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(54) METHOD, SYSTEM, GATEWAY AND USER DEVICE FOR RECEIVING/SENDING MULTIMEDIA MESSAGE

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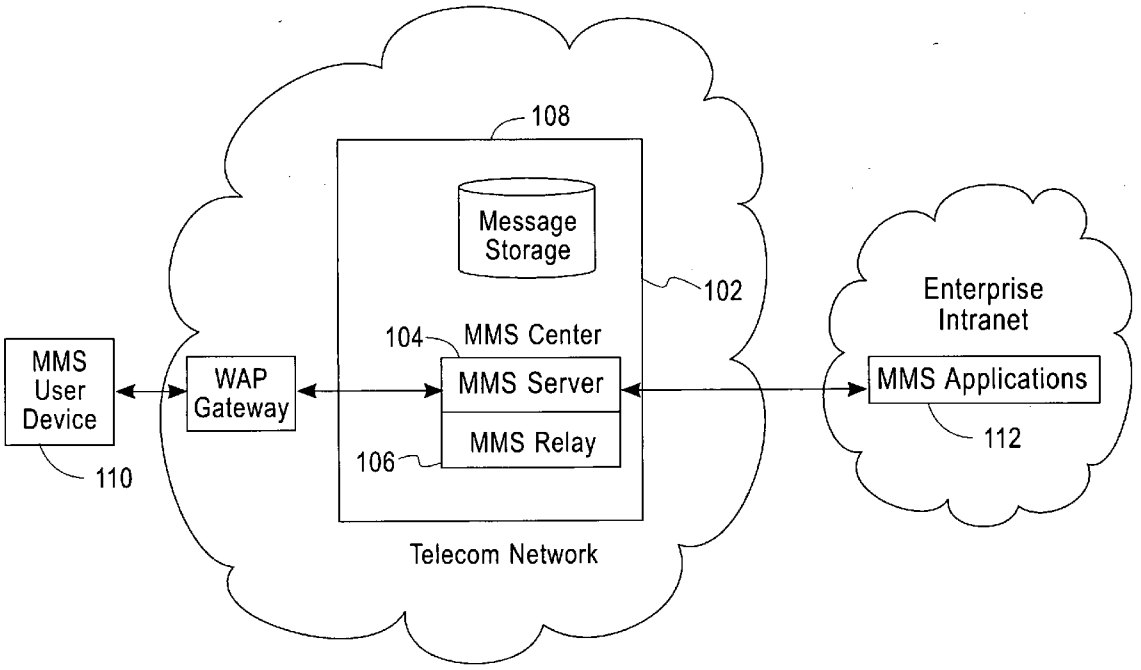
(57) **ABSTRACT**

Methods, systems, gateways and user devices for receiving/sending multimedia message. According to the invention, a multimedia messaging service system comprising a wireless LAN, a multimedia messaging service user device and a multimedia messaging service gateway, the user device communicates with the gateway via the wireless LAN so as to send and receive multimedia messages. Furthermore, the gateway of the invention detect whether the user device is located within the wireless LAN. If yes, then multimedia messages are sent and received via the wireless LAN; and if not, then via conventional telecom network. The invention also discloses a corresponding gateway and a corresponding user device.



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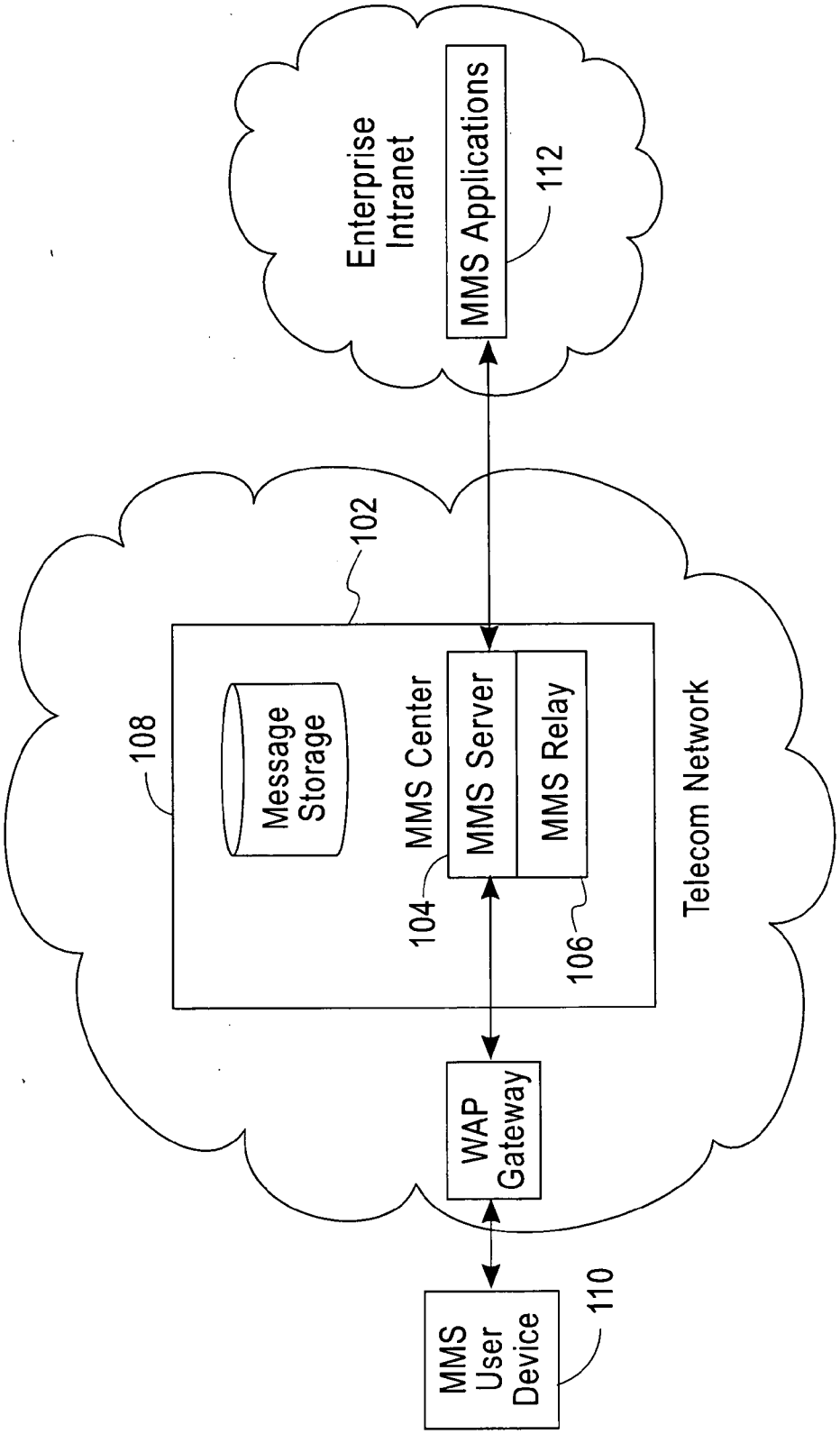

Enterprise Intranet
MMS Applications
112
102
108
Message Storage
MMS Center
MMS Server
MMS Relay
104
106
Telecom Network
WAP Gateway
MMS User Device
110

