US007969925B2

(12) **United States Patent**
Lin

(10) **Patent No.: US 7,969,925 B2**
(45) **Date of Patent: *Jun. 28, 2011**

(54) **PEER-TO-PEER MOBILE DATA TRANSFER METHOD AND DEVICE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/832,576**

(22) Filed: **Jul. 8, 2010**

(65) **Prior Publication Data**

US 2010/0274916 A1 Oct. 28, 2010

Related U.S. Application Data

(63) Continuation of application No. 11/042,620, filed on Jan. 24, 2005, now Pat. No. 7,773,550, which is a continuation-in-part of application No. 10/817,994, filed on Apr. 5, 2004, and a continuation-in-part of application No. 10/935,342, filed on Sep. 7, 2004, now Pat. No. 7,764,637.

(51) **Int. Cl.**
H04W 4/00 (2009.01)

(52) **U.S. Cl.** **370/313**; 370/395.3; 455/466; 709/206

(58) **Field of Classification Search** 455/466; 370/313, 395.3
See application file for complete search history.

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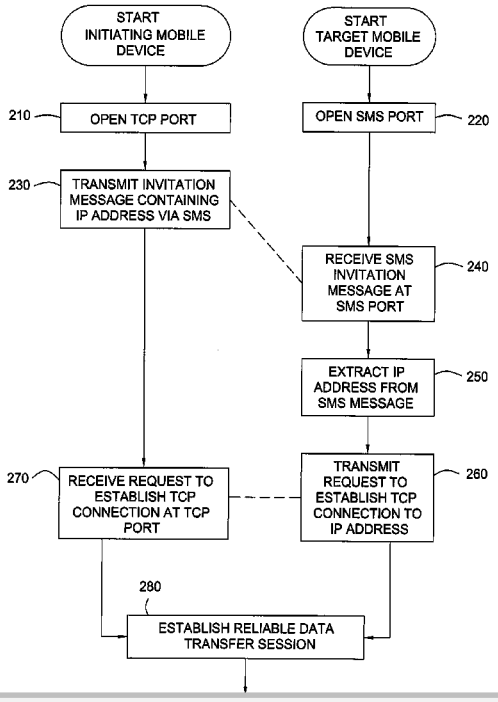
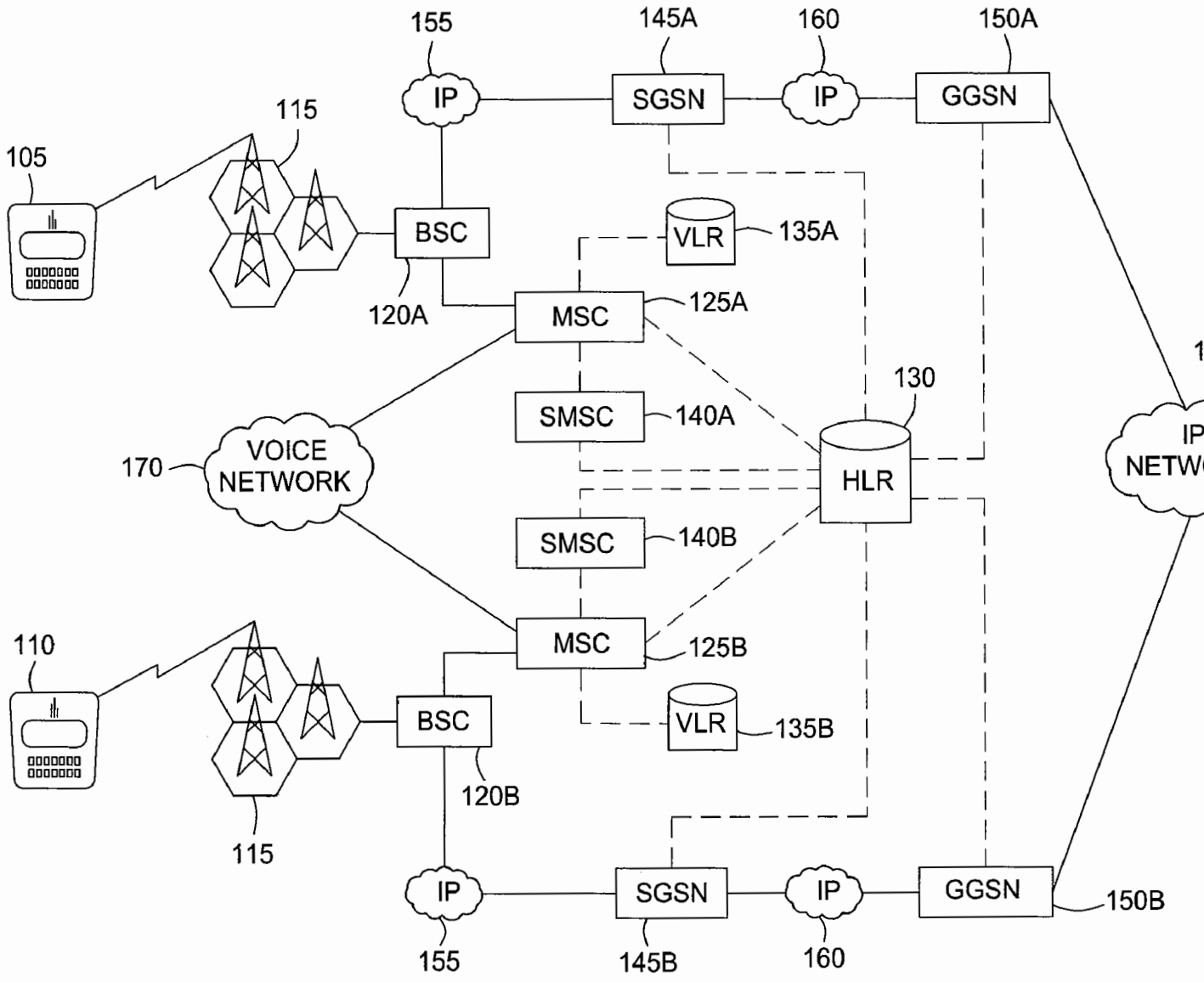
(57) **ABSTRACT**

