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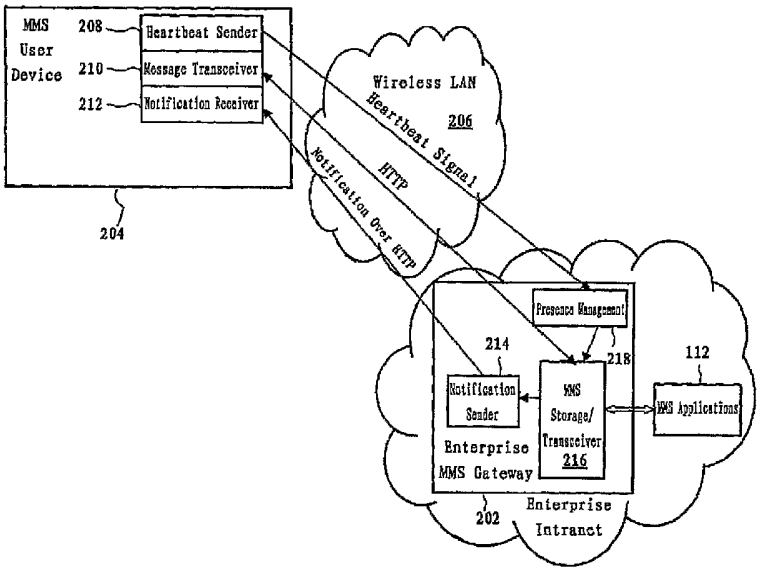
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(54) Title: METHOD, SYSTEM, GATEWAY AND USER DEVICE FOR RECEIVING/SENDING MULTIMEDIA MESSAGE



(57) Abstract: The application discloses a method, system, gateway and user device for receiving/sending multimedia message. According to the invention, the 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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Description

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

Technical Field

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

Background Art

[002] 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.

[003] Figure 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.

[004] 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.

Disclosure of Invention

[005] Considering above, the present invention aims to provide a new MMS system supporting MMS applications in a wireless LAN environment.

[006] Therefore, an aspect of 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 said wireless LAN; a MMS gateway, for receiving, storing and sending the multimedia message sent by said MMS user device.

[007] Accordingly, it is possible to provide a direct MMS communication channel between MMS users and backend systems for enterprise applications over telecom network.

[008] Another aspect of the invention provides a MMS system supporting both telecom network and wireless LAN and having improved security. To achieve this a direct communication channel between the MMS user device and the enterprise applications is set up. Because there is a way to bypass the operator's MMS Center without storing MMS messages on the MMS Center, the communication channel between the client and the backend MMS server can be encrypted 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.

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

[010] Specifically, one embodiment 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 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 storage location information of the multimedia message over said wireless LAN so that the wireless LAN receives said multimedia message.

[011] 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 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.

[012] Another aspect of the invention is a method for receiving/sending a multimedia message, characterized in that 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 said MMS user device and said MMS gateway.

[013] The preferred embodiment change the MMS operational model and bring at least one of the following advantages:

[014] 1. The provision of an end-to-end security solution for MMS applications, especially for enterprise applications;

[015] 2. It is more convenient for enterprises to provide various kinds of MMS applications than before because there is no limitation from the operator;

[016] 3. Improvement to the MMS price model. Currently the cost of sending MMS is much higher than SMS (Short Messaging Service). This greatly limits the wide usage of MMS in the consumer and enterprise markets. However, through embodiments of 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;

[017] 4. Embodiment of the invention are 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;

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

[019] 6. Multiple network supporting and transparent switching among those networks could cover much bigger areas and make users use the communication channel, which

is the best choice for them at that time to send and receive multimedia messages.

Brief Description of the Drawings

[020] Other objects, 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:

[021] Fig.1 is an overview of a MMS system in the prior art;

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

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

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

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

Mode for the Invention

[026] 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.

[027] 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 said MMS system, gateway and user device, a method for receiving and sending multimedia message of the present invention is implied.

[028] The basic idea 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 said wireless LAN, and a MMS gateway 202 for receiving, storing and sending multimedia messages over said 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.

[029] 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.

[030] Said MMS user device 204 may comprise a message transceiver 210 and a notification receiver 212, and said MMS gateway 202 may comprises a notification sender 214 and a multimedia message storage/transceiver216 (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, said message transceiver sends a request (such as a HTTP request when the HTTP protocol is used) carrying the MMS message to said 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 said 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 said MMS user device, said 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 said location information such as URL from the MMS notifying message. Then the message transceiver sends a request (such as a HTTP request) carrying said location information to said 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.

