[0106] Representation Negotiation Mechanism

[0107] There is a representation negotiation mechanism provided. The mechanism supports the selection of the wanted location system and data format between two speakers. The descriptive location negotiation is considered during the location registration. Once the user registers his location, he will indicate the format of that data. In case a third party needs to request that information it will be notified about the location information format (those formats will be previously specified and publicly reported).

[0108] Security Mechanisms

[0109] There is an authentication mechanism selected/defined between SLoP speakers, to guarantee the integrity/authenticity/accessibility (e.g., no spoofing and certain DOS attacks) of the involved parties. Use of the authentication and/or the encryption mechanisms is to be settable by the service endpoint (user may enable or disable the use of the mechanisms). It is done per session or per endpoint. The primary design for security in the architecture is end-to-end.

[0110] Policy Mechanisms

[0111] There is a policy specification language selected/defined for specifying various policies that are relevant to the architecture. A PIB is defined for all the speakers. The policy instance for a target should be available to the server representing the target, where the policy instance tells how a server shall serve the spatial location of the target.

[0112] Server Discovery Mechanism

[0113] There are two aspects of this issue. There is a discovery mechanism for the Target to find out the server where he can register his SLO data. Secondly, there is a discovery mechanism selected/defined for a client to find the appropriate server for a given target when needed.

[0114] The Server Discovery is an Important Issue for scalability problems. There are different approaches for obtaining the closest Location Server or its equivalent. The first choice is using a static preconfigured address of the Server where the user is subscribed. The optional choice would be using multicast messages for locating the nearest Location Server to establish the initial connection. There are many alternatives for achieving an efficient multicast mechanism (Hussein F. Salama et al "Evaluation of Multicast Routing Algorithms for Real Time Communication on High-Speed Networks," N.C. State University.) After being located, the Server will present a policy mechanism for user authorization to continue with the service.

[0115] In the case of using SIP as the control protocol, it already provides the server discovery mechanism for both cases, i.e. for the Target and Client trying to contact the Location Server either to register or to get the location information.

[0116] Transmission and Reliability Mechanism

[0117] The design of a reliability mechanism is affected by the transport protocol below the Spatial Location architecture. Various transport protocols have different reliability levels. If TCP is selected, there is no need to have this extra mechanism. However, TCP seems too "heavy" for some services. Since this service must be independent of the type of communication and the reliability should be guaranteed, the transport protocol will care of this issue. The transport protocol also has to ensure the security for different mechanisms according to the user device and service provider. At this point SIP uses UDP or TCP independently based on user requirements.

[0118] Message Coding Mechanism

[0119] There is a coding mechanism selected/designed for coding/decoding all the messages. All the users must support the coding mechanism.

[0120] The users support the basic coding mechanism selected as default for all the transactions. A standard scheme is defined based in a header and a message body. Both are coded using text-based language such as XML. In the header are defined the default fields needed for the protocol transaction including encryption information and in the body are inserted the information according to the specific message. Using an extensible language permits later extensions with new headers or features. This way it has the reliability of the XML format coding and the extensibility of the text-based language. In the concrete case that the body is carrying location information it can be inserted using the Geography Markup Language (GML) (Geography by Markup Language (GML) v1.0 OGC Document Number: 00-029.May 12, 2000. http://www.opengis.org/techno/specs/00-029/GML.html). The proposed naming is based on Uniform Resources Identifiers (URI) (See RFC 2396) and it follows the syntax defined for Target Information ID (TID) and Target record Accessing ID (TAD) in Tang et al "Serving Spatial Information over Internet" and in the "Target Naming Scheme" set forth in IETF draft-tang-spatial-target-00.txt. These definitions compose the Identifier for persistent data (TID) and roaming purposes among Location servers (TAD). Preferably, either the TID or TAD will be present in the headers of all the SL messages. Furthermore, the message will preferably contain the Spatial Location representation described and attributes described below.

[0121] SLO Entities

[0122] These definitions are based on the architecture requirements identified for providing SLO information.

[0123] Client is the element that requests the Physical Location of another element (called Target). It can be either a user device requesting the location of another terminal or an application that needs to obtain the user location data for providing additional services (Location Based services, Emergency notifications, etc). The Client behaves like a Target when it is providing the SL information.

[0124] Target is the element whose Physical Location the Client requests. It can have capabilities for resolving its location or not. In case of the simplest equipment, it will send to its server the Spatial Location structure without the geographical information. In this case the data structure includes the user requirements and basic information and within that data is included the rights to the server for resolving the Target location and filling the Spatial Location structure.

[0125] User Interface (UI) is what the user utilizes to interact with the Location Server (LS). The UI is typically implemented as an integral part of a mobile terminal or as an application on top of a WEB and/or WAP server belonging to a Network Provider. Therefore, the UI is physically implemented on the called Target and based on the SIP nomenclature it will be a SIP User Agent.