

**EVEREST****EVEREST IST-2002-001858****D08****End-to-end QoS over B3G systems***(QoS management in the Core Network and QoS Mapping)***Contractual Date of Delivery to the CEC:** July 31<sup>st</sup> 2004**Actual Date of Delivery to the CEC:** August 3<sup>rd</sup> 2004**Editor:** Nima Nafisi (KCL)**Author(s):** see list**Participant(s):** UPC, KCL, TID**Workpackage:** WP3**Est. person months:** 7**Security:** Public (PU)**Nature:** Report**Version:** 1.0**Total number of pages:** 60**Abstract:**

This document addresses the end-to-end QoS framework envisaged in the EVEREST project in the context of Beyond 3G systems. A new end-to-end architecture, based on policy management and centralized entities, is introduced to manage QoS in a heterogeneous radio access network with common radio resource management capabilities.

After the definition of the QoS framework, the document focuses on the IP core network of the B3G access network and the coordination of QoS between the IP part and the radio part of the access network and the mapping between the DiffServ service classes and the radio QoS classes has been done. Finally, to respect the DiffServ scalability paradigm, solutions have been introduced to overcome the scalability problems of a centralized bandwidth broker in a mobile access network. The proposed scheme envisages a hierarchy of bandwidth brokers coupled with QoS routing and an IP tunnel-based micromobility management.

**Keyword list:** End to end QoS architecture, Policy-Based Networking, DiffServ Core Network, Mapping between the DiffServ classes and the radio QoS classes, Hierarchical Bandwidth Broker, Wireless QoS Broker

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## EXECUTIVE SUMMARY

This document addresses the end-to-end QoS framework envisaged in the EVEREST project in the context of Beyond 3G systems. The document is basically divided in two main sections.

The first one, entitled End-to-End QoS Architecture, is devoted to explain the rationality of the end-to-end (E2E) QoS architecture considered in the EVEREST project. To this end, first, the document presents an overview of the reference QoS framework over which the EVEREST E2E QoS architecture is built. Specifically this overview considers three main topics: the UMTS QoS E2E architecture defined under releases 5 and 6, the usage of Diffserv QoS mechanisms in the Core Network part, and main issues on the Policy based QoS management proposed by IETF. Later on, considering these three main building block, the main aspects of the proposed E2E architecture for EVEREST are discussed. This architecture extends the 3GPP QoS approach by maintaining the Policy Decision Function (PDF), already introduced in 3GPP R5/R6, and by introducing two new entities in the QoS architecture: the Bandwidth Broker (BB) and the wireless QoS broker (WQB). The BB is in charge of the control plane of the Core Network DiffServ domain while the WQB is the counterpart of the BB for the radio part of the access networks. Details on the behaviour of both entities are given in the document. To conclude this first main section detailed mapping between the defined QoS classes of the Radio Access Networks and Diffserv PHBs, which characterize the QoS management in the Core Network, is also provided.

The second main section is devoted to study the DiffServ Core Network part. In particular a scalable QoS architecture based in hierarchical Bandwidth Brokers is evaluated. Specifically, the trade-off between signalling overhead and over-provisioning, the QoS routing aspects as well as the interaction of the QoS routing and the mobility management are discussed.

Finally, it is not worthless to mention here that in the Technical Annex the proposed title of the document was "QoS management in the Core Network and QoS Mapping ", because it was thought that an initial performance evaluation of the Core Network part was possible in a stand alone way, that is, without going in detail in the end-to-end QoS issues. However, once the work started, it was very clear that both aspects could not be separated anymore. For that reason the title of the document has been changed and a significant part of the document is devoted to describe the End-to-end QoS architecture, before going to the Core Network issues.

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