[031] 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. Here a "heartbeat" is a repeating signal transmitted from a device to indicate that the device is in operation.

[032] 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.

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

[034] 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.

[035] 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 said MMS system, gateway and user device, a method for receiving and sending multimedia message of the present invention is implied.

[036] 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.

[037] 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.

[038] 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.

[039] 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.

[040] 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.

[041] 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.

[042] 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. Said 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.

[043] 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, said 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 said 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.

[044] 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 said 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.

[045] 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.

[046] 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, said 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.

[047] 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.

[048] 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.

[049] 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).

[050] 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.

[051] 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.

[052] 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.

[053] It needs not to say that the encryption may be realized in any possible manner. The following is an example.

[054] 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.

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

[056] 3. The random 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.

[057] 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.

[058] 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.

[059] 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.

Claims

[001] 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.

[002] The multimedia messaging service system as claimed in Claim 1, characterized in that, 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, 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; 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.

[003] The multimedia messaging service system as claimed in Claim 1, 2 or 3, characterized in that, said MMS gateway further comprises an authentication module for verifying the authorization of MMS user devices.

[004] The multimedia messaging service system as claimed in any preceding Claim, characterized in that said MMS gateway is provided in an enterprise intranet and communicates with multimedia message applications of the enterprise.

[005] 5.The multimedia messaging service system as claimed in Claim 1, characterized in 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 com-

municates 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.

[006] The multimedia messaging service system as claimed in Claim 5, characterized in that, 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, 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 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; 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.

[007] The multimedia messaging service system as claimed in Claim 2 or 6, characterized in that said heartbeat signal comprises the user device number or IP address.

[008] The multimedia messaging service system as claimed in Claim 5 or 6, characterized in that, said MMS gateway further comprises an authentication module for verifying the authorization of MMS user devices.

[009] The multimedia messaging service system as claimed in Claim 8, characterized in that, 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.

[010] The multimedia messaging service system as claimed in Claim 5 or 6, characterized in that said MMS gateway is provided in an enterprise intranet and communicates with multimedia message applications of the enterprise.

[011] The multimedia messaging service system as claimed in Claim 5, characterized in that, 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.

[012] The multimedia messaging service system as claimed in Claim 11, characterized in that said heartbeat signal comprises the user device number or IP address.

[013] The multimedia messaging service system as claimed in Claim 11, characterized in that, said MMS gateway further comprises an authentication module for verifying the authorization of MMS user devices.

[014] The multimedia messaging service system as claimed in Claim 11, 12 or 13, characterized in that said MMS gateway is provided in an enterprise intranet and communicates with multimedia message applications of the enterprise.

[015] 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.

[016] 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.

[017] The multimedia messaging service system as claimed in Claim 15 or 16, characterized in that said heartbeat signal comprises the user device number or IP

address.

[018] 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.

[019] The multimedia messaging service gateway as claimed in Claim 18, characterized in that, 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.

[020] The multimedia messaging service gateway as claimed in Claim 18 or 19, characterized in further comprising an authentication module for verifying the authorization of MMS user devices.

[021] The multimedia messaging service gateway as claimed in Claim 20, characterized in that, 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.

[022] 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.

[023] The multimedia messaging service gateway as claimed in Claim 22, characterized in further comprising an authentication module for verifying the authorization of MMS user devices.

[024] The multimedia messaging service gateway as claimed in Claim 18, 19 or 22, characterized in that said heartbeat signal comprises the user device number or IP address.

[025] The multimedia messaging service system as claimed in Claim 18, 19 or 22, characterized in that said MMS gateway is provided in an enterprise intranet and communicates with multimedia message applications of the enterprise.

[026] A method for receiving/sending a multimedia message, characterized in that the multimedia message is sent and received between a MMS user device and a MMS gateway via a wireless LAN.

[027] 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.

[028] The method for receiving/sending a multimedia message as claimed in Claim 27, characterized in that said step of detecting whether the wireless LAN is available comprises detecting the heartbeat signals sent by said MMS user device.

[029] The method for receiving/sending a multimedia message as claimed in Claim 28, characterized in that said heartbeat signal comprises user device number or IP address.

[030] The method for receiving/sending a multimedia message as claimed in Claim 26 or 27, characterized in that 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.

[031] The method for receiving/sending a multimedia message as claimed in Claim 26 or 27, characterized in that 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.

[032] The method for receiving/sending a multimedia message as claimed in Claim 26 or 27, characterized in that when sending and/or receiving a multimedia message, said MMS gateway verifies the authorization of said MMS user device.

