who is (rwhois) protocol v. 1.5." (RFC 2167, IETF 1997), LDAP (RFC 1777 W. Yeong et al. "Lightweight directory access protocol," RFC 1777, IETF, March 1995) and other multicast based protocols available to determine where a user might be reachable. It is possible to receive a list of locations because the user might be logged in at several hosts simultaneously or because the location server has inaccurate information. The way to contact the user in such cases is to try each of the listed addresses until the user is located.

[0090] SIP Mobility

[0091] SIP transparently supports name mapping and redirection services that enables personal mobility. Personal mobility is the ability of end users to originate and receive calls and access subscribed services on any terminal in any location and the ability of the network to identify end users as they move. Personal Mobility is based on the use of a unique personal identity based in the above mentioned SIP URL.

[0092] The SIP also supports terminal mobility by proxying and redirecting request to the current location where the user is logged in. This process has been briefly described above, where it uses the possible URLs where it is supposed that the user can be reached. With SIP the user can register his current location and even the service profile required for the session. In the registration process the user can provide his personal identity for achieving Personal Mobility. Afterwards, for locating a user, the SIP needs the Location server, which can use DNS, LDAP or any other similar mechanism for obtaining the address where is located the client.

[0093] SIP and SLO

[0094] The user can register temporarily at the local SIP server where he will be attached for a certain period of time. That registration only indicates that the user is located at that point. For newer services coming into being (Location based services, Emergency calls, etc.) the user needs to provide more detailed information of his situation. Using the framework provided by SIP, it is more effective that in the same registration process the user inserts more information about his location.

[0095] Such information and the requirements to register that information may follow the architecture requisites defined in the SLO working group. See Haitao Tang, "A Proposal for the Version-01 BOF Charter," Feb. 21, 2000 located at http://www.nre.nokia.com/ip-location/charter-v01-00.txt. See also IETF draft-tand-islf-reg-00.txt for "Problems and Requirements of Some IP Applications Based on SLO Information" by Tang et al, February 2000.

[0096] Hence, a simple SIP registration becomes more effective using the SLO data as payload. In this way, the user identifier used in the SIP (URL) can be linked to more complete information about the user's geographical location. This purpose may be effected by adding the SLO as the SIP Content Type during the registration. Further guidance is provided below regarding all the entities and conditions for using the SLO structure properly.

[0097] SLO Introduction

[0098] A presence service can provide address Spatial Location (SLO) information establishment, exchange, and utilization for IP devices. The objective is to let IP-addressable devices and applications be able to establish/acquire and provide the spatial location data concerning themselves and other parties when allowed. Security is a fundamental requirement for many situations of the data exchanges and services. See above mentioned BOF charter document by H. Tang. The main constraints for any implementation will be security and scalability.

[0099] The former is important to provide a general trusted service, where all the information is reliable. For this issue it is important to establish various security channels between the entity that provide or request the information and the entity that stores and retrieves that information for other Services (Emergency, Personal services, Signalling, etc.).

[0100] To obtain certain security on the communication means the existent secure protocols and encryption mechanisms such as 3DES, SSL, IPsec, PGP, etc. can be used. Since the SIP is chosen for the SLO transport, it already provides a secure channel using PGP.

[0101] The other issue is the scalability and it is as important as security. In the present architecture all the various scenarios have been considered as well as the amount of information to be exchanged. The type of data exchanged between the possible entities in different scenarios and its updates have been analyzed as well. Obviously, a fixed user only needs to provide its location once and it will be permanently there. Afterwards, a mobile entity (IP terminal, phone, etc.) is considered, and in this case the user provides his initial location with the possibility of spatial translation. Hence, after the notification of the initial location it has to be tracked during his movements, but updates of location are periodically required. The periodicity of the updates depends on the velocity of terminal, i.e., if the user is walking the updating period can be longer than if the user is moving with another means of locomotion (car, bike, etc). These considerations have to be taken in account for the traffic generated on each situation and the protocol chosen for those updates.

[0102] Spatial Location Architecture

[0103] Below are identified the Basic Requirements for designing the basic architecture. Described are the main characteristics that the service should contain in its essential design. It has to be considered that in the actual market there are many possibilities for providing similar serviced. Considering that the aim of this invention is to provide a common infrastructure that is to be used worldwide and in multiple devices, it has to be flexible, scalable and secure. These properties are crucial to meet the requests of various service providers and become well accepted as the common instrument for providing spatial location.

[0104] Spatial Location Representations

[0105] It supports different location data representations/expressions. For interoperability reasons, it has an absolute location system as the supported format by all the service speakers. It lists all other absolute location systems and their data formats, which may be supported by the service elements on an optional basis. It also supports for descriptive locations while no syntax and standard is defined in the current architecture scope.