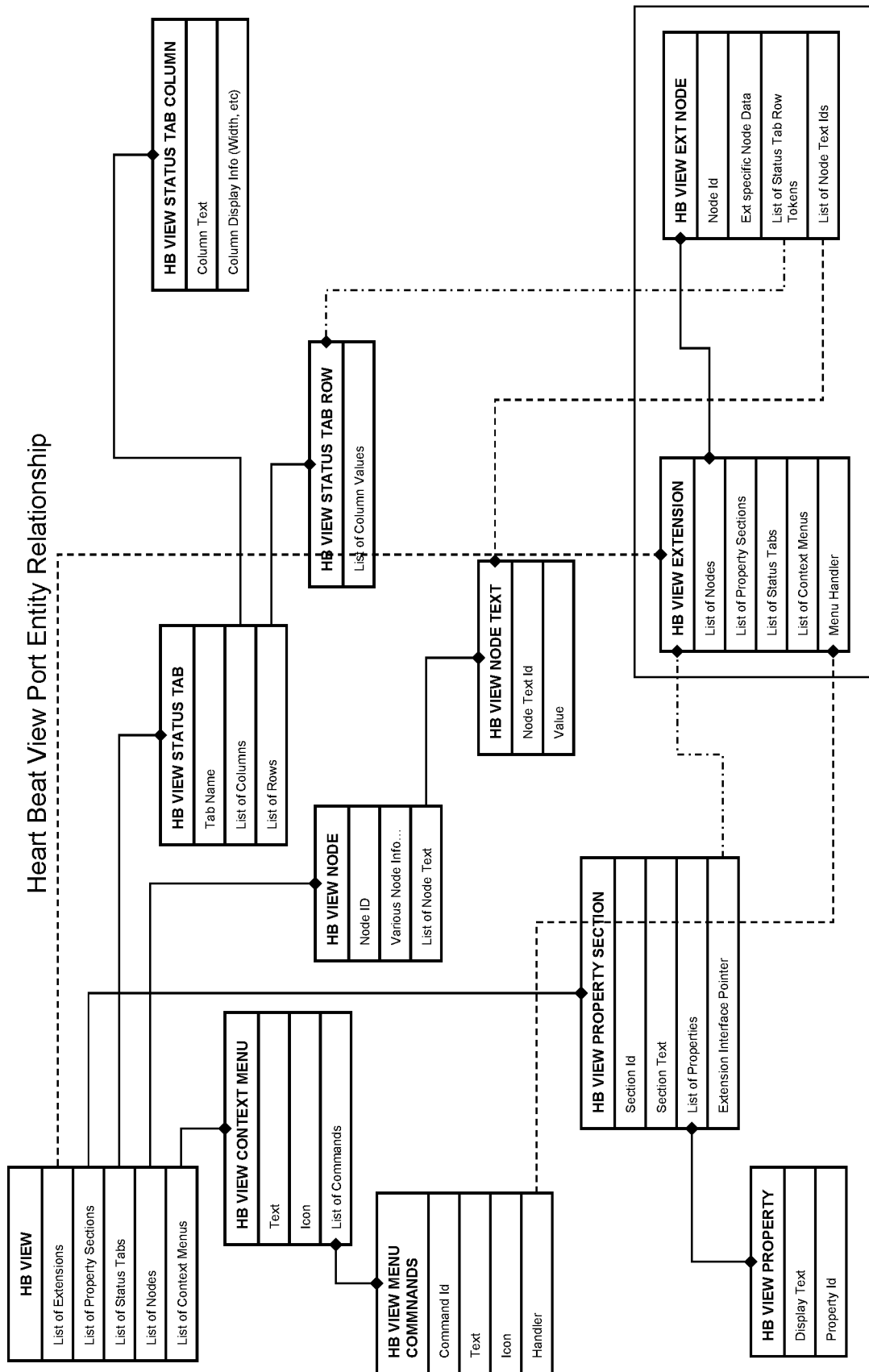


Figure 54

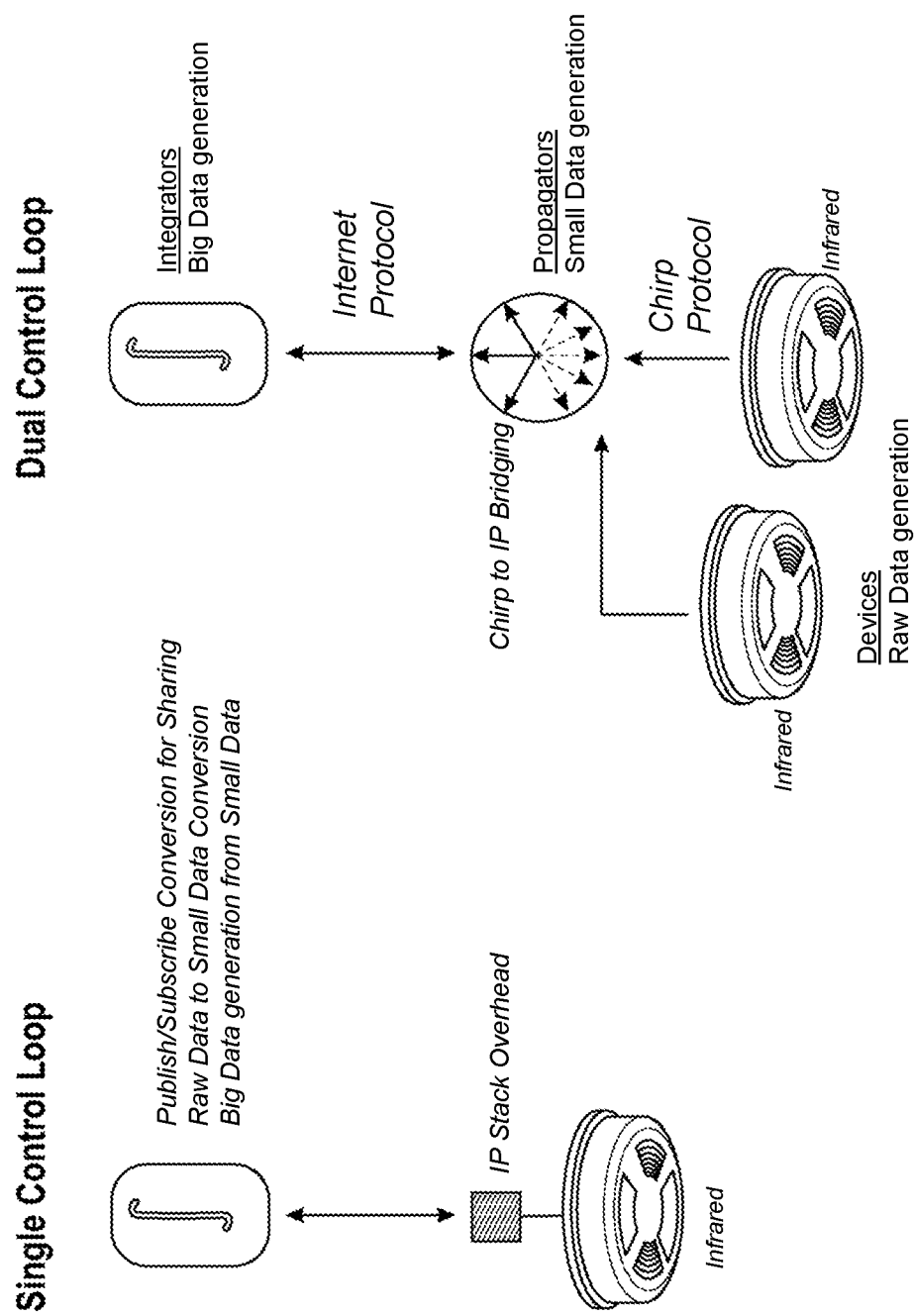


Figure 56

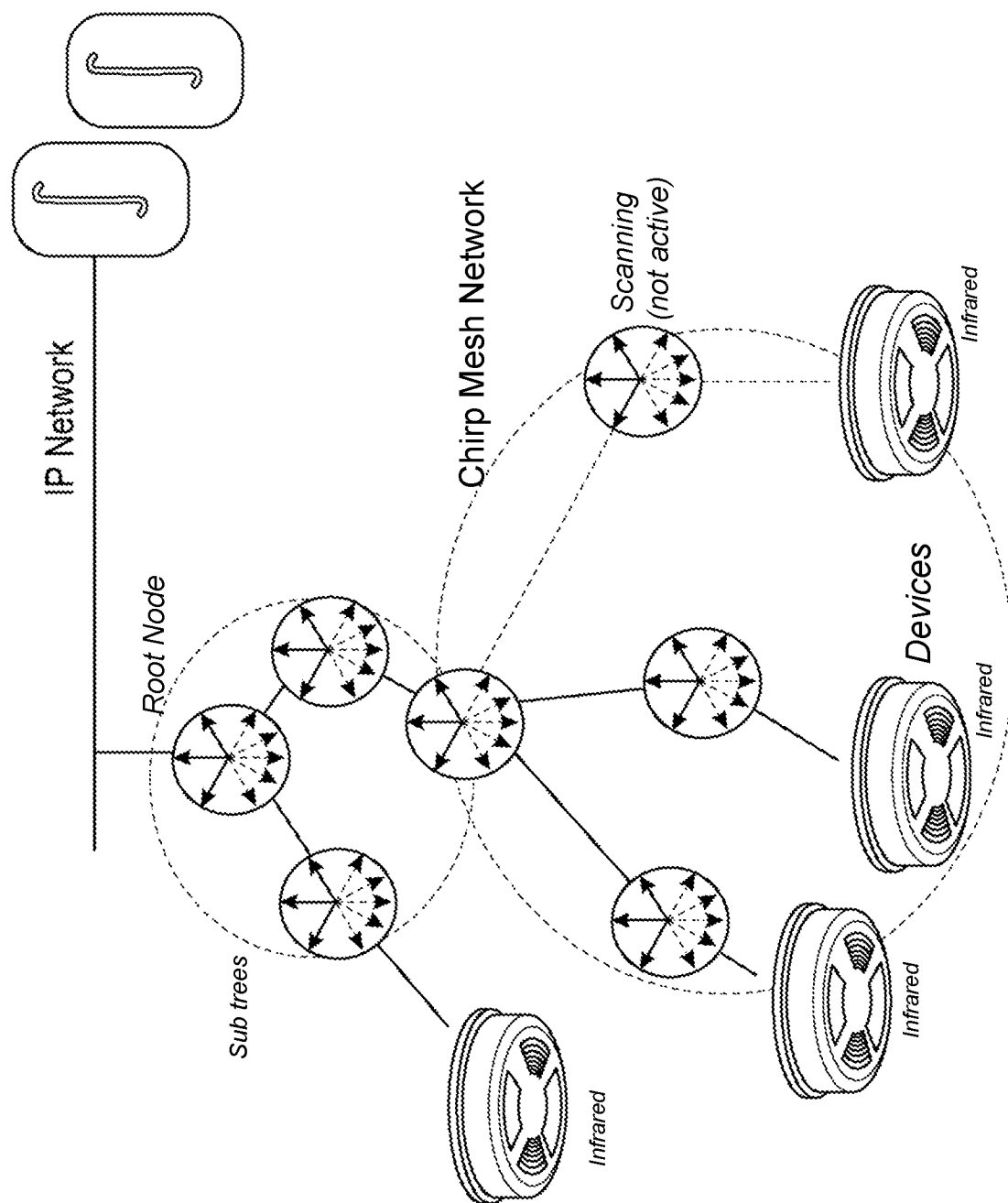


Figure 57

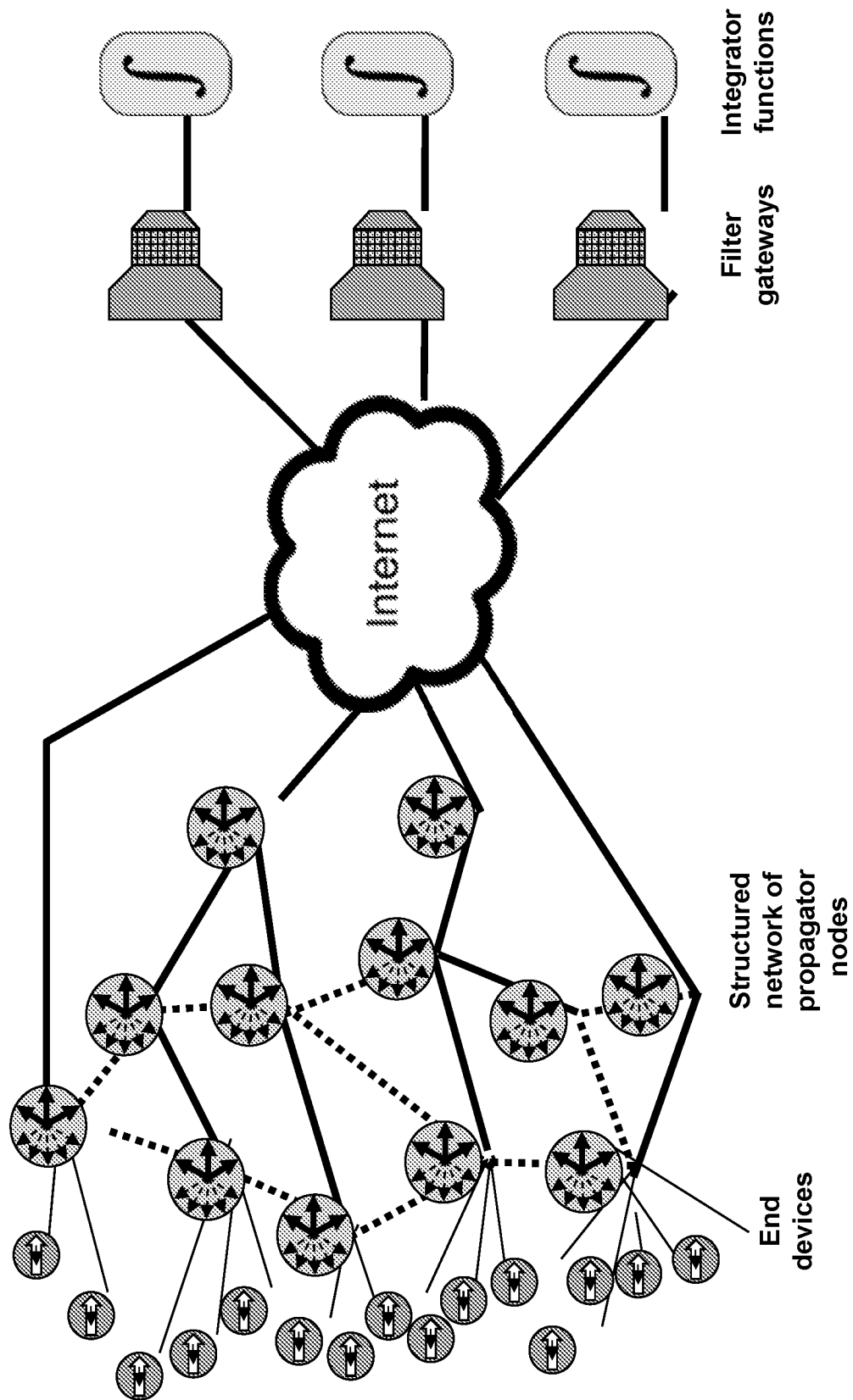


Figure 58

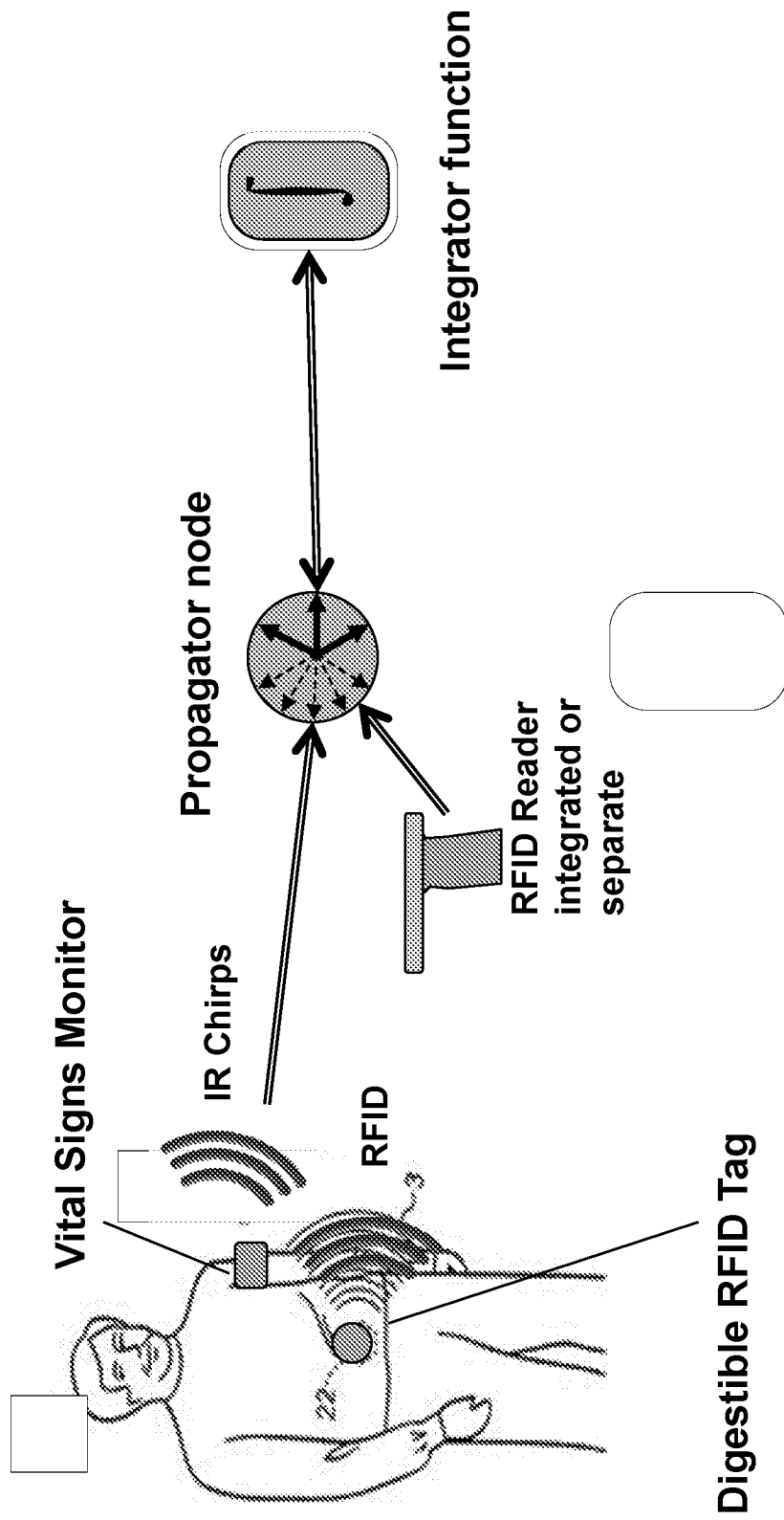


Figure 59

An Integrator function retrieves data from End Devices such as moisture sensors as well as external feeds and uses the information to control irrigation valves.

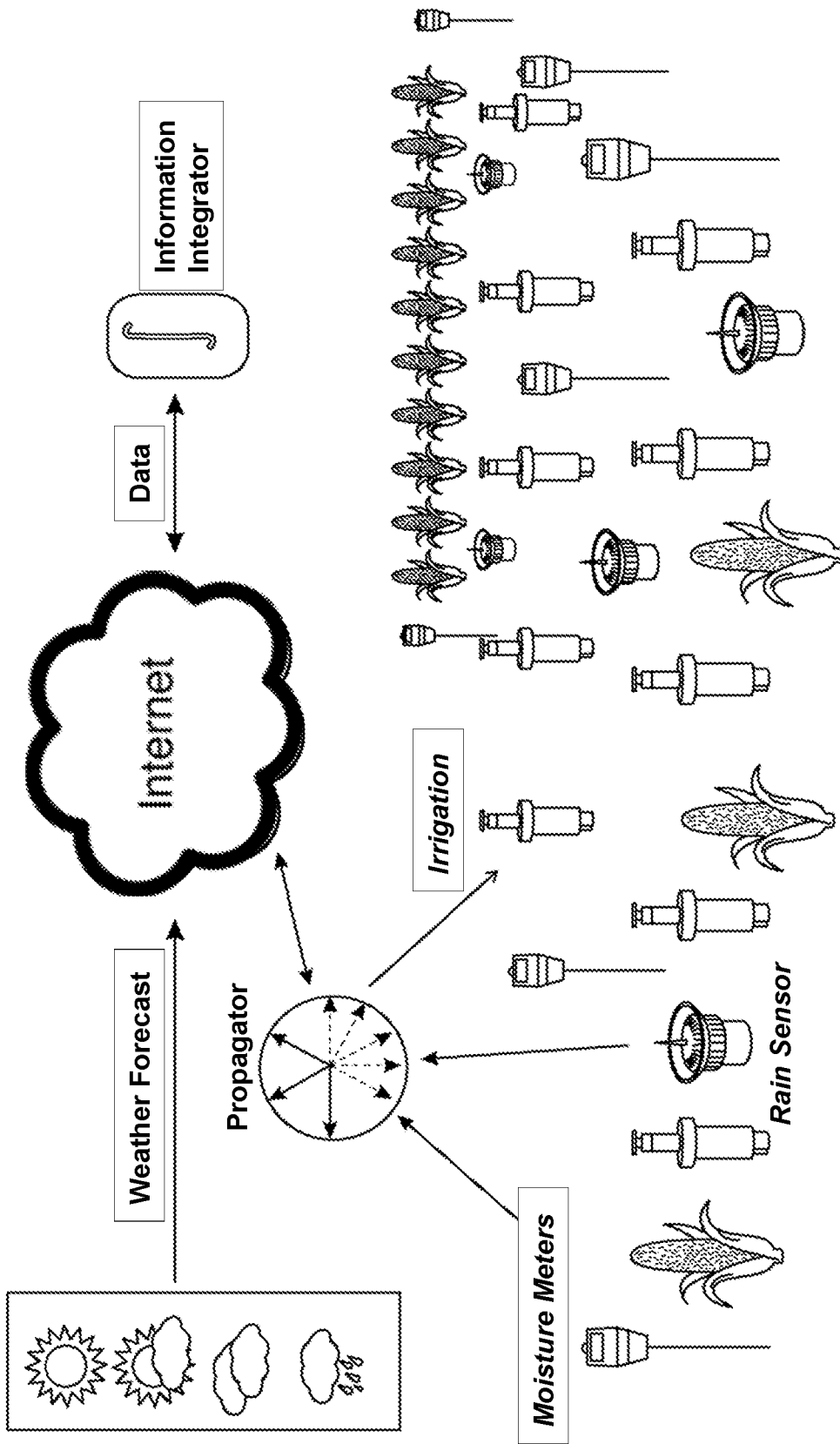
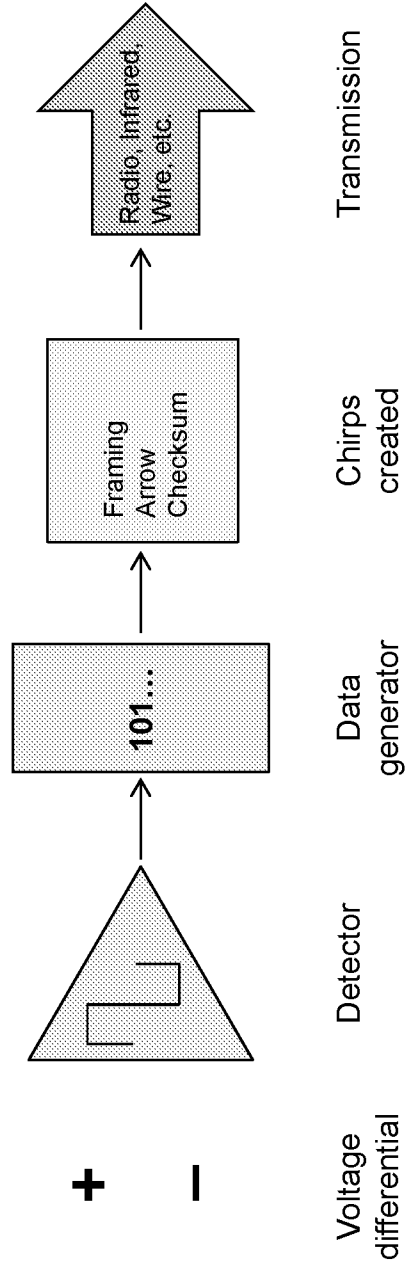
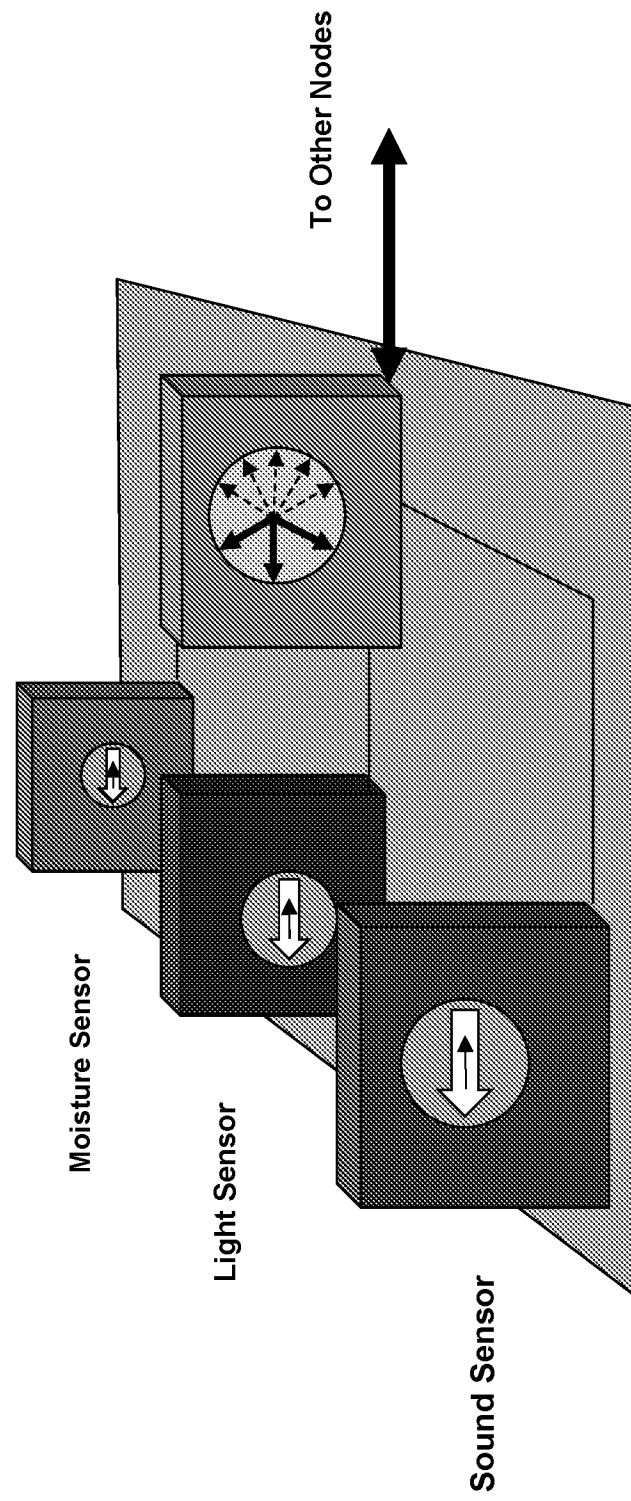


Figure 60



In millions of simple End Devices, basic physical states will be converted to Chirp payloads. An address, "arrow" of transmission, and checksum are added to this payload to form the complete Chirp packet.

Figure 61



Some devices will combine multiple IoT functions in a single package. Here an End Device includes a Propagator node that may provide networking services for additional nearby End Devices.