[033] The method for receiving/sending a multimedia message as claimed in Claim 26 or 27, characterized in that 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.

[034] The method for receiving/sending a multimedia message as claimed in Claim 33, characterized in that the MMS user device or the MMS gateway can fresh the secret key by changing the session ID.

[035] The method for receiving/sending a multimedia message as claimed in Claim 33, characterized in that 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.

[036] The method for receiving/sending a multimedia message as claimed in Claim 33, characterized in that the step of issuing the certificate is performed by synchronization via an infrared port.

[037] The method for receiving/sending a multimedia message as claimed in Claim 27, characterized in that 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.

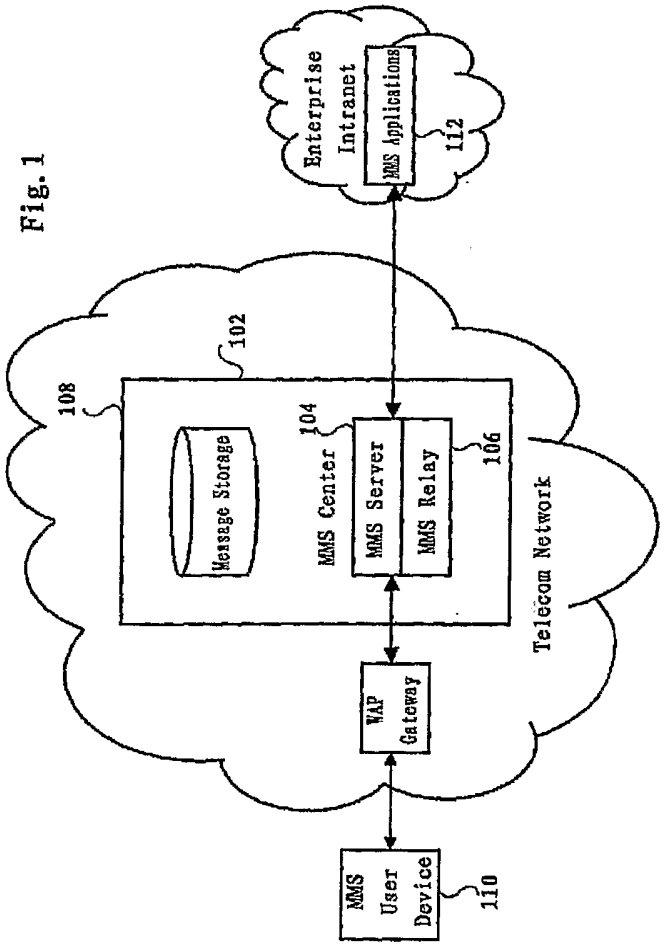
[038] The method for receiving/sending a multimedia message as claimed in Claim 27, characterized in that the step of receiving a multimedia message via the telecom network by the MMS user device comprises the following steps: said MMS gateway sends a notification message carrying storage location information 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 retrieves 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.

[039] The method for receiving/sending a multimedia message as claimed in Claim 37 or 38, characterized in that said gateway is provided in said MMS gateway.

[040] The method for receiving/sending a multimedia message as claimed in Claim 37 or 38, characterized in that said gateway is provided in said telecom network.

