

QoS in SIP-based NGN – state of the art and new requirements

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Dipl.-Ing. (FH) Frank Weber (weber@e-technik.org)

**Fachhochschule Frankfurt am Main – University of Applied Sciences
Research group for telecommunication networks
Laboratory for telecommunication networks**

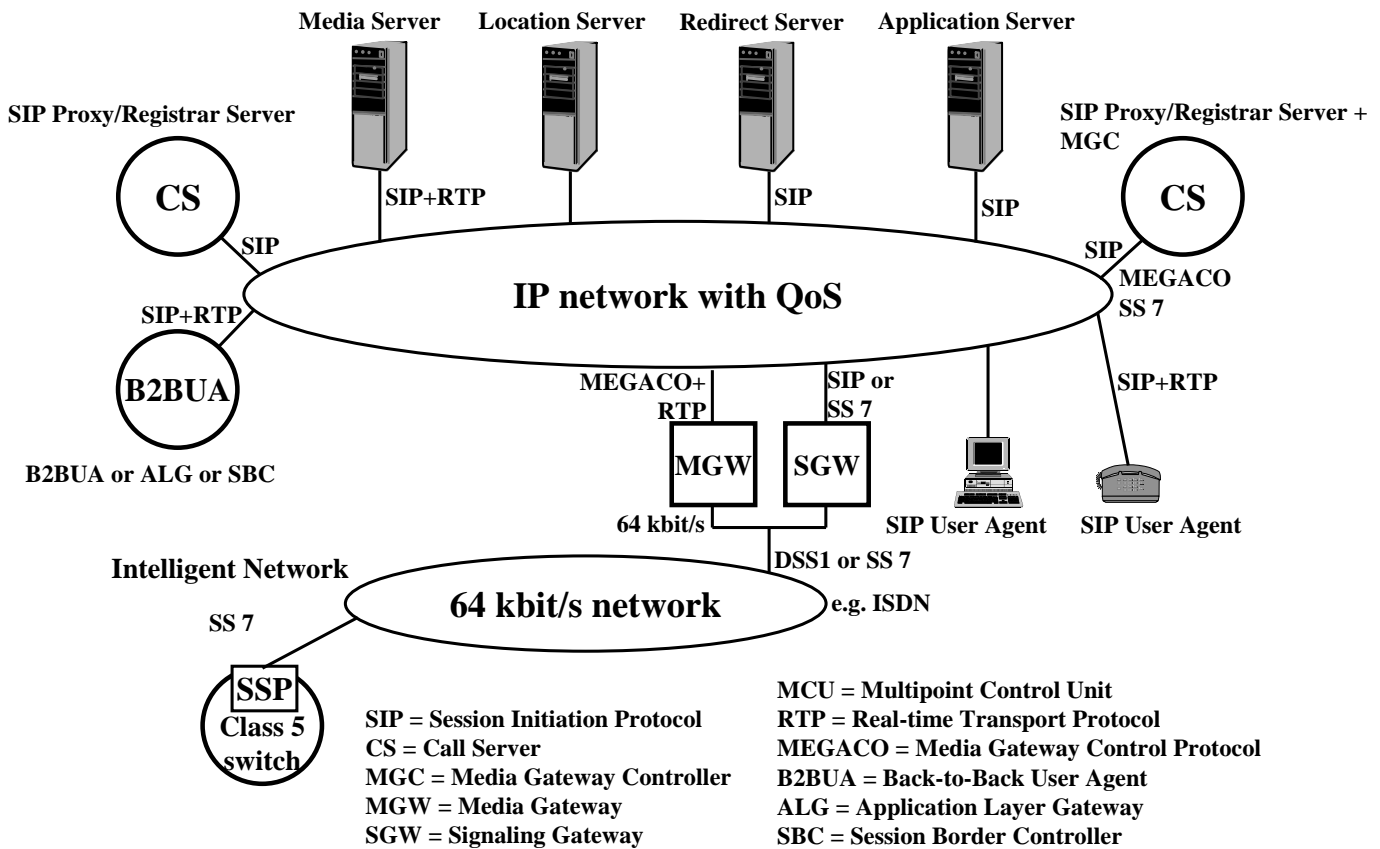
Kleiststraße 3, 60318 Frankfurt a.M., Germany