Fig. 1

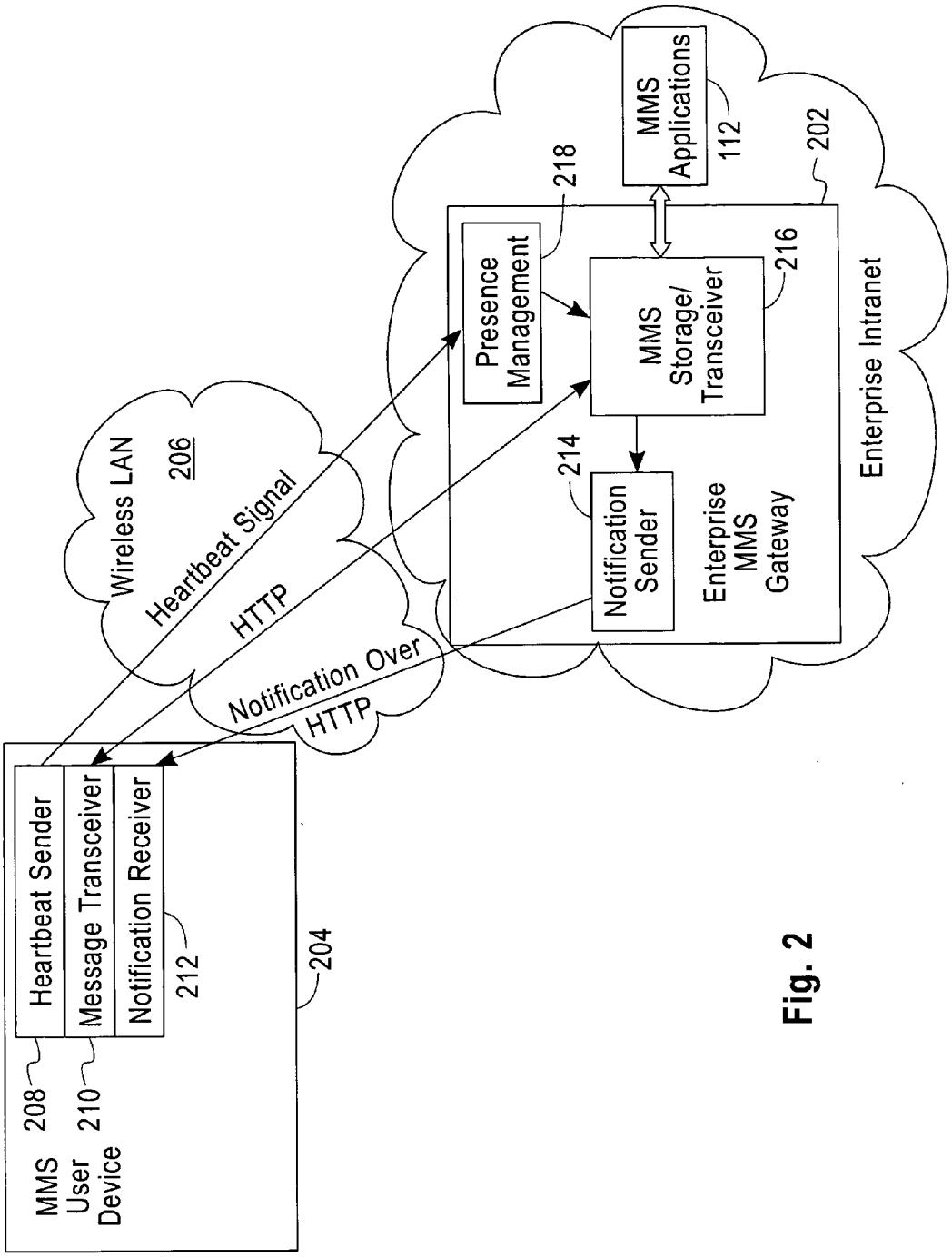

MMS User Device
208
210
Heartbeat Sender
Message Transceiver
Notification Receiver
212
204
Wireless LAN
206
Heartbeat Signal
HTTP
Notification Over HTTP
Presence Management
218
MMS Storage/ Transceiver
216
Notification Sender
214
Enterprise MMS Gateway
MMS Applications
112
202
Enterprise Intranet

Fig. 2

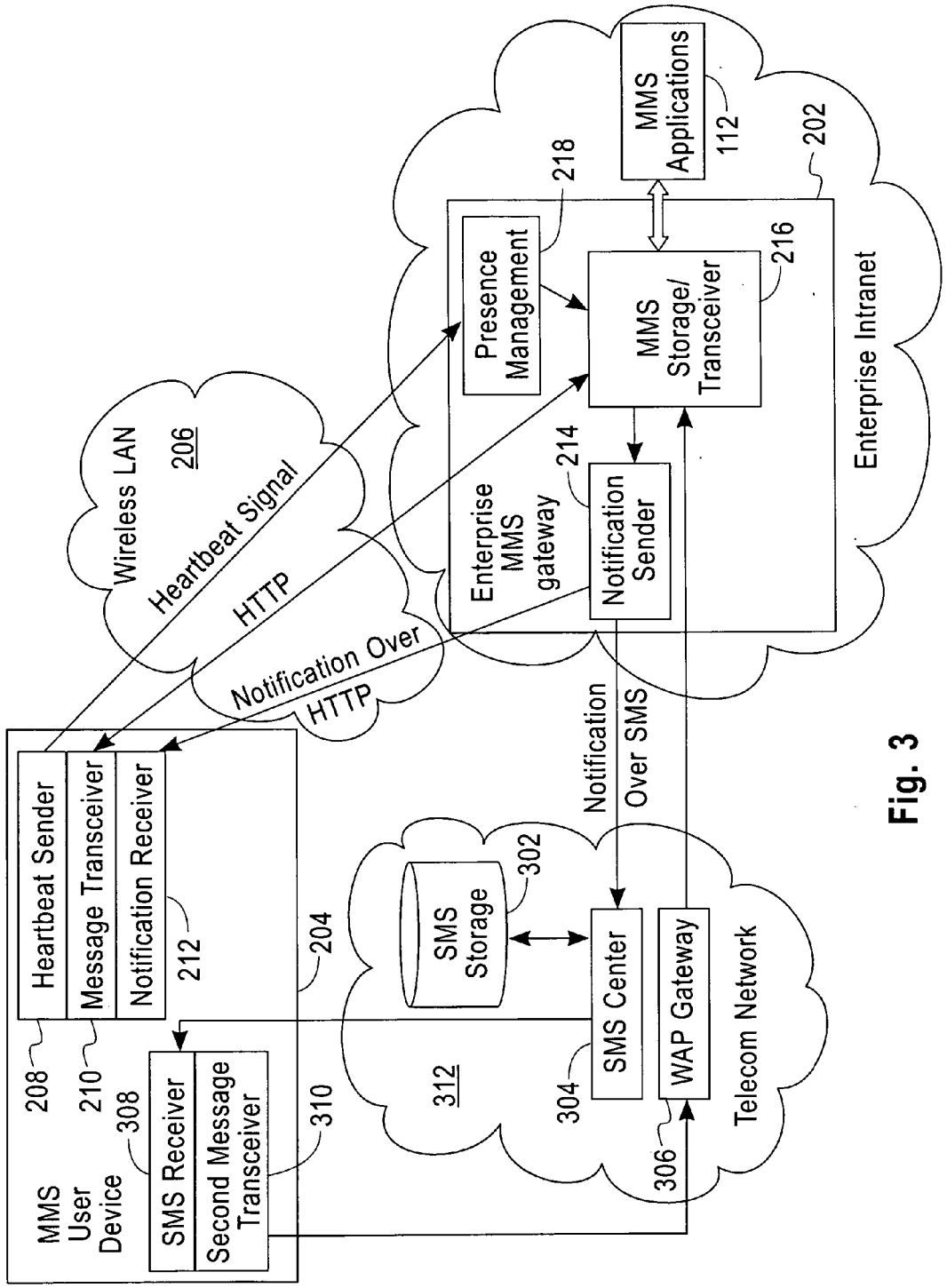
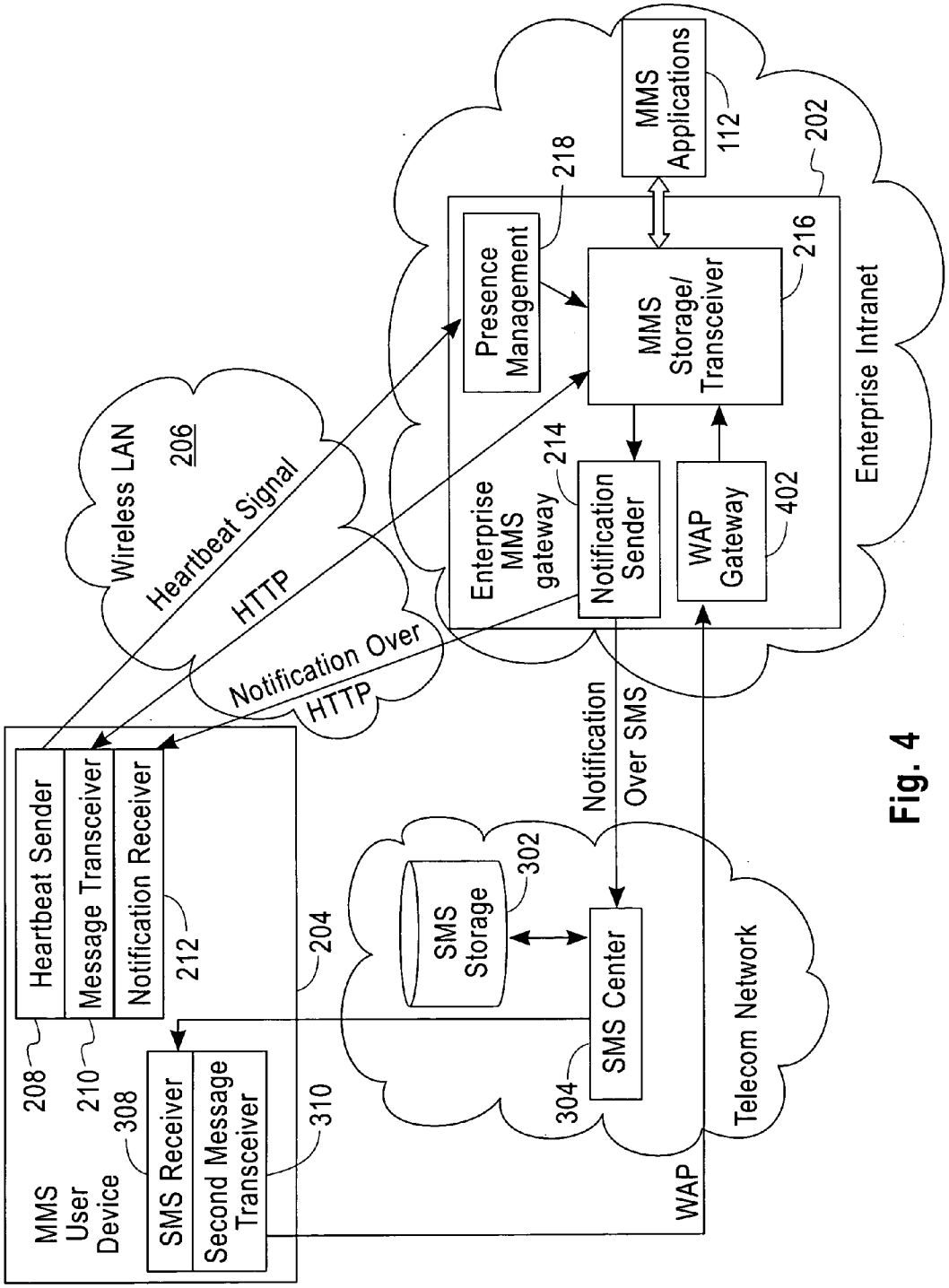