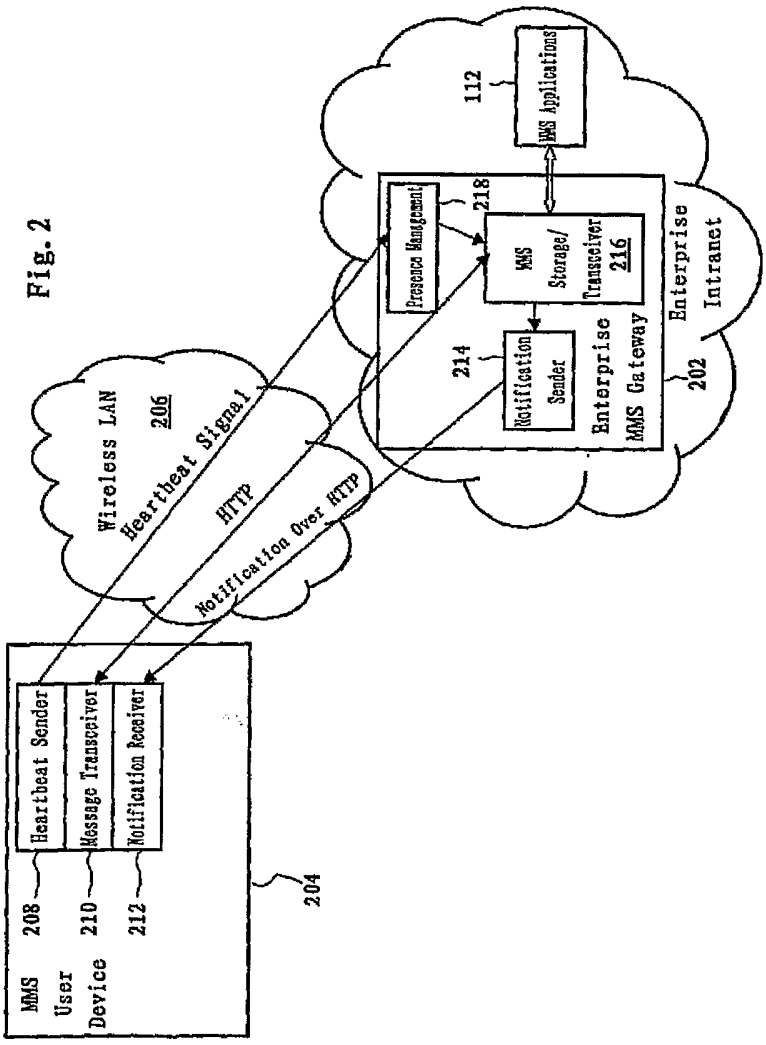
[Fig.]

Fig. 1

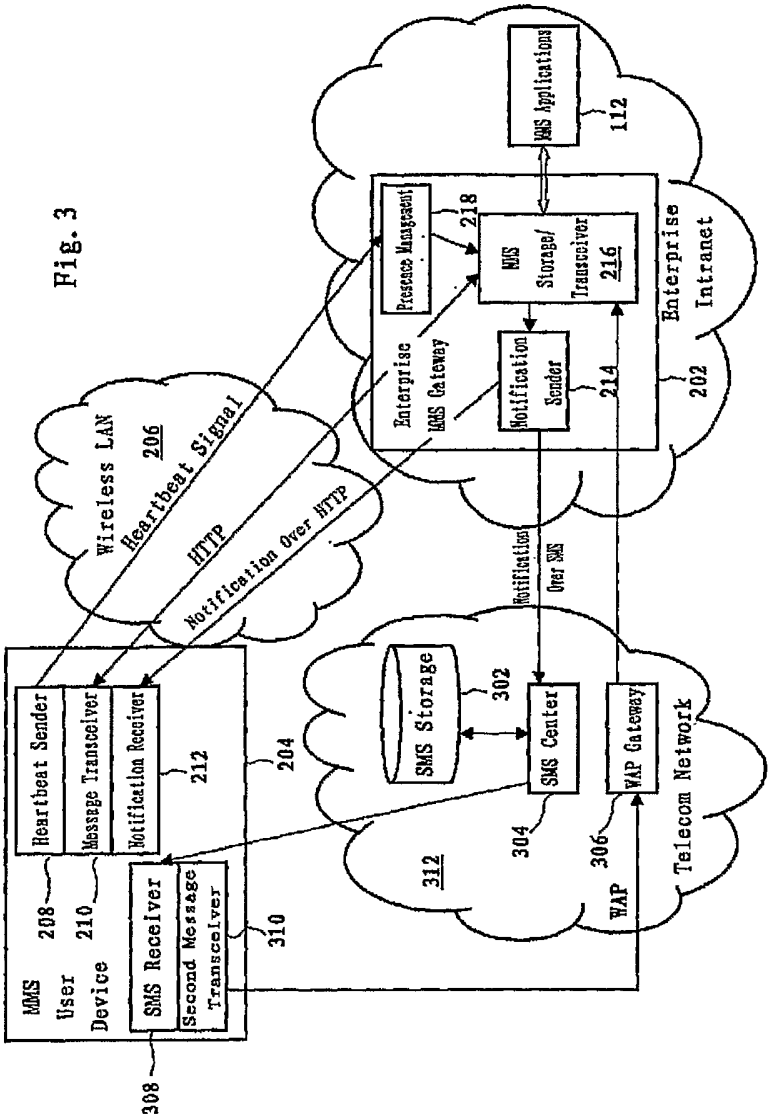

Enterprise Intranet
MMS Applications
112
102
108
104
Message Storage
MMS Center
MMS Server
MMS Relay
106
Telecom Network
WAP Gateway
MMS User Device
110

[Fig.]