**Web: www.fh-frankfurt.de/~weberfra
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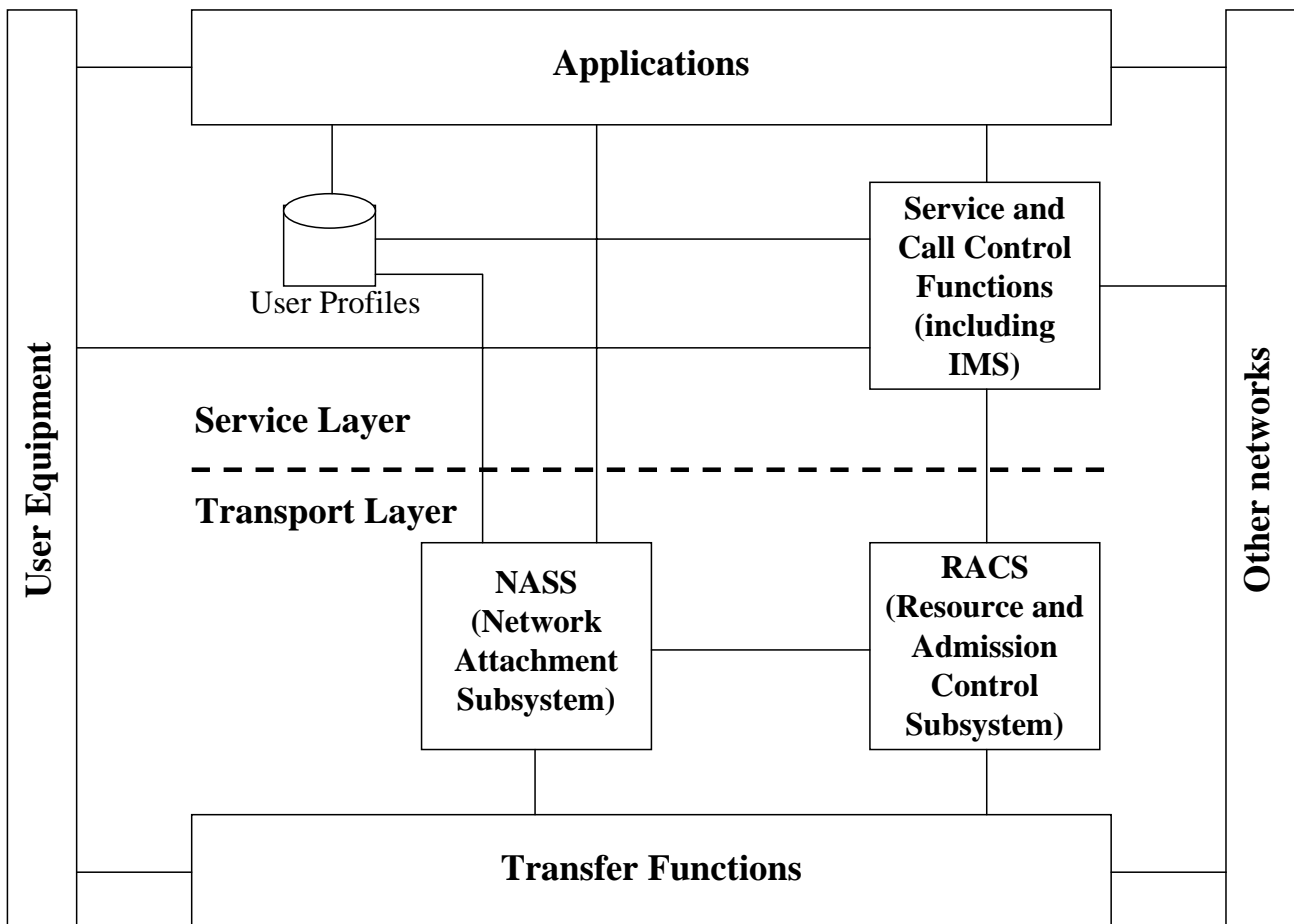
Overview

- 1 QoS (Quality of Service) and resource control in SIP-based NGN (Session Initiation Protocol; Next Generation Networks)**
- 2 New requirements to QoS management in SIP-based NGN**
- 3 New approach: Integrated framework for comprehensive QoS control in NGN**
- 4 Conclusion and outlook**

1 QoS and resource control in SIP-based NGN



Functional QoS architecture



Features of NGNs' QoS architecture

- **Per-session QoS/resource control for every single media flow between 2 subscribers**
- **3 possible modes (push/pull/push-pull mode) for best flexibility and compatibility with standard SIP equipment and UMTS equipment (NGN/IMS convergence)**
- **Resource allocation/reservation/release has to be signalled to involved transport network elements → high volume of additional traffic for QoS/resource management**

Deficiencies of NGNs' QoS architecture

- **No. of parallel sessions ↑**
 - * **Resources occupied by user data traffic ↑**
 - + **Resources available ↓**
 - * **Resource management traffic ↑**
 - + **Resources available ↓**
- **Average media session duration ↓**
 - * **No. of sessions (possible) per period of time ↑**
 - + **Resource management traffic ↑**
 - **Resources available ↓**
- **→ NGNs' QoS/resource control architecture does not scale**
- **Amount of required resource management traffic depends on (amongst others)**
 - * **No. of session requests per time per user**
 - * **Average session duration**
- **→ Amount of QoS/resource control traffic is influenced by factors that are not efficiently controllable by NGN provider**

