VoIP – SIP-based via Internet or NGN

Frank Weber, Ulrich Trick
Research Group for Telecommunication Networks,
University of Applied Sciences Frankfurt/M., Kleiststr. 3, D-60318 Frankfurt/M., Germany,
E-Mail: weber@e-technik.org, trick@e-technik.org

Abstract

Both, surveillance of the market and studies of current research and standardization works show that the evolution from traditional telecommunication networks towards NGN (Next Generation Networks) currently takes place. SIP (Session Initiation Protocol) as an IP-based signaling protocol, which today is used by many global Voice over Internet providers, plays a major role in future NGN-based telecommunication networks as well. SIP was also assigned as signaling protocol for the IMS (IP Multimedia Subsystem) of UMTS (Universal Mobile Telecommunication System) Rel. 5 and further releases.
In this presentation the difference between Voice over Internet, VoIP (Voice over IP) in general, and especially VoIP in an NGN is emphasized.
Key features of a NGN, and the mapping of logical NGN network elements to SIP network elements will be discussed (see figure 1).

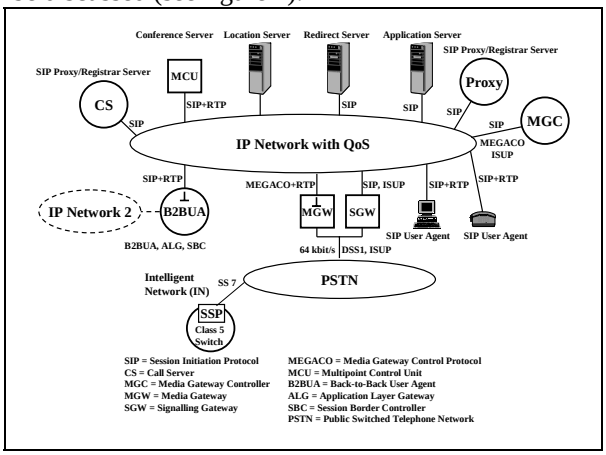

Figure 1: SIP-based NGN

Considering practical scenarios of possible NGN realizations results in entirely new aspects concerning the network's switching structure. Some instances are

- completely decentralized switching intelligence
- completely centralized switching intelligence
- partly centralized / decentralized switching intelligence
- termination of media never / always / only under certain circumstances / only if interworking with foreign networks
- transcoding functionality / avoidance
- high availability of certain parts of the network / redundancy.

In this context the current trend towards the use of Peer-to-Peer approaches for SIP-based communication infrastructures (P2P SIP) is pointed out.
After illustrating the IMS architecture fundamentals, the mapping of SIP-based NGN elements to IMS network elements is discussed.
Examining the migration towards All-NGN, interworking between existing and future telecommunication networks must be carefully attended because of the coexistence of packet-switched, connectionless, IP-based core networks beside traditional, circuit-switched, connection-oriented networks such as PSTN (e.g. ISDN-based).
Therefore attention must be paid not only to the conversion of signaling and media data but also to the integration of existing IN (Intelligent Network) service platforms. In this context, the connection and integration of different service platforms to the IMS is emphasized. In IMS, services are provided by so called application servers (AS). Those can consist in existent CAMEL service platforms (Customized Applications for Mobile network Enhanced logic), in OSA/Parlay service infrastructures (Open Service Architecture), or SIP application servers, respectively.
Implemented services could be provided by

- one of the above-mentioned service platforms or
- a combination of two ore more of the above-mentioned service platforms.

The individual ways of connecting these kinds of service infrastructures to the IMS is explained.
Furthermore, current NGN standardization, which is driven by ITU-T (International Telecommunication Union – Telecommunication standardization sector) and ETSI (European Telecommunications Standards Institute) in participation with 3GPP (Third Generation Partnership Project), leads to a NGN/IMS convergence concept which will be explained on the basis of a heterogeneous NGN infrastructure.