

## SUBSCRIBER DATA HANDLING IN TELECOMMUNICATIONS NETWORKS

The present invention relates to telecommunication. In particular, the invention relates to a new and advanced method and system for the management of subscriber data in telecommunication networks.

A problem with the services provided at present via various networks (e.g. GSM, Global System for Mobile communications; PSTN, Public Switched Telephone Network; Internet) is that they are designed to work only in a particular network. Each network has different practices for the handling of subscriber data. Locating services are tied to their target network and the accessibility of a person can only be treated within a given network. A person may be accessible e.g. via the Internet at a location where no paging network can be used.

The object of the present invention is to eliminate the problem described above. A specific object of the present invention is to disclose a new type of system and procedure in which subscriber data and above-mentioned services are available between different networks and in which the services can be directed to use the network currently used by the subscriber irrespective of the network interface. The invention makes it possible to create e.g. an accessibility service between different networks.

As for the features characteristic of the present invention, reference is made to the claims.

The system of the invention transmits and modifies subscriber data in conjunction with at least two duplex telecommunication networks handling different subscriber data. The telecommunication network is e.g. a public telephone network, a digital multi-service network, a public mobile communication network, a paging network, a message service network, a telex network or an IP-based network (IP, Internet Protocol).

The system comprises means for connecting the system, transparently in respect of the telecommunication system architecture, to telecommunication network elements handling subscriber data. 'Transparently' here means  
5 that the system does not require any changes in the architecture of the existing networks.

The system comprises means for storing the subscriber data for different telecommunication networks in logically the same database. The data of the  
10 database may be distributed in different elements while still essentially forming part of an entity interpreted as a single database.

The system comprises means for exchanging subscriber data between telecommunication network elements  
15 handling subscriber data and/or the database. Examples of exchangeable data are data indicating the subscriber's location and in which network and at what time the subscriber can be reached, or subscriber-specific service data, including the services used by  
20 the subscriber.

In a preferred embodiment of the invention, the system comprises means for the transmission of signalling between different telecommunication networks.

In a preferred embodiment of the invention,  
25 the system comprises means for converting data types so that the data type of the subscriber data is compatible with the database comprised in the system and with the data types of the network element of the telecommunication network linked to the system.

30 In a preferred embodiment of the invention, the system comprises means for forming a service profile for the subscriber. From the service data for each subscriber, it is possible to determine the network and service that the subscriber prefers to use.

35 In a preferred embodiment of the invention, the system comprises means for ensuring uninterrupted operation. The system is a critical component as regards network-independent services.

In a preferred embodiment of the invention, the system is implemented in the terminal device. In this case, the services are implemented and activated separately in each terminal device of the subscriber, taking the properties of each network into account.

In a preferred embodiment of the invention, a means comprised in the system is implemented as a part of a network element. The means comprised in the system may also be implemented as a module which is added to a network element of an existing telecommunication network.

The system of the invention provides the advantage of a uniform external interface to service user information for use e.g. in customer management systems. The system makes it possible to create a new and more advanced accessibility service in which the subscriber can be reached via a single interface from different telecommunication networks. The system saves network capacity. Subscriber search from other networks can be accomplished as a simple database search without setting up a complete telecommunication connection. Subscriber data can be practically managed in real time as the system is connected with elements exchanging subscriber data. In other words, a search service can be implemented as a simple exchange of characters.

In the following, the invention will be described by the aid of a few examples of its embodiments by referring to the attached drawing, wherein

Fig. 1 is a diagrammatic representation of a system according to the invention, and

Fig. 2 presents another embodiment of the invention, connected as a part of existing network elements.

As an example, the handling of subscriber location data will be now described. When the system 2 of the invention is added to the GSM network 3, it is connected between the MSC/VLR 4 (MSC/VLR, Mobile services Switching Center/Visitor Location Register) and the HLR

5 (HLR, Home Location Register) via means 1a. When the MSC/VLR 4 exchanges information with the HLR 5, the communication is transmitted via the system 2, which picks out the required data from the communication and transmits the communication further to the HLR 5 without altering the messages between the MSC 4 and the HLR 5. Thus, the system 2 has obtained subscriber location data from the communication between the MSC/VLR and the HLR in the GSM network 3 by filtering.