Figure 62

Tree Based Lineage Based Routing

P1: P0/1 → 1 (hence also one hop)

P2: P1/3 → 1-3 (two hop)

C1: P1/1 → 1-1

C2: P0/2 → 2

C3: P2/3 → 1-3-3

C4: P2/1 → 1-3-1 Hence C3/C4 Siblings

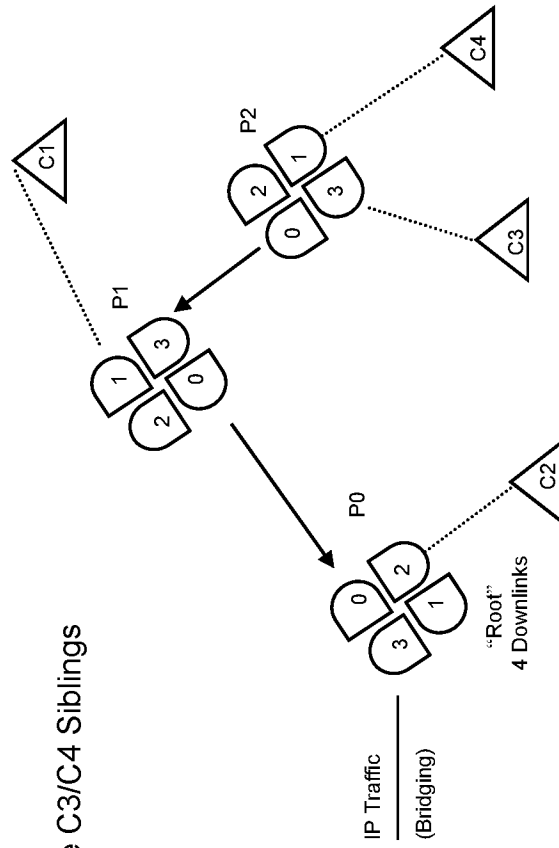


Figure 63

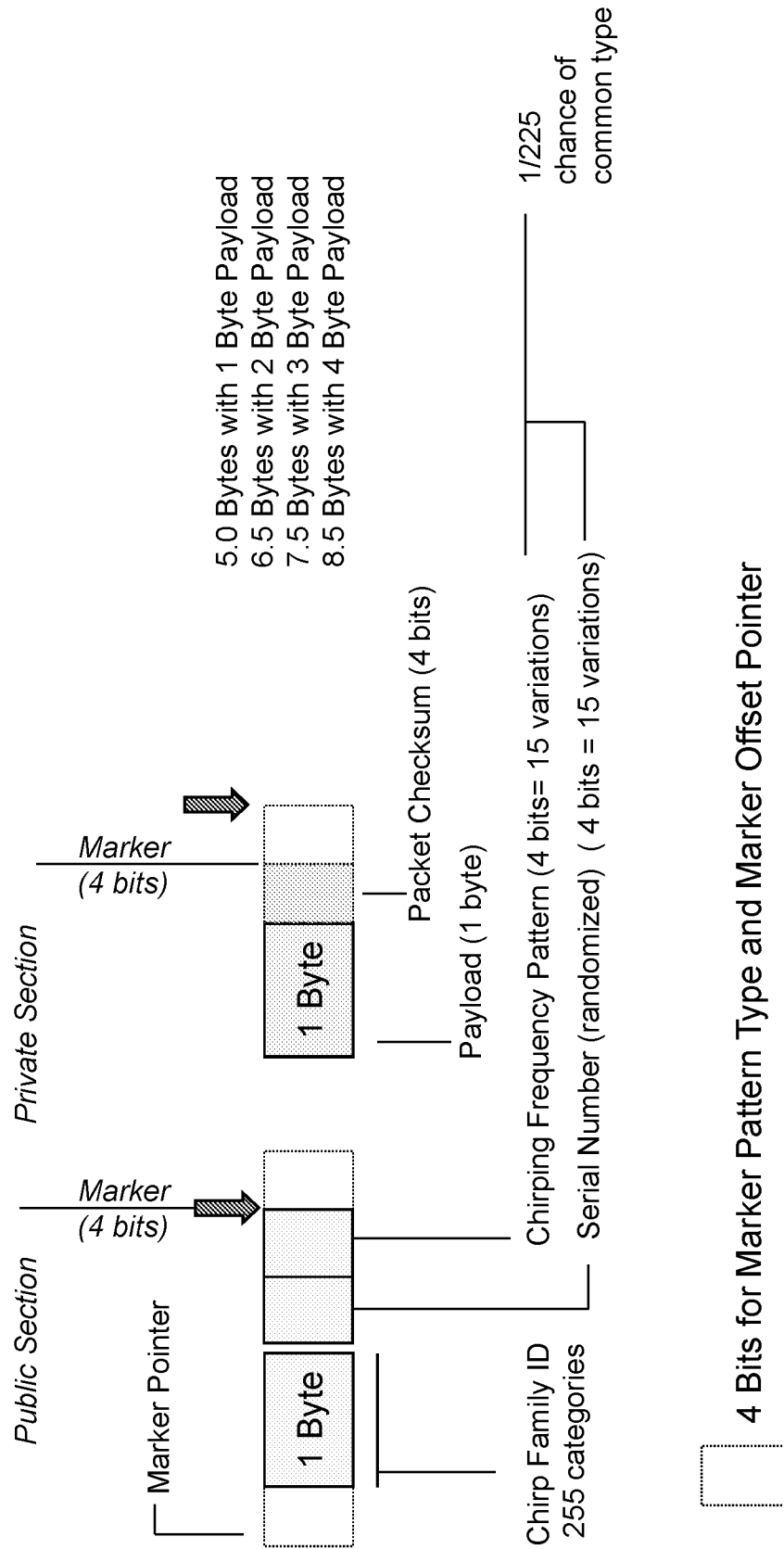


Figure 64

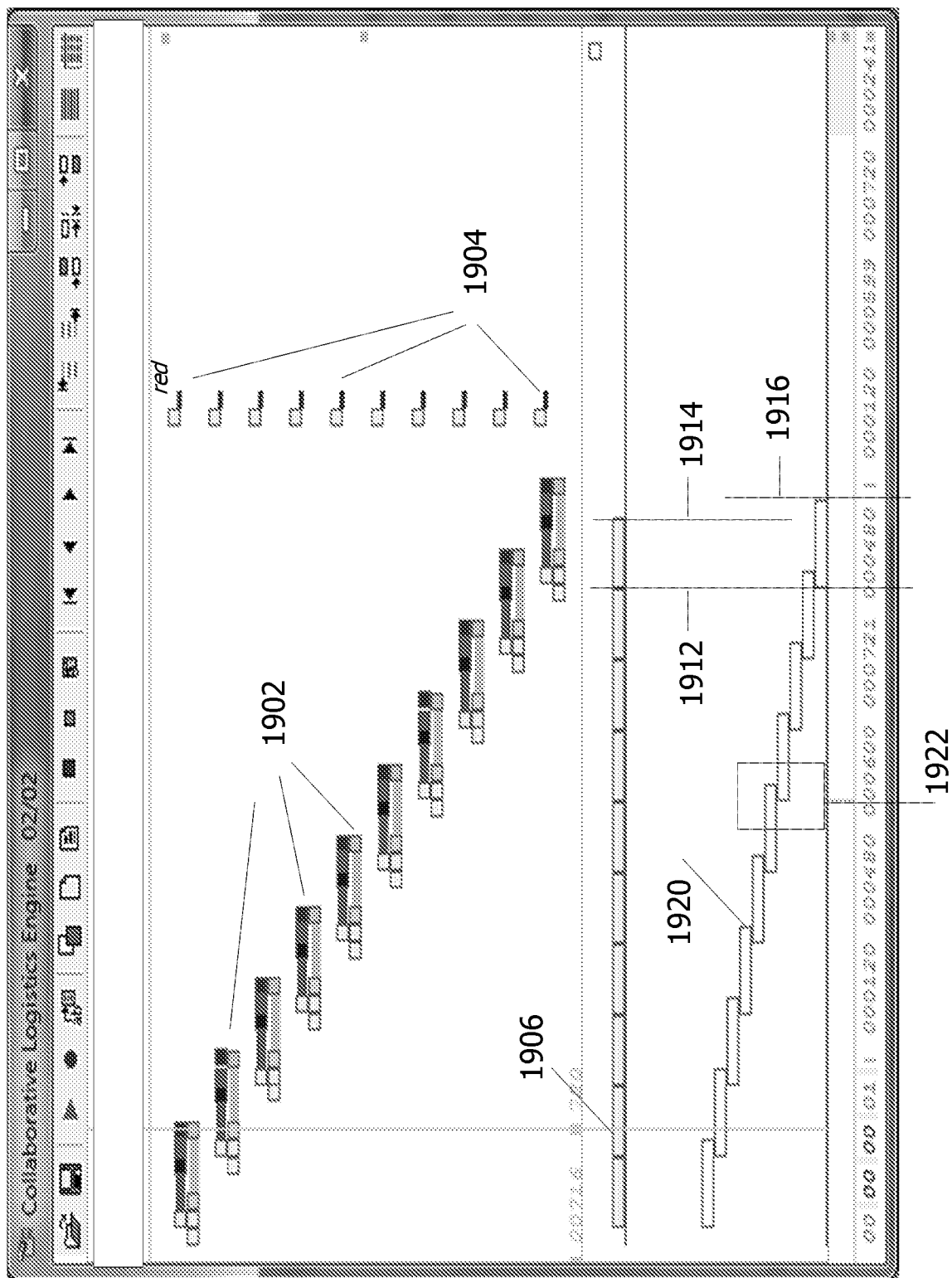
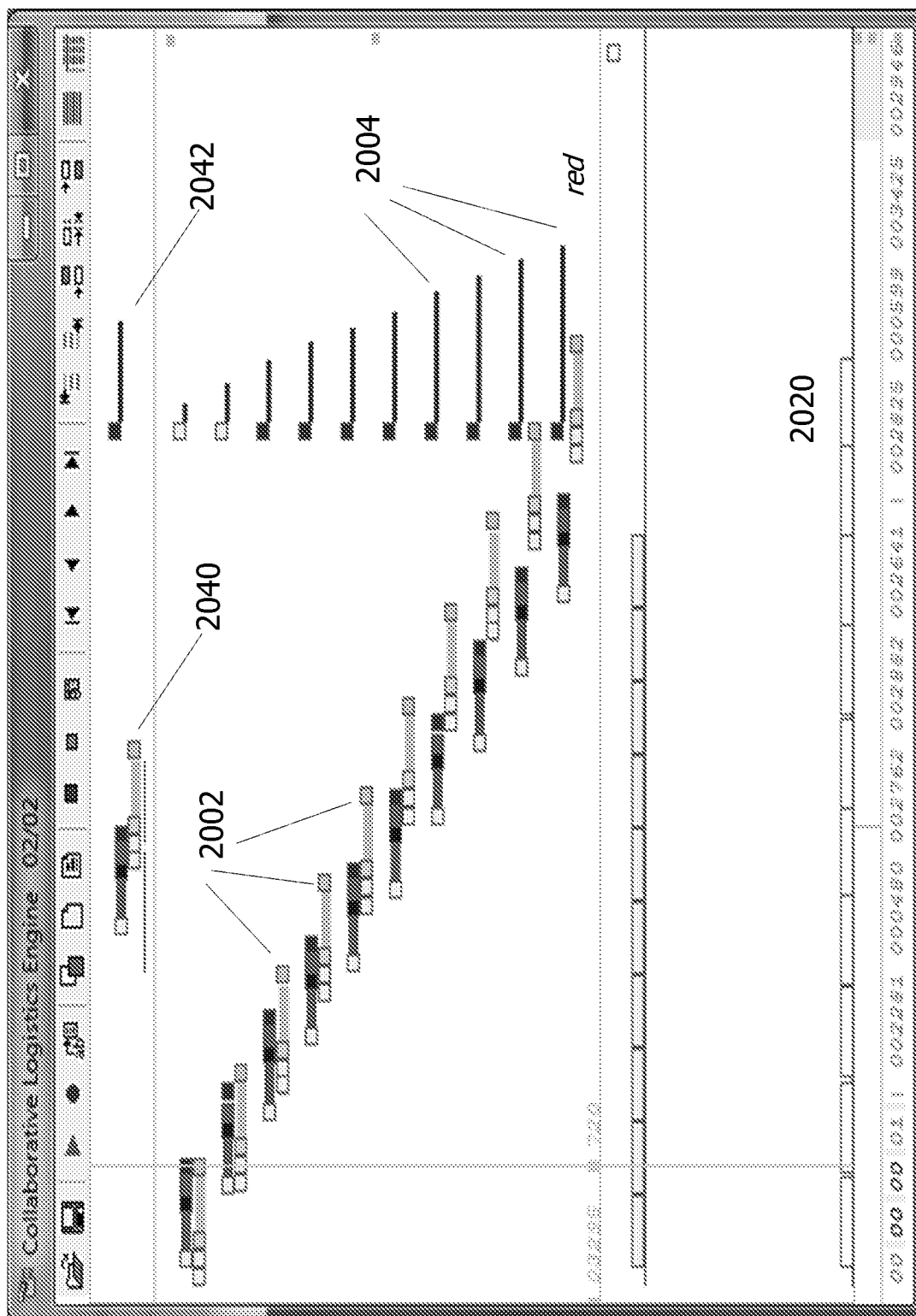


Figure 65



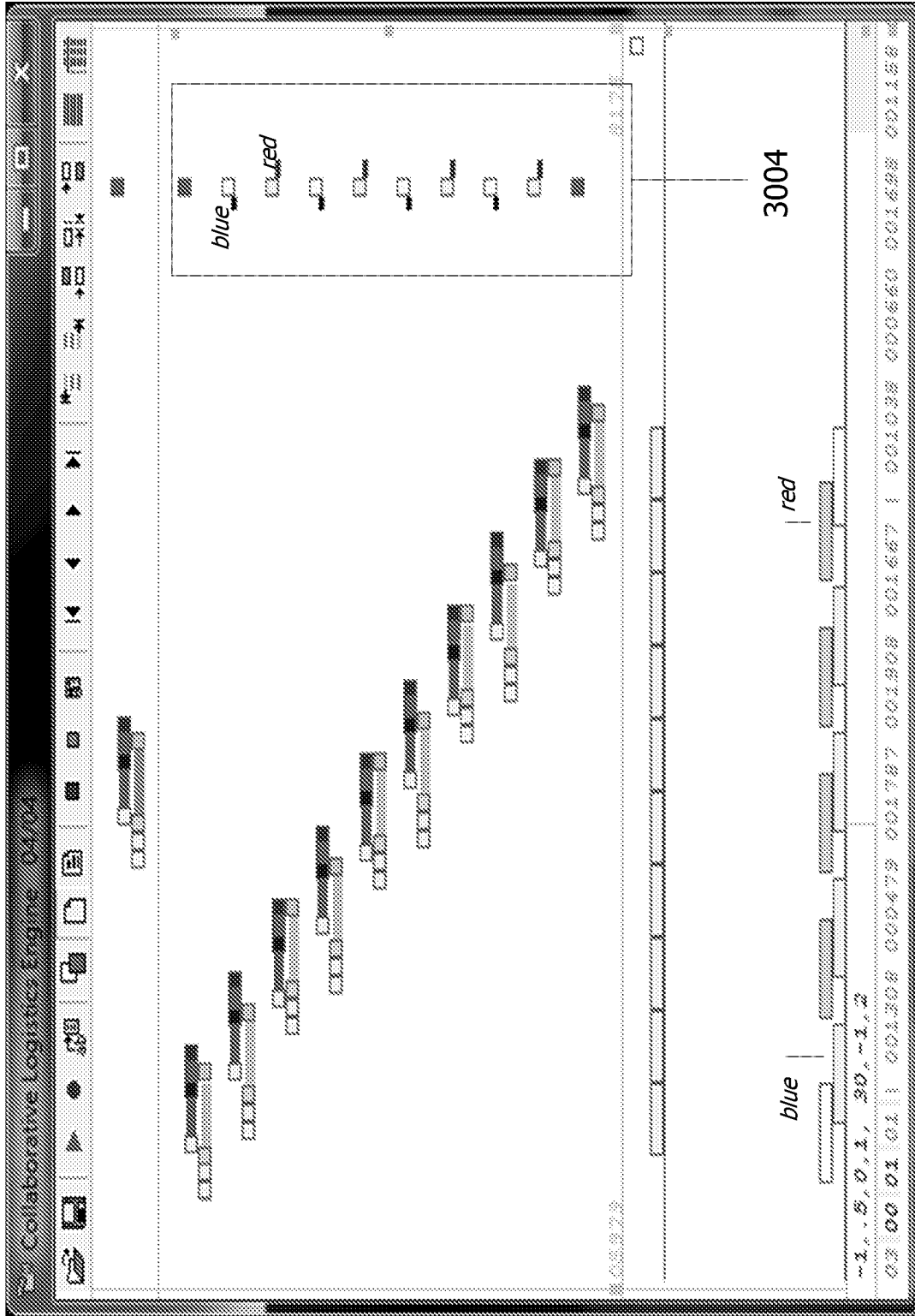


Figure 67

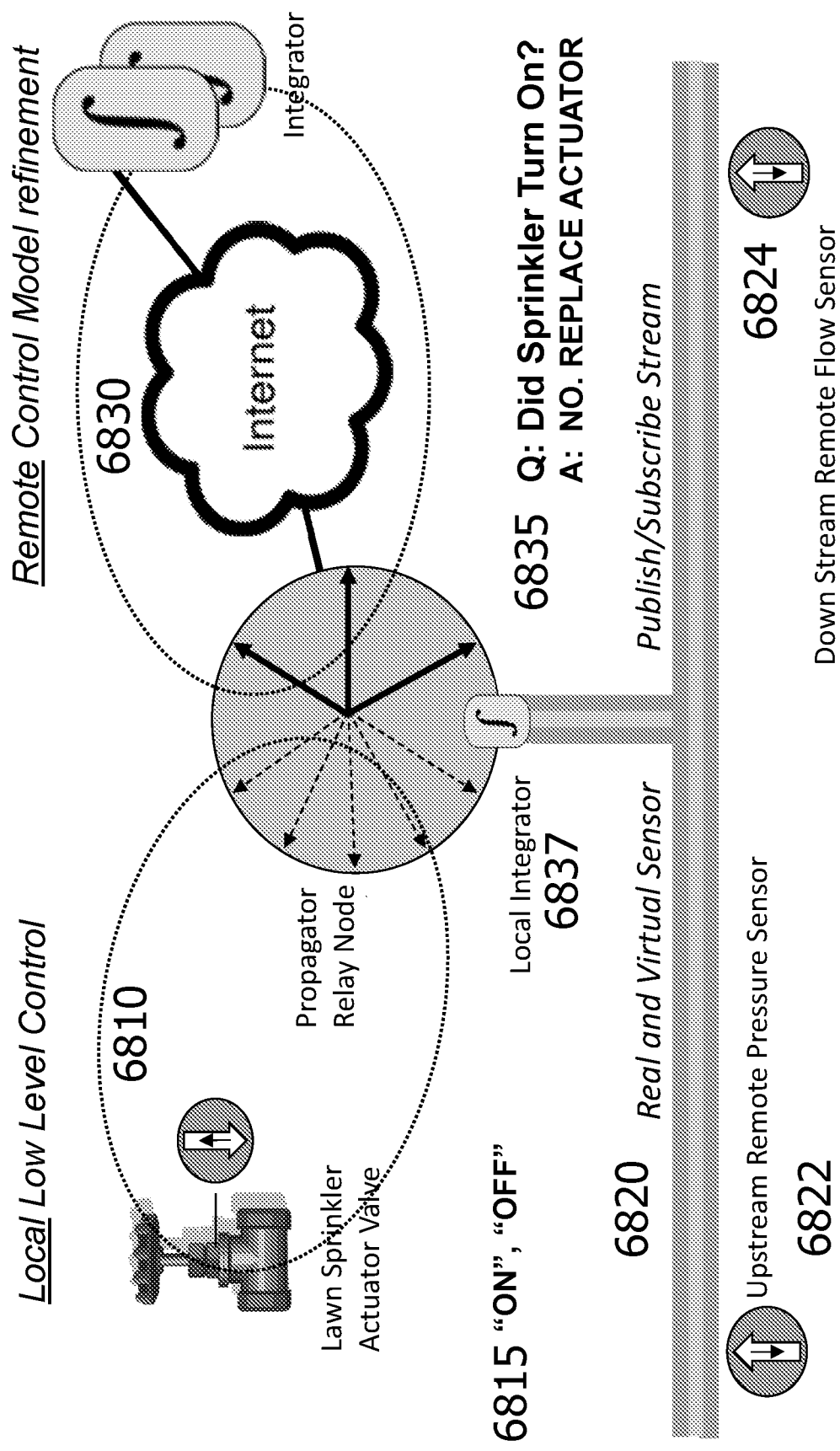


Figure 68

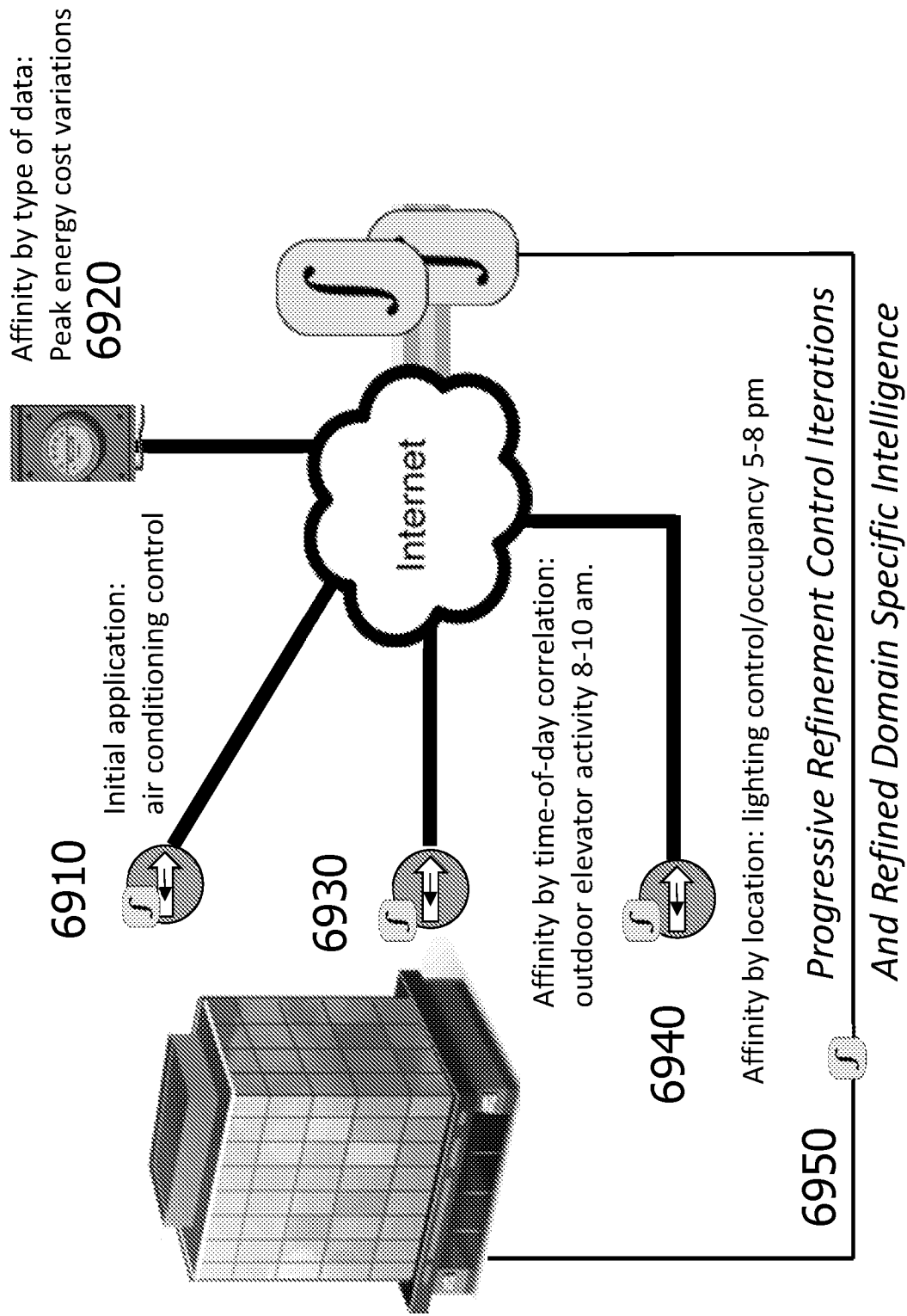
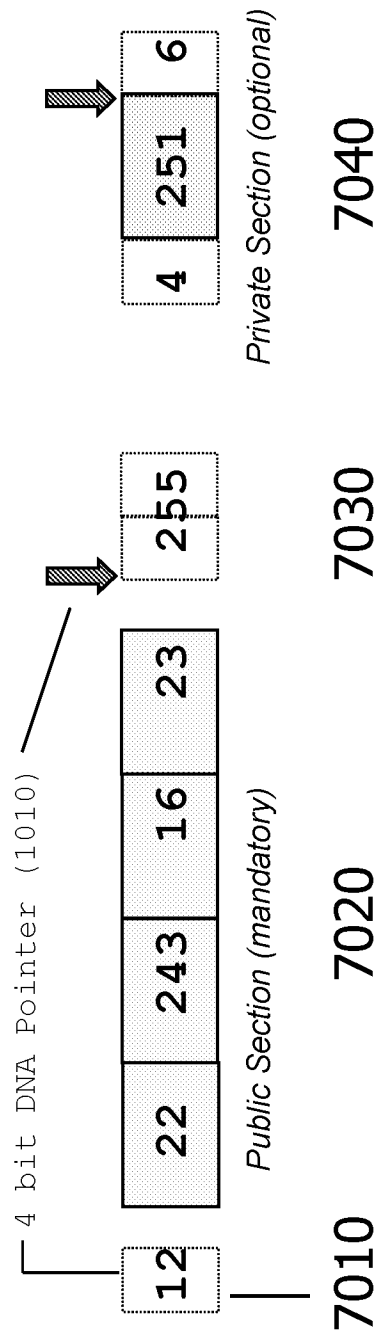
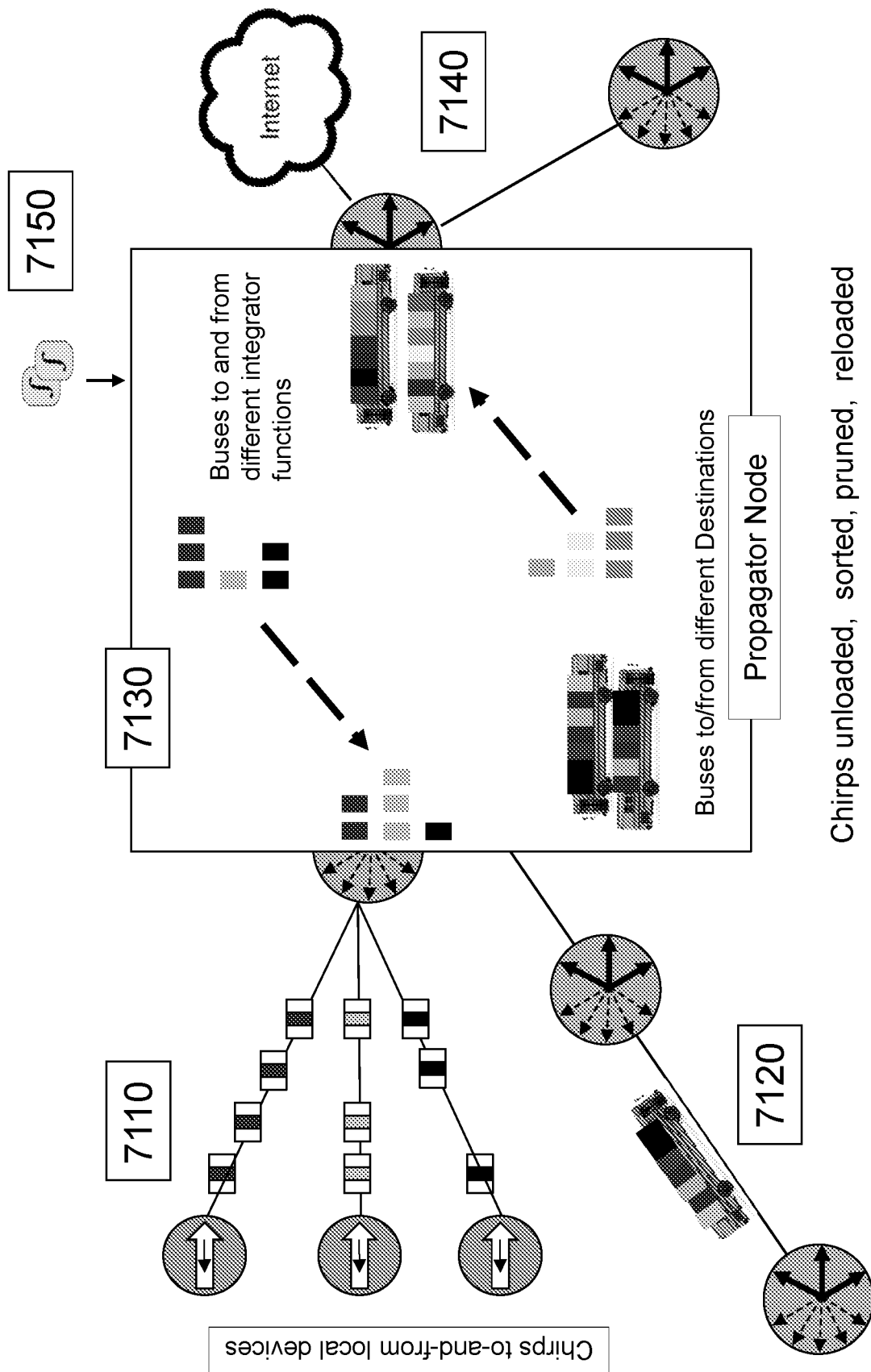


Figure 69



- 7050 Public Agent ID: 4.8.255 (4 byte Public, 8 bit Marker, DNA 255
- 7060 Agent 4.8.255: Format is 8.8.8.8 (4 variables, 1 byte each)
- 7070 Subscribed Chirp Classification: 4.8.255.22.243.16.23.
- 7080 Private Agent ID 1.4.6 decodes payload [251] for 4.8.255.22.243.16.23

Figure 70



Chirps unloaded, sorted, pruned, reloaded

Figure 71

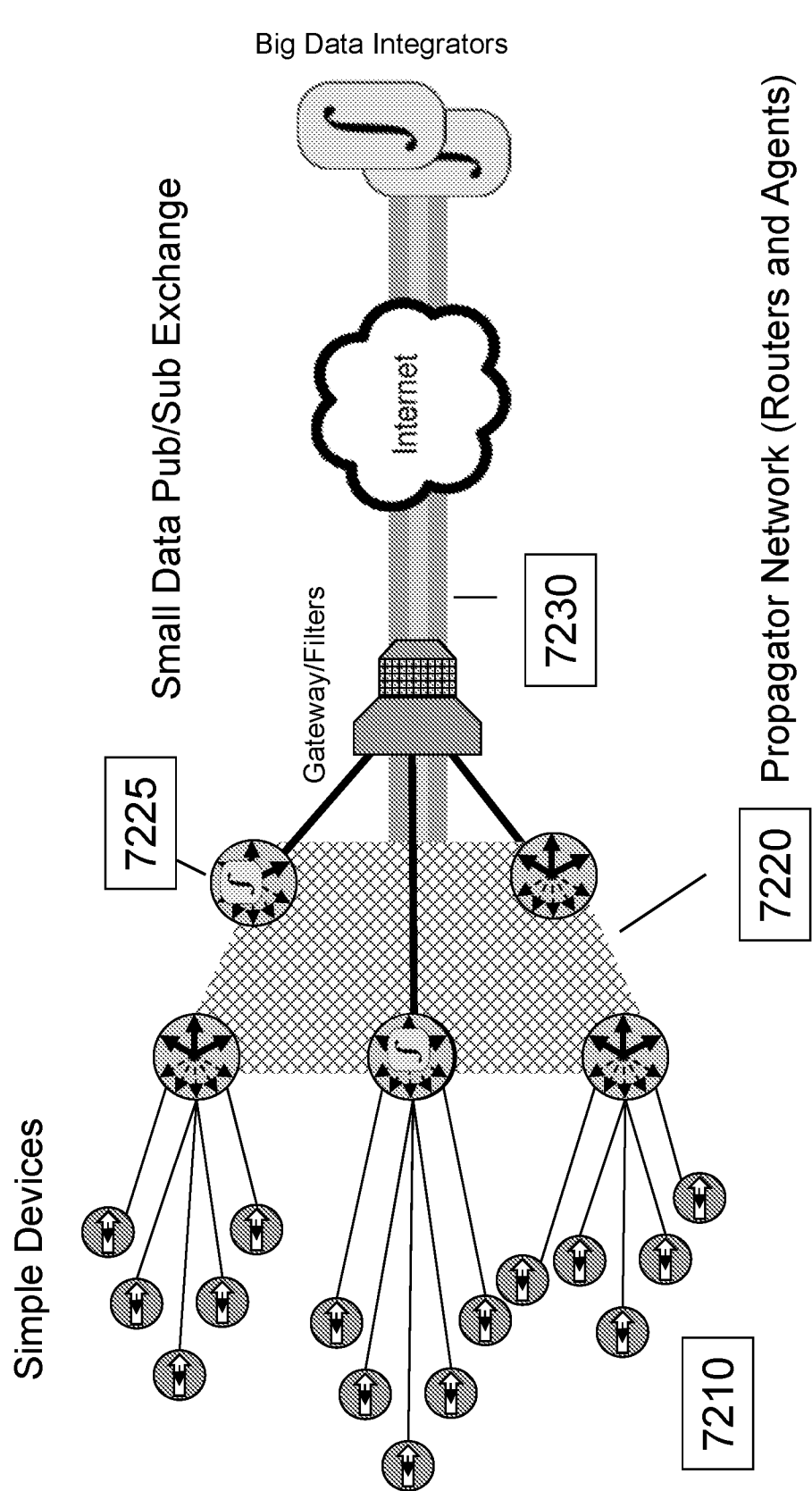


Figure 72

Title: Chirp Networks

Inventor: Francis daCosta

Applicant: MeshDynamics

CROSS REFERENCES

The instant application claims priority as a continuation of U.S. Utility Application 14/740,062, filed on June 15, 2015, presently pending, whose contents are incorporated by reference. Application 14/740,062 claims priority as a non-provisional of U.S. Provisional Application Serial Number 62/012,196, filed on June 13, 2014, presently expired.

