QoS in SIP-based NGN – introducing fundamental requirements and a new approach

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Abstract

An evolution is currently taking place in the world of telecommunication networks. Traditional circuit switched networks (such as ISDN (Integrated Services Digital Network)) are superseded by packet switched NGN (Next Generation Networks). Analyses of both, the current market situation and studies of ongoing research and standardisation work show that SIP (Session Initiation Protocol) as an IP-based signalling protocol plays a major role in NGN-based telecommunication networks.

Quality of Service (QoS) is one of the most important key features of NGN. This presentation outlines new requirements to the QoS management in SIP-based NGN, and introduces a new approach.

However, the standardised NGN QoS concept comes along with a high volume of additional traffic for the allocation and reservation, and – after call termination – the release of network resources. The resource management traffic itself is not efficiently controllable by the respective NGN's provider because it does not only depend on the number of end users but also on their session behaviour (e.g. the number of session requests per time per user, and the average duration of each session). Thus today's standardised NGN approaches of per-session QoS control do not scale and lead to inefficient resource management traffic.

By analysing both, the standardised NGN QoS concept and current research work, the following fundamental requirements can be outlined.

- Functions and mechanisms to provide trustworthy QoS for media sessions more efficiently/scalable
- End-to-end QoS and resource control, including access and core networks, and inter-domain QoS negotiation
- Simple and resource saving resource control/management approaches, based on standardised protocols and architectures
- Both, session-based multimedia services and non-session-based services (e.g., email and internet access) should be accessible within the same network. NGN's resource control has to be aware of a certain amount of traffic that is not session-based.
- Setup and management of QoS conditions within the transport network should generally occur independent of media session setup and therefore, has to be controlled by a specific management function
- NGN QoS provision should be independent of underlying transport technology such as MPLS, ATM, VLAN

A general new approach for the optimisation of SIP-based NGNs' QoS management is introduced with the integrated framework for comprehensive QoS control in NGN (see figure 1).

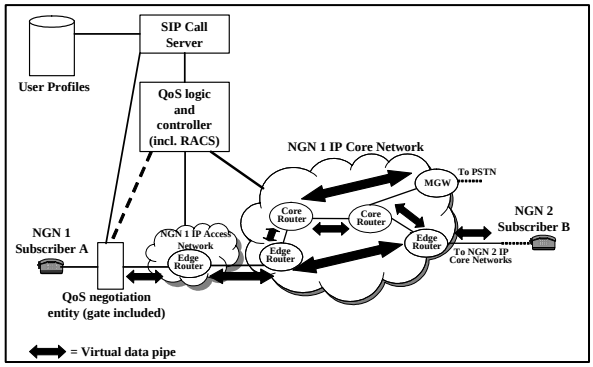

Figure 1: Integrated framework for comprehensive QoS control in NGN

By this new framework approach, the following key functions are fulfilled.

- Comprehensive QoS provision and management, including access and core networks, considering interconnection of different provider's networks
- Provision of end-to-end QoS for media streams by session-independent virtual data pipes (see figure 1) within the transport network, applicable with any underlying transport technology (such as MPLS, ATM)
- Algorithm-based dimensioning and control of virtual data pipes, processed by QoS logic and controller (see figure 1)
- Both, session-based traffic (such as voice sessions) and non-session-based traffic (such as email or Internet traffic) are taken into account for the computing of resources available within the transport networks
- SIP is used for session initiation and QoS negotiation between "QoS negotiation entity" and SIP call server (see figure 1)

A more detailed outlook on the new framework's overall functionality will be given within the presentation.