

QoS in IMS

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Abstract

IP Multimedia subsystem (IMS) defined by 3GPP/3GPP2 supplies a standardized Next Generation Networking architecture to telecom operators, which integrates both mobile and multimedia services. In the IMS, it is fundamental and most crucial for the IMS to provide the QoS required for real time multimedia sessions. The most important objective of this project is to design and propose E2E QoS solutions and reference E2E QoS architectures for 3GPP/3GPP2 IMS, which enable the IMS to supply QoS across its mobile networks and IP network. Moreover, two complete 3GPP/3GPP2 IMS solutions are designed and proposed, based on the reference IMS architectures defined in this project. Additionally, the E2E QoS concepts and mechanisms in Internet, GPRS/UMTS network and CDMA2000 network are also introduced and discussed.

The most important outcomes of this project can be summarized as the following five contributions to the development of 3GPP/3GPP2 IMS.

- The design and proposal of the two reference IMS architectures for 3GPP/3GPP2 IMS
- The design and proposal of two complete IMS solutions for 3GPP/3GPP2 IMS
- The definition of the E2E QoS Implementation Scenarios for the IMS
- Four E2E QoS solutions for the two IMS solutions.
- Two reference E2E QoS architectures for 3GPP/3GPP2 IMS.

These five contributions are explained in more detail below.

1. Two Reference IMS Architectures for 3GPP/3GPP2 IMS

One reference architecture (as shown in Figure 5.3) is designed and proposed to support the 3GPP specifications, and the other reference architecture (as shown in Figure 5.25) is designed and proposed to support the 3GPP2 specifications. Both of the two architectures are composed of three functional layers, such as Service/Application Layer, IMS layer and Transport Layer, which are defined to simplify the designing of the complete 3GPP/3GPP2 IMS networks.

2. Two IMS Solutions for 3GPP/3GPP2 IMS

According to the two vertical-layered reference IMS architectures, two complete IMS solutions (as shown in Figure 5.4 and Figure 5.26) are designed and proposed. The structures of the solutions are also vertical-layered. The proposed IMS solutions are designed to achieve the following features:

- Integration of the Function Entities in Each Layer
- Extensible Solutions
- High Availability and Scalability

3. Two E2E QoS Implementation Scenarios for the IMS

In order to support the different QoS service policies applied by operators in the IMS, this project defines two E2E QoS scenarios that can be applied in the E2E QoS

solutions. The first scenario is the E2E QoS implementation without the service based local policy, in which the operator offers the same QoS service to all the UE in the IMS. The second scenario is the E2E QoS implementation with the service based local policy, in which the operator is able to control the QoS services offered to the UE according to his service based local policy.

4. Four E2E QoS Solutions for the Two IMS Solutions

For each IMS solution designed by this project, the author designs and proposes two E2E QoS solutions to enable the E2E QoS across the cellular network to the IP access network through applying different QoS mechanisms. For each E2E QoS solution (in Section 5.2.3 and Section 5.4.1.1), there are also two QoS implementation scenarios, which allow the operator to implement the service based local policy in the cellular network or not.

5. Two Reference E2E QoS Architectures for 3GPP/3GPP2 IMS

Based on the four E2E QoS solutions designed for 3GPP/3GPP2 IMS solutions in different IMS contexts, two reference E2E QoS architectures are designed and proposed for 3GPP/3GPP2 IMS. One is defined as the All-DiffServ architecture and the other is defined as the DiffServ-RSVP architecture. Compared with the DiffServ-RSVP, the All-DiffServ architecture is highly recommended as the E2E QoS architecture for 3GPP/3GPP2 IMS because of its three advantages, Resource-Saving, Distributed QoS Management and Simplicity over the DiffServ-RSVP architecture. .

Hopefully, the proposed reference IMS architectures for 3GPP/3GPP2 IMS, complete high-performance IMS solutions, two E2E QoS implementation scenarios for the IMS, four E2E QoS solutions for the two IMS solutions and the two reference E2E QoS architectures for 3GPP/3GPP2 IMS may provide the operator with some insight about the future deployment of IMS.