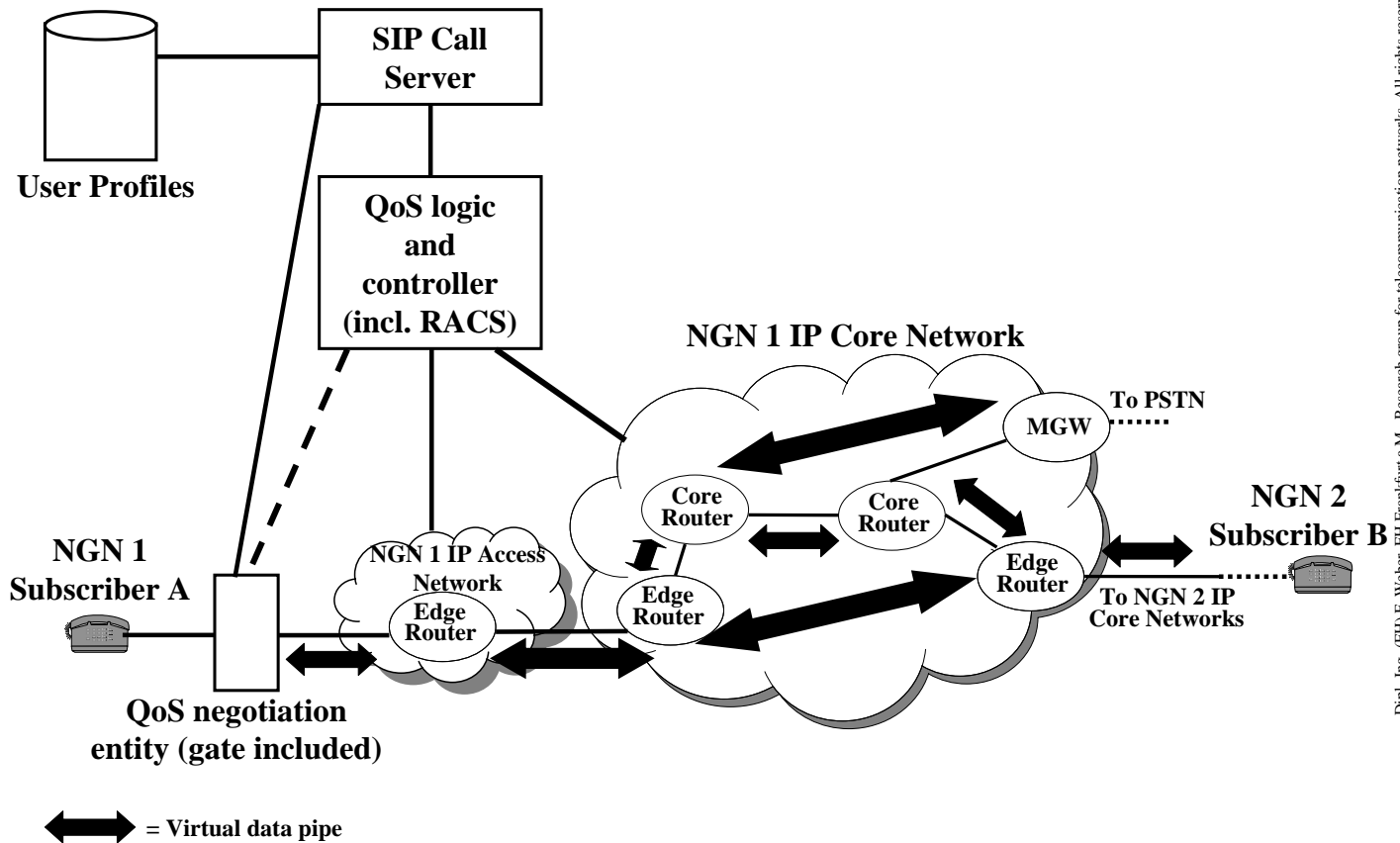
2 New requirements to QoS management in SIP-based NGN

- **Functions and mechanisms needed 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**

Further requirements

- **Provide resources for a certain number of media streams with certain bandwidth and QoS requirements**
- **Set up and managed independent of media sessions, has to be controlled by a specific management function**
- **Independent of underlying transport/QoS technology (such as MPLS, ATM, VLAN)**

3 New approach: Integrated framework for comprehensive QoS control in NGN



Integrated framework for comprehensive QoS control in NGN

- **QoS negotiation entity**
 - * Located at subscriber (CPE) or within provider's access network
 - * SIP for session initiation and QoS negotiation with Call Server
 - * Gate functionality for media streams
- **QoS logic and controller**
 - * Aware of IP network conditions, also for non-session-based traffic
 - * Aware of session-based traffic (SIP)
 - * Dimensioning and control of virtual data pipes based on algorithms
 - * Assignment of media streams to existing virtual data pipes
 - * Controls gate within QoS negotiation entity
- **Virtual data pipes**
 - * Virtual "paths" within the transport network, independent of underlying transport/QoS technology
 - * Provide defined bandwidth and QoS conditions, shared by several media streams
 - * Controlled by QoS logic and controller

4 Conclusion and outlook

- **Standardised NGN QoS/resource control architecture lacks of scalability and efficiency**
- **New requirements defined to NGN QoS/resource control**
- **New approach: Integrated framework for comprehensive QoS control in NGN**
- **Future research work will be focussed on the definition and development of mechanisms and algorithms for the new approach's appliance**
- **Further research needed to prove the new approach's efficiency**