Application 14/740,062 is also a continuation in part of U.S. Utility Application Serial Number 13/764,008, filed on Feb. 11, 2013, which is issued as U.S. Patent 9,363,651 on June 7, 2016, which in turn claimed priority as a continuation in part of U.S. Utility Application Serial Number 13/627,883, filed on September 26, 2012, and issued as U.S. Patent No. 8,923,186 on Dec. 30, 2014, which in turn claimed priority as a non-provisional utility application of Provisional U.S. Patent Application Serial Number 61/555,400 filed on November 3, 2011, currently expired, and Provisional U.S. Patent Application Serial Number 61/615,802, filed on March 26, 2012, presently expired, and Provisional U.S. Patent Application Serial Number 61/621,926, filed on April 9, 2012, presently expired, the contents of which are hereby incorporated by reference.

Application 14/740,062 also claims priority as a continuation in part of U.S. Patent Application Serial Number 13/571,294, filed on August 9, 2012, issued as 9,172,738 on October 27, 2015, which in turn claimed priority to U.S. Patent Application Serial Number 12/696,947, filed on January 29, 2010, which issued as U.S. Patent 8,520,691 on August 27, 2013, which in turn claimed priority as a non-provisional of U.S. application serial number 61/148,803, filed on January 30, 2009, presently expired, the contents of each prior application is hereby incorporated by reference. Application 13/571,294 also claimed priority as a continuation in part of U.S. Utility Application No. 12/352,457, filed on January 12, 2009, and issued as U.S. Patent 8,477,762 on July 2, 2013, the contents of each prior application is hereby incorporated by reference.

Application 14/740,062 also claims priority as a continuation in part of U.S. Application 13/541,446 filed on July 3, 2012, presently abandoned, the contents of which are hereby incorporated by reference.

Application 14/740,062 further claims priority as a continuation in part of U.S. Utility Application 14/523,778, filed on October 24, 2014, issued as U.S. Patent 9,730,100 on August 8, 2017, which in turn claims priority to U.S. Utility Application No. 12/625,365, filed on November 24, 2009, issued as U.S. Patent 8,514,852 on August 20, 2013, which in turn claimed priority to U.S. application 61/117,502, filed on Nov. 24, 2008, presently expired, which are hereby incorporated by reference.

FIELD OF THE INVENTION

This invention relates to the field of computer networks and machine communications and, more particularly to a network system and method for facilitating large scale messaging emanating from devices on the edge of the network. These edge devices include, for example, sensors and actuators that interface with the dynamics of the physical world and each other through terse messages. In some embodiments these terse messages are referred to as chirps. Small data propagators near the edge of the network optimize the data based on dynamic subscriber interests.

BACKGROUND OF THE INVENTION

Increasing percentages of devices connected to the Internet or other global networks are not used by people in the familiar way that personal computers, tablets and smart phones are. Interconnected devices monitor the environment, structures, transportation systems, factories, farms, forests, utilities, soil and weather conditions, oceans and resources. Many of these sensors and actuators are networked into autonomous sets, with much of the information being exchanged machine-to-machine directly and without human involvement.

Machine-to-machine communications are typically brief and specialized. Most sensors and actuators will report or act upon small pieces of information. For purposes of the systems described in this application these terse messages are "chirps." Burdening these devices with prior art standard network protocol stacks is inefficient, unnecessary and unduly increases their cost of ownership.

Machine-to-machine communications dominate in several applications, including the field referred to as the "Internet of Things." As described in this application, the architecture optimized for the Internet of Things necessarily entails a widely distributed topology relying on simpler chirp

protocols, especially at the edges of the network where the machine-to-machine communications predominate. Intermediate network elements perform information propagation, manage broadcasts, and provide protocol translation. Another class of devices house integrator functions providing higher-level analysis, for both near-edge analytics and broader-scope analysis. Small chirp data provides the necessary information for analytical systems.

The system as described in the application is described using certain analogies, such as the propagation of pollen, and interaction of social insects.

This application describes reasons why a different architecture is needed for the Internet of Things. The architectures described can coexist with existing incumbent networking protocols. In one embodiment, the architecture comprises integrator functions, propagator nodes, and end devices, and their interactions.

SUMMARY OF THE INVENTION

This invention addresses multiple embodiments. The methods taught address a variety of current networking challenges, specifically for mobile, temporal, or isolated networks, as can occur when a collection of wireless nodes is moving. These networks are mission critical, often requiring multiple connectivity media. Approaches for such networks are described in figures 9, 14, 15, 25, 39, 44, 45. As shown in those figures, the networks are often hybrids, involving both humans and machines. The machines may use IP or non IP (machine native) protocols. Such protocols are suitable for terse machine-to-machine (M2M) messaging and may use separate physical radios as shown in figures 22, 23, 25, 62, 63. Alternately, they may collaboratively share the same physical radio as shown in figures 32, 33, 39. Such a one-radio embodiment may use collaborative scheduling shown in figures 65-67. Lastly a Network Management System (NMS) framework must support clients which include humans, machines, routers and applications in the routers supporting terse M2M messaging, as shown in figure 12, element 060.

These diverse requirements are supported by a service delivery framework for network participants comprising mesh nodes (in one embodiment) wherein each mesh node supports wireless clients. The features implemented in the architecture include:

Logical Radio Routers Figures 1 through 8 depict one logical radio abstraction to support diverse client connectivity needs. Figures 9, 13, 14, 15, 25, 44, 45, 56 through 63 explain certain other embodiments. Figures 5, 6 depict the analogy to tree based wired switch stacks. The analogy to ports on the switches is made in Figures 9, 38 through 42. Figures 13, 14, 15, 16, 44, 45 depict mission critical embodiments. Home or office application are shown in Figures 22, 23, 56 through 63, 68, 69.

Efficient Terse Messaging Transport Figures 10, 11, 12, 24, teach concatenation for latency bound transmissions of terse M2M messaging, an embodiment of particular importance to VOIP packets.

Modular Nodes based on U/D/S/A Figures 17, 22, 23, 26, 38, 39 through 45, 63 are embodiments of modular frameworks supporting the logical radio abstractions of Uplink, Downlink, Scanner and Access Point. Failover and dynamic options from one uplink port to another is depicted in Figures 9, 21, 41, 42, 44, 45. Dynamic reconfigurable ports and sharing of U,D,S,A functions are depicted in Figures 9, 41, 42, 44, 45.

Isolated Network support: Figures 27 through 29 teach methods for Distributed DHCP address generation needed in mobile, temporal or isolated networks. Other applications are depicted in Figures 26, 39, 44, 45. Finally, Figure 27 depicts the SIP registry for M2M messaging, e.g. VOIP.

Remote Management Figures 18, 19 describe embodiments for remotely programming clients. Clients include mesh router applications, element 060 Figure 12. Programming applications or rule based directives is taught in Figures 30, 31. The NMS based application support framework is depicted in Figure 52. It extensively uses Local and Global Streams, Figures 48, 49. Intra router communications is implemented using terse UDP-based “heartbeats,” Figure 54. It is open and customizable and used for other M2M messaging. Stream Readers are used to translate and communicate with native formats, Figures 50, 51, 52. A published NMS API, Figure 53, enables custom and domain specific NMS development, see Figure 55.

Application-Aware Mesh Control Figures 12, 20, 43 depict facets of the Mesh Control Layer that manages mesh topology first introduced in Figure 1. The control layer is radio and protocol abstracted. It supports both IP and non-IP client devices and applications.

Chirp Device Registration and Discovery Figures 64, 70 describe a topic-based addressing scheme

that does not require IP based addressing schemes. Instead the nature of the device and its function, define its genus. Categories may be defined or created using the SIP/DHCP services depicted in Figures 27, 28. Figures 56 through 63 depict embodiments for such low-cost chirp devices. Category based information, e.g. “small data” is available within the M2M network for autonomous pattern discovery and machine control, see Figures 68, 69, 70.

Latency Sensitive Messaging Figures 56 through 63 depict embodiments of devices participating in a dynamic M2M publish subscribe exchange. Terse M2M messaging between devices includes latency sensitive traffic, see Figures 25, 56, 68, 69. Figure 71 shows chirp packets enter the propagator from both local and remote publishers (elements 7110 and 7120 respectively). The latter is containerized as a bus-load for efficient transport, 7120. Inside the propagator, port forwarding tables define the locations of interested subscribers. The bus containers may be reconstituted, in alignment with the current dynamics of the pub-sub exchange. Further processing includes removing chirp packets that are duplication or are no longer desired (such as for those packets that arrived out of order or contain information that is no longer current). In one embodiment, heart beat packet duplicates are discarded at each mesh node. The reconstituted bus containers are then sent out to both local and remote subscribers 7140. As shown in Figure 72, the top level view of the entire M2M service delivery framework consists of simple terse messaging devices 7210. Further included in the embodiment are propagator and bridging Mesh Network elements 7220 which incorporate agents. The agents are implemented within the nodes 7225. Agents act on behalf of big data subscriber requirements 7230.

BRIEF DESCRIPTION OF DRAWINGS

In order to more fully describe embodiments of the present invention, reference is made to the accompanying drawings. These drawings are not to be considered limitations in the scope of the invention, but are merely illustrative.

FIG. 1 illustrates how the network topology is changed by selecting a different backhaul in a two-radio system, with one link to the backhaul AP and the other link servicing the child AP. It depicts four network topologies. Each of the four network topologies provides a different set of performance in terms of latency and throughput. The mesh control software adjusts the latency and throughput parameters to meet voice/video or data performance requirements in terms of latency and bandwidth.

FIG. 2 contrasts the conventional "Dual Radio" mesh with the Logical Two-Radio Mesh. On the left of FIG 2, two radios labeled 010 and 020 provide client connectivity and ad hoc mesh backhaul functionality, respectively. All the mesh backhaul radios (020) are on the same channel depicted by the clouds of coverage of the same color (030). They are all part of the same sub-network. In contrast, on the right of FIG 2, the same radio (025) provides service to clients and also backhaul functionality but operates in different sub domains depicted by different color clouds of coverage (035). The left hand resembles a network hub, the right side a high performance network switch. Hubs are not scalable.

FIG. 3 compares the two-step process of a single radio relay to a two-radio relay. On the left side, (010) a single radio relay is shown. Every packet received has to be re-transmitted on the same radio. Thus the bandwidth with every hop in a single radio mesh network is reduced by approximately 50%. After three hops, the Bandwidth would be an eighth of what is available at the Ethernet backhaul. On the right side of FIG. 3 (020) a two-radio backhaul is shown, where packets received on one radio are re-transmitted on another radio operating on a non-interfering channel. In this configuration, there is no bandwidth reduction with every hop and bandwidth is preserved with every hop. Two radio mesh backhauls are scalable while single radio backhauls are not.

FIG. 4 shows how the structure of two-radio multiple hop mesh network where each two radio unit services a Basic Service Set (BSS) by configuring one of the two radios to serve as an AP to its clients. Clients may include the second radio of another two radio system, with this radio configured to run in station mode, providing the backhaul path back to the Ethernet link. In the insert, the uplink radio (labeled 010) connects to the parent mesh node while the downlink radio (labeled 020) acts like an Access Point to client radios, including other mesh nodes that connect to it through their uplink radio. Note that all service radios (020) operate on different non-interfering channels, depicted by different color ovals.

FIG. 5 shows the similarities between FIG 4 and a wired switch stack with the same chain of connectivity 040-050-060. Both have the same tree-like structure and up link and down link connections. In both cases the units (040,050,060) operate on a distinct sub domain.

FIG. 6 illustrates one embodiment of the two logical-radio approach with three physical radios. Two

radios constitute logically one radio of the two logical radio concept, while the third physical radio serves clients as the second radio of the two logical radio concept. By eliminating the sharing of physical radios for both backhaul and client services, the backhaul bandwidth is improved and also reduced the dependency to use the same type of radios for the backhaul and for clients. In the insert, the uplink radio (labeled 010) connects to the parent mesh node while the downlink radio (labeled 020) connects to the uplink radio of child mesh nodes. The service radio (labeled 030) act as Access Points to client radios shown as triangles. One such is labeled 040. Note that all service radios (030) operate on different non-interfering channels, depicted by different color ovals.

FIG. 7 illustrates another embodiment of the two logical radio approach but with five physical radios. The uplink and downlink radios (shown as one radio Fig. 6) are split into two radios, in this embodiment, with each responsible for one direction of traffic. Bandwidth is doubled and latency halved, since traffic in the opposing direction now has its own channel or logical "lane". Thus, the radio labeled 010 in Figure 6 is now radios 012 and 010. Similarly, the radio marked 020 in Figure 6 is now split into radios labeled 022 and 020. The radio pairs 012-010 and 022-020 provide the same functionality as the radios labeled 010 and 020 in Figure 6 but with twice the bandwidth and approximately half the latency.

FIG. 8 is an extension of the five-radio embodiment shown in Figure 7. In Figure 7, there is one service radio to service both voice and data clients. However voice and data traffic has different performance requirements. By having different Access Point radios service the voice and data clients, the contention between voice and data packets attempting to gain access to the same medium is reduced. Also, with different radios servicing the data and voice clients, the voice and data packets can now be treated differently. The Access Point radios servicing the voice clients could therefore be operating in TDMA (time division multiple access) mode while the AP radio servicing the data clients operates in CSMA (Collision Sense Multiple Access) mode. The two radios (032) and (034) thus provide different functionality. VoIP devices such as phones connect to the former, data devices such as laptops to the latter.

FIG 9 is a five-radio extension of the three-radio configuration shown in Figure 6 but with more dedicated service radios operating on different frequencies for different types of client radios.

FIG 10 shows the maximum VOIP bandwidth available per client, using 802.11 radios, as the

number of clients increase, as measured by the size of the packet that each client can send every 20 ms. As the number of clients increase the size of the packet - and the associated voice quality - drops dramatically. In one embodiment, to achieve 64 Kbps voice quality, an 802.11b radio can support around 25 clients.

FIG 11 shows the maximum VOIP bandwidth available per client, using 802.11a radios, as the number of clients increase, using the same packet size metric sent every 20 ms. As the number of clients increase the size of the packet - and the associated voice quality - drops dramatically. In one embodiment, to maintain 64 Kbps voice quality, an 802.11a radio can support around 55 clients.

FIG. 12 shows extensions developed and implemented in the mesh network stack to provide an efficient backhaul for voice. The small voice packets are concatenated into larger packets and sent (as one packet) at regular intervals to the backhaul radios. At each mesh node voice packets intended for that destination are removed and the rest sent back (as one large packet).

As explained below, the embodiment includes a Packet classifier (labeled 010) that recognizes voice packets based on size and regularity of transmissions. A VOIP concatenation engine (labeled 020) "container-izes" small voice packets into a larger "container" packet for more efficient transportation. Real time extensions (labeled 030) to the Linux kernel enable the system to provide near real time performance for sending and receiving the latency sensitive VOIP container packets through the network - regardless of what the Operating System is doing at the time.

Application driven rules and Scripts are resident in device abstracted APPLICATION layer library 060, a supervisory control layer above three lower control layer modules: TCP/IP, MESHCONTROL 040 and SCAN 050. Direct Machine to Machine (M2M) communications are controlled by APPLICATION over the Software MAC layer. The Software MAC Layer is typically running at the Kernel level of the software platform, requiring LINUX KERNEL EXTENSION 030. These extensions enable low level, fast applications/algorithms, operating at close to port forwarding tables, operating at (Kernel level) Drivers for Ports 080. The APPLICATION layer is analogous to the Control Plane in the SDN paradigm. The control plane manages the buses, Fig. 72 needed for real time M2M messaging for industrial applications Figs. 56, 68, 69, down to port level routing. The TCP/IP layer supports AAA audit trails and AES encryption 090 so the Application Service Delivery and Deployment is securely managed.

FIG. 13 shows the concept of a "Hybrid Mesh network" where two-radio systems provide two types of service. In one case, they are part of an infrastructure mesh as shown by the two-radio mesh node labeled 010. In another embodiment, the same node may be dynamically reconfigured to support ad hoc peer-to-peer connectivity. The node labeled 020 (marked as E8) has two radios. One is intended for client radio connection to infrastructure mesh nodes - see the radio labeled 030 on the unit marked E9. The other provides a peer-to-peer mesh capability, as shown by radio labeled 040. Depending on the needs of the network, the two-radio units are dynamically re-configured to support either need, infrastructure mesh (010) or backhaul support to ad hoc mesh (020). Labels 050 and 060 designate connected and broken ad hoc mesh links.

FIG. 14 is an application of the Hybrid Mesh concept to a Public Safety embodiment. The node labeled 010 is a Stationary node on top of a light pole, in this embodiment. A mobile embodiment shown as labeled 020 is entering the building (arrow) such as when carried by firefighters. These mobile units are also called "breadcrumb" routers. The Mobile Mesh nodes provide connectivity to two-radio portable units worn by the firefighters in this picture. All firefighters are thus connected to themselves through a peer-to-peer mesh network shown as a thin line. They are also connected to the Infrastructure mesh backhaul through one or more connect points. This ensures redundancy in network connectivity. The broken link (labeled 060, Figure 13) is avoided.

FIG. 15 is an application of the Hybrid Mesh concept related to a Battle Force Protection embodiment.

FIG 16 depicts an embodiment using mesh nodes which feature four radio slots used in the modular mesh framework of Fig. 17. There are two slots for radio cards on the front and back. Up to four radios 010 are thus supported on a single embedded systems board. The radio card antenna connections 030 are included for four radios. Two Ethernet ports 020 provide wired access to provision wired uplink and wired service access.

FIG 17 indicates the modular mesh framework, whereby a four slot board, as shown in Fig. 16, may be configured to provide different functionalities: Two radio Backhaul (BH) 010; three radios BH+AP 020; four Radio with BH AP and Scanner 030; four radio with Full Duplex (FD) using a coupled two radio BH 040. Further, since the modular mesh framework always forms a tree, these

nodes are part of a switch hierarchy, as shown in Fig. 5.

FIG 18 depicts how the installation software is tagged to both the radios and board characteristics. It shows a serial line connected to load the boot loader program, after which the Ethernet port is used to complete the software installation and branding process. Compiling the install program on the board it is intended to run on performs this function, thus creating a unique software image.

FIG. 19 is a view of the flash deployment software developed and implemented to ensure that software generated for the install of this board cannot be used by another mesh node. When the software installation process begins, the software is compiled on the board it is intended for and the compilation process is unique since it is based on a number of unique factors. The software is generated on the board that it is intended to run on - to ensure that the software image cannot be used to run on another board, thus preventing both software privacy and dissuading theft of the mesh nodes.

FIG. 20 shows that the Mesh Control Software sits above the Media Access Control (MAC) of the radio. As such it is radio and protocol agnostic, in one embodiment.

FIG. 21 shows how channel interference is dynamically managed in the logical two-radio system.

FIGS. 22 and 23 introduce an embodiment bridging across diverse wireless medium using the example of an N-Logical wireless medium bridge, referred to as the "nightlight." In one embodiment, the nightlight serves as both range extender and intermediary between device "chirps" and more conventional, IP based, communication devices and protocols.

FIG. 24 shows the synchronization of multiple voice devices accessing the same wireless medium with a focus on the time for bulk receipt of packets that are shared among the separate devices.

FIG. 25 shows a voice device talking to a dedicated voice radio and data devices taking to a data radio, with one phone 2501, capable of taking to both 2502 and 2503 in one embodiment. The night light embodiment 2504 manages both voice and data transceivers, in the depicted embodiment.

FIG. 26 depicts the dynamic collaboration tree for an exemplary supply chain application, where

routers support modular U,D,S,A functionalities and messaging is driven by collaborative scheduling, as detailed in Figs. 65, 66, 67.

FIG. 27 shows an isolated mobile network cluster and communication within it using VOIP phones.

FIGS. 28 and 29 describe an embodiment wherein isolated network clusters may converge with distributed DHCP services and inherent conflict resolution using randomized sub net address ranges.

FIGS. 30 and 31 depict the process of generating an OS-independent image for secure small footprint devices and an exemplary graphical programming environment for simple sensory devices, in one embodiment.

FIGS. 32 and 33 depict device repeaters and range extenders. Conceptually these devices are similar to clients, such as the soldiers in the battle force embodiment shown in FIG. 15. The range extenders provide blind repeating and therefore range extension for remote devices. They also serve as a redundant path, similar to FIG. 13 but employing a single physical radio. Thus, in chirp language, they are birds that repeat and relay a bird song in string of pearl configurations.

FIGS. 34 through 36 depict representative IP based "light" or low payload packets that may be used to transport chirp data over an IP based network. 802.11 packets are used as examples. Chirp data is encapsulated in such packets for onward transmissions, in unicast, multicast or broadcast modes, in search of flower/agents/tunes/subscribers interested in the chirp/pollen. In one embodiment, chirp devices use such innocuous frames to transport payload - only chirp aware routers know how to recognize them as chirp packets and process their (secure) routing to appropriate agents accordingly.

FIGS. 37 through 38 map the equivalent slots/ports of wired and wireless switch equivalents as shown in Figs. 4 and 5.

FIG. 39 shows how logical radio modes, Uplink (U), Downlink (D), Scanner (S), Access Point for Service (A) map to physical transceivers in single radio and multi radio mesh node embodiments. The joining of tree branches 3950 to tree trunks 3960 is aided by common routers 3952.

FIG. 40 is a simulation of a representative prior art mesh routing algorithm and its comparison to

tree based routing of Fig 4. The thicker blue lines in Fig 40, 4040 denote the minimal spanning tree. Note the dashed lines have to be additionally recomputed for each node in prior art mesh routing. Performance deteriorates exponentially as $O(n^2)$ where n is the number of mesh members.

FIGS. 41 and 42 depict a switch equivalent of logical radios operating in both wired and wireless mediums/channels, using Logical Radios Uplink (U), Downlink (D), Scanner (S) and $O(n)$ routing. The logical radio switching module (as an insert in one embodiment) is introduced.

FIG. 43 is a schematic of how the abstraction layers for logical radios may themselves be combined to create more complex abstractions. Element 4320 refers to two abstractions AP (also in Figs. 12, 17). The "bridge" is a combined logical radio abstraction, similar to the Uplink and Downlink (U+D) backhaul, but bridging over disparate frequencies and protocols.

FIG. 44 shows the bridging function (as described in Fig. 43). Mobile node 4455 switches from "blue" 5.8G backhaul to a "pink" 2.4G backhaul. The sub tree beginning with mobile node 4457 is thus operating on a non-interfering channel/frequency/protocol. The static counterpart is 4460.

FIG. 45 depicts a "string of pearls" configuration of static mesh nodes. A mobile mesh node, traveling at 60 mph makes temporary connections with each node in the string. Switching from node to another is seamless and unbroken, as noted by the video output below. The process is repeated with single radios embodiments, using logical radios. Bandwidth degraded along the string of pearls, as expected, but video output was still jitter free and unbroken, due to proactive Scan Control, Fig. 12, Logical Radio abstractions and the benefits of $O(n)$, tree based routing.

FIG. 46 depicts the dependency of latency sensitive traffic to the network tree topology, specifically, the number of siblings in sub trees along the route to the destination node/parent/root.

FIG. 47 depicts the use of a reserved time slot for transmitting bulked, latency sensitive data, whereby clients remain silent during transmission in this time slot. The time slot allocations may be fixed or variable. In one embodiment it is dynamically managed by Collaborative Scheduling.

FIG. 48 depicts broadcasts/streams restricted to a region. The region may be defined by geography, membership and mesh topology e.g. restrict the number of hops or sub trees. Further, the region may

include directions: up/down or a set of turn by turn directions. An example of regional streams may include a section of the home, where only siblings of a sub tree require particular data stream. Note that backhaul bandwidth is not affected outside stipulated regions. Restricted broadcasting improves overall network health.

FIG. 49 is effectively the reverse of Fig 48 and is global: e.g. not restricted. Tree based topologies favor global broadcasts. Streams from the root are always downwards. While streams from nodes may be either, they are typically upwards. The majority of devices populate the edge of the network and their pollen is typically upward bound, necessitating bulking, exception handling and deterministic time mail delivery along the route.

FIG. 50 depicts the Stream Reader, an agent authorized to peer into network router transmission and receiving packet queues, prior to their onward transmission through the network. Like Post office sorters, they identify and sort packets for scheduled deliveries, prune dead letters, duplicate messages etc. They also provide decoded outputs for Stream viewers, a custom GUI for the data. Stream readers may also forward output to other readers, mail boxes or messaging systems.

FIG. 51 depicts a circuit diagram of Stream Readers and their associated Stream Viewers, wired together to provide a capability, in this case "feeding" a section of the composite view ports 5190. The composite view port is back drivable since its connection may be to real or historical data.

FIG. 52 depicts the adapters and API interface components that provide an extensible, open library of stream reader and viewers. This enables the rapid prototyping of custom circuits to provide specialized competencies. The view port additions enable human participation in managing the network health. This includes, through adaptor view ports, all assets of the network and their health.

FIGS. 53 and 54 depict the published interfaces for the Network Manager Streams API and the Heart Beat Entity relationships, respectively. Together, these facilitate speedy viewport development.

FIG. 55 depicts an embodiment of methods outlined in Figs. 47 through 54. 5530 depicts the current mesh topology in dark lines. The lighter lines are alternatives gleamed from mesh node heart beats, which in turn was gleamed from SCAN agents, Fig 12. Clicking on a mesh node brings up its machine status 5520. This includes applications resident on that router. Recent heart beat log shown

in 5540. Green light 5540 indicates that heart beat based algorithms infer the node is healthy e.g. multiple alternate parents, strong signals.

FIG. 56 compares contemporary thin client, single control loop architecture to a dual control loop, with a membrane separating the two control loops but, through the chirp to IP bridge/membrane, there is bidirectional, pruned and selective traffic, based on collaborative scheduling of bus schedules in both directions. Note that the two control loops are working on their own frequencies but neither is waiting on the other, see also Fig 46. This predicates the need for a "hub", e.g. Propagator. They also serve as bridges between the upper control loop, IP based and lower, tighter (low latency/isochronous) control loops preferably in more efficient chirp protocols. Note that the overhead of converting raw, machine specific raw data to a more palatable device abstracted format (e.g. small data) is performed within the cloud in the single control loop model, (left) and delegated to propagators in the other (right). Further, the lower control loop, between propagators and devices can be low latency/isochronous while the upper control loop focuses on more infrequent high level tasks: performance tracking, exception handling system updates (event based, low latency), routine hourly reports (large interval periodic).

FIGS. 57 and 58 depicts a burgeoning market place "exchange", where the confluence of multiple sources of terse but potentially rich content streams, often in organic protocols occurs at propagator trees. The root node serves as the Chirp to IP bridge/membrane. Small data is progressively refined and pruned, in proactive manner, as data moves upstream, like salmon upstream.

FIGS. 59 and 60 depict a publish/subscribe exchange/market supporting multiple devices and integrators each operating in their own private communities/ but also part of the same logical exchange.

FIG. 59 is an example of a small "exchange" of multiple data streams, operating on different, non-interfering wireless media. The "vital signs" Integrator is fed exception and periodic, non urgent pruned data from the propagator. The exchange between device and integrator is managed by having two segmented control loops, maintained by the propagator.

FIG. 60 is an example of a proactive control system, operating on the confluence of both local and external data publishers. The propagator, with appropriate transceivers, picks up multiple sensor

streams, from a grid of diverse sensor types. Local Integrators/Agents residing in the propagator, can quickly discern patterns and overall state of a large area- since small data is being generated and shared across a local mesh network, see Figs 57 through 58. Local data streams are consolidated to provide a composite view of the region of interest. This feeds a second control systems where big data publishers provide a more global perspective. Thus, weather forecasts predicting rain, can cause the cloud server to direct the propagator network to direct which section of the corn field need additional local irrigation.

FIG. 61 depicts the simple circuitry needed to mass manufacture very low cost, low footprint, light chirp or "pollen" generators.

FIG. 62 depicts a first layer, rudimentary small data generator, where sensor fusion/consensus generates early warning signals with fewer false positives. The propagator and first layer integrator may be bundled as one device, servicing both single and multi-sensor subscribers in the local meshed network and beyond.

FIG. 63 depicts a modular four leaf clover like propagator, with 4 independent transceivers, 90 degrees rotated from each other. The 4 transceivers may be logically assigned uplink, downlink and scanner functionality, based on where the clients and relay node parents are located and the current network routing priorities. The transceivers may be dynamically and logically reassigned as the network topology changes or as clients migrate into and out of the network. Note that, as other 4 port devices depicted in this application, there is only one uplink per the 4 leaf clover design- it is scalable tree architecture. One layer is shown - overlays of such devices cover different wireless transmission media (e.g. Infrared LEDS for Chirp and Bluetooth for IP networking). A stack of such four leaf transceivers than thus service both Chirp and IP clients, including other propagators. Routing is shown as lineage based, so siblings are distinctively identified. In one embodiment the unit is autonomously rotated to better align Uplink and Downlink radios to see alternate parents, 5530.