A technique is provided for a direct data transfer session, including for multimedia content, between mobile devices without the need for using a separate multimedia server to store multimedia content. Direct data transfer sessions between mobile devices are established by transmitting necessary address information through page-based messaging services that utilize the underlying digital mobile network databases and services to resolve the identification and location of the mobile devices.

20 Claims, 3 Drawing Sheets





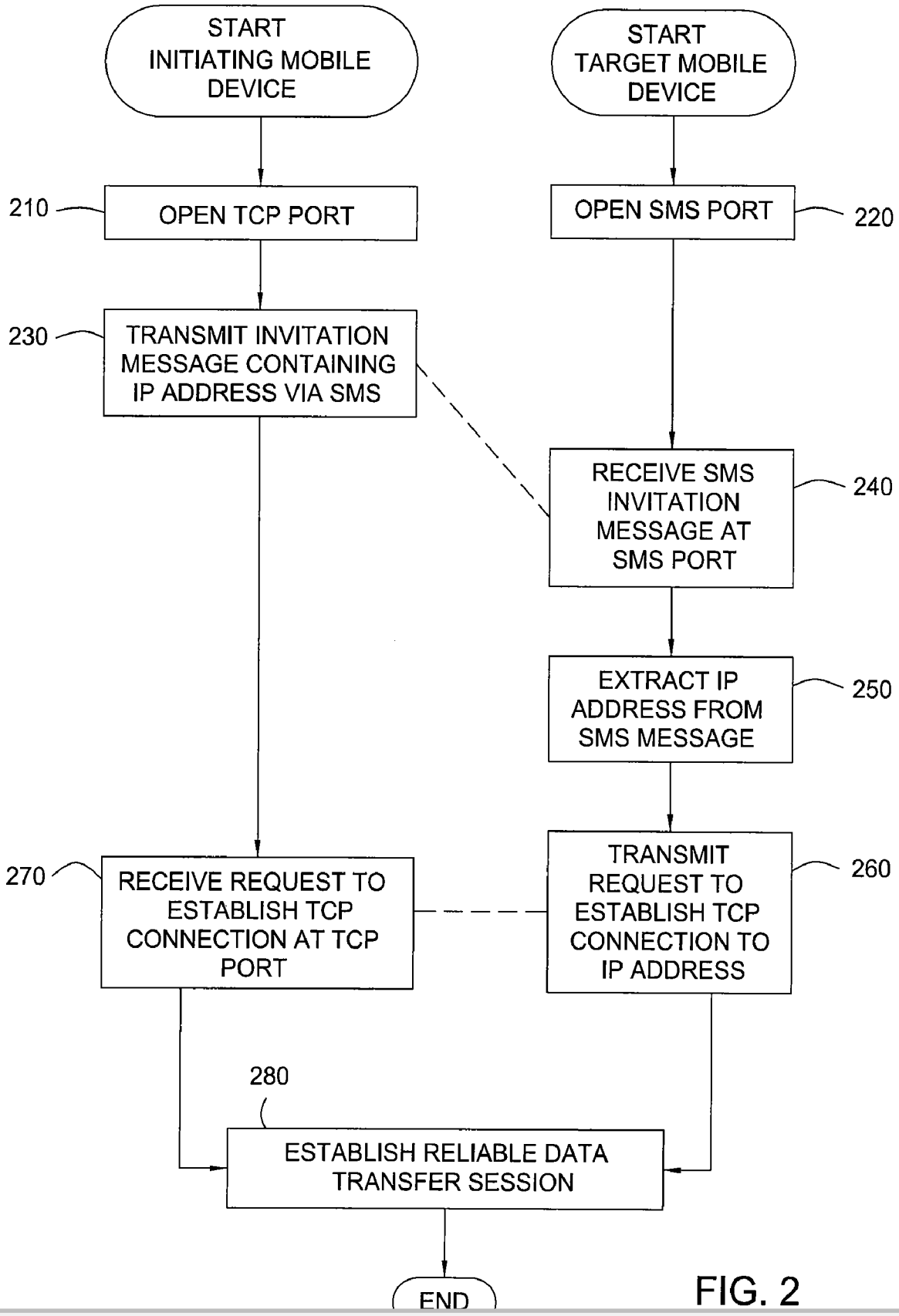


FIG. 2

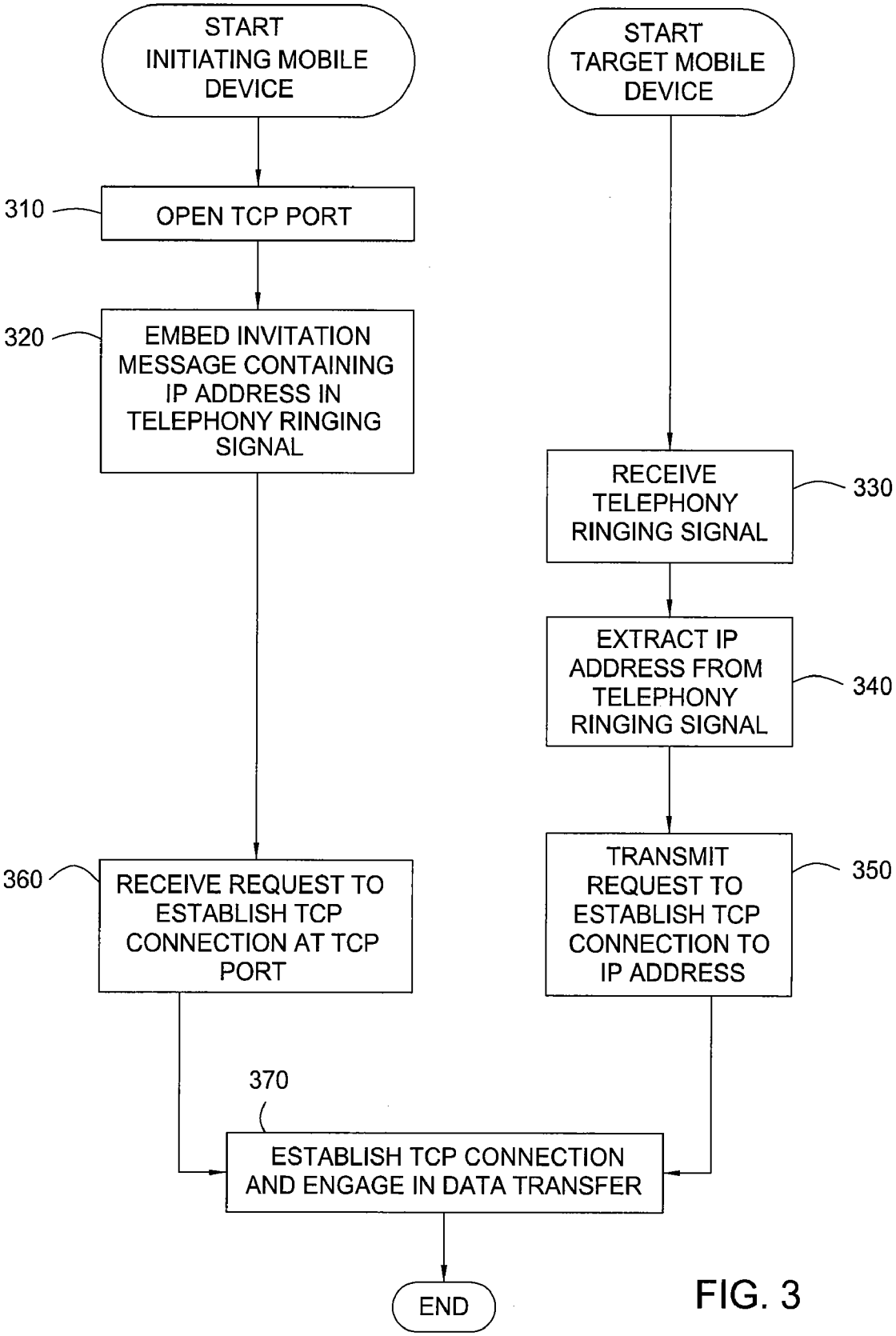


FIG. 3

PEER-TO-PEER MOBILE DATA TRANSFER METHOD AND DEVICE

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 11/042,620, filed Jan. 24, 2005, which is a continuation-in-part of U.S. patent application Ser. No. 10/817,994, filed Apr. 5, 2004, and a continuation-in-part of U.S. patent application Ser. No. 10/935,342, filed Sep. 7, 2004.