MMS User Device
Heartbeat Sender
Message Transceiver
Notification Receiver
SMS Receiver
Second Message Transceiver
208
210
212
308
310
204
Wireless LAN
206
Heartbeat Signal
HTTP
Notification Over HTTP
Enterprise MMS gateway
Presence Management
MMS Storage/ Transceiver
Notification Sender
MMS Applications
218
216
214
112
202
Enterprise Intranet
Notification Over SMS
SMS Storage
302
SMS Center
WAP Gateway
304
306
312
Telecom Network

Fig. 3


Wireless LAN
206
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112
202
218
Presence Management
MMS Storage/ Transceiver
216
Enterprise Intranet
Enterprise MMS gateway
214
Notification Sender
WAP Gateway
402
Notification Over SMS
Heartbeat Sender
Message Transceiver
Notification Receiver
212
204
208
210
308
310
MMS User Device
SMS Receiver
Second Message Transceiver
SMS Storage
302
SMS Center
304
Telecom Network
WAP

Fig. 4

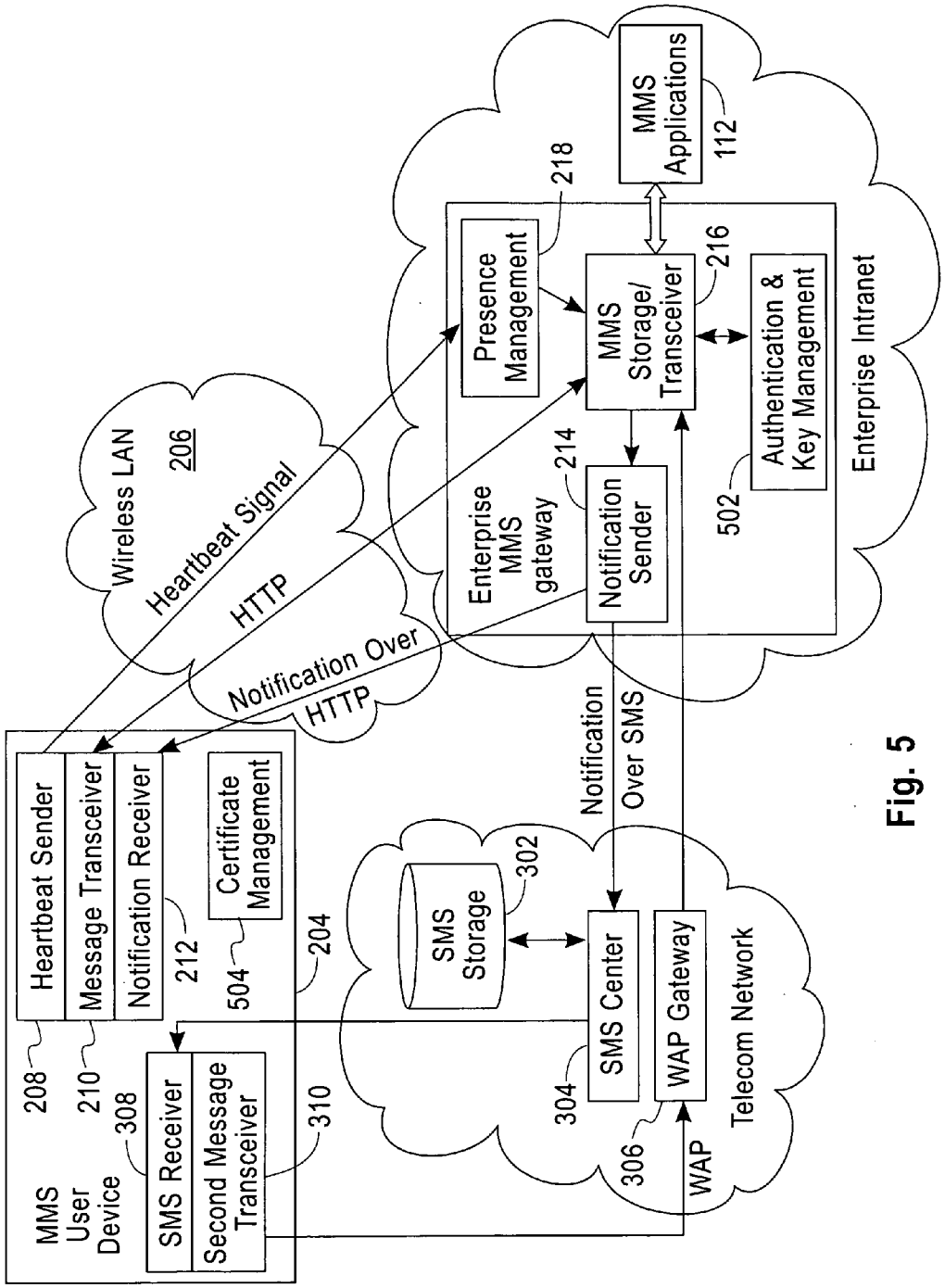
Wireless LAN
206
Heartbeat Signal
HTTP
Notification Over
HTTP
MMS User Device
Heartbeat Sender
Message Transceiver
Notification Receiver
Certificate Management
SMS Receiver
Second Message Transceiver
208
210
212
504
204
308
310
Enterprise MMS gateway
Presence Management
MMS Storage/ Transceiver
Notification Sender
MMS Applications
Authentication & Key Management
Enterprise Intranet
218
216
214
112
502
Notification Over SMS
SMS Storage
SMS Center
WAP Gateway
Telecom Network
302
304
306
WAP