FIG. 64 depicts one embodiment of category classification based approach to publishing M2M data. The Marker Pointer tells the router/propagator/agent where to look for the type of Pattern being used. Thus Marker patterns located at Byte 6, would be part of the 6.X... family. A 4 bit Marker pattern value of 15 would imply that data being published is part of the 6.4.15 family. This coarse

granularity may be sufficient to route the published data in the general direction of interested subscribers. Further levels of finer granularity are available to agents aware of what Marker Pattern 15 signifies e.g. how the category data in the 6 bytes of (open but cryptic) finer classification data are expected to be read.

FIGS. 65 through 67, relate to the distributed collaborative scheduling engine. Fig 65 is the starting condition where each task is taking just a little longer than expected. The usual first in first out queue, see Fig. 66, results on excessive delays further out for entities at the tail of the queue. Fig 67 employs collaborative scheduling to balance out and maintain overall "customer satisfaction". Two tasks are "stacked", because they are contending for the same resource a portion of the time. Stacking implies more resources are needed. When the resources are limited must be shared, this is not an option. As an example, consider the case of chirp devices and IP devices sharing the same wireless channel. Collaborative scheduling shifts the two tasks in opposite directions in time, to remove the stacking. The shifts are based on shifting those task start/end times within "Customer Satisfaction" constraints defined by the blue/red ranges for the task. In one embodiment, schedulers runs at each mesh node, thereby providing dynamic scheduling services for all packets entering or leaving the mesh node.

FIG. 68 depicts application use cases that highlight the shared publish subscribe exchange through which small data reaches big data subscribers and their analysis/inference engines. A low cost lawn sprinkler actuator is controlled through a local control loop 6910, a remote control loop 6930, conversing through a shared publish-subscribe exchange, 6920. Upstream to the actuator valve a water pressure sensor is depicted, 6922 as is a down stream water flow sensor 6924. Both sensors reside within the local (and secure) M2M home community and their (subscribed) chirps are part of scheduled pub/sub exchange 6920. The lower control loop vocabulary is limited to actuator commands 6915, (e.g. ON, OFF). The system has no way of knowing whether the lawn sprinkler is functional, without accessing information from the larger M2M community. When chirp data is time tagged, then causal analysis indicates that if the upstream water pressure is "good" and the down stream flow is "bad", then the actuator is worn out and needs replacement, see 6835. A local integrator agent, 6837 may also, through access to the shared pub/sub stream, 6920, be directed to perform this check each time the valve is activated, thus reserving internet traffic for exception handling. Thus an intelligent valve actuator emerges, without additional hardware/sensors at the actuator. Dual control loops thus provide intelligence without adding to the cost of the device.

FIG. 69 depicts how discovery of related sensory streams can drive more refined control models for M2M Enterprise. The initial application is Air Conditioning control for a large building, 6910. The integrator agents, through the shared chirp classification streams, discovers other local subscribers to the energy usage/cost data 6920 active in the same building. Further analysis of their activities indicates that the front door elevators are active the same time that the heating/cooling in that zone is "unstable", 6930. It also can correlate night time activity, when lights are turned on 6940 in zones that need to be activated, when the lights are on. Hence multiple, related subscriptions now drive a refined control model for air conditioning, 6950. Note that human "experience" would arrive at the same conclusions over time but machines, through their subscriptions and pattern analysis are able to close the loop semi-autonomously or autonomously. Further, the causal analyses/inferences gleaned from one building may be transportable across related domains.

FIG. 70 depicts how discovery is engendered through the chirp classification system in one embodiment, see also Figure 64. In Figure 70, the 4 bit marker pointer 7010 has a bit address of 1010, indicating an 8 bit marker pointer 7030, at the end of the packet with its agent ID of 255. This means that the public section 7020 is 4 bytes long. The coarse classification is thus 4.8.255, sufficient for pub/sub bus schedules to deliver the chirps to hubs and clearing houses, see 7050. Those who have subscribed to Agent 4.8.255 may then be able to decipher the container further. For example, Agent 48.255 states that each of the 4 bytes is a further classification, see 7060. The full chirp classification is thus 4.8.255.22.243.16.23. Note that without access to the agent, though a subscription, this level of detail is not possible, since how the data is internally formatted within the 4 bytes is not known a priori. 4 bit marker pointer may be used for common and free formats while 8 bit markers, 7030 are used for subscription based services, in one embodiment of this invention. The same process applies to the (private) payload 7040 and 7080, where additional agent subscriptions are needed. Thus the level of shared information may be incrementally controlled within an M2M social community operating at the edge. Note that a larger 8 byte chirp (e.g. 8.8.X.) may also choose to use multiple agents with one agent pointing to another within the same packet. The incremental control of information shared is thus implemented in multiple manners.

FIG. 71 shows chirp packets enter the propagator from both local and remote publishers 7110 and 7120 respectively. The latter is containerized as a busload for efficient transport, 7120. Inside the propagator, port forwarding tables define the locations of interested subscribers. The bus containers

may be reconstituted, in alignment with the current dynamics of the pub-sub exchange. Chirp packets that are no longer desired or duplicates. For example, heart beat packet duplicates are discarded at each mesh node. The reconstituted bus containers are then sent out to both local and remote subscribers 7140. Subscriber interests are provided by both local and remote agents of integrator functions, 7050. Since chirps are category based, the protocol handlers (on both sides of the Chirp/IP boundary) are logically part of the same publish subscribe bus system, with buses operating at different schedules in both networks. In one embodiment, bus schedules are managed by a distributed scheduler, such as the embodiment of figs. 65 through 67. An Analogy would be nation wide bus services involving both greyhound (IP) and county (chirp) bus services collaborating on bus schedules to minimize overall delay, based on current traffic supply/demand.

FIG. 72, a version of Fig. 58, depicts the top level view of the entire M2M service delivery framework consisting of simple terse messaging devices 7210. A propagator and bridging Mesh Network 7220. This includes agents resident on the nodes 7225, see also 7050 of Fig. 71. Agents act on behalf of big data subscriber interests 7230. The propagator and integrator functions are thus closely coupled, down to the network port forwarding tables. This engenders efficient, latency sensitive, “small data” flows.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

The description above and below and the drawings of the present document focus on one or more currently embodiments of the present invention and also describe some exemplary optional features and/or alternative embodiments. The description and drawings are for the purpose of illustration and not limitation. Those of ordinary skill in the art would recognize variations, modifications, and alternatives. Such variations, modifications, and alternatives are also within the scope of the present invention. Section titles are terse and are for convenience only.

The following concepts are applied in the embodiments described below:

1. Logical Radio Routers
2. Efficient Terse Messaging Transport
3. Modular Nodes based on U/D/S/A
4. Isolated Network support
5. Remote Management

6. Application Aware Mesh Control
7. Chirp Device Registration and Discovery
8. Latency Sensitive Terse Messaging

This section applies those methods to transport "chirp" broadcasts akin to VoIP packets from "chirp" device networks to co-existent and incumbent IP based network devices and protocols.

Raison d'être for Chirp Protocols

Traditional networking protocols/techniques, specifically IP-based protocols, originated from *sender-oriented* communications. They emulated legacy frameworks of human-human networks to support human-to-human correspondence. Thus the methods of routing postal mail resulted in email. Emails are sender oriented. Sender oriented communications are intended to be read by stated intended recipients only. It is not lightweight: it contains destination addresses and potential encryption so they are not tampered by hackers. They were historically point to point communications.

With all this overhead in place, on every packet basis, IP based routing protocols favor economies of scale in moving large packets, preferably with best effort only. When QoS is required (latency/jitter/assured delivery) IP protocols extract a premium. Small packets are also charged a premium because the "standard" minimum packet size was not designed with them in mind. Traveling inside the minimum size, they have to pay the same price in transmission time and bandwidth requirements as the "standard" minimum.

This adversely affects the delivery schedule of lightweight packets (e.g. VOIP, Figs 10, 11) that travel no faster than large packets, through no fault of theirs, other being smaller than the standard packet size. Hence container based transport for VOIP, Figs. 10-12 are discussed in referenced applications. Filling the packet container reduces the "price" per VOIP packet and also ensures reliable (assured latency/jitter) delivery. Without containerization, client capacity rapidly deteriorates, Figs 10-11. The IP highway is not suited for short chirp like devices, whether they are VOIP packets or other types of small-payload transmissions.

In addition to favoring larger packet sizes, retries (as in birds chirping repetitively) are frowned

upon. Resending large packets increases traffic and TCP/IP overhead costs are based on a low number of retries. Further, retries are discouraged because they may flood the network e.g. broadcast storms. Retries are the exception, not the de facto modus operandi. Hence various forms of "virus" checks on email, file transports etc. are used. Since small packets are treated as one large packet, any device that begins to "chirp" like birds who chirp blindly and repetitively are costly especially when these chirp-like packets are travelling solo, Figs 10-11 and hence the value of concatenation and scheduled transmissions of larger packets see 020 in Fig 12.

In contrast with legacy networks, communications that uses retries and over provisioning/broadcast storms are common in nature. For instance, pollen distribution by plants is not sender oriented. Instead, as many messages are sent as possible, in all directions. Note that these storms (e.g. pollen, monsoons) are seasonal, their time to live functions are encoded in their design. Parameters for these information containers do not have to be explicitly stated in each packet header. Pollen has its time-to-live function genetically encoded in it. Beyond that time it is ineffective. No network flooding can occur, despite over provisioning. Broadcasts are managed at a distributed systems level through the mesh control layer, Fig 20, not on a per packet basis. Now, flooding can be contained, as in nature.

Further, nature's "packets" are receiver oriented. Pollen is promiscuously propagated, witness the temporary broadcast storms called allergy season. It is the receiver that has the (genetically encoded) secret handshake to unlock the pollen packet data. Sender data need not be encrypted.

In nature, receiver oriented security enables pollen to be lightweight (terse) and carried far by even low power winds. Further, pollen is reasonably patient or latency indifferent. As long as winds appear within pollen season, spring will occur. Light weight chirps/pollen are thus secure and lower Total Cost of Ownership (TCO) based on their lightness and "patience."

In the world of Internet of Things (IoT), there is a need to be able to support lightweight chirp-like data without unduly taxing either the incumbent IP based networking protocols or the "chirp" device. This network protocol would support economical and effective transport of small, terse, repetitive chirps. In many cases the chirps are latency indifferent. Further, they would allow varieties of subscriber driven (receiver oriented) temporary broadcast storms without adverse effects.

DNA based Genus Classification

Routers/Propagators, need some pollen “genus” or category or description to enable the match making. What does this descriptor look like? Bird chirps serve as an analogy. Bird chirps are categorized, based on studying individual bird categories. We can identify the bird type from its chirp/tune/melody. Hence those subscribers interested in melodies from doves, can now receive those recordings, based on bird category. The categories will have to support different levels of granularity - some bird enthusiasts are only interested in doves near their homes. Hence the category field, should be sufficiently flexible in design, to support further drill down.

In both melody/tunes and DNA structures, there exist "marker" strands of information that provide a common pattern across members of the category. These markers occur at specific locations and are of specific patterns. Thus, some categories may be described as those that have a 8 bit marker, always in the 4th byte of the bit stream. Thus the classification could be 4.8.XX.XX, where XX are more levels of granularity that may be gleaned from knowing a specific pattern type and what it entails, in terms of how to further classify the public (no security but not necessarily universally decipherable) category field.

Subscription based granularity Finer granularity is simply a matter of loading the appropriate agents who can recognize and sort based on information unlocked by the marker templates. Markers may be used in both public and private sections, Fig. 64. Agents unlock those patterns, based on access to Marker data formats to generate a finer granularity category/payload. In Fig. 70, the public category 4.8.255 7050 is sufficient to get the pollen to the **4.8.XX** “bus stop”. Agent 7060 then provides the data format to identify pollen as **4.8.255.22.243.16.23** 7070. The publish subscribe exchange can thus support M2M flows shown in Figs. 68, 69 at varying levels of granularity. The payload is still secure, with its own agent 7080.

Low Overhead Routing is now possible: a quick bit mask on incoming chirp packets, Fig. 71 filters all publishers for **4.8.255....** Further filtering may require addition agent subscriptions e.g.

4.8.255.22

4.8.255.22.243 ...

In one embodiment, Public classifications provide at least 3 levels of addressing (e.g. 4.8.255) and potentially the complete DNA strand/signature, based on agent subscriptions.

The number of sub genus categories (e.g. 3 for 4.8.255) needed to more tightly define the zone of publisher interest is diverse. It is based on subscriber interests and mesh topologies see Figs. 13, 39, 59, 60, 63, 68, 69. The nature of sorting, aggregation, filtering chirp data favors hubs along the router mesh tree. As described in referenced applications, natural “hubs” emerge, where it is more toll and hop cost effective to place agent for rerouting and reloading buses, Fig. 71, and agents will move to propagator nodes based on demand/supply and toll/hop costs, see Appendix A, 10/434,948.

Finer granularity costs requests follow the same toll hop costs and driven by the same economics: some applications/agents will work with “cheaper” but still relevant data some “hops” away. Other traffic may be more latency/jitter sensitive see Figs. 56, 68, and onwards. In one embodiment, packets are cloned at each junction of the mesh tree, to support multiple subscribers and routes. Pollen subscriber thus are dynamically driving the “wind” of bus loads, their contents and their frequency, at concurrent multiple levels of granularity, Fig. 71, 72.

Inherent Security of Chirp Protocols

Encapsulating Chirp Packets Chirp data transport involves traversing the IP network, in some embodiments, and are thus susceptible to snooping/hacking. But this is not your typical IP data packet since the data is based on Chirp/Pollen-ID and/or Flower/Agents-ID etc. These are not typical IP or MAC-ID type Sender/Receiver Address Frames, Figs. 34 through 36. The same format is also available for chirp devices:

- a) The IP Destination Address (if applicable), and can include other addressing information depending on the type of transmission involved - e.g. unicast, multi-cast or broadcast, 3520,
- b) Chirp-ID (in the Sender Address frame, SA, 3522),
- c) Agent-ID being sought (in the BSSID Element, 3524)
- d) Any other use of the IP frame formats, recognizable by an agent.

All options (and their variants) exist within the exemplary Action Frame format, suitable for transmission over standard WIFI networks.

In one embodiment, Fig. 36 shows a measurement request action frame, 3630. These management or action frames look like the innocuous request from stations requesting information from a specific AP (with BSSID). Only chirp aware routers are aware that these are actually chirp packets and that the data in the DA, SA and BSSID is to be interpreted differently based on their internally known data format (Marker template, Figs. 64, 70).

Chirp routers know just enough to decode the DA, SA and BSSID data sections, Figs. 35-36, to provide necessary routing. They cannot decipher the vendor specific information elements - only specific agents/tunes/flowers hold those private "keys." Routers simply engineer "winds" and "buses" to move pollen.

How does the Chirp aware router recognize a chirp packet masquerading as an IP packet? Multiple embodiments exist:

SIP-like Registries In one embodiment, the router knows which interface transports Chirp packets. It has a complete list of 802.11 stations associated with this AP. As part of the tree topology, it also has a list of all stations downstream - via the downlinks, Figs. 4 through 8. It may not have access to the routing tables up stream. However, it may use distributed SIP registries that contain both chirp device and agent ID locations. Some embodiment use dynamic SIP registries to continue to provide VOIP phone connectivity even within isolated clusters. The same principles may be used to define where agents/flowers are, or the reverse look up - where chirp devices are, of interest to a particular agent.

Local Port Identification Even without the aid of SIP-like registries, chirp routers are still cognizant of the special nature of the data packets being transmitted. Chirp routers are keeping track of which port interface was used to inject the IP packet into the mesh network. In the mesh nodes shown in Figs 17, 23, there are multiple interfaces generally provided - the uplink and down links of Backhauls (BH and FD) and the client Access Points (AP). If the chirp packet came in through one of the APs, then it is marked as a chirp, since the Chirp ID provided does not match an associated IP based client's IP address or MAC-ID in its routing table.

Exclusion Principle in one embodiment, the AP does not need to keep a list of chirp devices it services - it can surmise its identity based on the *exclusion principle*, namely, this device ID, if an IP

based device, is not in its routing tables or those of its node neighbors. Chirp device port locations and identity do not have to be stored, if anonymity is desired. In one embodiment, the chirp will still be forwarded up and/or down through the up links and down links the mesh tree, marked as a chirp in search of the agent/tune/subscriber. The identity of both chirp and its interested agent/tune/flower is hidden and yet the pollen reaches the flower efficiently. Ability to provide this type of anonymity extends existing prior art IP based routing security.

Incognito Pollen: Some pollen travel incognito. That is, they expect propagators to rebroadcast them, potentially in all directions, until an intended agent discovers them. In one embodiment, a "4.0" category pollen implies a marker at byte 4 but its length is not specified. Agents with bit mask filtering locate such semi-incognito pollen, they know what the marker is. Note the marker can be arbitrarily long or short. Short markers increase the occurrence of false positives with other marker types (e.g. 4 bit markers 1.0.1.1 sharing same 4 bits as 8 bit marker 1.0.1.1.0.0.1.1). Agents that have this level of information can also glean other data from the packet melody/strands, to filter them out.

Port based Zone Control In another embodiment, a "0.0" category pollen does not specify either the location or size of the marker. This is completely incognito and the propagator must continue to rebroadcast the pollen both up and down the tree till it reaches either roots or leaves of the tree. Chirp devices have no access to the IP network except through the bridging propagators Fig. 22. As in nature's broadcast storms, an agent at the chirp interfaces is either present or the pollen dies. Not that the tree networks in Fig 22 are all layer 2. Only routers and their routing applications (Fig. 12) can initiate a bridge from Chirp to IP. Hence IP spamming/flooding from a corrupted or malfunctioning chirp device is stopped at the router.

Audit Trails Enterprise Class messaging mandates full audit trails on the myriad forms of communication being supported with the network. Each mesh node keeps a time window log of all messages received from all ports 090, Fig. 12. Further, for security reasons, it needs to keep a log of all out going packets created by applications operating at both Kernel and Application levels of the Stack. In one embodiment, the mesh node routing tables treat applications as a special class of client devices, resident in their multi-tenant application deployment environment. The location of affected devices is known within the network tree. Heart beat based messages are sent to all "clean" nodes to avoid contact with "affected" nodes and a new "temporal Key" is issued. Akin to ant colonies, the nodes response to "danger" evolves over time as publish-subscribe demographics change within the

hybrid social network of humans and their machines and their evolving machine Esperanto, Fig. 69, 70.

Lineage Based Secret Maps. In some situations, a 0.0 pollen may wish to specify a direction and nothing else - e.g. up or down the tree. Thus, in one embodiment 0.0.1 pollen are upwards, while 0.0.2 pollen are downwards. Since each category has its own vocabulary and language, 0.0 chirp families may choose to use the next two bits to define direction (0.0.0.1, 0.0.1.0, 0.1.1.0 ..), as opposed to marker size. If the device is removed from the network and its expected topology, the navigation fails. The device is therefore “imprinted”, like migrating birds, with a navigation “Mother” pattern. This is relevant to imprinting devices in the field to become part of a network, for life. The directions encompass both the chirp network topology and its parent IP based network tree, in an hybrid mesh network comprising of both, Figs 22, 39 et al. Alternate navigation routing maps are also provided in one embodiment, for dynamic failover in healthy networks, Fig. 55.

Chording Channels An agent can convert the data flow to be IP based, with regular IP addresses. In one embodiment, private networks coexist and span both chirp and conventional transmissions using "pattern" hopping techniques known only to them and their agents on the network. Part of the data travels as IP Data frames while others via chirp protocols, analogous to musical chords or dual signatures needed on a check. Only agents know the (chorded) "tune" This further obfuscates the chirp data flow.

In some embodiments, chirp data comprises IP based transport packets whose format is regular and legitimate IP-based packet. It supports all the Frame Control feature sets, Fig 34, 3420, including multiple frames, power management and Distribution System (DS) flags. Thus, competent agents, running on chirp aware routers, may also convert IP data (including VOIP packets) into chirp packets, send them anonymously to another agent and then reconvert them back to IP traffic. This obfuscates IP based data flow. Thus both Chirp and IP payloads may be used interchangeably to obfuscate data flow within both chirp and legacy networks.

Conventional IP based devices may also use category patterns as part of their data classification schemes. IP based packet headers specify the sensor MAC_ID or serial number within the payload, in addition to the category classification for IP based applications using the pub-sub exchange. By the same token chirp devices, may, in their private payload or public category type, contain an IP

address where they wish their pollen to be sent. At each junction of the mesh network, there is the potential to bridge between IP and non IP logical radio mesh networks, Fig. 22. At each junction there is the ability to reroute the packets or prune and reload them, Fig. 71, in alignment with current pub-sub demographics.

Chirp Bus Shuttle Scheduling

Several embodiments refer to scheduling of VOIP, to enable chirp like broadcasts from chirp like device networks to be efficiently repackaged to travel on existent and incumbent prior art IP based Network devices and protocols.

Chirps do not have destination addresses. Like school children boarding a school bus, they must be directed to get on the "yellow" bus/wind. In one embodiment, at each bus stop along the way, they need to be told which next bus to board, Fig. 71. The edge router Figs. 12, 23, 71 manages bus arrival and departure times and also getting the chirp/pollen bulk containerized and ready for each bus trip. Where containers go is driven by the "clients": it is directing pollen to interested parties only. The chirp routers manage pollen/chirps getting on the correct "yellow" buses and bus departure schedules, as depicted in Fig. 71.

Random Intervals, In one embodiment, simple devices chirp intervals are random, thereby providing a "white noise" effect that smarter devices can adjust for, using automatic gain control and other methods.

Regular Intervals In one embodiment, buses leave at regular intervals to help schedule when a container of chirps arrives and leaves at each bus station. They are a part of the mesh network support infrastructure for chirp travel. Their frequency of arrival is driven by the polling frequency (e.g. 20 ms for VOIP phones). It will vary depending on the chirp device nature and urgency per methods taught previously, Figs. 12, 24, 27, 28. Scanning and polling frequency is adaptive, per methods taught for mobile nodes.

Dynamic Intervals. Additionally, subscribers, in one embodiment, awaiting specific pollen delivery, may also request sooner or later delivery, thereby dynamically changing Quality of Service (QoS). Collaborative scheduling agents, in some embodiments, ensure global supply chain alignment of

supply/demand using simple concepts like "avoid" and "cluster" to ensure appropriate use of bandwidth resources and prevent "stacking" Figs. 65 and also teaches hierarchical scheduling collaborative agents in control systems, Figs, 26, 39, 68, 69.

This is a departure from Prior Art, where sender oriented IP packets declare their Quality of Service (QoS) requirements a priori, and QoS requirements are blindly enforced along the network path at significant added cost. QoS is *dynamically managed in a receiver oriented network*.

Bus Logistics Hubs In one embodiment, using the bus stations as decision points breaks up routing decision to *hops between logistics hubs*. The current active subscriber demographics and demand may be reevaluated at these hub points. Re-routing may be needed. For example, in one embodiment, routing policies may be specified. One "policy" is in place that all GE refrigerators provide a daily health status short "chirp" "color" (e.g. red, orange, blue, purple) forwarded to GE appliance service centers/subscribers. There are four such appliance region centers e.g. North, South, East and West. Based on the chirp signature and device location, directives running in edge routers "know" which bus load this pollen/chirp has to be part of. There may be multiple subscribers so it also needs to track and route multiple concurrent buses to multiple subscriber locations. Further, at each bus stop, at each mesh node, the routers must "know" enough to "sort" pollen, at varied levels of granularity for most effective onward directions, Fig. 71. If packets need to be cloned to support multiple subscribers, they are, at forks along the path, in this embodiment. VOIP-like chirp packet cloning is managed by the router on a need basis, where forks occur - e.g. the container was traveling north, now is split into eastward and westward "half" containers and combined with other fellow "half" eastward and westward bound containers to form a more efficient whole container.

Departures from Prior Art The hierarchical tree architecture is similar to a post office hierarchy (county, city, country are the hub levels), but unlike the post office, the direction or "default" address does not convert the communication into explicit addresses and sender-oriented transmissions. This type of routing circumvents the *static address schemes* used in traditional mail and email routing. In these embodiments, the destination of the bus is dynamic and so is its routing path. This is analogous to not just changing bus routing (e.g. an accident) but also end destination (e.g. hospital) based on the current situation and nature of containerized load. If the load is no longer needed, it is discarded mid journey. Round tripping, caused by static destination addresses, is avoided. Further packets are cloned and pruned at each junction of the route, in alignment with pub-

sub demands.

Collaborative Coexistence

Chirp data transport to the cloud involves traversing the IP network. Collaborative Coexistence is key since some chirp packets have subscribers reachable only through the incumbent IP network, e.g. VOIP chirp-like packets for an overseas subscriber. These networks and protocols must also conform to the existing frameworks and mediation layers e.g. Figs 12, 20. Chirp/pollen devices are simple- they do not know where the flower is. Hence IP destination addresses cannot be provided. Chirp aware routing supports these new receiver oriented packets.

Further, if chirp devices intend to operate in the same frequency spectrum as IP devices, then both dance partners need to share the dance floor without constantly stubbing each others toes (e.g. collision □ causing interference □ some causing retries □ possibly network flooding). Coexistence requires chirp devices not habitually create collisions or accidents on the IP based highways, like bad drivers. Methods taught with legacy chirp like devices (VOIP) see Figs. 10-12, 24-25 ensure both types of transmitters dance well together in the same RF space.

Scheduling Device Chirps In one embodiment the chirp transmission schedules feeds the inter-node chirp bus schedules. Collaborative Scheduling, Figs 65 though 67 is used by mesh nodes to thus drill down to generate the local bus schedules for the node-node transport system. This in turn, drives when chirps need to arrive. The schedule also directs when buses leave. Routers are monitoring the bus queues. Routers may also thus request smart chirp devices to chirp more (if missing buses) or less frequently (if often waiting in line). Chirps then occur with the timing constraints of the bus scheduling system so that chirp packets arrive in time to climb aboard the bus in time to meet the inter-bus schedules of the logistics hubs. Hence, smart chirp devices, have an advantage over their simpler chirp only devices.

Ideally, Chirp transmissions should occur sufficiently frequently for the level of granularity requested by the subscribers ("Customers") schedules.

Small blue/red shift directives are provided by the Access Point for chirp devices. The Access Point receiving the chirps, monitors them to determine the range of the transmission "task" start/end times

and their blue/red regions. It can thus profile the task and its variants. The bus schedule for the subscribers are then examined to determine the optimal bus size and interval. This, in turn drives how often the chirps must be transmitted and at what time. Synchronization may be approximate, measured in terms of a non dimensional parameter e.g. the fraction of the current chirp interval. This ensures complicity since both parties understand what that means regardless of whether they represent the time in nanoseconds or primitive register counters, Thus listen capable chirp devices may be controlled to adapt to the subscriber interests.

Closing Local Control Loops

Compare pollen based routing to conventional IP addressing. IP addressing is destination based. After the IP packet reaches its destination, the payload is deciphered. The typical thin client machine control loop, Fig. 56 is best efforts and assumes (remote) connectivity. It is difficult to provide local autonomous machine control for applications in Figs. 39, 56, 57, 68 , 69.

The Chirp Category classifications scheme enables usable small data to be both generated and consumer by and for the edge member devices. Data is processed closer to the source/cluster, where it has more impact in tight sensing-control-actuation loops Fig 56.

Topology Matters Fig 46, depicts why network latency and topology are inter-related and hence relevant to latency sensitive VOIP/Chirp bus delivery schedules. In one embodiment, a round robin approach where, the AP services each client in turn. In that example, 10 ms is the (equal) service duration for individual client services. Packets are buffered till a round robin cycle is complete. At the end of each cycle the container is sent, per up the tree, in one embodiment. The local latency upper bound would therefore be 30 ms for section 70. By the same token, the root node is servicing 5 clients and hence the upper bound to reach the root node is 50 ms for sections 70, 80. Further, the example pointed out that, had all the nodes been connected directly to the root node, the latency would be 90 ms. 1 hop networks - all clients connected to a root node - are not necessarily "better". A five-hop string-of-pearls, $O(n)$ routing scheme, Fig 45, may provide better service, than the 1-hop 5-client star, Fig 46, Section 80.

In one embodiment, bus delivery schedules are driven by the round robin delay caused by servicing siblings, at each sub tree along a route. More siblings imply more latency and favor node/device

migrations. Others may barter to get a bigger slice of the pie. Accordingly, network topology and routing is modified based on toll/hop costs.

In Fig 46, nodes operated independently and asynchronously but based on a common multiple of some service time interval e.g. 10 ms. Minimum Bus Intervals vary, based in the number of siblings. During the process, the bus interval is set. Buses leave at preset intervals, regardless of whether the bus is full or not. In more efficient implementations, the departure time is flexible, and buses may wait till more passengers arrive, within a prescribed waiting limit. Thus the stream and CSMA allocations are based on "stacking", in dynamic alignment with "Customer Satisfaction" Figs. 65, 66, 67.

Periodic Silent Intervals In Fig 47, the bulk bus transport stream 4720 is first, during which all clients can listen but not talk, see Figss. 12, 24. The remainder time 4750 is used to transfer data back from IP based clients to nodes etc. Further, Fig. 25 shows separate "channels" for concurrent transmissions. Contention is reduced during the Stream section, 4720 and possibly more. SCAN agent, Fig 12, measures overall activity of disparate packet types (a form of "channel list"). Note that in Wi-Fi standard infrastructure mode, all communications are with the AP, hence tree based routing is inherent.

Stream Reader Circuits: Fig. 50 depicts the stream reader, in one embodiment. Special purpose Stream Readers are privy to data traffic queued for transmission at a node. Like post office sorters, they identify and sort the "mail" and therefore, help to collectively define bus schedules, reduce dead letter re-transmissions etc. Stream readers, resident at the node, feel the "pulse" and therefore provide early warning signals to the Mesh Control Layer. More "mail" from one node may increase toll cost for other child nodes to switch parents, using load balancing and adaptive power control methods, Fig 1.