Fig. 2

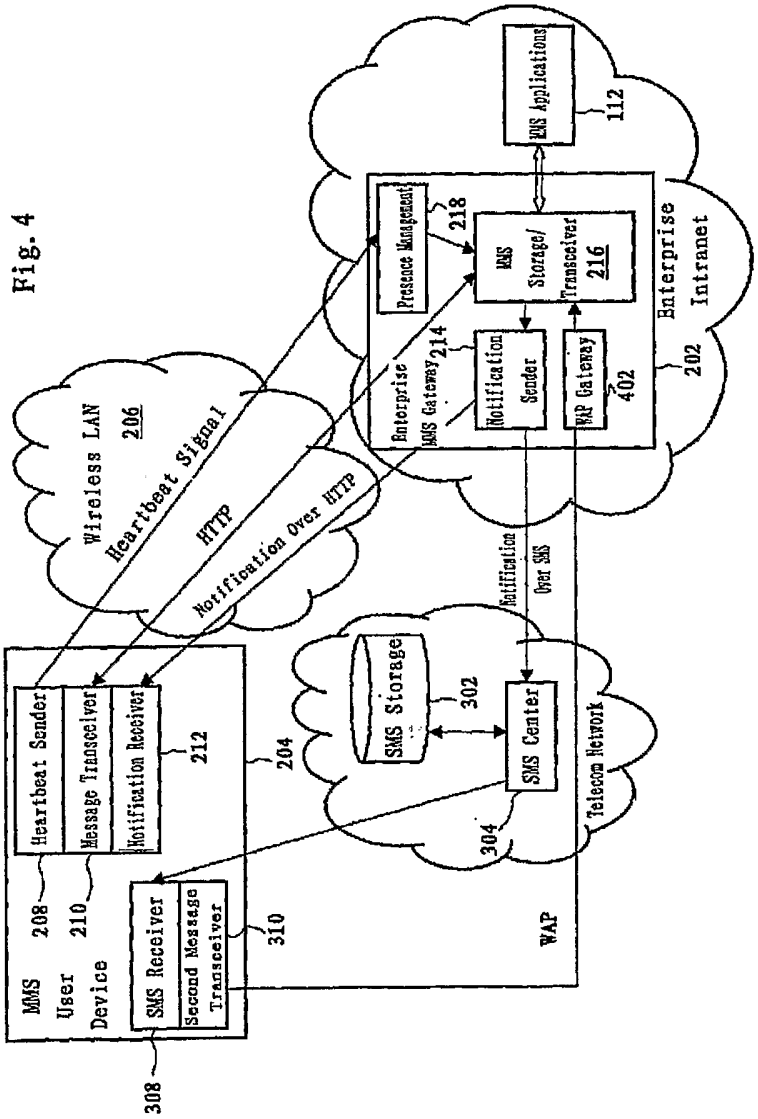

112
MMS Applications
218
Presence Management
MMS Storage/ Transceiver 216
214
Notification Sender
Enterprise MMS Gateway
202
Enterprise Intranet
Wireless LAN 206
Heartbeat Signal
HTTP
Notification Over HTTP
Heartbeat Sender
Message Transceiver
Notification Receiver
208
210
212
MMS User Device
204

[Fig.]


Fig. 3
MMS Applications
112
Presence Management
218
MMS Storage/ Transceiver
216
Enterprise MMS Gateway
Notification Sender
214
Enterprise Intranet
202
Wireless LAN
206
Heartbeat Signal
HTTP
Notification Over HTTP
Notification Over SMS
SMS Storage
302
SMS Center
304
WAP Gateway
306
Telecom Network
312
WAP
Heartbeat Sender
Message Transceiver
Notification Receiver
212
204
MMS User Device
208
210
SMS Receiver
Second Message Transceiver
310
308