Fig. 5

METHOD, SYSTEM, GATEWAY AND USER DEVICE FOR RECEIVING/SENDING MULTIMEDIA MESSAGE

TECHNICAL FIELD

[0001] The invention relates to multimedia messaging service (MMS), particularly a multimedia messaging service system, a gateway and a user device used in the system, and a method for receiving/sending multimedia message.

BACKGROUND

[0002] Multimedia messaging service (MMS) is a new global messaging standard that enables a wide range of different media elements, including text, color pictures, animations, audio samples, and video clips. MMS promises a dramatic increase in messaging capabilities that will enrich user experience and create a major new source of revenue for network operators as well as service providers and enterprises. However, If MMS is deployed in B2E (Business-to-Enterprise) and B2C (Business-to-Customer) applications to support mobile employee and consumers, there are two requirements for this usage. The first one is that some small businesses need a simple way to send multimedia messages (hereinafter referred to as "MMS messages") to the mobile users. Another requirement is that an end-to-end solution is needed for large enterprises to provide a high security message solution for enterprise applications. However, the current MMS infrastructure can't meet these two requirements. In addition, wireless LAN is becoming more and more popular in an enterprise, so when an employee is at office, sending and receiving MMS via wireless LAN (WLAN) is a better solution than via telecom network (such as Global System for Mobile Communications (GSM), General Packet Radio Service (GPRS), Code Division Multiple Access (CDMA), and so on) for enterprise because the performance of the solution is very good and its cost is very low.

[0003] **FIG. 1** shows a general view of the MMS architecture, in which the most important component is a MMS Center (or MMS Gateway) **102** including two subsystems: an MMS server **104** and an MMS relay **106**. The MMS server is responsible for storing and handling incoming and outgoing messages by means of a message storage **108**. Associated with the MMS server is the MMS relay, which is responsible for transferring messages between different messaging systems. Because MMS is a message store/forward system, MMS messages have to be stored and forwarded by the MMS Center owned by a telecom operator when enterprise users communicate with the backend system (MMS applications **112**) with a multimedia messaging user device (hereinafter referred to as "MMS user device") via the MMS channel.

[0004] Therefore there is a potential security problem in this kind of systems since it is not an end-to-end solution for enterprise mobile applications. Another problem is the interface between the MMS center and enterprise applications. Currently different MMS centers provide different APIs, which brings some troubles for service providers to connect those different operators. Furthermore, if an enterprise wants to connect to an operator's MMS center, it has to sign a contract with the operator to follow the operator's price and security policy. Maybe this also brings some inconvenience for enterprises.

SUMMARY OF THE INVENTION

[0005] Therefore, the present invention provides a new MMS system supporting MMS applications in a wireless LAN environment. The invention provides a multimedia messaging service system (MMS system) comprising: a wireless LAN; a MMS user device for sending and receiving multimedia message over the wireless LAN; a MMS gateway, for receiving, storing and sending the multimedia message sent by the MMS user device.

[0006] Another aspect of the invention is to provide a MMS system supporting both telecom network and wireless LAN and having improved security.

[0007] Another aspect of the invention is to provide a MMS user device, a MMS gateway that may be used in above system, and a method for receiving/sending MMS message.

[0008] Another aspect of the invention is a MMS gateway comprising: a presence manager for detecting whether a MMS user device is located a wireless LAN; a multimedia message storage/transceiver for storing the multimedia messages sent by MMS user devices; a notification sender for sending a notification over the wireless LAN to the MMS user device when a multimedia message is present in the multimedia message storage/transceiver and when the presence manager detects that the MMS user device is located in the wireless LAN.

[0009] Another aspect of the invention is a method for receiving/sending a multimedia message, wherein the multimedia message is sent and received between a MMS user device and a MMS gateway via a wireless LAN.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Other aspects, features and advantages of the invention will become more apparent after reading the following detailed description of the preferred embodiments. The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention. In the drawings:

[0011] **FIG. 1** is an overview of a MMS system in the prior art;

[0012] **FIG. 2** is a block diagram showing a first embodiment of the MMS system, gateway and user device according to the present invention;

[0013] **FIG. 3** is a block diagram showing a second embodiment of the MMS system, gateway and user device according to the present invention;

[0014] **FIG. 4** is a block diagram showing a third embodiment of the MMS system, gateway and user device according to the present invention;

[0015] **FIG. 5** is a block diagram showing a fourth embodiment of the MMS system, gateway and user device according to the present invention;

DESCRIPTION OF THE INVENTION

[0016] The present invention provides an MMS system supporting MMS applications in a wireless LAN environ-

ment. It provides a multimedia messaging service system (MMS system) comprising: a wireless LAN; a MMS user device for sending and receiving multimedia message over the wireless LAN; a MMS gateway, for receiving, storing and sending the multimedia message sent by the MMS user device. Accordingly, it is possible to provide a direct MMS communication channel between MMS users and backend systems for enterprise applications over telecom network.

[0017] The invention also provides a MMS system supporting both telecom network and wireless LAN and having improved security. Thus, the invention is to setup a direct communication channel between the MMS user device and the enterprise applications. Because there is a way to bypass the operator's MMS Center without storing MMS messages on the MMS Center, so we can encrypt the communication channel between the client and the backend MMS server with some security protocols, e.g. WTLS (Wireless Transport Layer Security), to enhance the security for MMS applications. When the user moves into a wireless LAN enabled office and the user's MMS device can access enterprise intranet via wireless LAN, the backend server can detect the user's roaming and switch its working model from the telecom model to WLAN model. Therefore the user could use an MMS device to access MMS applications via WLAN in an enterprise.

[0018] The invention also provides a MMS user device, a MMS gateway that may be used in above system, and a method for receiving/sending MMS message. Specifically, the invention provides a MMS user device comprising: a heartbeat sender for sending heartbeat signals to be detected by a wireless LAN; a notification receiver for receiving from the wireless LAN a notification indicating a fact that there is a multimedia message to be received; a Message transceiver for sending multimedia message by sending a request carrying the multimedia message over the wireless LAN, and in response to the notification, sending a request carrying storage location information of the multimedia message over the wireless LAN so that the wireless LAN receives the multimedia message.