Stream readers can feed multiple stream viewers, 5040, sequential readers/agents, 5060 or a logging database 5080 community mailbox etc. A circuit of collaborating stream readers and subscribers emulate complex logistic supply chains, see Fig. 51, 5120. Disparate traffic data is sent to knowledge repositories 5180. Secure Control lines from it, 5170, drive sub-circuit behaviors and their outputs, 5125, 5135, 5155. Repositories may also provide the secret handshakes needed by readers to correctly decode public network traffic 5150. Thus bulk network traffic, 5150 may employ little or

no encryption and thus be lightweight, like pollen. Further, the Network Viewer 5190 may be connected to the real time stream plug in circuit 5145 or run it in playback mode, 5165 from knowledge repositories 5180. The same circuit based framework 5120 may also provide interleaved real time and historical trending, simulations and machine learning, Fig. 52, 5290. Note that 5155 is not connected - it is in "connectionless" broadcast/multicast mode. Thus both direct and indirect subscription styles are supported within the same stream reader framework.

One embodiment of an open extensible Stream Reader Framework, Fig. 52, is implemented in Java. A subset, JavaScript API 5230, provides dynamic and customizable HTML based views. Custom Stream viewers define the GUI for different devices and form factors. More complex business logic applications use the Enterprise class Java API and Repository 5240. Third party adapters and applications, 5250, extend the network to consumers/providers of information and their viewers. Fig 53 and 54 depicts the published interfaces for the Network Manager Streams API and the Heart Beat Entity relationships, respectively. Together, they enable speedy development, for Hybrid Human-Machine networks Fig. 55.

Device Management and Control

Discovery and Registration: Several embodiments expand on the DHCP approach with the isolated distributed SIP registry functionality as described in that invention. Terse and periodic VOIP chirps are routed by the local SIP server. Further, when the VOIP network joins an external network, SIP registry information is exchanged. The Chirp registries may thus also exchange chirp device classifications and protocol specifics. Other (restricted) registries may contain location of agents dispersed at local nodes based on bus scheduling requirements. This enables discovery using the same approaches for devices, agents and logistics hubs. A comprehensive framework for discovery and routing for both Chirp and IP devices are thus supported by the DHCP and SIP registry modules, specifically designed for mobile, temporal wireless mesh networks.

When a new device is registered on the network, its agent/app is "loaded"- . This agent/app then provides the subscriber-based chirp-to-chirp translations and chirp-to-IP translations and filtered "small" data. Based on the direction of the chirp, agents may also direct propagators to provide intermediate translations see Figs. 22,23 through applets operating at the routing and "port" forwarding tables at each mesh node port/interface of the dynamic switch stack tree.

Learning through Correlations Figs. 68 through 69 depict application use cases that highlight the shared publish subscribe exchange through which small data reaches big data subscribers and their analysis/inference engines. In Fig 68, a low cost lawn sprinkler actuator is controlled through a local control loop, 6910 and a remote control loop 6930, conversing through a shared publish-subscribe exchange, 6920, see also Fig. 56. Upstream to the actuator valve a water pressure sensor is depicted, 6922 as is a down stream water flow sensor 6924. Both sensors reside within the local (and secure) M2M home community and their (subscribed) chirps are part of scheduled pub/sub exchange 6920.

The lower control loop vocabulary is limited to actuator commands 6915, (e.g. "ON", "OFF"). The system has no way of knowing whether the lawn sprinkler is functional, without accessing information from the larger M2M community. When chirp data is time tagged, then causal analysis indicates that if the upstream water pressure is "good" and the down stream flow is "bad", then the actuator is worn out and needs replacement, see 6835. A local integrator agent, 6837 may also, through access to the shared pub/sub stream, 6920, be directed to perform this check each time the valve is activated, thus reserving internet traffic for exception handling. Thus an intelligent valve actuator emerges, without additional hardware/sensors at the actuator. Dual control loops thus provide intelligence without adding to the cost of the device.

Figure 69 depicts how discovery of related sensory streams can drive more refined control models for M2M Enterprise. The initial application is Air Conditioning control for a large building, 6910. The integrator agents, through the shared chirp classification streams, discovers other local subscribers to the energy usage/cost data 6920 active in the same building. Further analysis of their activities indicates that the front door elevators are active the same time that the heating/cooling in that zone is "unstable", 6930. It also can correlate night time activity, when lights are turned on 6940 in zones that need to be activated, when the lights are on. Hence multiple, related subscriptions now drive a refined control model for air conditioning, 6950. Note that human "experience" would arrive at the same conclusions over time but machines, through their subscriptions and pattern analysis are able to close the loop semi-autonomously or autonomously. Further, the causal analyses/inferences gleaned from one building may be transportable across related domains. Therein lies the power of a shared pub/sub exchange - the ability to glean useful data from hitherto unknown sources. See also

Classification Aided Discovery How does the local integrator or its big data supervisors "discover"

water pressure correlations in Fig 68 or the local energy consumers in Fig 69 ?. This discovery is engendered through the chirp classification system, two embodiments shown in Figures 64 and 70. In Figure 70, the 4 bit marker pointer 7010 has a bit address of 1010, indicating an 8 bit marker pointer 7030, at the end of the packet with its agent ID of 255. This means that the public section 7020 is 4 bytes long. The coarse classification is thus 4.8.255, sufficient for pub/sub bus schedules to deliver the chirps to hubs and clearing houses, see 7050. Those who have subscribed to Agent 4.8.255 may then be able to decipher the container further. For example, Agent 48.255 states that each of the 4 bytes is a further classification, see 7060. The full chirp classification is thus 4.8.255.22.243.16.23.

Network Management The resulting implementation within a network of wireless nodes is scalable with no loss of bandwidth over many hops. The resulting network logic is distributed with low level autonomy on routing, power and channel management. The network uses distributed intelligence in terms of applications and where they reside: the result is a network where both the network management and the applications within the network can be distributed. The embodiments serve as a new type of service delivery framework specifically to address more "smarts" at the edge where the simple devices are sending terse messages or chirps. The network is flexible in that it can be implemented with multi-purpose devices, with alternative embodiments relying on a router and other embodiments using a client device. The embodiments rely on mesh nodes or routers, with the benefit of the router versus Machine controller are that by relying on the router there is low latency communication and ability to prevent escalation. The embodiments also rely on the router as the application delivery platform. The result is that the SDN control plane extends to the edge of the network where the chirping devices broadcast. In one embodiment the heartbeat extension to include sensor feeds and the result is integration with the NMS.

In summary, a new type of device management system emerges where efficient M2M command and control is enabled at the edge and edge communities. Chirp category based packet identification provides the M2M version on nature's receiver based communication protocols. Timing pollen "winds" is explored in Figs 25, 26, 65, 71. Heart Beats and Streams are discussed in Figs 46 through 55. The streams support applications in closing real time M2M control loops, Figs. 56 through 63, 68 through 71. Figs 72 and 58, depict the top level view of devices, propagators and integrators, each essential to a sustainable Internet of Things.

CLAIMS

1. A system of transmitting of data packets within a network comprising:
 - at least one device transmitting at least one short communication message;
 - at least one device transmitting at least one standard communication message;
 - an array of wireless network routers communicating in a tree-shaped logical structure;
 - at least one of said wireless network routers comprising a chirp receiver for the at least one short communication message; and
 - at least one of said wireless network routers comprising a standard receiver for at least one standard-length communication message;wherein said chirp receiver accepts said short communication message in a round robin manner from client devices associated with said chirp receiver, wherein each short communication message is received at a designated time period; wherein said short communication messages are buffered until all messages are received from all clients and a single buffered packet is formed from the combined short communication messages; and
- wherein each wireless network router further comprises an uplink function connecting said wireless network router to another wireless network router in the tree or an external ip-based network; a downlink function connecting said wireless network router to other wireless network routers within said tree; and a scanning function wherein the uplink function and the downlink function connect the wireless network routers participating in the system in a tree-based virtual switch and wherein said buffered packet is sent using the three-shaped virtual switch.

2. The system of claim 1 wherein a path within said tree-based virtual switch can be calculated in linear time with respect to the number of wireless network routers participating in the tree.
3. The system of claim 1 wherein said buffered packet is transmitted within the tree to the designated target host connected to another wireless network router or the external ip-based network.
4. The system of claim 3 wherein a path through the tree of the buffered packet is calculated in linear time.
5. The system of claim 3 wherein the transmission of the buffered packet does not delay standard communication messages transmitted in the tree.
6. The system of claim 1 wherein said clients are dispersed throughout the tree-shaped network.
7. The system of claim 1 wherein said round robin clients can reserve more than one time slot to obtain additional resources from the wireless network router.

8. A system of transmitting of data packets within a network comprising:

at least one device transmitting at least one short communication message having metadata attached to said communication message;

an array of wireless network routers communicating in a tree-shaped logical structure; and

at least one of said wireless network routers comprising a chirp receiver for the at least one short communication message;

wherein said chirp receiver accepts said short communication message in a round robin

manner from client devices associated with said chirp receiver, wherein each short

communication message is received at a designated time period; wherein said short

communication messages are buffered until all messages are received from all clients

and at least one buffered packet is formed from the combined short communication

messages;

wherein each wireless network router further comprises an uplink function connecting said

wireless network router to another wireless network router in the tree or an external

ip-based network; a downlink function connecting said wireless network router to

other wireless network routers within said tree; and a scanning function wherein the

uplink function and the downlink function connect the wireless network routers

participating in the system in a tree-based virtual switch;

wherein said buffered packet is sent using the uplink function of said wireless network router

through the three-shaped network.

9. The system of claim 8 wherein multiple buffered packets are formed from the short

communication messages and wherein the metadata attached to each communication message

determines which buffered packet the short communication message is attached to.

10. The system of claim 9 wherein a path for buffered packet is calculated based on the metadata and intended target of the each buffered packet.

11. The system of claim 10 wherein the path calculation for the routing of the packet within the tree is performed in linear time.

12. The system of claim 8 wherein some short communication messages are cloned to multiple buffered packets and are sent to multiple destinations.

13. The system of claim 12 wherein said buffered packets are cloned at multiple forks in the tree-shaped network.

14. The system of claim 8 wherein each router participating in the tree may disassemble the buffered packet and send different parts in different directions.

15. The system of claim 8 wherein said short message metadata includes a latency requirement.

16. The system of claim 8 wherein a latency requirement for each short message is calculated on basis of type of data contained in the short message metadata.

17. A system of transmitting of data packets within a network comprising:
- at least one device transmitting at least one short communication message having metadata attached to said communication message;
 - an array of wireless network routers communicating in a tree-shaped logical structure;
 - at least one of said wireless network routers comprising a chirp receiver for the at least one short communication message;
 - wherein said chirp receiver accepts said short communication message from client devices associated with said chirp receiver, wherein each short communication message is received along with its metadata and wherein said short communication message is published to a local control loop; and
 - wherein each wireless network router further comprises an uplink function connecting said wireless network router to another wireless network router in the tree or an external ip-based network; a downlink function connecting said wireless network router to other wireless network routers within said tree; and a scanning function wherein the uplink function and the downlink function connect the wireless network routers participating in the system in a tree-based virtual switch.
18. The system of claim 17 wherein each control loop assembles and processes short communication messages assigned to the particular control group.
19. The system of claim 17 wherein each control group further comprises a local integrator agent, wherein said agent performs a check of all short communication messages received by the local control loop.

20. The system of claim 17 wherein said short communication messages comprises status messages and command messages.

ABSTRACT

A system of transmitting of data packets within a network is described. The network includes at least one device transmitting short communication messages and another device transmitting standard communication message. The network also includes an array of wireless network routers communicating in a tree-shaped logical structure with one router including a receiver for the short communication messages. The receiver accepts the short communication message in a round robin manner from client wherein each short communication message is received at a designated time period. A single buffered packet is formed from the combined short communication messages and sent using the tree-shaped network.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		Chirp Networks		
First Named Inventor/Applicant Name:		Francis DACOSTA		
Filer:		Szymon Maciej Gurda		
Attorney Docket Number:		0357-03304		
Filed as Small Entity				
Filing Fees for Utility 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
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				730

Electronic Acknowledgement Receipt

EFS ID:	30611051
Application Number:	15728863
International Application Number:	
Confirmation Number:	9690
Title of Invention:	Chirp Networks
First Named Inventor/Applicant Name:	Francis DACOSTA
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-03304
Receipt Date:	10-OCT-2017
Filing Date:	
Time Stamp:	14:21:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 730
RAM confirmation Number	101117INTEFSW14214900
Deposit Account	501709
Authorized User	Michael Cherskov

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	Application Data Sheet	WebADS.pdf	164305	no	9
			27814e105c1093b6c4ef498f539b7efa774b0c42		
Warnings:					
Information:					
2	Oath or Declaration filed	Declaration.pdf	265830	no	1
			c54ace9315258f06997a83e24e76216c81ff3833		
Warnings:					
Information:					
3	Drawings-only black and white line drawings	Figures.pdf	21608308	no	72
			d5c63ad33fd6ff01a4bed8f4eeab519d40dbced		
Warnings:					
Information:					
4		Specification.pdf	262181	yes	40
			a8a1bca73f9ded5104a7edc8a3626e55ed37f498		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	33	
	Claims		34	39	
	Abstract		40	40	
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	34901	no	2
			bf4921b2aa177795d09ff46aa5f0dfda40e22089		

Warnings:	
Information:	
Total Files Size (in bytes):	22335525
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>	

SCORE Placeholder Sheet for IFW Content

Application Number: 15728863

Document Date: 10/10/2017

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

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- Drawing

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www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
15/728,863	10/10/2017	2414	730	0357-03304	20	3

CONFIRMATION NO. 9690

FILING RECEIPT



0000000093001590

27197
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602

Date Mailed: 10/27/2017

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)

Francis DACOSTA, Santa Clara, CA;

Applicant(s)

MeshDynamics, Santa Clara, CA;

Power of Attorney: None

Domestic Applications for which benefit is claimed - None.

A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

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: Yes

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: 10/25/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/728,863**

Projected Publication Date: 04/11/2019

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Chirp Networks

Preliminary Class

370

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).

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Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/728,863	10/10/2017	Francis DACOSTA	0357-03304

27197
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602

CONFIRMATION NO. 9690
IMPROPER CFR REQUEST



Date Mailed: 10/27/2017

RESPONSE TO REQUEST FOR CORRECTED FILING RECEIPT

Continuity, Priority Claims, Petitions, and Non-Publication Requests

In response to your request for a corrected Filing Receipt, the Office is unable to comply with your request because:

- One or more of the benefit claims under 35 U.S.C. § 120 cannot be included on the Filing Receipt since applicant did not specify whether the application is a continuation, divisional or continuation-in-part of the prior application. Applicant must submit a new application data sheet (ADS) that sets forth the relationship, and the ADS must be accompanied by a petition under 37 CFR 1.78 if filed after the time period set forth in 37 CFR 1.78.

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.

/agizaw/

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 15/728,863	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	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), (l), 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(j))	20	minus 20 = *	x 40 =	0.00	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			
			TOTAL	730		TOTAL	
* If the difference in column 1 is less than zero, enter "0" in column 2.							
APPLICATION AS AMENDED - PART II							
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	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))					OR	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR	
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	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))					OR	
	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.							

CORRECTED ADS FORM

Application Number	15728863
Title of Invention	Chirp Networks

Inventor Information

****If no data is shown, no data has been corrected****

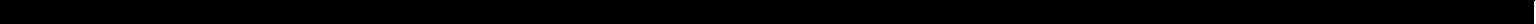
	Data of Record	Updated Data
Order Number		
Name		

Residence Information

Residency		
City		
State		
Country of Residence		

Mailing Address of Inventor

Address 1		
Address 2		
City,State/Province, Postal Code		
Country		



Application Information

	Data of Record	Updated Data
Title of Invention	Chirp Networks	
Attorney Docket Number	0357-03304	
Entity Type	Small	

Domestic Benefit/National Stage Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121,365(c), or 386(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(a).

	Data of Record	Updated Data
Prior Application Status		<u>pending</u>
Application Number		
Continuity Type		<u>CON</u>
Prior Application Number		<u>14740062</u>
Filing Date (YYYY-MM-DD)		<u>2015-06-15</u>
Patent Number		
Issue Date (YYYY-MM-DD)		

		Data of Record	Updated Data
	Prior Application Status		<u>pending</u>
	Application Number		<u>14740062</u>
	Continuity Type		<u>PRO</u>
	Prior Application Number		<u>62012196</u>
	Filing Date (YYYY-MM-DD)		<u>2014-06-13</u>
	Patent Number		
	Issue Date (YYYY-MM-DD)		

		Data of Record	Updated Data
	Prior Application Status		<u>patented</u>
	Application Number		<u>13571294</u>
	Continuity Type		<u>CIP</u>
	Prior Application Number		<u>12352457</u>
	Filing Date (YYYY-MM-DD)		<u>2009-01-12</u>
	Patent Number		<u>8477762</u>
	Issue Date (YYYY-MM-DD)		<u>2013-07-02</u>

		Data of Record	Updated Data
	Prior Application Status		<u>abandoned</u>
	Application Number		<u>14740062</u>
	Continuity Type		<u>CIP</u>
	Prior Application Number		<u>13541446</u>
	Filing Date (YYYY-MM-DD)		<u>2012-07-03</u>
	Patent Number		
	Issue Date (YYYY-MM-DD)		

	Data of Record	Updated Data
Prior Application Status		<u>patented</u>
Application Number		<u>14740062</u>
Continuity Type		<u>CIP</u>
Prior Application Number		<u>14523778</u>
Filing Date (YYYY-MM-DD)		<u>2014-10-24</u>
Patent Number		<u>9730100</u>
Issue Date (YYYY-MM-DD)		<u>2017-08-08</u>

	Data of Record	Updated Data
Prior Application Status		<u>patented</u>
Application Number		<u>14523778</u>
Continuity Type		<u>CON</u>
Prior Application Number		<u>12625365</u>
Filing Date (YYYY-MM-DD)		<u>2009-11-24</u>
Patent Number		<u>8514852</u>
Issue Date (YYYY-MM-DD)		<u>2013-08-20</u>

	Data of Record	Updated Data
Prior Application Status		<u>pending</u>
Application Number		<u>12625365</u>
Continuity Type		<u>PRO</u>
Prior Application Number		<u>61117502</u>
Filing Date (YYYY-MM-DD)		<u>2008-11-24</u>
Patent Number		
Issue Date (YYYY-MM-DD)		

		Data of Record	Updated Data
	Prior Application Status		<u>patented</u>
	Application Number		<u>14740062</u>
	Continuity Type		<u>CIP</u>
	Prior Application Number		<u>13764008</u>
	Filing Date (YYYY-MM-DD)		<u>2013-02-11</u>
	Patent Number		<u>9363651</u>
	Issue Date (YYYY-MM-DD)		<u>2016-06-07</u>

		Data of Record	Updated Data
	Prior Application Status		<u>patented</u>
	Application Number		<u>13764008</u>
	Continuity Type		<u>CIP</u>
	Prior Application Number		<u>13627883</u>
	Filing Date (YYYY-MM-DD)		<u>2012-09-26</u>
	Patent Number		<u>8923186</u>
	Issue Date (YYYY-MM-DD)		<u>2014-12-30</u>

		Data of Record	Updated Data
	Prior Application Status		<u>pending</u>
	Application Number		<u>13627883</u>
	Continuity Type		<u>PRO</u>
	Prior Application Number		<u>61615802</u>
	Filing Date (YYYY-MM-DD)		<u>2012-03-26</u>
	Patent Number		
	Issue Date (YYYY-MM-DD)		

		Data of Record	Updated Data
	Prior Application Status		<u>pending</u>
	Application Number		<u>13627883</u>
	Continuity Type		<u>PRO</u>
	Prior Application Number		<u>61555400</u>
	Filing Date (YYYY-MM-DD)		<u>2011-11-03</u>
	Patent Number		
	Issue Date (YYYY-MM-DD)		

		Data of Record	Updated Data
	Prior Application Status		<u>pending</u>
	Application Number		<u>13627883</u>
	Continuity Type		<u>PRO</u>
	Prior Application Number		<u>61621926</u>
	Filing Date (YYYY-MM-DD)		<u>2012-04-09</u>
	Patent Number		
	Issue Date (YYYY-MM-DD)		

		Data of Record	Updated Data
	Prior Application Status		<u>patented</u>
	Application Number		<u>14740062</u>
	Continuity Type		<u>CIP</u>
	Prior Application Number		<u>13571294</u>
	Filing Date (YYYY-MM-DD)		<u>2012-08-09</u>
	Patent Number		<u>9172738</u>
	Issue Date (YYYY-MM-DD)		<u>2015-10-27</u>

	Data of Record	Updated Data
Prior Application Status		<u>patented</u>
Application Number		<u>13571294</u>
Continuity Type		<u>CIP</u>
Prior Application Number		<u>12696947</u>
Filing Date (YYYY-MM-DD)		<u>2010-01-29</u>
Patent Number		<u>8520691</u>
Issue Date (YYYY-MM-DD)		<u>2013-08-27</u>

	Data of Record	Updated Data
Prior Application Status		<u>pending</u>
Application Number		<u>12696947</u>
Continuity Type		<u>PRO</u>
Prior Application Number		<u>61148803</u>
Filing Date (YYYY-MM-DD)		<u>2009-01-30</u>
Patent Number		
Issue Date (YYYY-MM-DD)		

Foreign Priority Information

****If no data is shown, no data has been corrected****

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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(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).

	Data of Record	Updated Data
Application Number		
Country		
Filing Date		
Access Code		

Applicant Information

****If no data is shown, no data has been corrected****

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.

	Data of Record	Updated Data
Applicant Type		
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		
Applicant is an Organization		
Name		
Organization Name		
Address 1		
Address 2		
City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		

Email Address		
---------------	--	--

Assignee Information including Non-Applicant Assignee Information

****If no data is shown, no data has been corrected****
Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office

	Data of Record	Updated Data
Order		
Applicant is an Organization		
Name		
Organization Name		

Mailing Address

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

Signature

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Corrected ADS 1.0

Signature	/Szymon M. Gurda/	Registration Number	58451
First Name	Szymon	Last Name	Gurda

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: MeshDynamics
Title: Chirp Networks
Serial No.: 15/728,863
Filing Date: October 10, 2017
Atty. Docket: 0363-03304

Submitted via EFS-Web on November 1, 2017.

BOX: MISSING PARTS
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

123 West Madison Street
Suite 400
Chicago, Illinois 60602
(312) 621-1330

REQUEST TO ACCEPT REPLACEMENT ADS

Dear Sir:

Per Notice from October 27, 2017, applicant hereby submits a new ADS via the WebADS system to clarify the priority claim of this application. This application is a continuation of co-pending application serial number 14/740,062 filed on June 15, 2015. A marked up ADS is also included showing the change on page 3 of the ADS. Applicant requests entry of the amended ADS and priority claim.

Respectfully submitted,

CHERSKOV FLAYNIK & GURDA, LLC

By: /Szymon M. Gurda/
Szymon M. Gurda (Reg. No. 58,451)

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		
<p>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.</p> <p>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.</p>			

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				
Legal Name				
Prefix	Given Name	Middle Name	Family Name	Suffix
	Francis		DACOSTA	
Residence Information (Select One)		☒ US Residency ☐ Non US Residency ☐ Active US Military Service		
City	Santa Clara	State/Province	CA	Country of Residence ⁱ US
Mailing Address of Inventor:				
Address 1	3355 Benton Street			
Address 2				
City	Santa Clara	State/Province	CA	
Postal Code	95051	Country ⁱ	US	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.				<input type="button" value="Add"/>

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).	
☐ An Address is being provided for the correspondence information of this application.	
Customer Number	27197
Email Address	mail@cherskov.com
<input type="button" value="Add Email"/> <input type="button" value="Remove Email"/>	

Application Information:

Title of the Invention	Chirp Networks		
Attorney Docket Number	0357-03304	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	72	Suggested Figure for Publication (if any)	67

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

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	27197		
Prefix	Given Name	Middle Name	Family Name
<div>Registration Number</div> <div> <div>Prefix</div> <div>Given Name</div> <div>Middle Name</div> <div>Family Name</div> <div>Suffix</div> </div> <div>Remove</div>			
<div>Registration Number</div> <div> <div>Prefix</div> <div>Given Name</div> <div>Middle Name</div> <div>Family Name</div> <div>Suffix</div> </div> <div>Remove</div>			
<div>Registration Number</div>			
Additional Representative Information blocks may be generated within this form by selecting the Add button.			

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(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 or 371(c) Date (YYYY-MM-DD)		
	CONTINUATION OF	14740062	2015-06-15		
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
14740062	Claims benefit of provisional	62012196	2014-06-13		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14740062	Continuation in part of	13764008	2013-02-11	9363651	2016-06-07
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13764008	Continuation in part of	13627883	2012-09-26	8923186	2014-12-30
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
13627883	Claims benefit of provisional	61615802	2012-03-26		
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
13627883	Claims benefit of provisional	61555400	2011-11-03		

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
13627883	Claims benefit of provisional	61621926	2012-04-09		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14740062	Continuation in part of	13571294	2012-08-09	9172738	2015-10-27
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13571294	Continuation in part of	12696947	2010-01-29	8520691	2013-08-27
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
12696947	Claims benefit of provisional	61148803	2009-01-30		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13571294	Continuation in part of	12352457	2009-01-12	8477762	2013-07-02
Prior Application Status		Abandoned		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
14740062	Continuation in part of	13541446	2012-07-03		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14740062	Continuation in part of	14523778	2014-10-24	9730100	2017-08-08
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14523778	Continuation of	12625365	2009-11-24	8514852	2013-08-20

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
12625365	Claims benefit of provisional	61117502	2008-11-24
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			

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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(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).

Application Number	Country ¹	Filing Date (YYYY-MM-DD)	Access Code ¹ (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			

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.

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/5B/39 or PTO/5B/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

- ☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.
- ☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

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.

Applicant 1

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 MeshDynamics

Mailing Address Information For Applicant:

Address 1	3355 Benton Street		
Address 2			
City	Santa Clara	State/Province	CA
Country ¹	US	Postal Code	95051
Phone Number		Fax Number	
Email Address			

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

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Assignee Information including Non-Applicant Assignee 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.

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Szymon M. Gurda/			Date (YYYY-MM-DD)	
First Name	Szymon	Last Name	Gurda	Registration Number	58451
Additional Signature may be generated within this form by selecting the Add button.					

Electronic Patent Application Fee Transmittal

Application Number:	15728863			
Filing Date:	10-Oct-2017			
Title of Invention:	Chirp Networks			
First Named Inventor/Applicant Name:				
Filer:	Szymon Maciej Gurda			
Attorney Docket Number:	0357-03304			
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
PROCESSING FEE, EXCEPT PROV. APPLS.	2830	1	70	70
Pages:				
Claims:				
Miscellaneous-Filing:				
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:	30831743
Application Number:	15728863
International Application Number:	
Confirmation Number:	9690
Title of Invention:	Chirp Networks
First Named Inventor/Applicant Name:	
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-03304
Receipt Date:	01-NOV-2017
Filing Date:	10-OCT-2017
Time Stamp:	19:52:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 70
RAM confirmation Number	110217INTEFSW19525500
Deposit Account	501709
Authorized User	Michael Cherskov

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	Application Data Sheet to update/ correct info	CorrectedADS.pdf	147660	no	10
			3c714bb0cc6ac63f7a563c4925c666132c258c08		
Warnings:					
Information:					
2	Transmittal Letter	ADSRequest.pdf	79116	no	1
			30067a3c9824a7efb2e42d191ae8c17760985115		
Warnings:					
Information:					
3	Miscellaneous Incoming Letter	MarkedUp.pdf	2316917	no	9
			8a932ece29aee2ec1ae3e439f971ea43334fbcd		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30333	no	2
			7a84bb9f1786d7950432c414855b6618490df7b0		
Warnings:					
Information:					
Total Files Size (in bytes):			2574026		

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.

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 11/03/2017

CVORACHA	ADJ #00000009	Mailroom Dt: 11/01/2017	
	Seq No: 5632	Sales Acctg Dt: 11/02/2017	15728863
	01 FC : 2830	-70.00 OP	

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 11/03/2017

CVORACHA RF #30204501 Mailroom Dt: 11/03/2017 15728863

Credit Card Refund Total: \$70.00

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UNITED STATES DEPARTMENT OF COMMERCE
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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
15/728,863	10/10/2017	Francis DACOSTA	0357-03304

27197
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602

CONFIRMATION NO. 9690
NEW OR REVISED PPD NOTICE



OC00000095372330

NOTICE OF NEW OR REVISED PROJECTED PUBLICATION DATE

The above-identified application has a new or revised projected publication date. The current projected publication date for this application is 02/15/2018. If this is a new projected publication date (there was no previous projected publication date), the application has been cleared by Licensing & Review or a secrecy order has been rescinded and the application is now in the publication queue.

If this is a revised projected publication date (one that is different from a previously communicated projected publication date), the publication date has been revised due to processing delays in the USPTO or the abandonment and subsequent revival of an application. The application is anticipated to be published on a date that is more than six weeks different from the originally-projected publication date.

More detailed publication information is available through the private side of Patent Application Information Retrieval (PAIR) System. The direct link to access PAIR is currently <http://pair.uspto.gov>. Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Questions relating to this Notice 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.



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
15/728,863	10/10/2017	2414	730	0357-03304	20	3

CONFIRMATION NO. 9690
CORRECTED FILING RECEIPT

27197
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602



Date Mailed: 11/13/2017

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)

Francis DACOSTA, Santa Clara, CA;

Applicant(s)

MeshDynamics, Santa Clara, CA;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 14/740,062 06/15/2015 PAT 9819747
which claims benefit of 62/012,196 06/13/2014
and is a CIP of 13/541,446 07/03/2012 ABN
and is a CIP of 14/523,778 10/24/2014 PAT 9730100
which is a CON of 12/625,365 11/24/2009 PAT 8514852
which claims benefit of 61/117,502 11/24/2008
and said 14/740,062 06/15/2015
is a CIP of 13/764,008 02/11/2013 PAT 9363651
which is a CIP of 13/627,883 09/26/2012 PAT 8923186
which claims benefit of 61/615,802 03/26/2012
and claims benefit of 61/555,400 11/03/2011
and claims benefit of 61/621,926 04/09/2012
and said 14/740,062 06/15/2015
is a CIP of 13/571,294 08/09/2012 PAT 9172738

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: Yes

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: 10/25/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/728,863**

Projected Publication Date: 02/15/2018

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Chirp Networks

Preliminary Class

370

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 Assets Control, 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).

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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.