FIELD OF THE INVENTION

The present invention relates generally to data transfer techniques for mobile devices, and more specifically, a technique to establish data transfer directly between mobile devices.

BACKGROUND OF THE INVENTION

Current multimedia messaging technologies for mobile devices depend upon a server that receives and prepares multimedia content to be retrieved by the recipient of the multimedia message. For example, the Multimedia Messaging Service ("MMS") protocol utilizes a server known as a Multi Media Service Center ("MMSC") to store multimedia content in preparation for a retrieval process initiated by the recipient. Specifically, under MMS, the initiating device initiates a data connection over TCP/IP and performs an HTTP POST of an MMS Encapsulation Format encoded multimedia message to the MMSC. The MMSC stores the multimedia message and makes it available as a dynamically generated URL link. The MMSC then generates a notification message containing the dynamically generated URL and sends the notification message to the recipient through WAP Push over the Short Message Service ("SMS") protocol. When the recipient receives the MMS notification message, it initiates a data connection over TCP/IP and performs an HTTP request to retrieve the MMS message containing multimedia content from the MMSC through the dynamically generated URL.

The MMSC is used, in part, by the MMS protocol in order to provide a known address (e.g., a URL) that can be provided to the recipient in a text based format in order to initiate a data transfer transaction to retrieve the multimedia content. Without such a known address, the sender would be unable to transmit multimedia content to the recipient, since other pre-existing messaging technologies (e.g., SMS) only provide the capability to send limited text, and not multimedia content, directly to the recipient. As such, what is needed is a method to establish data transfer sessions directly between mobile devices, where such mobile devices are capable of directly communicating with other mobile devices through the underlying wireless technology, such that no separate multimedia server and separate retrieval notification message is needed to obtain data (e.g., multimedia content) other than text.

SUMMARY OF THE INVENTION

The present invention provides a method for establishing a direct data transfer session between mobile devices over a digital mobile network system that supports data packet-based communications. Under the present invention, no separate data server need be used to provide a known location

opens a listening port defined by an underlying data packet based network protocol. The initiating mobile device sends an invitation message containing the network address, including the listening port, of the initiating device to a target mobile device through a page-mode messaging service (e.g., text based service) supported by the digital mobile network system. The initiating mobile device further utilizes and incorporates a unique identification number (e.g., telephone number, PIN number, etc.) associated with the target mobile device into the invitation message to locate and contact the target mobile device within the wireless mobile network. Once the initiating mobile device receives a response from the target mobile device at the listening port, the two mobile devices are able to establish a reliable virtual connection through the underlying data packet-based network protocol in order to transfer data directly between the two mobile devices.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** depicts a diagram of an environment for establishing a data transfer session in accordance with the present invention between a first mobile device and a second mobile device in a GSM mobile network system supporting GPRS as a data packet-based communications service, SMS as a text messaging service, and TCP/IP as an underlying data packet based network protocol.

FIG. **2** depicts a flow chart for establishing a data transfer session in accordance with the present invention.

FIG. **3** depicts a flow chart for a second embodiment for establishing a data transfer session in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** depicts one environment to deploy an embodiment of the present invention. As depicted, the underlying digital mobile network system in this environment is the Global System for Mobile communications (GSM) **100** standard. Under the GSM standard, each of the mobile devices **105** and **110** includes a Subscriber Information Module (SIM) card that contains unique identification information that enables the GSM system to locate the mobile devices within the network and route data to them. A current commercial example of a mobile device (e.g., smartphone, PDA, handheld, etc.) that might be used in FIG. **1** could be Research In Motion's (RIM) BlackBerry handheld devices, which include a QWERTY keyboard to facilitate the typing of text. As depicted, a GSM architecture. includes the following components: base transceiver stations (BTS) **115** and base station controllers (BSC) (**120**A or **120**B) for managing the transmission of radio signals between the MSC (defined below) and the mobile devices, mobile service-switching centers (MSC) (**125**A and **125**B) for performing the all switching functions and controlling calls to and from other telephone and data systems, a home location register (HLR) **130** for containing all the administrative, routing and location information of each subscriber registered in the network, visitor location registers (VLR) (**135**A and **135**B) for containing selected administrative information about subscribers registered in one HLR who are roaming in a another HLR, and an equipment identity register (EIR) (not shown) for containing a list of all valid mobile equipment on the network). As depicted in FIG. **1**, in one architecture of a GSM network, there may be exist one HLR while there may exist multiple

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