[0019] The invention also provides a MMS gateway comprising: a presence manager for detecting whether a MMS user device is located a wireless LAN; a multimedia message storage/transceiver for storing the multimedia messages sent by MMS user devices; a notification sender for sending a notification over the wireless LAN to the MMS user device when a multimedia message is present in the multimedia message storage/transceiver and when the presence manager detects that the MMS user device is located in the wireless LAN.

[0020] The invention also provides a method for receiving/sending a multimedia message, wherein the multimedia message is sent and received between a MMS user device and a MMS gateway via a wireless LAN. Preferably, the method detects whether a wireless LAN is available, and if not, then a telecom network will be used in sending and receiving multimedia messages between the MMS user device and the MMS gateway.

[0021] The invention has changed the MMS operational model and brought at least one of the following advantages:

[0022] 1. The invention can provide an end-to-end security solution for MMS applications, especially for enterprise applications;

[0023] 2. Based on the invention, it is more convenient for enterprises to provide various kinds of MMS applications than before because there is no limitation from the operator;

[0024] 3. The invention also changes the MMS price model. Currently the cost of sending MMS is much higher than SMS (Shore Messaging Service). This greatly limits the wide usage of MMS in the consumer and enterprise market. However, through the invention, the user can send and receive MMS messages without passing the MMS center, therefore the MMS price model is based on data flow, not on message number. Therefore it is possible for enterprise to benefit from the solution by reducing the operational cost;

[0025] 4. The invention is also advantageous to telecom network operators. They still could provide MMS services over GPRS network as soon as possible even if there is no MMS billing system and MMS center, for example in undeveloped regions;

[0026] 5. WLAN support makes it possible to provide MMS services in an enterprise with better performance and lower cost than GPRS or other telecom networks;

[0027] 6. Multiple network support and transparent switching among those networks could cover much larger areas and make users use one of communication channels, which is the best choice for them at that time, to send and receive multimedia messages.

[0028] Preferred embodiments of the present invention will now be described with reference to the accompanying drawings. It should be noted that throughout the description and the drawings, identical or corresponding components will be denoted with identical reference signs.

[0029] **FIG. 2** is a block diagram showing a first embodiment of a MMS system, a MMS gateway **202** and a user device **204** according to the present invention. In the following description to the MMS system, gateway and user device, a method for receiving and sending multimedia message of the present invention is implied.

[0030] A concept of the present invention is to send and receive multimedia message over wireless LAN. That is, the multimedia messaging system of the present invention comprises a wireless LAN **206**, a MMS user device **204** for sending and receiving multimedia messages over the wireless LAN, and a MMS gateway **202** for receiving, storing and sending multimedia messages over the wireless LAN. Thus, a direct MMS channel is established between the MMS user device **204** for sending and receiving multimedia messages over the wireless LAN and the MMS gateway **202** for receiving, storing and sending multimedia messages over the wireless LAN. As a result, security is ensured and cost will be reduced because of using the wireless LAN. Therefore, to an enterprise, its mobile employees may use MMS user devices **204**, such as mobile phones supporting wireless LAN, to interact with MMS applications **112** (communicated with an enterprise MMS gateway) in the enterprise.

[0031] Sending and receiving multimedia messages over the wireless LAN may be realized with any existing or future techniques. For example, the HTTP protocol, or any other

protocols, may be used to send and/or receive multimedia messages. In the present specification including the accompanying drawings, as an example, the HTTP protocol is adopted in the wireless LAN. Obviously, this should not be interpreted as a limit to the scope of protection of the present invention.

[0032] The MMS user device **204** may comprise a message transceiver **210** and a notification receiver **212**, and the MMS gateway **202** may comprises a notification sender **214** and a multimedia message storage/transceiver **216** (hereinafter referred to as "MMS storage/transceiver"). The MMS storage/transceiver functions to receive, store and send multimedia messages and communicate with the backend MMS applications in the enterprise. The notification sender functions only to send MMS notifying message to the user device. When a MMS user device is to send a MMS message, the message transceiver sends a request (such as a HTTP request when the HTTP protocol is used) carrying the MMS message to the MMS storage/transceiver. When the MMS user device is to receive a MMS message, that is, when the MMS storage/transceiver is to send a message to the MMS user device, the MMS gateway first calls the notification sender **214** to send a MMS notifying message carrying location information of the MMS message to the MMS user device, the location information indicates the storage location of the MMS message in the MMS storage/transceiver, and is URL information when the HTTP protocol is used. Next, the MMS user device retrieves the location information such as URL from the MMS notifying message. Then the message transceiver sends a request (such as a HTTP request) carrying the location information to the MMS storage/transceiver. And last, the MMS storage/transceiver retrieves the MMS message and returns it to the MMS user device. The message is received by the message transceiver.

[0033] In order that the MMS user device is able to determine whether a wireless LAN is available, or in order that the MMS gateway is able to determine whether a MMS user device is reachable, in a preferred embodiment, the MMS user device may further comprise a heartbeat sender, and the MMS gateway may further comprises a presence manager.

[0034] In a wireless LAN environment, a MMS user device sends heartbeat signals periodically to the enterprise MMS gateway. The heartbeat signals contain information such as about user device number and IP address, which are also recorded in the database in the presence manager. If the gateway periodically receives the heartbeat signals, it means the corresponding user is located in the coverage of the wireless LAN, and the gateway may send a notification to the user when there is a message to be sent to that user; otherwise it means the user is located in the telecom network or offline, and the gateway does not send any notification to the user even if there is a MMS message to be sent to that user.

[0035] As a preferred embodiment, the MMS gateway may comprise a authentication module for verifying whether a user is authorized to access the MMS system.

[0036] The MMS gateway of the present invention may be provided in an enterprise intranet, so as to, along with the wireless LAN and the mobile devices of the mobile employees of the enterprise, constitute a private MMS system of the enterprise. The MMS gateway, especially its MMS storage/transceiver, communicates with the backend MMS applications of the enterprise, so as to realize various MMS applications in the enterprise.

[0037] **FIG. 3** is a block diagram showing a first embodiment of a MMS system, a MMS gateway **202** and a user device **204** according to the present invention. In the following description to the MMS system, gateway and user device, a method for receiving and sending multimedia message of the present invention is implied.

[0038] The present embodiment is obtained by improving the first embodiment having been described with reference to **FIG. 2**. Therefore, the same components as those in the first embodiment will no longer be described in details.

[0039] The present embodiment differs from the first embodiment in that the MMS system supports both wireless LAN and telecom network or mobile phone network, such as GSM, GPRS, CDMA and the like. Accordingly, the MMS system further comprises a telecom network **312**. In the system, the MMS user device **204** is able to send and/or receive MMS messages over a wireless LAN **206**, as well as over a telecom network **312**; also, the MMS gateway is able to receive, store and send MMS messages over the wireless LAN **205**, as well as over the telecom network **312**.

[0040] Thus, when the MMS user device is located within a wireless LAN, a direct MMS channel is established over the wireless network between the MMS user device and the MMS gateway **202** provided in the enterprise intranet. As a result, security is ensured and cost will be reduced because of using the wireless LAN. Therefore, to an enterprise, its mobile employees may use MMS user devices **204**, such as mobile phones supporting wireless LAN, to interact with MMS applications **112** (communicated with an enterprise MMS gateway) in the enterprise.

[0041] And when no wireless LAN could be used by the MMS user device, by means of the present invention, the MMS user device is still able to send and/or receive multimedia messages via the telecom network, and there is no obstacle for the user to use the MMS user device.