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
15/728,863	10/10/2017	Francis DACOSTA	0357-03304

CONFIRMATION NO. 9690

IMPROPER CFR REQUEST



OC000000095240784

27197
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602

Date Mailed: 11/13/2017

RESPONSE TO REQUEST FOR CORRECTED FILING RECEIPT

Continuity, Priority Claims, Petitions, and Non-Publication Requests

In response to your request for a corrected Filing Receipt, the Office is unable to comply with your request because:

Improper Benefit Claim(s) to Prior-Filed Nonprovisional Application(s)

The benefit claim(s) to prior-filed nonprovisional application(s) is improper because there is no specific reference for each prior-filed application that includes: (1) the identification of the prior-filed application by application number, or international application number and international filing date; and (2) a clear indication of the relationship (i.e., continuation, divisional, or continuation-in-part) of the nonprovisional applications. Applicant must submit a corrected application data sheet (ADS) to include a specific reference. Applicant should review each benefit claim submitted and, if appropriate, provide the proper reference to the prior-filed application(s) as required by 37 CFR 1.78. A proper relationship includes an identification of each nonprovisional application as a continuation, divisional, or continuation-in-part application of the immediate prior-filed nonprovisional application for which a benefit is claimed under 37 CFR 1.78 in order to establish copendency throughout the entire chain of prior-filed applications. The specific reference must be included in the domestic benefit information section of an application data sheet (37 CFR 1.76).

Timeliness: The required reference for each benefit claim must be filed during the pendency of the instant application and within the later of: (1) four months from the actual filing date of the instant application, or the national stage commencement date if the instant application is a national stage application under 35 U.S.C. 371; or (2) sixteen months from the filing date of the prior-filed application. Failure to timely file the required reference is considered a waiver of any benefit claim, unless a grantable petition to accept an unintentionally delayed claim under 37 CFR 1.78(a), the surcharge set forth in 37 CFR 1.17(t), and the required reference are filed. See 37 CFR 1.78(a).

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.

/sstephanos/

UNITED STATES PATENT AND TRADEMARK OFFICE
COMMISSIONER FOR PATENTS
P.O.BOX 1450
ALEXANDRIA VA 22313-1451

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
POSTEDIGITAL
NNNNN

MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602



**Courtesy Reminder for
Application Serial No: 15/728,863**

Attorney Docket No: 0357-03304

Customer Number: 27197

Date of Electronic Notification: 11/13/2017

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:

mail@cherskov.com

sgurda@cherskov.com

akeith@cherskov.com

To view your correspondence online or update your email addresses, please visit us anytime at <https://sportal.uspto.gov/secure/myportal/privatepair>. If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

CORRECTED ADS FORM

Application Number	15728863
Title of Invention	Chirp Networks

Inventor Information

****If no data is shown, no data has been corrected****

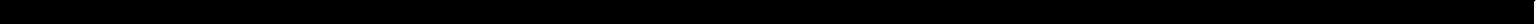
	Data of Record	Updated Data
Order Number		
Name		

Residence Information

Residency		
City		
State		
Country of Residence		

Mailing Address of Inventor

Address 1		
Address 2		
City,State/Province, Postal Code		
Country		



Application Information

	Data of Record	Updated Data
Title of Invention	Chirp Networks	
Attorney Docket Number	0357-03304	
Entity Type	Small	

Domestic Benefit/National Stage Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121,365(c), or 386(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(a).

	Data of Record	Updated Data
Prior Application Status	patented	
Application Number	15728863	
Continuity Type	CON	
Prior Application Number	14740062	
Filing Date (YYYY-MM-DD)	2015-06-15	
Patent Number	9819747	
Issue Date (YYYY-MM-DD)	2017-11-14	

		Data of Record	Updated Data
	Prior Application Status	pending	
	Application Number	14740062	
	Continuity Type	PRO	
	Prior Application Number	62012196	
	Filing Date (YYYY-MM-DD)	2014-06-13	
	Patent Number		
	Issue Date (YYYY-MM-DD)	0001-01-01	

		Data of Record	Updated Data
	Prior Application Status	pending	
	Application Number	13627883	
	Continuity Type	PRO	
	Prior Application Number	61621926	
	Filing Date (YYYY-MM-DD)	2012-04-09	
	Patent Number		
	Issue Date (YYYY-MM-DD)	0001-01-01	

		Data of Record	Updated Data
	Prior Application Status	patented	
	Application Number	14740062	
	Continuity Type	CIP	
	Prior Application Number	13571294	
	Filing Date (YYYY-MM-DD)	2012-08-09	
	Patent Number	9172738	
	Issue Date (YYYY-MM-DD)	2015-10-27	

	Data of Record	Updated Data
Prior Application Status		<u>patented</u>
Application Number		<u>13571294</u>
Continuity Type		<u>CIP</u>
Prior Application Number		<u>12696947</u>
Filing Date (YYYY-MM-DD)		<u>2010-01-29</u>
Patent Number		<u>8520691</u>
Issue Date (YYYY-MM-DD)		<u>2013-08-27</u>

	Data of Record	Updated Data
Prior Application Status		<u>expired</u>
Application Number		<u>12696947</u>
Continuity Type		<u>PRO</u>
Prior Application Number		<u>61/148,803</u>
Filing Date (YYYY-MM-DD)		<u>2009-01-30</u>
Patent Number		
Issue Date (YYYY-MM-DD)		

	Data of Record	Updated Data
Prior Application Status		<u>patented</u>
Application Number		<u>12696947</u>
Continuity Type		<u>CIP</u>
Prior Application Number		<u>12352457</u>
Filing Date (YYYY-MM-DD)		<u>2009-01-12</u>
Patent Number		<u>8477762</u>
Issue Date (YYYY-MM-DD)		<u>2013-07-02</u>

		Data of Record	Updated Data
	Prior Application Status	abandoned	
	Application Number	14740062	
	Continuity Type	CIP	
	Prior Application Number	13541446	
	Filing Date (YYYY-MM-DD)	2012-07-03	
	Patent Number		
	Issue Date (YYYY-MM-DD)	0001-01-01	

		Data of Record	Updated Data
	Prior Application Status	patented	
	Application Number	14740062	
	Continuity Type	CIP	
	Prior Application Number	14523778	
	Filing Date (YYYY-MM-DD)	2014-10-24	
	Patent Number	9730100	
	Issue Date (YYYY-MM-DD)	2017-08-08	

		Data of Record	Updated Data
	Prior Application Status	patented	
	Application Number	14523778	
	Continuity Type	CON	
	Prior Application Number	12625365	
	Filing Date (YYYY-MM-DD)	2009-11-24	
	Patent Number	8514852	
	Issue Date (YYYY-MM-DD)	2013-08-20	

		Data of Record	Updated Data
	Prior Application Status	pending	
	Application Number	12625365	
	Continuity Type	PRO	
	Prior Application Number	61117502	
	Filing Date (YYYY-MM-DD)	2008-11-24	
	Patent Number		
	Issue Date (YYYY-MM-DD)	0001-01-01	

		Data of Record	Updated Data
	Prior Application Status	patented	
	Application Number	14740062	
	Continuity Type	CIP	
	Prior Application Number	13764008	
	Filing Date (YYYY-MM-DD)	2013-02-11	
	Patent Number	9363651	
	Issue Date (YYYY-MM-DD)	2016-06-07	

		Data of Record	Updated Data
	Prior Application Status	patented	
	Application Number	13764008	
	Continuity Type	CIP	
	Prior Application Number	13627883	
	Filing Date (YYYY-MM-DD)	2012-09-26	
	Patent Number	8923186	
	Issue Date (YYYY-MM-DD)	2014-12-30	

		Data of Record	Updated Data
	Prior Application Status	pending	
	Application Number	13627883	
	Continuity Type	PRO	
	Prior Application Number	61615802	
	Filing Date (YYYY-MM-DD)	2012-03-26	
	Patent Number		
	Issue Date (YYYY-MM-DD)	0001-01-01	

		Data of Record	Updated Data
	Prior Application Status	pending	
	Application Number	13627883	
	Continuity Type	PRO	
	Prior Application Number	61555400	
	Filing Date (YYYY-MM-DD)	2011-11-03	
	Patent Number		
	Issue Date (YYYY-MM-DD)	0001-01-01	

Foreign Priority Information

****If no data is shown, no data has been corrected****

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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(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).

		Data of Record	Updated Data
	Application Number		
	Country		
	Filing Date		
	Access Code		

Applicant Information

****If no data is shown, no data has been corrected****

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.

	Data of Record	Updated Data
Applicant Type		
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		
Applicant is an Organization		
Name		
Organization Name		
Address 1		
Address 2		
City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		

Email Address		
---------------	--	--

Assignee Information including Non-Applicant Assignee Information

****If no data is shown, no data has been corrected****
Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office

	Data of Record	Updated Data
Order		
Applicant is an Organization		
Name		
Organization Name		

Mailing Address

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

Signature

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Corrected ADS 1.0

Signature	/Szymon M. Gurda/	Registration Number	58451
First Name	Szymon	Last Name	Gurda

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: MeshDynamics
Title: Chirp Networks
Serial No.: 15/728,863
Filing Date: October 10, 2017
Atty. Docket: 0363-03304

Submitted via EFS-Web on December 18, 2017.

BOX: MISSING PARTS
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

123 West Madison Street
Suite 400
Chicago, Illinois 60602
(312) 621-1330

REQUEST TO ACCEPT REPLACEMENT ADS

Dear Sir:

Per Notice dated November 13, 2017, applicant hereby submits a new ADS via the WebADS system to clarify the priority claim of this application. The filing receipt from November 13, 2017 included most of the priority claim, except for the following three applications.

1. U.S. Application 12/696,947 filed on January 29, 2010. U.S. Application 13/571,294 claimed priority to this application as a continuation-in-part.
2. U.S. Application 61/148,803 filed on January 30, 2009. U.S. Application 12/696,947 claimed priority to this application as a non-provisional.
3. U.S. Application 12/352,457 filed on January 12, 2009. U.S. Application 13/571,294 claimed priority to this application as a continuation in part.

Serial No. 15/643,108
Request to Accept ADS
Page -2-

A marked up ADS is also included showing the change on page 3 of the ADS.
Applicant requests entry of the amended ADS and priority claim.

Respectfully submitted,

CHERSKOV FLAYNIK & GURDA, LLC

By: /Szymon M. Gurda/
Szymon M. Gurda (Reg. No. 58,451)

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		
<p>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.</p> <p>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.</p>			

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				
Legal Name				
Prefix	Given Name	Middle Name	Family Name	Suffix
	Francis		DACOSTA	
Residence Information (Select One)		☒ US Residency ☐ Non US Residency ☐ Active US Military Service		
City	Santa Clara	State/Province	CA	Country of Residence ⁱ US
Mailing Address of Inventor:				
Address 1	3355 Benton Street			
Address 2				
City	Santa Clara	State/Province	CA	
Postal Code	95051	Country ⁱ	US	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.				<input type="button" value="Add"/>

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).	
☐ An Address is being provided for the correspondence information of this application.	
Customer Number	27197
Email Address	mail@cherskov.com
<input type="button" value="Add Email"/> <input type="button" value="Remove Email"/>	

Application Information:

Title of the Invention	Chirp Networks		
Attorney Docket Number	0357-03304	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	72	Suggested Figure for Publication (if any)	67

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

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	27197		
Prefix	Given Name	Middle Name	Family Name
<div>Registration Number</div> <div> <div>Prefix</div> <div>Given Name</div> <div>Middle Name</div> <div>Family Name</div> <div>Suffix</div> </div> <div> <div>Remove</div> </div>			
<div>Registration Number</div> <div> <div>Prefix</div> <div>Given Name</div> <div>Middle Name</div> <div>Family Name</div> <div>Suffix</div> </div> <div> <div>Remove</div> </div>			
<div>Registration Number</div>			
Additional Representative Information blocks may be generated within this form by selecting the Add button.			

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(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 or 371(c) Date (YYYY-MM-DD)		
	CONTINUATION OF	14740062	2015-06-15		
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
14740062	Claims benefit of provisional	62012196	2014-06-13		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14740062	Continuation in part of	13764008	2013-02-11	9363651	2016-06-07
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13764008	Continuation in part of	13627883	2012-09-26	8923186	2014-12-30
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
13627883	Claims benefit of provisional	61615802	2012-03-26		
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
13627883	Claims benefit of provisional	61555400	2011-11-03		

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
13627883	Claims benefit of provisional	61621926	2012-04-09		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14740062	Continuation in part of	13571294	2012-08-09	9172738	2015-10-27
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13571294	Continuation in part of	12696947	2010-01-29	8520691	2013-08-27
Prior Application Status		Pending		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
12696947	Claims benefit of provisional	61148803	2009-01-30		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13571294	Continuation in part of	12352457	2009-01-12	8477762	2013-07-02
Prior Application Status		Abandoned		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
14740062	Continuation in part of	13541446	2012-07-03		
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14740062	Continuation in part of	14523778	2014-10-24	9730100	2017-08-08
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14523778	Continuation of	12625365	2009-11-24	8514852	2013-08-20

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
12625365	Claims benefit of provisional	61117502	2008-11-24
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			

13571294 claims the benefit of 12352457 filed on 01-12-2009

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. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(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).

Application Number	Country ¹	Filing Date (YYYY-MM-DD)	Access Code ¹ (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			

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

<p>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.</p> <p>☐ 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.</p>
--

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/5B/39 or PTO/5B/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

- ☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.
- ☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

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.

Applicant 1

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 MeshDynamics

Mailing Address Information For Applicant:

Address 1	3355 Benton Street		
Address 2			
City	Santa Clara	State/Province	CA
Country ¹	US	Postal Code	95051
Phone Number		Fax Number	
Email Address			

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

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Assignee Information including Non-Applicant Assignee 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.

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	0357-03304
		Application Number	
Title of Invention	Chirp Networks		

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Szymon M. Gurda/			Date (YYYY-MM-DD)	
First Name	Szymon	Last Name	Gurda	Registration Number	58451
Additional Signature may be generated within this form by selecting the Add button.					

Electronic Acknowledgement Receipt

EFS ID:	31263994
Application Number:	15728863
International Application Number:	
Confirmation Number:	9690
Title of Invention:	Chirp Networks
First Named Inventor/Applicant Name:	
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-03304
Receipt Date:	18-DEC-2017
Filing Date:	10-OCT-2017
Time Stamp:	18:42:17
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	Application Data Sheet to update/ correct info	CorrectedADS.pdf	146187	no	10
			b9876bc984a50abe038433e79b0d74fe5de b210d		

Warnings:

Information:					
2	Transmittal Letter	Request.pdf	80429	no	2
			e21da47316212604c75492e9dac131441cee eda56		
Warnings:					
Information:					
3	Miscellaneous Incoming Letter	MarkedUPADS.pdf	1106344	no	9
			21c9620c8d303a9b21151df6c563a7ffad18 8f11		
Warnings:					
Information:					
Total Files Size (in bytes):			1332960		
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					



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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
15/728,863	10/10/2017	2464	730	0357-03304	20	3

CONFIRMATION NO. 9690

CORRECTED FILING RECEIPT

27197
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602



Date Mailed: 12/22/2017

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)

Francis DACOSTA, Santa Clara, CA;

Applicant(s)

MeshDynamics, Santa Clara, CA;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 14/740,062 06/15/2015 PAT 9819747
which claims benefit of 62/012,196 06/13/2014
and is a CIP of 13/764,008 02/11/2013 PAT 9363651
which is a CIP of 13/627,883 09/26/2012 PAT 8923186
which claims benefit of 61/615,802 03/26/2012
and claims benefit of 61/555,400 11/03/2011
and claims benefit of 61/621,926 04/09/2012
and said 14/740,062 06/15/2015
is a CIP of 13/571,294 08/09/2012 PAT 9172738
which is a CIP of 12/696,947 01/29/2010 PAT 8520691
which claims benefit of 61/148,803 01/30/2009
and said 13/571,294 08/09/2012
is a CIP of 12/352,457 01/12/2009 PAT 8477762
and said 14/740,062 06/15/2015
is a CIP of 13/541,446 07/03/2012 ABN
and is a CIP of 14/523,778 10/24/2014 PAT 9730100
which is a CON of 12/625,365 11/24/2009 PAT 8514852
which claims benefit of 61/117,502 11/24/2008

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: Yes

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: 10/25/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/728,863**

Projected Publication Date: 02/15/2018

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Chirp Networks

Preliminary Class

370

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).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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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.

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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).

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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.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		15728863
	Filing Date		2017-10-10
	First Named Inventor	daCosta, Francis	
	Art Unit	2464	
	Examiner Name	Ngo, Ricky Quoc	
	Attorney Docket Number	0357-03304	

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	7428300	B1	2008-09-23	Drew	
	2	6363062	B1	2002-03-26	Aaronson	
	3	7420952	B2	2008-09-02	daCosta	
	4	7583648	B2	2009-09-01	daCosta	
	5	7738402	B2	2010-06-15	Feldman	
	6	7649852	B2	2010-01-19	Thubert	
	7	8589247	B2	2013-11-19	Mesaros	
	8	6912204	B2	2005-06-28	Kossi	

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		15728863
Filing Date		2017-10-10
First Named Inventor	daCosta, Francis	
Art Unit	2464	
Examiner Name	Ngo, Ricky Quoc	
Attorney Docket Number	0357-03304	

9	6046992		2000-04-04	Meier	
10	8060395	B1	2011-11-15	Frasher	
11	5818830		1998-10-06	Daane	
12	7085292	B1	2006-08-01	Grayson	
13	9258765	B1	2016-02-09	daCosta	
14	8923186	B1	2014-12-30	daCosta	
15	9363651	B1	2016-06-07	daCosta	
16	5935268		1999-08-10	Weaver	
17	8144637	B2	2012-03-27	Goldberg	
18	7408928	B2	2008-08-05	Bradd	
19	7443842	B2	2008-10-28	Miyamoto	

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	15728863
Filing Date	2017-10-10
First Named Inventor	daCosta, Francis
Art Unit	2464
Examiner Name	Ngo, Ricky Quoc
Attorney Docket Number	0357-03304

20	5546391		1996-08-13	Mahany
21	6982960	B2	2006-01-03	Lee
22	5867785		1999-02-02	Averbuch
23	7103371	B1	2006-09-05	Liu
24	6393261		2002-05-21	Lewis
25	7200130		2007-04-03	Forstadius
26				

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	20120202514	A1	2012-08-09	Kadirkamathan	
	2	20100150170	A1	2010-06-17	Lee	

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		15728863
Filing Date		2017-10-10
First Named Inventor	daCosta, Francis	
Art Unit	2464	
Examiner Name	Ngo, Ricky Quoc	
Attorney Docket Number	0357-03304	

3	20020176390	A1	2002-11-28	Sparr	
4	20150036649	A1	2015-02-05	Chen	
5	20130343430	A1	2013-12-26	Bettendorff	
6	20070183346	A1	2007-08-09	Thubert	
7	20040100929	A1	2004-05-27	Garcia-Luna-Aceves	
8	20090304381	A1	2009-12-10	Muppidi	
9	20040095900	A1	2004-05-20	Siegel	
10	20020191573	A1	2002-12-19	Whitehill	
11	20020137459	A1	2002-09-26	Ebata	
12	20030115282	A1	2003-06-19	Rose	
13	20110225293	A1	2011-09-15	Rathod	

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		15728863
Filing Date		2017-10-10
First Named Inventor	daCosta, Francis	
Art Unit		2464
Examiner Name	Ngo, Ricky Quoc	
Attorney Docket Number		0357-03304

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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		15728863
Filing Date		2017-10-10
First Named Inventor	daCosta, Francis	
Art Unit	2464	
Examiner Name	Ngo, Ricky Quoc	
Attorney Docket Number	0357-03304	

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Art Unit	2464	
Examiner Name	Ngo, Ricky Quoc	
Attorney Docket Number	0357-03304	

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First Named Inventor	daCosta, Francis
Art Unit	2464
Examiner Name	Ngo, Ricky Quoc
Attorney Docket Number	0357-03304

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If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	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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NON-PATENT LITERATURE DOCUMENTS

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

Examiner Signature		Date Considered	
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*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	15728863
Filing Date	2017-10-10
First Named Inventor	daCosta, Francis
Art Unit	2464
Examiner Name	Ngo, Ricky Quoc
Attorney Docket Number	0357-03304

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	/Szymon M. Gurda/	Date (YYYY-MM-DD)	2018-02-09
Name/Print	Szymon M. Gurda	Registration Number	58451

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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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.
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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.

Electronic Acknowledgement Receipt

EFS ID:	31756468
Application Number:	15728863
International Application Number:	
Confirmation Number:	9690
Title of Invention:	Chirp Networks
First Named Inventor/Applicant Name:	Francis DACOSTA
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-03304
Receipt Date:	09-FEB-2018
Filing Date:	10-OCT-2017
Time Stamp:	19:19:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	Transmittal.pdf	74561	no	1
			c465f0f5d4a5e78c378e87c8904df470195f92d3		

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	IDS.pdf	1037110	no	10
			7ce4f3199b2f5b1302a92b7158e0998635a05355		
Warnings:					
Information:					
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Total Files Size (in bytes):			1111671		
<p>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.</p> <p><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.</p> <p><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.</p> <p><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.</p>					

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: MeshDynamics
Title: Chirp Networks
Serial No.: 15/728,863
Filing Date: October 10, 2017
Atty. Docket: 0363-03304

Electronically filed via EEF-Web on February 9, 2018.

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

123 West Madison Street, Suite 400
Chicago, Illinois 60602
(312) 621-1330

DISCLOSURE STATEMENT PER 37 C.F.R. § 1.97 AND § 1.98

Sir:

The citations listed on accompanying form PTO PTO/SB/08a are submitted in compliance with the duty of disclosure defined in 37 C.F.R. §§ 1.97 and 1.98.

This Disclosure Submission Statement is not to be construed as a representation that a search has been made, that additional matter material to the examination of this application does not exist, or that any one or more of these citations constitutes prior art under 35 U.S.C. 102.

Respectfully submitted,

CHERSKOV FLAYNIK & GURDA, LLC

By: /Szymon M. Gurda/
Szymon M. Gurda (Reg. No. 58,451)



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/728,863	10/10/2017	Francis DACOSTA	0357-03304

CONFIRMATION NO. 9690

PUBLICATION NOTICE



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27197
MICHAEL J. CHERSKOV
123 WEST MADISON STREET
SUITE 400
CHICAGO, IL 60602

Title:Chirp Networks

Publication No.US-2018-0049101-A1

Publication Date:02/15/2018

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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/>.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/728,863	10/10/2017	Francis DACOSTA	0357-03304	9690
27197	7590	03/28/2019		
MICHAEL J. CHERSKOV 123 WEST MADISON STREET SUITE 400 CHICAGO, IL 60602			EXAMINER BLANTON, JOHN D	
			ART UNIT	PAPER NUMBER
			2466	
			NOTIFICATION DATE	DELIVERY MODE
			03/28/2019	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):

akeith@cherskov.com
mail@cherskov.com
sgurda@cherskov.com

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file

provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-l.jsp.

Claims 1, 8, and 17 are rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1 of U.S. Patent No. 9,730,100. Although the claims at issue are not identical, they are not patentably distinct from each other because

For claims 1, 8, and 17; U.S. Patent No. 9,730,100 discloses: at least one device transmitting at least one short communication message; at least one device transmitting at least one standard communication message; an array of wireless network routers communicating in a tree-shaped logical structure; at least one of said wireless network routers comprising a chirp receiver for the at least one short communication message; and at least one of said wireless network routers comprising a standard receiver for at least one standard-length communication message; wherein said chirp receiver accepts

said short communication message in a round robin manner from client devices associated with said chirp receiver, wherein each short communication message is received at a designated time period; wherein said short communication messages are buffered until all messages are received from all clients and a single buffered packet is formed from the combined short communication messages; and wherein each wireless network router further comprises an uplink function connecting said wireless network router to another wireless network router in the tree or an external ip-based network; a downlink function connecting said wireless network router to other wireless network routers within said tree; and a scanning function wherein the uplink function and the downlink function connect the wireless network routers participating in the system in a tree-based virtual switch and wherein said buffered packet is sent using the three-shaped virtual switch (claim 1: ***A tree-shaped mesh network comprising: a mesh of wireless nodes forming a tree shaped network with one root node having a connection to an external network; chirp clients; and wireless network clients; wherein chirp clients comprise chirp devices having only one transceiver wherein said chirp devices transmit short duration messages using said transceiver wherein transmission of said short duration messages are scheduled at preset transmission intervals and said short duration messages comprise an information payload to be delivered to a participant in the mesh network; wherein at least one wireless node of the mesh of wireless nodes is a designated chirp-aware node wherein said chirp-aware node sets the preset transmission intervals for chirp client communication by broadcasting a beacon which prepares the mesh network for transmission by chirp clients of the short duration messages and said chirp-aware node further comprises a bridge between the short duration messages and IP based devices wherein said bridge includes a wireless receiver to receive the short duration messages and is connected to said external network; wherein the short duration messages are encapsulated into action frames by the at least one chirp-aware node, for onward transmission to other chirp aware routers; wherein each wireless node further comprises two logical radios wherein said two***

logical radios are implemented using a single physical radio, and a service radio wherein each wireless node uplink and downlink operates on distinct non-conflicting frequencies; and wherein said wireless network clients communicate with said wireless nodes using said service radios.

Claims 1, 8, and 17 are rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1 of U.S. Patent No. 9,819,747. Although the claims at issue are not identical, they are not patentably distinct from each other because

For claims 1, 8, and 17; U.S. Patent No. 9,819,747 discloses: at least one device transmitting at least one short communication message; at least one device transmitting at least one standard communication message; an array of wireless network routers communicating in a tree-shaped logical structure; at least one of said wireless network routers comprising a chirp receiver for the at least one short communication message; and at least one of said wireless network routers comprising a standard receiver for at least one standard-length communication message; wherein said chirp receiver accepts said short communication message in a round robin manner from client devices associated with said chirp receiver, wherein each short communication message is received at a designated time period; wherein said short communication messages are buffered until all messages are received from all clients and a single buffered packet is formed from the combined short communication messages; and wherein each wireless network router further comprises an uplink function connecting said wireless network router to another wireless network router in the tree or an external ip-based network; a downlink function connecting said wireless network router to other wireless network routers within said tree; and a scanning function wherein the uplink function and the downlink function connect the wireless network routers participating in the system in a

tree-based virtual switch and wherein said buffered packet is sent using the three-shaped virtual switch (claim 1: ***at least one device transmitting at least one short communication message; at least one network router comprising a chirp receiver for the at least one short communication message; wherein said chirp receiver accepts said short communication message during an access function of said router without interrupting other communications; and wherein said router further comprises an uplink function connecting said least one router to an external ip-based network using intermediary routers; a downlink function connecting said least one router to other routers within said network; and a scanning function wherein said uplink function, downlink function, scanning, and access functions are performed using one physical radio acting as multiple logical radios wherein the uplink function logical radio and the downlink function logical radio connect the routers participating in the system in a tree-based virtual switch.***).

Claims 1, 8, and 17 are rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1 of U.S. Patent No. 8,923,186. Although the claims at issue are not identical, they are not patentably distinct from each other because

For claims 1, 8, and 17; U.S. Patent No. 8,923,186 discloses: at least one device transmitting at least one short communication message; at least one device transmitting at least one standard communication message; an array of wireless network routers communicating in a tree-shaped logical structure; at least one of said wireless network routers comprising a chirp receiver for the at least one short communication message; and at least one of said wireless network routers comprising a standard receiver for at least one standard-length communication message; wherein said chirp receiver accepts said short communication message in a round robin manner from client devices associated with said chirp receiver, wherein each short communication message is

received at a designated time period; wherein said short communication messages are buffered until all messages are received from all clients and a single buffered packet is formed from the combined short communication messages; and wherein each wireless network router further comprises an uplink function connecting said wireless network router to another wireless network router in the tree or an external ip-based network; a downlink function connecting said wireless network router to other wireless network routers within said tree; and a scanning function wherein the uplink function and the downlink function connect the wireless network routers participating in the system in a tree-based virtual switch and wherein said buffered packet is sent using the three-shaped virtual switch (claim 1: ***a mesh of wireless nodes forming a tree shaped network with one root node having a connection to an external network; chirp clients; and wireless network clients; wherein chirp clients comprise low cost chirp devices wherein said low cost chirp devices transmit short duration messages wherein transmission of said short duration messages are scheduled at random intervals; wherein at least one wireless node of the mesh of wireless nodes is a designated chirp-aware node and said chirp-aware node further comprises a bridge between the short duration messages and IP based devices wherein said bridge includes a wireless receiver to receive the short duration messages and is connected to said external network; wherein all remaining wireless nodes of the mesh of wireless nodes disregard the short duration messages as random and transient noise by adaptively filtering out the short duration messages using Automatic Gain Control, Error correction or noise cancellation, wherein the short duration messages are sufficiently short in duration so that said adaptive filtering by said all remaining wireless nodes disregards the short duration messages as random and transient noise; wherein each wireless node further comprises two logical radios and a service radio wherein each wireless node uplink and downlink operates on distinct non-conflicting frequencies; and wherein said wireless network clients communicate with said wireless nodes using said service radios***).

Claims 1, 8, and 17 are rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1 of U.S. Patent No. 9,363,651. Although the claims at issue are not identical, they are not patentably distinct from each other because

For claims 1, 8, and 17; U.S. Patent No. 9,363,651 discloses: at least one device transmitting at least one short communication message; at least one device transmitting at least one standard communication message; an array of wireless network routers communicating in a tree-shaped logical structure; at least one of said wireless network routers comprising a chirp receiver for the at least one short communication message; and at least one of said wireless network routers comprising a standard receiver for at least one standard-length communication message; wherein said chirp receiver accepts said short communication message in a round robin manner from client devices associated with said chirp receiver, wherein each short communication message is received at a designated time period; wherein said short communication messages are buffered until all messages are received from all clients and a single buffered packet is formed from the combined short communication messages; and wherein each wireless network router further comprises an uplink function connecting said wireless network router to another wireless network router in the tree or an external ip-based network; a downlink function connecting said wireless network router to other wireless network routers within said tree; and a scanning function wherein the uplink function and the downlink function connect the wireless network routers participating in the system in a tree-based virtual switch and wherein said buffered packet is sent using the three-shaped virtual switch (claim 1-5: ***a mesh of wireless nodes forming a tree shaped network with one root node having a connection to an external network; chirp clients; and wireless network clients; wherein chirp clients comprise low cost chirp devices wherein said low cost***

chirp devices transmit short duration messages wherein transmission of said short duration messages are scheduled using a chirp scheduling technique; wherein at least one wireless node of the mesh of wireless nodes is a designated chirp-aware node and said chirp-aware node further comprises a bridge between the short duration messages and IP based devices wherein said bridge includes a wireless receiver to receive the short duration messages and is connected to said external network; wherein all remaining wireless nodes of the mesh of wireless nodes disregard the short duration messages as random and transient noise by adaptively filtering out the short duration messages using Automatic Gain Control, Error correction or noise cancellation, wherein the short duration messages are sufficiently short in duration so that said adaptive filtering by all remaining wireless nodes disregards the short duration messages as random and transient noise; wherein each wireless node further comprises two logical radios and a service radio wherein each wireless node uplink and downlink operates on distinct non-conflicting frequencies; and wherein said wireless network clients communicate with said wireless nodes using said service radios.).