10           The location information is stored in the database 12 of the system 2 by using means 13. This information could be utilised e.g. in an intelligent network service (IN, Intelligent Network) provided in a PSTN network 6, in which a service control point 7 (SCP, Service Control Point) sends a subscriber data inquiry to a service data point 8 (SDP, Service Data Point). Instead of being passed to the data point 8, the inquiry is directed using means 1b to the system 2, which may return the subscriber data immediately or direct the original inquiry to the service data point 8. After receiving a response from the service data point 8, the system 2 can add desired information to the data obtained from the service data point 8 and return the response to the service control point 7.

25           A corresponding practice can also be applied in a TCP/IP network 9 (TCP/IP, Transmission Control Protocol/Internet Protocol), where the system can be used as a server for various directory services. In an example, the system 2 is connected between a terminal 30 11 and a gatekeeper 10 as defined by the ITU H.323 standard series (ITU, International Telecommunications Union) via means 1c. The terminal logs on into the gatekeeper 10 and queries for information concerning call setup. The communication is transmitted via the system, which filters the required data from it. Exchange of information between the terminal 11 and the gatekeeper 10 works in the same way as in a network in which the system 2 of the invention is not used.

By the method described above, it is possible to implement an accessibility service that is considerably more advanced than present systems. When someone is trying to reach a subscriber e.g. via the GSM network, he/she may leave a message in the subscriber's telephone answering machine. Based on the subscriber's service profile formed using means 15, this message is transferred to the network considered best, e.g. to the Internet, where the message left in the answering machine is converted into an electronic mail message. The system 2 always contains information about the subscriber data of each network; for instance, a subscriber's location can be determined from the location data so that it can be used e.g. in an answering service.

The load on the system of the invention can be managed because, in present networks, subscribers can be distributed among different network components containing subscriber data so that only data for subscribers using network-independent services and the associated search and processing operations are routed via the system by using suitable signalling. The system 2 is provided with means 14 for the transmission of signalling.

The essential point about the system 2 is that it concentrates subscriber data, location and service data in the same system with the signalling of different telecommunication networks. The system 2 functions as a gateway between different networks. Since the subscriber data of all the networks that have joined the system are collected in the same database, a telecommunication connection between two different networks can be set up directly between the networks without having to check the subscriber data via a third network. In practice the system 2 also works in real time, thus differing from prior-art procedures in which subscriber data are handled by a batch processing method, collect-

ing subscriber data for several subscribers at the same time.

Fig. 2 presents a system according to the invention the invention, in which the means used in the system 2 are implemented as a part of the existing network elements. The system 2 is physically distributed as additional modules built into different network elements implementing the functions of the system 2.

The present application is based on Finnish application FI 980667, which has been filed on 25.3.1998 and whose contents are included here by this reference.

The invention is not restricted to the examples of its embodiments described above, but many variations are possible within the scope of the inventive idea defined by the claims.

## CLAIMS

1. System (2) for the management of subscriber data in conjunction with at least two duplex telecommunication networks handling different subscriber data, characterised in that the system (2) comprises

5 - means (1) for linking the system (2) in a transparent manner as regards telecommunication network architecture to telecommunication network elements handling subscriber data,

10 - means for storing the subscriber data of different telecommunication networks in logically the same database (12), and

- means (13) for exchanging subscriber data between the telecommunication network elements handling subscriber data and/or the subscriber database.

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2. System as defined in claim 1, characterised in that the system (2) comprises means (14) for the transmission of signalling between different telecommunication networks.

20 3. System as defined in claim 1 or 2, characterised in that the system (2) comprises means (1) for converting data types between the telecommunication network and the database.

4. System as defined in any one of claims 1 - 3, characterised in that the system (2) comprises means (15) for forming a service profile for the subscriber.

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5. System as defined in any one of claims 1 - 4, characterised in that a means comprised in the system (2) is implemented as a part of a network element.

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6. System as defined in any one of claims 1 - 5, characterised in that the system (2) is implemented in a terminal device.

35 7. Procedure for the management of subscriber data in conjunction with at least two duplex telecommu-



nication networks handling separate subscriber data, characterised in that

5 - a connection transparent in respect of the telecommunication system architecture is established to telecommunication network elements handling subscriber data,

- the subscriber data for different telecommunication networks are stored in logically the same database,

10 - subscriber data are exchanged between the telecommunication network elements handling subscriber data and/or the subscriber database.

8. Procedure as defined in claim 7, characterised in that signalling is transmitted between different telecommunication networks.

9. Procedure as defined in claim 7 or 8, characterised in data types are converted between the telecommunication network and the database.

10. Procedure as defined in any one of claims 7 - 9, characterised in that a service profile for the subscriber is formed.



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