[0042] Sending and receiving multimedia messages over the telecom network may be realized with any existing or future techniques. For example, when sending and/or receiving multimedia messages over the telecom network, conventional techniques may be used. In the present specification including the accompanying drawings, as an example, the WAP protocol is adopted in the telecom network. Obviously, this should not be interpreted as a limit to the scope of protection of the present invention.

[0043] Specifically, in this case, the MMS user device **204** further comprises a short message receiver (SMS receiver) **308** and a second message transceiver **310** (which is a WAP transceiver when the WAP protocol is used), and the telecom network **312** further comprises a gateway (which is a WAP gateway when the WAP protocol is used) **306** and a short message center (SMS center) **304** including a short message storage (SMS storage) **302**. In addition, the notification sender **214** and the MMS storage/transceiver in the MMS gateway **202** are further configured to be able to interact with the MMS user device via the telecom network.

[0044] As an example, the notification sender module may have two kinds of interfaces to communicate with user

devices. Assuming that the telecom network is a GSM network, and assuming that the HTTP protocol is used in the wireless LAN, then one interface may be a GSM modem interface, another interface may be a HTTP interface. The GSM modem interface is a GSM modem or phone connected to a PC serial port with an appropriate modem driver. Then the notification sender could send SMS to SMS center via the GSM modem. The HTTP interface sends MMS notification information to an MMS user over the wireless LAN.

[**0045**] When sending an MMS message via the telecom network, the MMS user device starts the second message sender **310** to send a request (such as a WAP request) carrying the MMS message to the gateway **306**, then the gateway **306** pass the MMS message to the MMS storage/transceiver for message storage. When the MMS user device is going to receive a MMS message via the telecom network, that is, when the MMS storage/transceiver is going to send a message to the MMS user device, it first calls the notification sender **214** to send a SMS notification message to the SMS center **304** of telecom, the SMS notification message carries location information indicating the storage location of the multimedia message in the MMS storage/transceiver. Then the SMS center forwards the notification to the user device **204**. After the SMS receiver of the user device receives the SMS and retrieves the location information, it generates a request (such as a WAP request) including the location information and the second message transceiver **310** sends the request to the gateway **306**. Finally the MMS storage/transceiver **216** retrieves the MMS message and sends it to the user device **204**. The MMS message is received by the second message transceiver.

[**0046**] For realizing automatic switching between the telecom network and the wireless LAN, in a preferable embodiment, the MMS gateway **202** further comprises a presence manager **218** configured to detect the location of the MMS user device **204**. When the MMS user device is located within the wireless LAN **205**, the MMS gateway communicate with the MMS user device via the wireless LAN; and when the MMS user device could not be detected as within the wireless LAN, the MMS gateway communicate with the MMS user device via the telecom network **312**. That is, since the wireless LAN is much better than the telecom network, the system will give first rank to the wireless LAN as long as the wireless LAN is available and regardless whether the telecom network is available. Only when the wireless LAN is unavailable is the telecom used to send and/or receive MMS message.

[**0047**] The detection process may be realized with any existing or future techniques, for example, by detecting the heartbeat signals sent periodically by the heartbeat sender of the MMS user device. Alternatively, the presence manager **218** certainly may make use of prior art locating techniques used in the telecom network, or any other locating techniques.

[**0048**] As in the first embodiment, and as a preferred embodiment, the MMS gateway may comprise a authentication module for verifying whether a user is authorized to access the MMS system. Furthermore, the MMS gateway may be provided in an enterprise intranet and communicate with backend MMS applications of the enterprises, so that various MMS applications of the enterprise may be realized.

[**0049**] In the present solution, the SMS center and the gateway such as WAP gateway are owned by telecom operators. The gateway is for communicating with the MMS user device by means of appropriate protocol such as WAP protocol, and converting, for example, the WAP protocol to a protocol adapted to communicate with the MMS storage/transceiver, such as HTTP protocol, so as to communicate with the MMS storage/transceiver.

[**0050**] Thus, when the MMS user device is located within the wireless LAN, the MMS user device communicate directly, within the enterprise intranet, with the MMS gateway. However, when the telecom network is used in communications, the SMS center and the gateway such as WAP gateway of the telecom network will still be used. In terms of the latter case, the solution could not ensure enough security.

[**0051**] If B2E or B2C needs a high security solution over telecom network, there are two ways to implement it. The first solution is to build an end-to-end security model, which allows a WTLS session to be established between a user device and the enterprise MMS gateway. Unfortunately, the WTLS only operates between a WAP client and a WAP gateway in the current WAP standard, therefore the WAP gateway has to be moved from the operator domain to the enterprise domain, that is, it is not the telecom operator who own the WAP gateway, but the enterprise who owns the WAP gateway. In other words, the WAP gateway **402** is provided in the MMS gateway, as shown in **FIG. 4** (the third embodiment).

[**0052**] The third embodiment only needs a telecom's SMS center **304** to store and forward MMS notification. But since the notification only carries the MMS location information, which is useful only in the intranet of an enterprise, so it's not necessary to encrypt the location information to protect the notification message. One advantage of the method is that this end-to-end security solution doesn't change the current MMS encapsulation and protocol standard, therefore the MMS user device **204** can be used in the invention without any change.

[**0053**] But some business doesn't want to own and maintain a WAP gateway because operators have already run a WAP gateway in their infrastructure. So we provide the second security solution in the invention, which is called Cipher-MMS Security Version.

[**0054**] As shown in **FIG. 5**, in a fourth embodiment, an authentication and key management module **502** is added in the MMS gateway to distribute symmetric keys to users and a certificate management module **504** is added in the user device. Both the MMS gateway and the user device deploy the same symmetric cipher to encode and decode MMS messages to protect the privacy of these messages.

[**0055**] The encryption may be realized in any possible manner. The following is an example.

[**0056**] 1. If the MMS user device has no certificate of the MMS gateway, it first sends a CA (certificate) requirement to the gateway. After the gateway confirms that the user has the access to send and receive MMS according to the user device number, the gateway's CA is sent to the user device. There are three methods to distribute a certificate to a user device: manually synchronize a certificate into the user device via an infrared port, or send a certificate via SMS or WAP response.

[0057] 2. The MMS user device sends a Master Key requirement to the gateway and the gateway creates a session ID and a master key, generally a random object, and sends them to the device via SMS or WAP response. The random object is encrypted by the gateway's private key.

[0058] 3. The random object is decoded by the user device and mixed with its phone number and session ID to generate a shared secret key. The mixing operation may be any operation, the simplest is XOR operation. At the same time, the gateway also generates a shared secret key with the same algorithm.

[0059] 4. Both the MMS user device and the MMS gateway can secretly communicate with each other by encrypting MMS messages with the shared secret key.

[0060] In above encryption process, both the MMS user device and the MMS gateway can fresh the shared secret key by changing the session ID to prevent the threat of attacks stemming from key reuse.

[0061] While the invention has been described with reference to specific embodiments disclosed herein, it is not confined to the details set forth herein, and this application is intended to cover all the variations or equivalents that are obvious to a person skilled in the art having read the specification.

[0062] Variations described for the present invention can be realized in any combination desirable for each particular application. Thus particular limitations, and/or embodiment enhancements described herein, which may have particular advantages to a particular application need not be used for all applications. Also, not all limitations need be implemented in methods, systems and/or apparatus including one or more concepts of the present invention.

[0063] The present invention can be realized in hardware, software, or a combination of hardware and software. A visualization tool according to the present invention can be realized in a centralized fashion in one computer system, or in a distributed fashion where different elements are spread across several interconnected computer systems. Any kind of computer system—or other apparatus adapted for carrying out the methods and/or functions described herein—is suitable. A typical combination of hardware and software could be a general purpose computer system with a computer program that, when being loaded and executed, controls the computer system such that it carries out the methods described herein. The present invention can also be embedded in a computer program product, which comprises all the features enabling the implementation of the methods described herein, and which—when loaded in a computer system—is able to carry out these methods.