Claim Rejections - 35 USC § 112

Claims 1-20 are 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.

Regarding claim 1, the limitations “at least one device transmitting” (line 3), “at least one standard-length communication message” (line 7-8), “each short communication message” (line 10-11), “all clients” (line 12), “each wireless network router” (line 15), “another wireless network router” (line 16), “other wireless network routers” (line 18), and “the three-shaped virtual switch” (line 21) are indefinite. For

example, the claim language is vague in disclosing which routers are in the array of routers or if they are separate entities. Is the at least one device transmitting the same device referred to more than once.

Claims 8 and 17 have similar indefiniteness issues.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5, 6, 8-10, 14, 17, 18, and 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong et al. (US 2009/0201898) ("Gong") in view of Struhsaker et al. (US 6,434,129) ("Struhsaker").

For claims 1 and 8; Gong discloses: at least one device transmitting at least one short communication message (paragraph 18: ***an additional radio, operating in a second, non-interfering frequency band, and other wireless communication functionality to establish and maintain wireless connections with mobile stations***); at least one device transmitting at least one standard communication message (paragraph 18: ***The mesh access points in the mesh network, in one implementation, generally include one radio, operating in a first frequency band, and associated wireless communication functionality to communicate with other mesh access points***); an array of wireless network routers communicating in a tree-shaped logical structure (figure 1); at least one of said wireless network routers comprising a chirp receiver for the at least one short communication message (paragraph 18: ***an***

additional radio, operating in a second, non-interfering frequency band, and other wireless communication functionality to establish and maintain wireless connections with mobile stations); and at least one of said wireless network routers comprising a standard receiver for at least one standard-length communication message (paragraph 18: *The mesh access points in the mesh network, in one implementation, generally include one radio, operating in a first frequency band, and associated wireless communication functionality to communicate with other mesh access points*); wherein said short communication messages are buffered until all messages are received from all clients (paragraph 29: *source mesh access point receives wireless packets from wireless clients and reads them onto an upstream transmit queue of a plurality of upstream transmit queues*) and a single buffered packet is formed from the combined short communication messages (paragraph 31: *If the predefined limit is exceeded, the source mesh access point 7 35 composes and transmits the packet upstream to the root mesh access point 21*); and wherein each wireless network router further comprises an uplink function connecting said wireless network router to another wireless network router in the tree or an external ip-based network (paragraph 33: *the intermediate mesh access points 2 31 and 4 33 may each forward a given aggregated packet to the root mesh access point*); a downlink function connecting said wireless network router to other wireless network routers within said tree (paragraph 49: *a given intermediate mesh access point (e.g., intermediate mesh access point 2 31) may forward a given packet to the appropriate destination (e.g., leaf mesh access point 7 35 or a local wireless client 60)*); and a scanning function wherein the uplink function and the downlink function connect the wireless network routers participating in the system in a tree-based virtual switch (paragraph 18: *associated wireless communication functionality to communicate with other mesh access points to thereby implement the wireless backbone*) and wherein said buffered packet is sent using the three-shaped virtual switch (figure 1).

Gong does not expressly disclose, but Struhsaker from similar fields of endeavor teaches: wherein said chirp receiver accepts said short communication message in a round robin manner from client devices associated with said chirp receiver, wherein each short communication message is received at a designated time period (col. 8, lines 23-67: *because the packet structure of a WLL system is not optimized for the typically long LAN packets, a method must be implemented that provides for fragmentation of LAN packets into packets appropriate for a WLL system ...a polled or token ring system in which the various users take turns sending data is appropriate for the LAN of the present invention. Such an implementation is very stable where every user is provided with a fixed time slot in which the user is allowed access to the data channel*). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the client polling/multi-point to single point connection as described by Struhsaker in the wireless mesh network as described by Gong. The motivation is to improve overhead.

For claim 3; Gong discloses: buffered packet is transmitted within the tree to the designated target host connected to another wireless network router or the external ip-based network (paragraph 35: *a given aggregated packet may have packets destined from the intermediate mesh access point. As such, the intermediate mesh access point may partially de-aggregate the packet to remove such packets and then forward the remaining packet upstream to the next intermediate mesh access point*).

For claim 5; Gong discloses the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Struhsaker from similar fields of endeavor teaches: the transmission of the buffered packet does not delay standard communication messages transmitted in the tree (col. 3, lines 40-45: *"embedded concentrated access" which allows the removal of a specified number of channels from the pool*

of multi-point RF communication channels and assigns them to the high traffic demand structure. These removed channels are referred to as the "micro-channel bank." The micro-channel bank provides the high traffic demand structure with traffic/bearer data, user control data and radio link specific overhead and control). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the client polling/multi-point to single point connection as described by Struhsaker in the wireless mesh network as described by Gong. The motivation is to allow for service levels.

For claim 6; Gong discloses: clients are dispersed throughout the tree-shaped network (figure 1).

For claim 9; Gong disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Struhsaker from similar fields of endeavor teaches: multiple buffered packets are formed from the short communication messages and wherein the metadata attached to each communication message determines which buffered packet the short communication message is attached to (col. 8, lines 35-40: *The fragmented packets can then be encapsulated with appropriate MAC data information including: packet length; ACK/NACK; a virtual or short interval address corresponding to a physical address; Cyclic Redundancy Code (CRC); and, Flow Control*). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the client polling/multi-point to single point connection as described by Struhsaker in the wireless mesh network as described by Gong. The motivation is to allow for service levels.

For claim 10; Gong discloses: a path for buffered packet is calculated based on the metadata and intended target of the each buffered packet (paragraph 52: *the*

intermediate mesh access point 2 31 extracts any local packets 706 for itself and the forwards the appropriate packets 706 to its local wireless client(s) 60 (612) and forwards the rest of the packets to the destination mesh access point).

For claim 14; Gong discloses: each router participating in the tree may disassemble the buffered packet and send different parts in different directions (paragraph 52: *the intermediate mesh access point 2 31 extracts any local packets 706 for itself and the forwards the appropriate packets 706 to its local wireless client(s) 60 (612) and forwards the rest of the packets to the destination mesh access point).*

For claim 17; Gong and Struhsaker disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Struhsaker from similar fields of endeavor teaches: wherein each short communication message is received along with its metadata (col. 8, lines 23-67: *The fragmented packets can then be encapsulated with appropriate MAC data information including: packet length; ACK/NACK; a virtual or short interval address corresponding to a physical address; Cyclic Redundancy Code (CRC); and, Flow Control*) and wherein said short communication message is published to a local control loop (col. 3, lines 15-20: *a second interface connecting the WLL to a plurality of customer premise equipment (CPE)*). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the client polling/multi-point to single point connection as described by Struhsaker in the wireless mesh network as described by Gong. The motivation is to improve overhead.

For claim 18; Gong disclose the subject matter in claim 17 as described above in the office action.

Struhsaker discloses a single point to multi-point Wireless Logic Loop that receives data from multiple clients; Gong discloses multiple mesh APs that each receive data from multiple client respectively. Multiple control loops are not disclosed by Struhsaker; however, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the wireless control loop at each mesh AP, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

For claim 20; Gong discloses the subject matter in claim 17 as described above in the office action.

Gong does not expressly disclose, but Struhsaker from similar fields of endeavor teaches: short communication messages comprises status messages and command messages (col. 16, lines 34-55: *The fragments are then encapsulated with certain information including: an address byte; a fragment sequence number and control; fragment length; a packet fragment; and, 16 or 32 bit CRC. The address byte, ADDR, is effectively the logical connection to the receiver unit and the customer premise interface. Where the IP address controls distribution of information to multiple users on the internet, this address controls the distribution of data at a customer premise interface on the WLL. The fragment sequence number and control byte, SEQ/C, provides information on the position of the fragment sequence in relation to the whole packet*).

Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement formatting as described by Struhsaker in the wireless mesh network as described by Gong. The motivation is to improve wireless performance.

Claims 2, 4, and 11 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong in view of Struhsaker as applied to claim 1 above, and further in view of Steer et al. (US 2004/0156345) ("Steer").

For claims 2, 4, and 11; Gong disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Steer from similar fields of endeavor teaches: a path within network can be calculated in linear time with respect to the number of wireless network nodes participating in the network (paragraph 87: *at least two time values are transmitted within efficiency field 106. A first time value reflects one of a total transmission time that is updated by every wireless network node or a transmission time of the initiating node so that a total time may be calculated*). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the link calculations as described by Steer in the wireless mesh network as described by Gong. The motivation is to improve transmission delays.

Claim 7 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong in view of Struhsaker as applied to claim 1 above, and further in view of Putzolu (US 2002/0007416).

For claim 7; Gong disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Putzolu from similar fields of endeavor teaches: round robin clients can reserve more than one time slot to obtain additional resources from the wireless network router (paragraph 43: *weighted round robin scheme*). Thus it would have been obvious to the person of ordinary skill in the art at the time of

the invention to implement the scheduling as described by Putzolu in the wireless mesh network as described by Gong. The motivation is to improve latency.

Claims 12 and 13 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong in view of Struhsaker as applied to claim 1 above, and further in view of Wen et al. (US 2005/0128940) ("Wen").

For claim 12; Gong disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Wen from similar fields of endeavor teaches: some short communication messages are cloned and are sent to multiple destinations (paragraph 6: ***a 1+1 protection scheme, allows both paths (e.g., the working and the protect) to concurrently transmit packets***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the redundancy as described by Wen in the wireless mesh network as described by Gong. The motivation is to improve reliability.

For claim 13; Gong disclose the subject matter in claim 12 as described above in the office action.

Gong does not expressly disclose, but Wen from similar fields of endeavor teaches: buffered packets are cloned at multiple forks in the network (paragraph 6: ***a 1+1 protection scheme, allows both paths (e.g., the working and the protect) to concurrently transmit packets***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the redundancy as described by Wen in the wireless mesh network as described by Gong. The motivation is to improve reliability using well-known techniques such as duplication.

Claims 15 and 16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong in view of Struhsaker as applied to claim 8 above, and further in view of Washabaugh et al. (US 7,023,856) ("Washabaugh").

For claim 15; Gong disclose the subject matter in claim 8 as described above in the office action.

Gong does not expressly disclose, but Washabaugh from similar fields of endeavor teaches: message metadata includes a latency requirement (col. 6, lines 1-23: ***four different traffic classes are established for traffic types that have distinct transmission requirements (i.e., bandwidth, latency, latency variation, traffic loss, etc.) In an embodiment, the packet classifier may read header information from the layer 2, layer 3, and layer 4 headers of a variable-length packet to classify the packet into one of the traffic classes***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the redundancy as described by Washabaugh in the wireless mesh network as described by Gong. The motivation is to improve reliability.

For claim 16; Gong disclose the subject matter in claim 8 as described above in the office action.

Gong does not expressly disclose, but Washabaugh from similar fields of endeavor teaches: a latency requirement for each short message is calculated on basis of type of data contained in the short message metadata (col. 6, lines 1-23: ***four different traffic classes are established for traffic types that have distinct transmission requirements (i.e., bandwidth, latency, latency variation, traffic loss, etc.) In an embodiment, the packet classifier may read header information from the layer 2, layer 3, and layer 4 headers of a variable-length packet to classify the packet into one of the traffic classes***). Thus it would have been obvious

to the person of ordinary skill in the art at the time of the invention to implement the redundancy as described by Washabaugh in the wireless mesh network as described by Gong. The motivation is to improve reliability.

Claim 19 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong in view of Struhsaker as applied to claim 1 above, and further in view of Lo et al. (US 2009/0115654) ("Lo").

For claim 19; Gong disclose the subject matter in claim 17 as described above in the office action.

Gong does not expressly disclose, but Lo from similar fields of endeavor teaches: a local integrator agent, wherein said agent performs a check of all communication messages received (paragraph 22: ***the local trackers 112 analyze data from the sensors 110 and generate signals relating to the target. In the present embodiment, each local tracker 112A-D independently receives data from one sensor 110A-D***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the localized processing as described by Lo in the wireless mesh network as described by Gong. The motivation is to improve efficiency.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN D BLANTON whose telephone number is (571)270-3933. The examiner can normally be reached on 7am-6pm EST, Mon-Thu.

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>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Faruk Hamza can be reached on 571-272-7969. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/JOHN D BLANTON/
Primary Examiner, Art Unit 2466

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<i>Search Notes</i> 	Application/Control No. 15/728,863	Applicant(s)/Patent Under Reexamination DACOSTA, Francis
	Examiner JOHN D BLANTON	Art Unit 2466

CPC - Searched*		
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Class	Subclass	Date	Examiner

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Search Notes		
Search Notes	Date	Examiner
inventor search	03/25/2019	jb
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	15728863
Filing Date	2017-10-10
First Named Inventor	daCosta, Francis
Art Unit	2464
Examiner Name	Ngo, Ricky Quoc
Attorney Docket Number	0357-03304

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46	20030012193	A1	2003-01-16	Novaes	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	15728863
Filing Date	2017-10-10
First Named Inventor	daCosta, Francis
Art Unit	2464
Examiner Name	Ngo, Ricky Quoc
Attorney Docket Number	0357-03304

	47	20020159409	A1	2002-10-31	Wolfe
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If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	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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NON-PATENT LITERATURE DOCUMENTS

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	/JOHN D BLANTON/	Date Considered	03/25/2019
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*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	15728863
Filing Date	2017-10-10
First Named Inventor	daCosta, Francis
Art Unit	2464
Examiner Name	Ngo, Ricky Quoc
Attorney Docket Number	0357-03304

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	/Szymon M. Gurda/	Date (YYYY-MM-DD)	2018-02-09
Name/Print	Szymon M. Gurda	Registration Number	58451

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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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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.B./

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L14	27	((assign\$4) with (slot timeslot) with (number amount) with (latency jitter)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 09:14
L16	157	(((weighted) adj (round) adj (robin)) same (slot timeslot) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 09:22
L17	12	(((weighted) adj (round) adj (robin)) same (slot timeslot) same (latency) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 09:22
L19	63	(((weighted) adj (round) adj (robin)) same (slot timeslot) and (latency) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 09:40
L22	17	((("1+1" adj protection).ab.) and (("1+1" adj protection)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 10:35
L24	287	((latency with header with (ie information)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 10:47
L25	22	((latency with header with (ie information) with (limit requirement max maximum)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 10:48
L28	492	((local) with sensor with data with (analysis analyz\$3 check\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 11:30
L29	10	"13571294"	US-PGPUB; USPAT	OR	ON	2019/03/25 12:46
L30	11	"12625365"	US-PGPUB; USPAT	OR	ON	2019/03/25 12:49
S1	2	"15728863"	US-PGPUB; USPAT	OR	ON	2019/03/20 20:37
S2	298	h04w40/248	US-PGPUB; USPAT	OR	ON	2019/03/20 21:23
S3	209	((parent with child with node) same (tree) same ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/21 20:45
S4	1	"20120202514".did.	US-PGPUB; USPAT	OR	ON	2019/03/22 08:50
S5	1	"20070183346".did.	US-PGPUB; USPAT	OR	ON	2019/03/22 08:56
S6	0	((chirp with (relay gateway bridge) with network) and (@ad<="20081104")	US-PGPUB;	OR	ON	2019/03/22 08:58

			USPAT			
S7	3	(chirp adj (relay gateway bridge)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 08:59
S8	44	(chirp with (relay gateway bridge)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 09:00
S9	218	(pan near2 (relay gateway bridge)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:07
S10	30	(pan adj (relay gateway bridge)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:07
S11	0	(pan adj (relay gateway bridge)) same ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:34
S12	5	(pan adj (relay gateway bridge)) and ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:35
S13	55	(pan near2 (relay gateway bridge)) and ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:41
S14	2	(pan near2 (relay gateway bridge)) same ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:41
S15	32	(pan near2 (relay gateway bridge)) and tree and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:46
S16	20	(pan near2 (relay gateway bridge)) and tree and ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:56
S17	1	"20110231321".did.	US-PGPUB; USPAT	OR	ON	2019/03/22 12:02
S18	169	(((relay gateway bridge)) same ((aggregat\$3 concatenat\$3)) same (timeslot slot) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 12:17
S19	12	(((relay gateway bridge)) same ((aggregat\$3 concatenat\$3)) same (timeslot slot) same (poll\$3 robin) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 13:01
S20	11	(((relay gateway bridge)) same (local adj control adj loop) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 13:22
S21	177	(((relay gateway bridge)) same (wireless adj local adj loop) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 13:58
S29	8	(wireless adj local adj loop) same ((buffer\$3 combin\$3) adj (packet)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/23 11:12
S30	49	(multi with (user subscriber) with (aggregat\$3) with (frame packet)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/23 11:16
S31	430	((aggregation) adj (frame packet)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/23 11:18
S32	50	((aggregation) adj (frame packet)) and (tree) and (@ad<="20081104")	US-PGPUB;	OR	ON	2019/03/23 12:22

			USPAT			
S34	7	((multi with (user subscriber) with (aggregat\$3) with (frame packet)) and tree and (@ad<="20081104"))	US-PGPUB; USPAT	OR	ON	2019/03/23 12:26
S40	193	((calculat\$3) with (path hop link) with (transmission adj time)) and (@ad<="20081104"))	US-PGPUB; USPAT	OR	ON	2019/03/24 09:37
S41	11	((calculat\$3) with (total) with (path hop link) with (transmission adj time)) and (@ad<="20081104"))	US-PGPUB; USPAT	OR	ON	2019/03/24 09:37
S42	5	((((multi multiple) adj (path hop link)) with (network)) and ((calculat\$3) with (total) with (transmission adj time)) and (@ad<="20081104"))	US-PGPUB; USPAT	OR	ON	2019/03/24 09:44

3/ 25/ 2019 1:09:13 PM
C:\ Users\ jblanton\ Documents\ EAST\ Workspaces\ 15728863.wsp

Bibliographic Data

Application No: 15/728,863

Foreign Priority claimed: ☐ Yes ☒ No

35 USC 119 (a-d) conditions met: ☐ Yes ☒ No ☐ Met After Allowance

Verified and Acknowledged: /JOHN D BLANTON/

Examiner's Signature

Initials

Title:

Chirp Networks

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/10/2017	370	2466	0357-03304
RULE			

APPLICANTS

MeshDynamics, Santa Clara, CA,

INVENTORS

Francis DACOSTA Santa Clara, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 14740062 06/15/2015 PAT 9819747

14740062 is a CIP of 14523778 10/24/2014 PAT 9730100

14740062 has PRO of 62012196 06/13/2014

14740062 is a CIP of 13764008 02/11/2013 PAT 9363651

13764008 is a CIP of 13627883 09/26/2012 PAT 8923186

14740062 is a CIP of 13571294 08/09/2012 PAT 9172738

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13627883 has PRO of 61621926 04/09/2012

13627883 has PRO of 61615802 03/26/2012

13627883 has PRO of 61555400 11/03/2011

13571294 is a CIP of 12696947 01/29/2010 PAT 8520691

14523778 is a CON of 12625365 11/24/2009 PAT 8514852

12696947 has PRO of 61148803 01/30/2009

13571294 is a CIP of 12352457 01/12/2009 PAT 8477762

12625365 has PRO of 61117502 11/24/2008

FOREIGN APPLICATIONS

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10/25/2017

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UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Francis Dacosta
Title: Chirp Networks
Serial No.: 15/728,863
Filing Date: October 10, 2017
Examiner: John D. Blanton
Art Unit: 2466
Atty. Docket: 0357-03304

Submitted via EFS-Web on September 30, 2019.

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RESPONSE TO NON-FINAL OFFICE ACTION

Dear Sir:

In response to the March 28, 2019 Non-Final Office Action, the Applicant submits the following amendments and remarks:

Amendments to the Claims begin on page two of this document.

Remarks/Arguments begin on page eight of this document.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application.

1. (Currently Amended) A system of transmitting of data packets within a network comprising:
 - at least one chirp device transmitting at least one short communication message, wherein
said short communication message is not suitable for direct transmission over a
standard network;
 - at least one standard device transmitting at least one standard communication message;
 - an array of wireless network routers communicating in a tree-shaped logical structure;
 - at least one of said wireless network routers comprising a chirp receiver for the at least
one short communication message; and
 - at least one of said wireless network routers comprising a standard receiver for at least
one standard-length communication message;
 - wherein said chirp receiver accepts said short communication message in a round robin
manner from client chirp devices associated with said chirp receiver, wherein
each short communication message is received at a designated time period;
 - wherein said short communication messages are buffered until all messages are
received from all ~~clients~~ client chirp devices and a single ~~buffered~~ concatenated
packet is formed from the ~~combined~~ received short communication messages; and
 - wherein each wireless network router further comprises an uplink function connecting
said wireless network router to ~~another~~ a parent wireless network router in the
array of wireless network routers having a tree-like shape or an external ip-based
network; a downlink function connecting said wireless network router to other

wireless network routers within said tree; and a scanning function wherein the uplink function and the downlink function connect the wireless network routers participating in the system in a tree-based virtual switch and wherein said ~~buffered~~ concatenated packet is sent using the tree-shaped ~~three-shaped~~ virtual switch.

2. (Previously Presented) The system of claim 1 wherein a path within said tree-based virtual switch can be calculated in linear time with respect to the number of wireless network routers participating in the tree.

3. (Currently Amended) The system of claim 1 wherein said ~~buffered~~ concatenated packet is transmitted within the tree to the designated target host connected to another wireless network router or the external ip-based network.

4. (Currently Amended) The system of claim 3 wherein a path through the tree of the ~~buffered~~ concatenated packet is calculated in linear time.

5. (Currently Amended) The system of claim 3 wherein the transmission of the ~~buffered~~ concatenated packet does not delay standard communication messages transmitted in the tree.

6. (Previously Presented) The system of claim 1 wherein said clients are dispersed throughout the tree-shaped network.

7. (Previously Presented) The system of claim 1 wherein said round robin clients can reserve more than one time slot to obtain additional resources from the wireless network router.

8. (Currently Amended) A system of transmitting of data packets within a network comprising:

at least one chirp device transmitting at least one short communication message having metadata attached to said communication message, wherein said short communication message is not suitable for direct transmission over a standard network;

an array of wireless network routers communicating in a tree-shaped logical structure;

and

at least one of said wireless network routers comprising a chirp receiver for the at least one short communication message;

wherein said chirp receiver accepts said short communication message in a round robin manner from client chirp devices associated with said chirp receiver, wherein each short communication message is received at a designated time period; wherein said short communication messages are buffered until all messages are received from all clients and at least one ~~buffered~~ concatenated packet is formed from the ~~combined~~ received short communication messages;

wherein each wireless network router further comprises an uplink function connecting said wireless network router to another wireless network router in the tree or an external ip-based network; a downlink function connecting said wireless network router to other wireless network routers within said tree; and a scanning function

wherein the uplink function and the downlink function connect the wireless network routers participating in the system in a tree-based virtual switch; wherein said ~~buffered~~ concatenated packet is sent using the uplink function of said wireless network router through the tree-shaped ~~three-shaped~~ network.

9. (Currently Amended) The system of claim 8 wherein multiple ~~buffered~~ concatenated packets are formed from the short communication messages and wherein the metadata attached to each communication message determines which ~~buffered~~ concatenated packet the short communication message is attached to.

10. (Currently Amended) The system of claim 9 wherein a path for ~~buffered~~ concatenated packet is calculated based on the metadata and intended target of the each ~~buffered~~ concatenated packet.

11. (Previously Presented) The system of claim 10 wherein the path calculation for the routing of the packet within the tree is performed in linear time.

12. (Currently Amended) The system of claim 8 wherein some short communication messages are cloned to multiple ~~buffered~~ concatenated packets and are sent to multiple destinations.

13. (Currently Amended) The system of claim 12 wherein said ~~buffered~~ concatenated packets are cloned at multiple forks in the tree-shaped network.

14. (Currently Amended) The system of claim 8 wherein each router participating in the tree may disassemble the ~~buffered~~ concatenated packet and send different parts in different directions.

15. (Previously Presented) The system of claim 8 wherein said short message metadata includes a latency requirement.

16. (Previously Presented) The system of claim 8 wherein a latency requirement for each short message is calculated on basis of type of data contained in the short message metadata.

17.-20, (Cancelled)

21. (New) A wireless mesh network comprising:

a root node having an external connection comprising an uplink, the root node further comprising a downlink connection for communication with at least one child node;

at least one child node having an uplink for communicating with the root node, each child node further capable of comprising a downlink connection for communication with other child nodes;

wherein each uplink and downlink connection uses non-conflicting distinct channels for transmission;

wherein each child node uplink connects on the channel of the root node downlink or the channel of another child node downlink;

wherein said root node and the at least one child node create a tree-like structure.

22. (New) The wireless mesh network according to claim 21 wherein clients communicate with the root node using the root node downlink channel.

23. (New) The wireless mesh network according to claim 21 wherein clients communicate with a child node using that child node's downlink channel.

Applicant's Remarks

In the Official Action dated March 28, 2019, the Examiner raised a double patenting rejection on claims 1, 8, and 17. In addition, claims 1-20 were rejected under 35 U.S.C. § 112 for being indefinite. Claims 1-20 were rejected under 35 U.S.C. § 103 as being unpatentable over prior art.

Double Patenting

Applicant will submit a terminal disclaimer along with this office action response to address the Double Patenting Issues.

Indefiniteness

Applicant has amended independent claims 1 and 8 to further clarify the scope of same. The claims are directed to two types of client devices: ones sending short messages (or 'chirp' clients) and other devices that send conventional (or 'standard' clients). Applicant submits that the changes to the claims obviate the rejections.

Support for Amendments

Support for the added claim limitation that the short messages are not suitable for transmission over standard networks is found in the specification page 19, fourth full paragraph, (paragraph 99 of the published application), which states:

This adversely affects the delivery schedule of lightweight packets (e.g. VOIP, Figs 10, 11) that travel no faster than large packets, through no fault of theirs, other being smaller than the standard packet size. Hence container based transport for VOIP, Figs. 10-12 are discussed in referenced applications. Filling the packet container reduces the "price" per VOIP packet and also ensures reliable (assured latency/jitter) delivery. Without containerization, client capacity rapidly deteriorates, Figs 10-11. The IP highway is not suited for short chirp like devices, whether they are VOIP packets or other types of small-payload transmissions.

Support for the added claim limitation that the short messages are concatenated into standard messages is found in specification page 8, third full paragraph (paragraph 35 of the published application), which states:

As explained below, the embodiment includes a Packet classifier (labeled 010) that recognizes voice packets based on size and regularity of transmissions. A VOIP concatenation engine (labeled 020) "container-izes" small voice packets into a larger "container" packet for more efficient transportation. Real time extensions (labeled 030) to the Linux kernel enable the system to provide near real time performance for sending and receiving the latency sensitive VOIP container packets through the network - regardless of what the Operating System is doing at the time.

Applicant has added a third independent claim 21 and claims 22-23. Support for the claims is found in application serial number 12/696,947, which was incorporated by reference by the present application. The claims require non-conflicting distinct channels to be used for the uplink and the downlink in a tree-shaped network. Support for this limitation is found in the published patent col. 6, lines 14-45 and figure 1B:

The downlink wireless connections 135 on the three nodes depicted in FIG. 1(b) employ distinct frequencies for transmission or transmission channels. The downlink on the root node 145 employs channel "ChX." In turn, the uplink on the first child node 155 employs "ChX" to communicate with the root node 145. In turn, the first child node 155 uses a different frequency or channel "ChY" to communicate with its immediate child node 165. The child node 165 uses the same ChY channel on its uplink so as to be able to communicate with its parent node 155. Finally, the child node 165 uses a third channel "ChZ" to communicate with any one or more nodes downstream (not pictured). In one embodiment of the present invention each of AP 145, 155, and 165 may employ separate radios for uplink and downlink connections. In another embodiment, a single radio may be employed in

these APs. When a single radio is employed, it may utilize separate frequencies for uplink and downlink connections such as channels X, Y, and Z shown in FIG. 1B. Alternately, a single radio implementation may utilize the same frequency for uplink and downlink, essentially making channels X, Y, and Z all the same. A single channel implementation creates more co-channel interference in the mesh than a multi-channel implementation, but has some simplifications of operation that may be advantageous in some circumstances. Regardless of whether single or multiple relay radios are used, or how many RF channels are utilized for communication within the mesh, according to the present invention the connection topology will always be formed in a tree-like structure and each mesh AP or node will contain routing table data and connectivity logic consistent with a distributed routing table structure and a tree-like connectivity structure.

Obviousness

Independent claims 1 and 8 have been amended to clarify the nature of the terse messages, or chirps. The claims now require that the short messages are not suitable for direct transmission over a standard network. The Examiner has cited the combination of U.S. Patent Publication 2009/0201898 to Gong, along with U.S. Patent 6,434,129 to Struhsaker. Examiner indicates that Gong paragraph 18 discusses a system that handles ‘short communication messages.’

Applicant disagrees that Gong handles terse messages or chirps, especially as required by the current claims. Gong paragraph 18 describes a traditional wireless network node with either one or two radios. There is no mention of handling of short messages, especially as required by the presently amended claims – messages that cannot be routed over conventional networks. Instead, Gong is concerned about channel management, not handling of messages:

The mesh access points in the mesh network, in one implementation, generally include one radio, operating in a first frequency band, and associated wireless communication functionality to communicate with other mesh access points to thereby implement the wireless backbone, as discussed more fully below. All or a subset of the mesh access points, in one implementation, also include an additional radio, operating in a second, non-interfering frequency band, and other wireless

communication functionality to establish and maintain wireless connections with mobile stations, such as wireless client 60.

Gong ¶18.

