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(54) Title: METHODS AND SYSTEMS FOR SENDING ALERT MESSAGES IN MOBILE NETWORKS

(57) Abstract: A method and a system for sending alert messages are provided. The method includes accessing location information of a plurality of user mobile devices in the mobile network from a database. The database is configured by integrating with one or more location sources in the mobile network, and the database is different from a home location register and a home subscriber server of the mobile network. The method further includes accessing a message handling capacity information of each of a plurality of network elements in the mobile network. Furthermore, the method includes sending an alert message to the plurality of user mobile devices through the plurality of network elements based on the location information. Moreover, the alert message is sent through a network element of the plurality of network elements at a sending rate based on a message handling capacity information of the network element.

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AMENDED CLAIMS

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- [Claim 1] A method for sending alert messages in a mobile network, the method comprising:
accessing location information of a plurality of user mobile devices in the mobile network from a visitor location register (VLR) database, the visitor location register (VLR) database configured by integrating with one or more location sources in the mobile network;
accessing a message handling capacity information of each of a plurality of network elements in the mobile network; and
sending an alert message to the plurality of user mobile devices through the plurality of network elements based on the location information, wherein the alert message is sent through a network element of the plurality of network elements at an allocated message sending rate based on a message handling capacity information of the network element, and wherein the allocated message sending rate is a maximum message sending rate.
- [Claim 2] The method of claim 1, further comprising:
accessing a network resource capacity information associated with the mobile network, wherein the sending rate of the alert message is further based on the network resource capacity information.
- [Claim 3] The method of claim 1, wherein accessing the location information corresponding to a user mobile device of the plurality of user mobile devices further comprises accessing information of network elements that are currently servicing the user mobile device.
- [Claim 4] The method of claim 1, wherein sending the alert message through a group of network elements of the plurality of network elements comprises sending the alert message at an allocated message sending rate through the group of network elements, the allocated message sending rate determined based on a message handling capacity information of the group of network elements.
- [Claim 5] The method of claim 1, wherein the plurality of network elements comprises at least one of a mobile switching center (MSC) and a serving GPRS support node (SGSN).
- [Claim 6] The method of claim 1, wherein the plurality of network elements comprises at least one of a base station controller (BSC), a radio network controller (RNC), a mobility management entity (MME) and a femtocell gateway.

- [Claim 7] The method of claim 1, wherein the plurality of network elements comprises at least one of a base transceiver station (BTS), a femtocell site, a NodeB and an eNodeB.
- [Claim 8] The method of claim 2, wherein the network resource capacity information comprises at least one of an allowable number of paging requests of each location area code and a paging capacity information of each cell site.
- [Claim 9] The method of claim 1, further comprising identifying occurrence of an alert event in an alert area, wherein the alert message is associated with the alert event, and wherein the plurality of user mobile devices are associated with a plurality of users in the alert area.
- [Claim 10] The method of claim 1, wherein integrating with the one or more location sources in the mobile network comprises at least one of: integrating with probes installed on one or more interfaces in the mobile network; integrating with a mobile positioning system in the mobile network; integrating with call data records associated with a mobile switching centre (MSC) with location events; and integrating with the visitor location register (VLR) database.
- [Claim 11] A public alert system, comprising:
a visitor location register (VLR) database configured to store location information of a plurality of user mobile devices in a mobile network, the visitor location register (VLR) database configured by integrating with one or more location sources in the mobile network; and
a message handling system communicably coupled with the visitor location register (VLR) database for accessing the location information, the message handling system configured to:
access a message handling capacity information of each of a plurality of network elements in the mobile network; and
send an alert message to the plurality of user mobile devices through the plurality of network elements based on the location information, wherein the alert message is sent through a network element of the plurality of network elements at an allocated message sending rate based on a message handling capacity information of the network element, and wherein the allocated message sending rate is a maximum message sending rate.
- [Claim 12] The public alert system of claim 13, further configured to:
access a network resource capacity information associated with the

- mobile network, wherein the sending rate of the alert message is further based on the network resource capacity information.
- [Claim 13] The public alert system of claim 13, wherein accessing the location information corresponding to a user mobile device of the plurality of user mobile devices further comprises accessing information of network elements that are currently servicing the user mobile device.
- [Claim 14] The public alert system of claim 13, wherein the message handling system is configured to send the alert message through a group of network elements at an allocated message sending rate, the allocated message sending rate determined based on a message handling capacity information of the group of network elements.
- [Claim 15] The public alert system of claim 13, wherein the plurality of network elements comprises at least one of a mobile switching center (MSC) and a serving GPRS support node (SGSN).
- [Claim 16] The public alert system of claim 13, wherein the plurality of network elements comprises at least one of a base station controller (BSC), a radio network controller (RNC), a mobility management entity (MME) and a femtocell gateway.
- [Claim 17] The public alert system of claim 13, wherein the plurality of network elements comprises at least one of a base transceiver station (BTS), a femtocell site, a NodeB and an eNodeB.
- [Claim 18] The public alert system of claim 14, wherein the network resource capacity information comprises at least one of an allowable number of paging requests of each location area code and a paging capacity information of each cell site.
- [Claim 19] The public alert system of claim 13, further comprising an alert application for receiving information of occurrence of an alert event in an alert area, wherein the alert message is associated with the alert event, and wherein the plurality of user mobile devices are associated with a plurality of users in the alert area.
- [Claim 20] A non-transitory computer-readable medium storing a set of instructions that when executed cause a computer to perform a method comprising:
accessing location information of a plurality of user mobile devices in a mobile network from a visitor location register (VLR) database, the visitor location register (VLR) database configured by integrating with one or more location sources in the mobile network;
accessing a message handling capacity information of each of a

plurality of network elements in the mobile network; and
sending an alert message to the plurality of user mobile devices through
the plurality of network elements based on the location information,
wherein the alert message is sent through a network element of the
plurality of network elements at an allocated message sending rate
based on a message handling capacity information of the network
element, and wherein the allocated message sending rate is a maximum
message sending rate.