[0064] Computer program means or computer program in the present context include any expression, in any language, code or notation, of a set of instructions intended to cause a system having an information processing capability to perform a particular function either directly or after conversion to another language, code or notation, and/or reproduction in a different material form.

[0065] Thus the invention includes an article of manufacture which comprises a computer usable medium having computer readable program code means embodied therein for causing a function described above. The computer readable program code means in the article of manufacture comprises computer readable program code means for causing a computer to effect the steps of a method of this invention. Similarly, the present invention may be implemented as a computer program product comprising a computer usable medium having computer readable program code means embodied therein for causing a function described above. The computer readable program code means in the computer program product comprising computer readable program code means for causing a computer to effect one or more functions of this invention. Furthermore, the present invention may be implemented as a program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for causing one or more functions of this invention.

[0066] It is noted that the foregoing has outlined some of the more pertinent objects and embodiments of the present invention. This invention may be used for many applications. Thus, although the description is made for particular arrangements and methods, the intent and concept of the invention is suitable and applicable to other arrangements and applications. It will be clear to those skilled in the art that modifications to the disclosed embodiments can be effected without departing from the spirit and scope of the invention. The described embodiments ought to be construed to be merely illustrative of some of the more prominent features and applications of the invention. Other beneficial results can be realized by applying the disclosed invention in a different manner or modifying the invention in ways known to those familiar with the art.

What is claimed, is:

1. A multimedia messaging service system comprising:

a wireless LAN;

a MMS user device for sending and receiving multimedia message over said wireless LAN; and

a MMS gateway, for receiving, storing and sending the multimedia message sent by said MMS user device.

2. The multimedia messaging service system as claimed in claim 1, wherein:

said MMS gateway comprises a multimedia message storage/transceiver, a presence manager and a notification sender;

said MMS user device comprises a heartbeat sender, a message transceiver and a notification receiver,

said presence manager detects the heartbeat signals sent by the heartbeat sender so as to confirm whether said MMS user device is located within said wireless LAN,

when said multimedia message storage/transceiver has a multimedia message stored therein and said presence manager detects that said MMS user device is located within said wireless LAN, the notification sender sends a notification over said wireless LAN to said MMS user device, said notification is received by said notification receiver; and

said message transceiver is configured to send a multimedia message by sending a request carrying said multimedia message over said wireless LAN to said multimedia message storage/transceiver, or, when said

notification receiver receives said notification, to send a request carrying storage location information of the multimedia message over said wireless LAN to said multimedia message storage/transceiver, so that said multimedia message storage/transceiver retrieves the multimedia message according to said location information and returns it to said MMS user device via said wireless LAN to be received by said message transceiver.

3. The multimedia messaging service system as claimed in claim 1, wherein said MMS gateway further comprises an authentication module for verifying the authorization of MMS user devices.

4. The multimedia messaging service system as claimed in claim 1, wherein said MMS gateway is provided in an enterprise intranet and communicates with multimedia message applications of the enterprise.

5. The multimedia messaging service system as claimed in claim 1, further comprising:

a telecom network communicating with said MMS user device and said MMS gateway, and said MMS user device and said MMS gateway further make use of the telecom network to send, receive and store multimedia messages,

wherein, said MMS gateway further comprises a presence manager for detecting the location of the MMS user device, and when said MMS user device is located within said wireless LAN, said MMS gateway communicates with the MMS user device via said wireless LAN, and when said MMS user device fails to be detected within said wireless LAN, said MMS gateway communicates with said MMS user device via the telecom network.

6. The multimedia messaging service system as claimed in claim 5, wherein:

said MMS gateway further comprises a multimedia message storage/transceiver and a notification sender;

said MMS user device comprises a heartbeat sender, a message transceiver, a notification receiver, a short message receiver and a second message transceiver;

said telecom network further comprises a short message center and a gateway,

said presence manager detects the heartbeat signals sent by the heartbeat sender so as to confirm whether said MMS user device is located within said wireless LAN;

when said multimedia message storage/transceiver has a multimedia message stored therein and said presence manager detects that said MMS user device is located within said wireless LAN, the notification sender sends a notification over said wireless LAN to said MMS user device, said notification is received by said notification receiver; when said multimedia message storage/transceiver has a multimedia message stored therein and said presence manager detects that said MMS user device is not located within said wireless LAN, the notification sender sends a short message notification to said short message center, which sends a short message to said short message receiver so as to notify said MMS user device;

said message transceiver is configured to send a multimedia message by sending a HTTP request carrying said multimedia message over said wireless LAN to said multimedia message storage/transceiver, or, when said notification receiver receives said notification, to send a request carrying storage location information of the multimedia message over said wireless LAN to said multimedia message storage/transceiver, so that said multimedia message storage/transceiver retrieves the multimedia message according to said storage location information and returns it to said MMS user device via said wireless LAN to be received by said message transceiver; and

said second message transceiver is configured to send a multimedia message to said multimedia message storage/transceiver by sending a request carrying said multimedia message to said gateway, or, when said short message receiver receives said notification, to send a request carrying storage location information of the multimedia message via said gateway to said multimedia message storage/transceiver, so that said multimedia message storage/transceiver retrieves the multimedia message according to said storage location information and returns it to said MMS user device via said telecom network, said multimedia message is received by said second message transceiver.

7. The multimedia messaging service system as claimed in claim 2, wherein said heartbeat signal comprises the user device number or IP address.

8. The multimedia messaging service system as claimed in claim 5, wherein said MMS gateway further comprises an authentication module for verifying the authorization of MMS user devices.

9. The multimedia messaging service system as claimed in claim 8, wherein said authentication module is further configured to realize key management, and said MMS user device further comprises a certificate manager, which, along with said authentication module, conducts certificate management for the MMS user device and encryption management for the communication between the MMS user device and the MMS gateway.

10. The multimedia messaging service system as claimed in claim 5 or 6, wherein said MMS gateway is provided in an enterprise intranet and communicates with multimedia message applications of the enterprise.

11. The multimedia messaging service system as claimed in claim 5, wherein:

said MMS gateway further comprises a multimedia message storage/transceiver, a notification sender and a gateway;

said MMS user device comprises a heartbeat sender, a message transceiver, a notification receiver, a short message receiver and a second message transceiver;

said telecom network further comprises a short message center, and

wherein:

said presence manager detects the heartbeat signals sent by the heartbeat sender so as to confirm whether said MMS user device is located within said wireless LAN;

when said multimedia message storage/transceiver has a multimedia message stored therein and said presence

manager detects that said MMS user device is located within said wireless LAN, the notification sender sends a notification over said wireless LAN to said MMS user device, said notification is received by said notification receiver; when said multimedia message storage/transceiver has a multimedia message stored therein and said presence manager detects that said MMS user device is not located within said wireless LAN, the notification sender sends a short message notification to said short message center, which sends a short message to said short message receiver so as to notify said MMS user device;

said message transceiver is configured to send a multimedia message by sending a HTTP request carrying said multimedia message over said wireless LAN to said multimedia message storage/transceiver, or, when said notification receiver receives said notification, to send a request carrying storage location information of the multimedia message over said wireless LAN to said multimedia message storage/transceiver, so that said multimedia message storage/transceiver retrieves the multimedia message and returns it to said MMS user device via said wireless LAN to be received by said message transceiver;

said second message transceiver is configured to send a multimedia message to said multimedia message storage/transceiver by sending a request carrying said multimedia message to said gateway, or, when said short message receiver receives said notification, to send a request carrying storage location information of the multimedia message via said gateway to said multimedia message storage/transceiver, so that said multimedia message storage/transceiver retrieves the multimedia message and returns it to said MMS user device via said gateway and said telecom network, said multimedia message is received by said second message transceiver.