Examiner also cited ¶29 of Gong for its suggestion of buffering of data. While Gong does discuss creating an uplink buffer, it is a purely conventional one. The same paragraph mentions how the data that is buffered could also be sent through the network without any additional processing:

In the following implementation, a given source mesh access point (e.g., leaf mesh access point 7 35) intends to send a packet to the root mesh access point 21. As described in more detail below, the source mesh access point 7 35 aggregates traffic into a single packet to transmit to the root mesh access point 21. In a particular implementation, a source mesh access point receives wireless packets from wireless clients and reads them onto an upstream transmit queue of a plurality of upstream transmit queues. The selected upstream transmit queue can depend on the access class or other attribute associated with the packet. An aggregation process may operate on the upstream transmit queues.

Gong ¶29.

The present claims require the short messages to be not suitable for direct transmission over a standard network. Applicant submits that the approach of Gong and other prior art teaches away from the applicant's claimed method. Gong in ¶29 teaches encapsulating each message with an additional information the header:

In one implementation, each wireless client frame may be encapsulated by a radio resource management header ...

In the Background section of the present application, the applicant explains that simply adding a standard header to the short messages is not an acceptable solution:

Burdening these devices with prior art standard network protocol stacks is inefficient, unnecessary and unduly increases their cost of ownership.

Instead, the network nodes must process the short messages and prepare them for transmission over the standard network without interfering with normal network communications. Without this processing the messages are not suitable for transmission over standard networks.

Examiner also cited col. 8 and lines 35-40 of Struhsaker as relevant to the short messages. Struhsaker is concerned with providing VoIP services on a local wireless network. Similarly to Gong, Struhsaker suggests adding more overhead to packet fragments. In fact, the cited section of Struhsaker discusses dividing standard packets into fragments, where each fragment receives its own overhead, such as MAC addresses, etc. This increases the overhead, instead of decreasing it:

WLL system is not optimized for typically long LAN packets, a method must be implemented that provides for fragmentation of LAN packets into packets appropriate for a WLL system. The fragmented packets can then be encapsulated with appropriate MAC data information including: packet length; ACK/ NACK; a virtual or short interval address corresponding to a physical address; Cyclic Redundancy Code (CRC); and, Flow Control.

Struhsaker col. 8, lines 35-40.

In this way, Struhsaker increases the overhead of the system instead of decreasing it teaching away from the current approach.

The remaining cited prior art likewise fails to demonstrate the requirement claim elements. U.S. Publication 2002/0007416 to Putzolu is concerned with prioritizing multimedia data. U.S. Publication 2005/0128940 to Wen discusses routing data over multiple connections for redundancy and security, adding more overhead and cutting throughput. U.S. patent 7,023,856 to Washabaugh shows a traffic classifier that adds 'traffic class' data to each packet, increasing overhead. Lo discusses signal processing from local tracking devices, there is no discussion of processing the signals into different types of messages or how to handle short messages as required by the presently pending claims.

Applicant has made an earnest attempt to respond to the Office Action. No new matter was added by this amendment. Applicant contends that that the Application is in condition for allowance and the same is respectfully requested. If a telephonic interview would expedite examination of the Application, the Examiner is urged to contact the undersigned. Claims 1-16, 21-23 are pending.

Respectfully submitted,

CHERSKOV FLAYNIK & GURDA, LLC

/Szymon M. Gurda/

Szymon M. Gurda (58,451)

Electronic Patent Application Fee Transmittal				
Application Number:		15728863		
Filing Date:		10-Oct-2017		
Title of Invention:		Chirp Networks		
First Named Inventor/Applicant Name:		Francis DACOSTA		
Filer:		Szymon Maciej Gurda		
Attorney Docket Number:		0357-03304		
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(\$)
Extension - 3 months with \$0 paid	2253	1	700	700
Miscellaneous:				
Total in USD (\$)				700

Electronic Acknowledgement Receipt

EFS ID:	37321558
Application Number:	15728863
International Application Number:	
Confirmation Number:	9690
Title of Invention:	Chirp Networks
First Named Inventor/Applicant Name:	Francis DACOSTA
Customer Number:	27197
Filer:	Szymon Maciej Gurda
Filer Authorized By:	
Attorney Docket Number:	0357-03304
Receipt Date:	30-SEP-2019
Filing Date:	10-OCT-2017
Time Stamp:	16:35:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 700
RAM confirmation Number	E20199TG36103611
Deposit Account	501709
Authorized User	Szymon Gurda

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	Extension of Time	Ext.pdf	75748	no	1
			9f7ea7b0d9f969df6b31d92af697c43ead9b927d		
Warnings:					
Information:					
2		Response.pdf	115943	yes	13
			81dbe2cf9baf5b01f509641d39558aa39a02d825		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	7	
	Applicant Arguments/Remarks Made in an Amendment		8	13	
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30230	no	2
			9b2512b78ab76f0737fb4abcc5f1437762b3aee5		
Warnings:					
Information:					
Total Files Size (in bytes):			221921		

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.

**PATENT
CONFIRMATION NO. 9690**

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Francis DaCosta
Application: CHIRP NETWORKS
Serial No.: 15/728,863
Filing Date: October 10, 2017
Examiner: John D. Blanton
Attorney Ref. No.: 0357-03304

Submitted via EFS-Web on September 30, 2019.

Commissioner for Patents
Box 1450
Alexandria VA 22313-1450

123 West Madison Street
Chicago, Illinois 60602
(312) 621-1330

PETITION TO EXTEND TIME

Dear Sir:

It is respectfully requested that the time for filing a response to the March 28, 2019 Office Action, be extended by three months to Monday, September 30, 2019 inasmuch as September 28, 2019 was a Saturday.

Payment of the \$700.00 extension of time will be arranged using the EFS-Web electronic filing system. The Office is authorized to charge any deficiency or credit any overpayment to the undersigned's Deposit Account No. 501701.

Respectfully submitted,

CHERSKOV FLAYNIK & GURDA, LLC

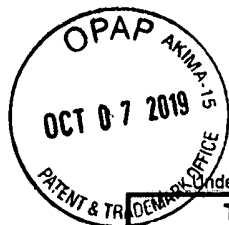
By: /Szymon M. Gurda/
Szymon M. Gurda (Atty. Reg. No. 58,451)

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 15/728,863		Filing Date 10/10/2017		☐ To be Mailed		
ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO										
APPLICATION AS FILED - PART I										
		(Column 1)	(Column 2)							
FOR		NUMBER FILED	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), (l), 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										
		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT	09/30/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 19	Minus	** 20	= 0	x \$50 =		0		
	Independent (37 CFR 1.16(h))	* 3	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		
		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	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".						/ZETA T ADAMS/				
*** 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.										

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.



M

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.

**TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING
REJECTION OVER A "PRIOR" PATENT**

Docket Number (Optional)
0357-03304

In re Application of: Francis daCosta

Application No.: 15/728,863

Filed: Oct. 10, 2017

For: Chirp Networks

The applicant, Francis daCosta, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 9730100 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☒ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

2. ☐ The undersigned is an attorney or agent of record. Reg. No. _____

Francis daCosta
Signature

9/28/19
Date

Francis daCosta as applicant and owner of DYNAMIC MESH NETWORKS, INC. DBA MESHDYNAMICS
Typed or printed name

Applicant
Title

Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

This collection of information is required by 37 CFR 1.321. 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.

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



PATENT

Confirmation No. 9690

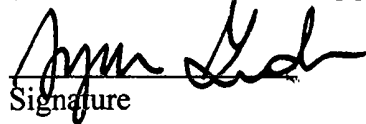
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Francis Dacosta
Title: Chirp Networks
Serial No.: 15/728,863
Filing Date: October 10, 2017
Examiner: John D. Blanton
Art Unit: 2466
Atty. Docket: 0357-03304

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below.

Szymon M. Gurda
Name


Signature

Sept. 30, 2019
Date

Mail Stop: Amendment
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

123 West Madison Street
Suite 400
Chicago, Illinois 60602
(312) 621-1330

TRANSMITTAL

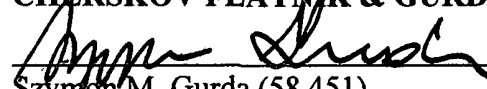
Dear Sir:

As indicated by the Sept. 30, 2019 Office Action Response filed in the above-captioned case, applicant hereby submits the terminal disclaimer and fee.

If a telephonic interview would expedite review of the submission, the Examiner is urged to contact the undersigned.

Respectfully submitted,

CHERSKOV FLAYNIK & GURDA, LLC


Szymon M. Gurda (58,451)
312-621-1330



United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :C44696

Sale Accounting Date:10/07/2019

Sale Item Reference Number
15728863

Effective Date
10/07/2019

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I201907F49552617	2814	STATUTORY OR TERMINAL DISCLAIMER	\$160.00	Check

Application Number * 15/728,863 *	Application/Control No. 15/728,863	Applicant(s)/Patent under Reexamination DACOSTA, Francis	
	Examiner BLANTON, JOHN D	Art Unit 2466	
Document Code - DISQ		Internal Document - DO NOT MAIL	

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed: <u>07 October 2019</u>	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
/PAMELA A YOUNG/ Technology Center: PLRC Telephone:



UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/728,863	10/10/2017	Francis DACOSTA	0357-03304	9690
27197	7590	12/18/2019		
MICHAEL J. CHERSKOV 123 WEST MADISON STREET SUITE 400 CHICAGO, IL 60602			EXAMINER BLANTON, JOHN D	
			ART UNIT	PAPER NUMBER
			2466	
			NOTIFICATION DATE	DELIVERY MODE
			12/18/2019	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):

akeith@cherskov.com
mail@cherskov.com
sgurda@cherskov.com

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Election/Restrictions

Newly submitted claims 21-23 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

The newly submitted claims 21-23 are directed towards a network tree structure and the allocation of channels in the tree network. Originally submitted claims 1-16 are directed towards sensor networks and aggregation of messages to a gateway/bridge device.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 21-23 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Response to Arguments

Applicant's arguments filed 9/30/2019 have been fully considered but they are not persuasive.

On page 10 of the Applicant's Response, Applicant: "***messages that cannot be routed over conventional networks***".

Examiner respectfully disagrees with Applicant's argument. Applicant does not claim the limitation in the arguments. Thus argument is not relevant to the Instant Claims.

On page 11 of the Applicant's Response, Applicant: "***The present claims require the short messages to be not suitable for direct transmission over a standard network.***".

Examiner respectfully disagrees with Applicant's argument. Gong discloses devices operating at different frequencies than the mesh APs, this renders the direct communication "not suitable".

On page 11-12 of the Applicant's Response, Applicant: "***Applicant submits that the approach of Gong and other prior art teaches away from the applicant's claimed method... In this way, Struhsaker increases the overhead of the system instead of decreasing it teaching away from the current approach.***".

Examiner respectfully disagrees with Applicant's argument. Gong discloses devices operating in a tree network; in no way does this criticize, discredit, or otherwise discourage the solution claimed.

In view of the above discussions the rejection of claims 1-16 still stands.

Claim Rejections - 35 USC § 112

Claims 1-16 are 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.

Regarding claim 1, the limitation "client chirp devices" (line 12, 15) are indefinite. A chirp device in line 2 is claimed; however, client chirp devices are claimed in line 12.

It is unclear whether the chirp device is a member of the client chirp devices. The limitation "client chirp device" in line 15 has antecedent basis in line 12.

Claim 8 has similar indefiniteness issues.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5, 6, 8-10, and 14 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong et al. (US 2009/0201898) ("Gong") in view of Struhsaker et al. (US 6,434,129) ("Struhsaker").

For claims 1 and 8; Gong discloses: at least one device transmitting at least one short communication message (paragraph 18: ***an additional radio, operating in a second, non-interfering frequency band, and other wireless communication functionality to establish and maintain wireless connections with mobile stations***); at least one device transmitting at least one standard communication message (paragraph 18: ***The mesh access points in the mesh network, in one implementation, generally include one radio, operating in a first frequency band, and associated wireless communication functionality to communicate with other mesh access points***) wherein said short communication message is not suitable for direct transmission over a standard network (paragraph 18: ***For example, in 802.11 wireless networks, the backbone radios on the wireless routing nodes may transmit wireless packets between each other using the 802.11a protocol on the 5 GHz band, while the second radio on each***

mesh access point may interact with wireless clients on the 2.4 GHz band); an array of wireless network routers communicating in a tree-shaped logical structure (figure 1); at least one of said wireless network routers comprising a chirp receiver for the at least one short communication message (paragraph 18: *an additional radio, operating in a second, non-interfering frequency band, and other wireless communication functionality to establish and maintain wireless connections with mobile stations*); and at least one of said wireless network routers comprising a standard receiver for at least one standard-length communication message (paragraph 18: *The mesh access points in the mesh network, in one implementation, generally include one radio, operating in a first frequency band, and associated wireless communication functionality to communicate with other mesh access points*); wherein said short communication messages are buffered until all messages are received from all clients (paragraph 29: *source mesh access point receives wireless packets from wireless clients and reads them onto an upstream transmit queue of a plurality of upstream transmit queues*) and a single concatenated packet is formed from the combined short communication messages (paragraph 31: *If the predefined limit is exceeded, the source mesh access point 7 35 composes and transmits the packet upstream to the root mesh access point 21*); and wherein each wireless network router further comprises an uplink function connecting said wireless network router to another wireless network router in the tree or an external ip-based network (paragraph 33: *the intermediate mesh access points 2 31 and 4 33 may each forward a given aggregated packet to the root mesh access point*); a downlink function connecting said wireless network router to other wireless network routers within said tree (paragraph 49: *a given intermediate mesh access point (e.g., intermediate mesh access point 2 31) may forward a given packet to the appropriate destination (e.g., leaf mesh access point 7 35 or a local wireless client 60)*); and a scanning function wherein the uplink

function and the downlink function connect the wireless network routers participating in the system in a tree-based virtual switch (paragraph 18: ***associated wireless communication functionality to communicate with other mesh access points to thereby implement the wireless backbone***) and wherein said concatenated packet is sent using the tree-shaped virtual switch (figure 1).

Gong does not expressly disclose, but Struhsaker from similar fields of endeavor teaches: wherein said chirp receiver accepts said short communication message in a round robin manner from client devices associated with said chirp receiver, wherein each short communication message is received at a designated time period (col. 8, lines 23-67: ***because the packet structure of a WLL system is not optimized for the typically long LAN packets, a method must be implemented that provides for fragmentation of LAN packets into packets appropriate for a WLL system ...a polled or token ring system in which the various users take turns sending data is appropriate for the LAN of the present invention. Such an implementation is very stable where every user is provided with a fixed time slot in which the user is allowed access to the data channel***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the client polling/multi-point to single point connection as described by Struhsaker in the wireless mesh network as described by Gong. The motivation is to improve overhead.

For claim 3; Gong discloses: concatenated packet is transmitted within the tree to the designated target host connected to another wireless network router or the external ip-based network (paragraph 35: ***a given aggregated packet may have packets destined from the intermediate mesh access point. As such, the intermediate mesh access point may partially de-aggregate the packet to remove such packets and then forward the remaining packet upstream to the next intermediate mesh access point***).

For claim 5; Gong disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Struhsaker from similar fields of endeavor teaches: the transmission of the concatenated packet does not delay standard communication messages transmitted in the tree (col. 3, lines 40-45: ***"embedded concentrated access" which allows the removal of a specified number of channels from the pool of multi-point RF communication channels and assigns them to the high traffic demand structure. These removed channels are referred to as the "micro-channel bank." The micro-channel bank provides the high traffic demand structure with traffic/bearer data, user control data and radio link specific overhead and control***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the client polling/multi-point to single point connection as described by Struhsaker in the wireless mesh network as described by Gong. The motivation is to allow for service levels.

For claim 6; Gong discloses: clients are dispersed throughout the tree-shaped network (figure 1).

For claim 9; Gong disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Struhsaker from similar fields of endeavor teaches: multiple concatenated packets are formed from the short communication messages and wherein the metadata attached to each communication message determines which concatenated packet the short communication message is attached to (col. 8, lines 35-40: ***The fragmented packets can then be encapsulated with appropriate MAC data information including: packet length; ACK/NACK; a virtual or short interval address corresponding to a physical address; Cyclic Redundancy Code (CRC); and, Flow Control***). Thus

it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the client polling/multi-point to single point connection as described by Struhsaker in the wireless mesh network as described by Gong. The motivation is to allow for service levels.

For claim 10; Gong discloses: a path for concatenated packet is calculated based on the metadata and intended target of the each concatenated packet (paragraph 52: *the intermediate mesh access point 2 31 extracts any local packets 706 for itself and the forwards the appropriate packets 706 to its local wireless client(s) 60 (612) and forwards the rest of the packets to the destination mesh access point*).

For claim 14; Gong discloses: each router participating in the tree may disassemble the concatenated packet and send different parts in different directions (paragraph 52: *the intermediate mesh access point 2 31 extracts any local packets 706 for itself and the forwards the appropriate packets 706 to its local wireless client(s) 60 (612) and forwards the rest of the packets to the destination mesh access point*).

For claim 17; Gong and Struhsaker disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Struhsaker from similar fields of endeavor teaches: wherein each short communication message is received along with its metadata (col. 8, lines 23-67: *The fragmented packets can then be encapsulated with appropriate MAC data information including: packet length; ACK/NACK; a virtual or short interval address corresponding to a physical address; Cyclic Redundancy Code (CRC); and, Flow Control*) and wherein said short communication message is published to a local control loop (col. 3, lines 15-20: *a second interface connecting the WLL to a plurality of customer premise equipment (CPE)*). Thus it would have been obvious to the person of ordinary skill in the

art at the time of the invention to implement the client polling/multi-point to single point connection as described by Struhsaker in the wireless mesh network as described by Gong. The motivation is to improve overhead.

For claim 18; Gong disclose the subject matter in claim 17 as described above in the office action.

Struhsaker discloses a single point to multi-point Wireless Logic Loop that receives data from multiple clients; Gong discloses multiple mesh APs that each receive data from multiple client respectively. Multiple control loops are not discloses by Struhsaker; however, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the wireless control loop at each mesh AP, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

For claim 20; Gong disclose the subject matter in claim 17 as described above in the office action.

Gong does not expressly disclose, but Struhsaker from similar fields of endeavor teaches: short communication messages comprises status messages and command messages (col. 16, lines 34-55: ***The fragments are then encapsulated with certain information including: an address byte; a fragment sequence number and control; fragment length; a packet fragment; and, 16 or 32 bit CRC. The address byte, ADDR, is effectively the logical connection to the receiver unit and the customer premise interface. Where the IP address controls distribution of information to multiple users on the internet, this address controls the distribution of data at a customer premise interface on the WLL. The fragment sequence number and control byte, SEQ/C, provides information on the position of the fragment sequence in relation to the whole packet***).

Thus it would have been obvious to the person of ordinary skill in the art at the time of

the invention to implement formatting as described by Struhsaker in the wireless mesh network as described by Gong. The motivation is to improve wireless performance.

Claims 2, 4, and 11 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong in view of Struhsaker as applied to claim 1 above, and further in view of Steer et al. (US 2004/0156345) ("Steer").

For claims 2, 4, and 11; Gong disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Steer from similar fields of endeavor teaches: a path within network can be calculated in linear time with respect to the number of wireless network nodes participating in the network (paragraph 87: ***at least two time values are transmitted within efficiency field 106. A first time value reflects one of a total transmission time that is updated by every wireless network node or a transmission time of the initiating node so that a total time may be calculated***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the link calculations as described by Steer in the wireless mesh network as described by Gong. The motivation is to improve transmission delays.

Claim 7 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong in view of Struhsaker as applied to claim 1 above, and further in view of Putzolu (US 2002/0007416).

For claim 7; Gong disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Putzolu from similar fields of endeavor teaches: round robin clients can reserve more than one time slot to obtain additional resources from the wireless network router (paragraph 43: ***weighted round robin scheme***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the scheduling as described by Putzolu in the wireless mesh network as described by Gong. The motivation is to improve latency.

Claims 12 and 13 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong in view of Struhsaker as applied to claim 1 above, and further in view of Wen et al. (US 2005/0128940) ("Wen").

For claim 12; Gong disclose the subject matter in claim 1 as described above in the office action.

Gong does not expressly disclose, but Wen from similar fields of endeavor teaches: some short communication messages are cloned and are sent to multiple destinations (paragraph 6: ***a 1+1 protection scheme, allows both paths (e.g., the working and the protect) to concurrently transmit packets***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the redundancy as described by Wen in the wireless mesh network as described by Gong. The motivation is to improve reliability.

For claim 13; Gong disclose the subject matter in claim 12 as described above in the office action.

Gong does not expressly disclose, but Wen from similar fields of endeavor teaches: concatenated packets are cloned at multiple forks in the network (paragraph

6: *a 1+1 protection scheme, allows both paths (e.g., the working and the protect) to concurrently transmit packets*). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the redundancy as described by Wen in the wireless mesh network as described by Gong. The motivation is to improve reliability using well-known techniques such as duplication.

Claims 15 and 16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong in view of Struhsaker as applied to claim 8 above, and further in view of Washabaugh et al. (US 7,023,856) ("Washabaugh").

For claim 15; Gong disclose the subject matter in claim 8 as described above in the office action.

Gong does not expressly disclose, but Washabaugh from similar fields of endeavor teaches: message metadata includes a latency requirement (col. 6, lines 1-23: *four different traffic classes are established for traffic types that have distinct transmission requirements (i.e., bandwidth, latency, latency variation, traffic loss, etc.) In an embodiment, the packet classifier may read header information from the layer 2, layer 3, and layer 4 headers of a variable-length packet to classify the packet into one of the traffic classes*). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the redundancy as described by Washabaugh in the wireless mesh network as described by Gong. The motivation is to improve reliability.

For claim 16; Gong disclose the subject matter in claim 8 as described above in the office action.

Gong does not expressly disclose, but Washabaugh from similar fields of endeavor teaches: a latency requirement for each short message is calculated on basis

of type of data contained in the short message metadata (col. 6, lines 1-23: ***four different traffic classes are established for traffic types that have distinct transmission requirements (i.e., bandwidth, latency, latency variation, traffic loss, etc.) In an embodiment, the packet classifier may read header information from the layer 2, layer 3, and layer 4 headers of a variable-length packet to classify the packet into one of the traffic classes***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the redundancy as described by Washabaugh in the wireless mesh network as described by Gong. The motivation is to improve reliability.

Claim 19 is/are rejected under 35 U.S.C. 103 as being unpatentable over Gong in view of Struhsaker as applied to claim 1 above, and further in view of Lo et al. (US 2009/0115654) ("Lo").

For claim 19; Gong disclose the subject matter in claim 17 as described above in the office action.

Gong does not expressly disclose, but Lo from similar fields of endeavor teaches: a local integrator agent, wherein said agent performs a check of all communication messages received (paragraph 22: ***the local trackers 112 analyze data from the sensors 110 and generate signals relating to the target. In the present embodiment, each local tracker 112A-D independently receives data from one sensor 110A-D***). Thus it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement the localized processing as described by Lo in the wireless mesh network as described by Gong. The motivation is to improve efficiency.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN D BLANTON whose telephone number is (571)270-3933. The examiner can normally be reached on 7am-6pm EST, Mon-Thu.

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>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Faruk Hamza can be reached on 571-272-7969. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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.

/JOHN D BLANTON/
Primary Examiner, Art Unit 2466

<i>Search Notes</i> 	Application/Control No. 15/728,863	Applicant(s)/Patent Under Reexamination DACOSTA, Francis
	Examiner JOHN D BLANTON	Art Unit 2466

CPC - Searched*		
Symbol	Date	Examiner
h04w40/248	03/25/2019	jb

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
inventor search	03/25/2019	jb
NPL search, google	03/25/2019	jb
east search h04w40/248 (text, PGPub and USPat)	03/25/2019	jb
east search h04w40/248 (text, PGPub and USPat)	12/13/2019	jb

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	"15728863"	US-PGPUB; USPAT	OR	ON	2019/03/20 20:37
S2	298	h04w40/248	US-PGPUB; USPAT	OR	ON	2019/03/20 21:23
S3	209	(parent with child with node) same (tree) same ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/21 20:45
S4	1	"20120202514".did.	US-PGPUB; USPAT	OR	ON	2019/03/22 08:50
S5	1	"20070183346".did.	US-PGPUB; USPAT	OR	ON	2019/03/22 08:56
S6	0	(chirp with (relay gateway bridge) with network) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 08:58
S7	3	(chirp adj (relay gateway bridge)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 08:59
S8	44	(chirp with (relay gateway bridge)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 09:00
S9	218	(pan near2 (relay gateway bridge)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:07
S10	30	(pan adj (relay gateway bridge)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:07
S11	0	(pan adj (relay gateway bridge)) same ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:34
S12	5	(pan adj (relay gateway bridge)) and ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:35
S13	55	(pan near2 (relay gateway bridge)) and ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:41
S14	2	(pan near2 (relay gateway bridge)) same ((aggregat\$3 concatenat\$3)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:41
S15	32	(pan near2 (relay gateway bridge)) and tree and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 11:46
S16	20	(pan near2 (relay gateway bridge)) and tree and ((aggregat\$3 concatenat\$3)) and (	US-PGPUB;	OR	ON	2019/03/22 11:56

		@ad<="20081104")	USPAT			
S17	1	"20110231321".did.	US-PGPUB; USPAT	OR	ON	2019/03/22 12:02
S18	169	(((relay gateway bridge)) same ((aggregat\$3 concatenat\$3)) same (timeslot slot) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 12:17
S19	12	(((relay gateway bridge)) same ((aggregat\$3 concatenat\$3)) same (timeslot slot) same (poll\$3 robin) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 13:01
S20	11	(((relay gateway bridge)) same (local adj control adj loop) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 13:22
S21	177	(((relay gateway bridge)) same (wireless adj local adj loop) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/22 13:58
S29	8	(wireless adj local adj loop) same ((buffer\$3 combin\$3) adj (packet)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/23 11:12
S30	49	((multi with (user subscriber) with (aggregat\$3) with (frame packet)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/23 11:16
S31	430	((aggregation) adj (frame packet)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/23 11:18
S32	50	((aggregation) adj (frame packet)) and (tree) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/23 12:22
S34	7	((multi with (user subscriber) with (aggregat\$3) with (frame packet)) and tree and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/23 12:26
S40	193	((calculat\$3) with (path hop link) with (transmission adj time)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/24 09:37
S41	11	((calculat\$3) with (total) with (path hop link) with (transmission adj time)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/24 09:37
S42	5	((multi multiple) adj (path hop link)) with (network)) and ((calculat\$3) with (total) with (transmission adj time)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/24 09:44
S50	27	((assign\$4) with (slot timeslot) with (number amount) with (latency jitter)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 09:14
S52	157	(((weighted) adj (round) adj (robin)) same (slot timeslot) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 09:22
S53	12	(((weighted) adj (round) adj (robin)) same (slot timeslot) same (latency) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 09:22
S55	63	(((weighted) adj (round) adj (robin)) same (slot timeslot) and (latency) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 09:40
S58	17	((("1+1" adj protection).ab.) and (("1+1" adj protection)) and (@ad<="20081104")	US-PGPUB; USPAT	OR	ON	2019/03/25 10:35
S60	287	((latency with header with (ie information)) and	US-	OR	ON	2019/03/25

		(@ad< = "20081104")	PGPUB; USPAT			10:47
S61	22	(latency with header with (ie information) with (limit requirement max maximum)) and (@ad< = "20081104")	US- PGPUB; USPAT	OR	ON	2019/03/25 10:48
S64	492	((local) with sensor with data with (analysis analyz\$3 check\$3)) and (@ad< = "20081104")	US- PGPUB; USPAT	OR	ON	2019/03/25 11:30
S65	10	"13571294"	US- PGPUB; USPAT	OR	ON	2019/03/25 12:46
S66	11	"12625365"	US- PGPUB; USPAT	OR	ON	2019/03/25 12:49
S68	36	((iot mtm m2m) with (relay gateway bridge) with network) and (@ad< = "20081104")	US- PGPUB; USPAT	OR	ON	2019/12/13 08:21
S70	140	((((iot mtm m2m sensor) adj (relay gateway bridge)) with network) and (@ad< = "20081104")	US- PGPUB; USPAT	OR	ON	2019/12/13 08:50
S72	5	((((iot mtm m2m sensor) adj (relay gateway bridge)) with mesh) and (@ad< = "20081104")	US- PGPUB; USPAT	OR	ON	2019/12/13 11:04
S74	57	((((iot mtm m2m sensor) near5 (relay gateway bridge)) with mesh) and (@ad< = "20081104")	US- PGPUB; USPAT	OR	ON	2019/12/13 11:05

12/ 13/ 2019 2:13:56 PM
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/728,863	10/10/2017	Francis DACOSTA	0357-03304	9690
27197	7590	08/06/2020		
MICHAEL J. CHERSKOV 123 WEST MADISON STREET SUITE 400 CHICAGO, IL 60602			EXAMINER BLANTON, JOHN D	
			ART UNIT	PAPER NUMBER
			2466	
			NOTIFICATION DATE	DELIVERY MODE
			08/06/2020	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):

akeith@cherskov.com
mail@cherskov.com
sgurda@cherskov.com

<i>Notice of Abandonment</i>	Application No.	Applicant(s)
	15/728,863	DACOSTA, Francis
	Examiner	Art Unit
	JOHN D BLANTON	2466

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

This application is abandoned in view of:

1. ☒ Applicant's failure to timely file a proper reply to the Office letter mailed on 18 December 2019.
 - (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
 - (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 to the final rejection. (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) if this is utility or plant application, a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. Note that RCEs are not permitted in design applications.)
 - (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 8 below).
 - (d) ☒ No reply has been received.
2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
 - (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
 - (b) ☐ The submitted fee of \$ _____ is insufficient. A balance of \$ _____ is due.
The issue fee required by 37CFR 1.18 is \$ _____. The publication fee, if required by 37 CFR 1.18(d), is \$ _____.
 - (c) ☐ The issue fee and publication fee, if applicable, has not been received.
3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
 - (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
 - (b) ☐ No corrected drawings have been received.
4. ☐ The letter of express abandonment which is signed by the attorney or agent of record or other party authorized under 37 CFR 1.33 (b). See 37 CFR 1.138(b).
5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34) upon the filing of a continuing application.
6. ☐ The decision by the Patent Trial and Appeal Board rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.
7. ☐ The dismissal of the appeal in an application having no allowed claims. (When an appeal is dismissed in an application having no allowed claims the application stands abandoned. See MPEP 1215.04 subsections I-V for an explanation of the reasons why an appeal is dismissed.)
8. ☐ The reason(s) below:

/JOHN D BLANTON/
Primary Examiner, Art Unit 2466

Petitions to revive under 37 CFR 1.137, or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.