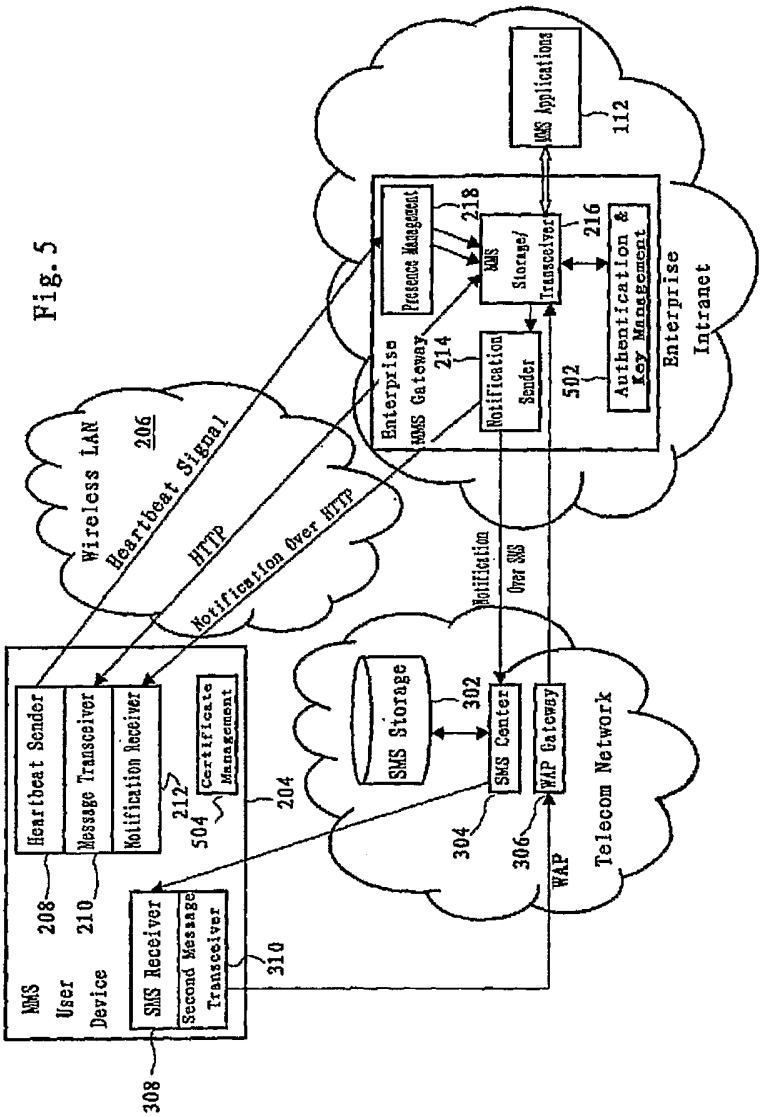
[Fig.]

Fig. 4


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

[Fig.]

Fig. 5


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

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2005/051135

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L12/58 H04L12/56 H04L12/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2001/053687 A1 (SIVULA TIMO) 20 December 2001 (2001-12-20) paragraphs [0031], [0032], [0005]; figure 1	1,26 5,27-30, 37,39,40
Y	US 2003/040280 A1 (KOSKELAINEN PETRI) 27 February 2003 (2003-02-27) paragraphs [0032], [0033]; figure 8	5,27-30
Y	WO 03/094553 A (NOKIA CORPORATION; ROOKE, MICHAEL; SAVINEN, TEPPO; HOLOPAINEN, TAPIO) 13 November 2003 (2003-11-13) page 2, line 8 - page 3, line 20	5,27-30
Y	US 2003/172121 A1 (EVANS JOHN P ET AL) 11 September 2003 (2003-09-11) paragraphs [0022], [0023]; figure 2	37,39,40

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
1 July 2005	05. 09. 2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Kreppel, J

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2005/051135

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	MOSTAFA M-E: "MMS - the modern wireless solution for multimedia messaging" PERSONAL, INDOOR AND MOBILE RADIO COMMUNICATIONS, 2002. THE 13TH IEEE INTERNATIONAL SYMPOSIUM ON SEPT. 15-18, 2002, PISCATAWAY, NJ, USA,IEEE, vol. 5, 15 September 2002 (2002-09-15), pages 2466-2472, XP010614171 ISBN: 0-7803-7589-0 the whole document ----	1-31, 37-40

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2005/051135

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1 - 31, 37 - 40

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-31,37-40

Apparati and method of multimedia messaging wherein presence of user devices within a wireless LAN is detected

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2. claims: 32-36

Method for providing secure access to a MMS gateway within a wireless LAN

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP2005/051135

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2001053687 A1	20-12-2001	FI 20001437 A	17-12-2001
US 2003040280 A1	27-02-2003	EP 1419646 A1	19-05-2004
		WO 03019918 A1	06-03-2003
		US 2005111441 A1	26-05-2005
WO 03094553 A	13-11-2003	WO 03094553 A1	13-11-2003
		AU 2002258029 A1	17-11-2003
US 2003172121 A1	11-09-2003	AU 2003223243 A1	29-09-2003
		EP 1491024 A1	29-12-2004
		WO 03079641 A1	25-09-2003