12. The multimedia messaging service system as claimed in claim 11, wherein said heartbeat signal comprises the user device number or IP address.

13. The multimedia messaging service system as claimed in claim 11, wherein: said MMS gateway further comprises an authentication module for verifying the authorization of MMS user devices.

14. The multimedia messaging service system as claimed in claim 11, wherein said MMS gateway is provided in an enterprise intranet and communicates with multimedia message applications of the enterprise.

15. A multimedia message user device comprising:

a heartbeat sender for sending heartbeat signals to be detected by a wireless LAN;

a notification receiver for receiving from said wireless LAN a notification indicating a fact that there is a multimedia message to be received;

a message transceiver for sending multimedia message by sending a request carrying said multimedia message over said wireless LAN, and in response to said notification, sending a request carrying a storage location information of the multimedia message over said wireless LAN so that the MMS user device receives said multimedia message from the wireless LAN.

16. The multimedia message user device as claimed in claim 15, further comprising:

a short message receiver for receiving short message notifications from a telecom network; and

a second message transceiver, for sending a multimedia message by sending a request carrying said multimedia message to a gateway of a telecom network or via a telecom network to a gateway outside of the telecom network, and, in response to said short message notification, sending a request carrying storage location information of the multimedia message via said gateway, so that the multimedia message is received from the telecom network.

17. The multimedia messaging service system as claimed in claim 15, wherein said heartbeat signal comprises the user device number or IP address.

18. A multimedia messaging service gateway, comprising:

a presence manager for detecting whether a MMS user device is located a wireless LAN;

a multimedia message storage/transceiver for receiving, storing and sending the multimedia messages sent by a MMS user device; and

a notification sender for sending a notification over said wireless LAN to said MMS user device when a multimedia message is present in said multimedia message storage/transceiver and when said presence manager detects that said MMS user device is located in said wireless LAN.

19. The multimedia messaging service gateway as claimed in claim 18, wherein:

said presence manager is further configured so that, when said MMS user device is detected to be located within said wireless LAN, said multimedia messaging service gateway communicates with said MMS user device over said wireless LAN, and when said MMS user device fails to be detected to be located within said wireless LAN, said multimedia messaging service gateway communicates with said MMS user device over a telecom network; and

said notification sender is further configured to send a notification to said MMS user device via a short message center of said telecom network when a multimedia message is stored in said multimedia message storage/transceiver and said presence manager detects that said MMS user device is not located within said wireless LAN.

20. The multimedia messaging service gateway as claimed in claim 18, characterized in further comprising an authentication module for verifying the authorization of MMS user devices.

21. The multimedia messaging service gateway as claimed in claim 20, wherein: said authentication module is further configured to realize key management, so as to conduct certificate management for the MMS user device and encryption management for the communication between the MMS user device and the multimedia messaging service gateway.

22. The multimedia messaging service gateway as claimed in claim 19, further comprising a gateway for receiving via said telecom network the request carrying the multimedia message or the storage location information

thereof and sent by said MMS user device, so as to receive the multimedia message sent by said MMS user device or send the multimedia message stored in said multimedia message storage/transceiver to said MMS user device.

23. The multimedia messaging service gateway as claimed in claim 22, further comprising an authentication module for verifying the authorization of MMS user devices.

24. The multimedia messaging service gateway as claimed in claim 18, wherein said heartbeat signal comprises the user device number or IP address.

25. The multimedia messaging service system as claimed in claim 18, wherein said MMS gateway is provided in an enterprise intranet and communicates with multimedia message applications of the enterprise.

26. A method for receiving/sending a multimedia message, comprising receiving/sending the multimedia message between a MMS user device and a MMS gateway via a wireless LAN.

27. The method for receiving/sending a multimedia message as claimed in claim 26, characterized in detecting whether the wireless LAN is available, if not, then multimedia messages are sent and received between said MMS user device and said MMS gateway via a telecom network.

28. The method for receiving/sending a multimedia message as claimed in claim 27, wherein said step of detecting whether the wireless LAN is available comprises detecting the heartbeat signals sent by said MMS user device.

29. The method for receiving/sending a multimedia message as claimed in claim 28, wherein said heartbeat signal comprises user device number or IP address.

30. The method for receiving/sending a multimedia message as claimed in claim 26, wherein the step of sending a multimedia message via the wireless LAN by said MMS user device comprises a step of sending a request carrying said multimedia message via the wireless LAN.

31. The method for receiving/sending a multimedia message as claimed in claim 26, wherein the step of receiving a multimedia message via the wireless LAN by the MMS user device comprises the following steps:

said MMS gateway sends a notification carrying storage location information of the multimedia message to said MMS user device;

said MMS user device retriever said location information from said notification;

said MMS user device sends a request carrying said location information to said MMS gateway;

said MMS gateway retrieves said multimedia message according to said location information and returns the multimedia message to said MMS user device.

32. The method for receiving/sending a multimedia message as claimed in claim 26, wherein when sending and/or receiving a multimedia message, said MMS gateway verifies the authorization of said MMS user device.

33. The method for receiving/sending a multimedia message as claimed in claim 26, wherein the sent/received multimedia message is encrypted by the following steps:

the MMS gateway issues a certificate to the MMS user device;

in response to a request of a MMS user device having a certificate, the MMS gateway sends a session ID and a master key encrypted by the gateway's private key to the MMS user device;

the master key is decoded by the MMS user device and mixed with the MMS user device's phone number and the session ID to generate a shared secret key;

the gateway generates a shared secret key with the same algorithm;

the multimedia message is encrypted using said shared secret key.

34. The method for receiving/sending a multimedia message as claimed in claim 33, wherein the MMS user device or the MMS gateway can fresh the secret key by changing the session ID.

35. The method for receiving/sending a multimedia message as claimed in claim 33, wherein at least one of the step of issuing the certificate and the step of sending the session ID and the master key is performed by sending a short message or a WAP response.

36. The method for receiving/sending a multimedia message as claimed in claim 33, wherein the step of issuing the certificate is performed by synchronization via an infrared port.

37. The method for receiving/sending a multimedia message as claimed in claim 27, wherein the step of sending a multimedia message via the telecom network by said MMS user device comprises the steps of:

sending a request carrying said multimedia message via a gateway;

said gateway sends the multimedia message to said MMS gateway.

38. The method for receiving/sending a multimedia message as claimed in claim 27, wherein the step of receiving a multimedia message via the telecom network by the MMS user device comprises the following steps:

said MMS gateway sends a notification message carrying storage location information of the multimedia message to a short message center of the telecom network;

said short message centers forwards said notification message to the MMS user device;

said MMS user device retriever said storage location information from said notification message, and sends a request carrying said storage location information via a gateway to said MMS gateway;

said MMS gateway retrieves the multimedia message according to said storage location information and returns the multimedia message via said gateway to said MMS user device.

39. The method for receiving/sending a multimedia message as claimed in claim 37, wherein said gateway is provided in said MMS gateway.

40. The method for receiving/sending a multimedia message as claimed in claim 37, wherein said gateway is provided in said telecom network.

41. An article of manufacture comprising a computer usable medium having computer readable program code means embodied therein for causing receiving/sending a multimedia message, the computer readable program code

means in said article of manufacture comprising computer readable program code means for causing a computer to effect the steps of claim 26.

42. A computer program product comprising a computer usable medium having computer readable program code means embodied therein for causing functions of a multimedia messaging service gateway, the computer readable program code means in said computer program product comprising computer readable program code means for causing a computer to effect the functions of claim 18.

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