

[0110] In another example of convergence a subscriber transmits a GSM text message with the word “news” to a particular MSISDN. The SMSC delivers the messages to the gateway 1 (Hydra). Hydra accesses the relevant AP and receives xHTML content, it translates this to MMS, and sends the MMS content to the MMSC of the mobile network. The MMSC in turn delivers the MMS content to the subscriber.

[0111] In a further example use case, the subscriber replies to the above MMS with selection of an option within the MMS. The MMSC delivers the message to Hydra, which internally retrieves the xHTML content of the previous session from the session manager, and translates it to MMS. This MMS is sent to the MMSC, which then routes it to the subscriber. It will be appreciated from the last scenario above that operation of a session control or control service within Hydra can be very important. It provides an important link between one cycle and another of an overall session. In more detail, this facilitates session-based application navigation, which is essential in providing a useable convergent service by maintaining current state where there may be several sequential atomic user service level transactions across multiple bearers. In the following passages the terms “convergent service” and “user service” are not to be confused with the internal gateway services such as the services of FIG. 4. They are a service as seen by a user. For example in a user service which may require subscriber input via traversal of multiple menu levels via WAP or IVR, with intermediate service data or content delivery to the subscriber via SMS or MMS, session based application navigation maintains the current subscriber state within the transaction so that the subscriber is returned to most logical location in the service based on his progress as stored in his current session.

[0112] A specific example is to allow the user service to resume at a logical point in the event of certain internal failure, rather than forcing the subscriber to re-start his user service interaction. Additionally, session control also allows the convergent service to be managed at a level higher than possible through the management of the component bearers or internal gateway services. Session management allows user service-level billing and charging events to be generated on the service access gateway, which facilitates the billing of the user service independently, and without the need for co-relation of the billing records generated by the component bearer systems, where a logical linkage between events across different systems relating to a common ‘convergent’ service transaction may be available.

[0113] Session control also facilitates user service management—by monitoring the current state of user services, and monitoring user service activity, detecting user service abnormalities and applying session-level service management parameters such as idle timeouts, which might otherwise be invisible when managing the user service through the management of the individual bearer systems. A specific example would be in a user service where a content download request was made by the subscriber by SMSC and where the content is delivered by MMSC. In the case of billing for this user service, without session management it may be necessary to co-relate the billing record from the SMSC with the billing record from the MMSC relating to the delivery of the content to bill for the user service. Session management facilitates user service level billing from the

gateway 1 by tracking the progress of the transactions through the SMSC and the MMSC and generating an appropriate billing event at an appropriate stage in the session. Using the same example, in the event of the SMS requesting the user service being successfully delivered to the application provider—whereupon a failure occurred causing no MMSC to be returned containing the requested content. Session management facilitates the detection of this error by monitoring the session activity, and logging the failure. Without session management, such a failure is very difficult to detect with the operator’s network by monitoring the activity of the two independent bearers services, since no failure of either bearer has occurred.

[0114] In the description above with reference to FIG. 1 mention is made of cascading privileges. These privileges are managed by a provisioning service of the gateway 1. The provisioning service receives an on-line request from an AP for provisioning on the gateway 1. As shown in FIG. 11 in step 160 the provisioning service on initiation of the gateway grants rights to the operator (host) of the gateway 1. In step 161 the operator in turn grants rights to a service provider (or virtual service provider) who hosts an aggregate AP. In step 162 the virtual service provider grants rights to a number of associated APs, who in turn grants right to subordinate APs in step 163. The rights which can be granted by any one party are a subset of the rights defined by a “delegatable schema” of an originating set of rights. An authorisation and policy control service of the server enforces the rights.

[0115] Referring to FIG. 12 a record 170 generated by the provisioning service includes a right 171 having a schema 172 defining the access control values, and a delegatable schema 173 defining the maximum extent of rights of an assignee of the right-holder. The record 170 also includes a digital signature 174 or other authentication data. Another record 180 generated by the provisioning service is for an assignee of the holder of the record 170. This record includes rights 181 defined by a schema 182, which is a subset of the delegatable schema 173. The record 180 also has a delegatable schema 183, allowing further cascading as the situation arises. There is also a digital signature 184 for the record 180, and for every successive record. The actual rights govern, in practice, service policy parameters such as right of access to network bearers, permitted content formats and volumes, maximum and minimum charging parameters.

[0116] It will be appreciated that the invention provides a gateway which interfaces with application provider servers in the Internet domain and with enablers in the mobile network domain to allow a wide variety of content download and user service provision to subscribers. Content or user services may be provided by a particular AP server operating independently or via a web of linked AP servers with very simple setup by virtue of the cascaded access control right mechanism. Another major advantage is the ability to efficiently perform convergence of content formats to provide the desired content format or service type for the subscriber. This is achieved despite the fact that there are a wide variety of subscriber mobile device capabilities and AP content formats. The fact that the gateway 1 interacts with mobile network enablers in two-way sessions before ultimate delivery to the subscriber also helps to achieve considerable versatility in convergence.