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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES).

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Introduction

The BSM architecture is characterized by the separation between common Satellite-Independent (SI) protocol layers and alternative lower Satellite-Dependent (SD) layers, which are connected through the Satellite Independent Service Access Point (SI-SAP) [1]. The general issues concerning the architecture of BSM systems are described in ETSI TR 101 984 [i.1], further specific requirements and functional models for Quality of Service (QoS) concerning IP-over-satellite aspects are presented in ETSI TR 101 985 [i.2] and ETSI TR 102 157 [i.3].

In general the SI-SAP offers an agnostic interface to whichever SD layer is used. So QoS provision in the BSM architecture has to face the issue of traversing the SI-SAP interface by means of standardized signalling, which is expected to enable on one side maintaining compatibility with existing QoS functions required in the IP layers and above, and on the other side communication to the lower layer entities deputed to QoS accomplishment.

At the IP layer, two principal techniques for QoS provision exist: DiffServ [7], and RSVP/IntServ [4], [5]. At the SD layers more sophisticated QoS methods are closely linked to lower layer resource management and control, they strongly depend on the satellite technology adopted and on the particular implementation.

For QoS provision in a BSM network the concept of QIDs (Queue Identifiers) is a key concept [2]. They represent abstract queues, each with a defined class of service, for transfer of IP packets to the SD layers. The satellite dependent lower layers are responsible for assigning satellite capacity and/or particular forwarding behaviour to these abstract queues according to defined properties. The reader should in particular refer to ETSI TS 102 463 [i.14], for a detailed description of QIDs and of the associated primitives.

1 Scope

The aim of the present document is to define an open specification for enabling QoS for IP-based multimedia satellite systems, based on the DiffServ model. If IP packets entering the BSM network require a particular QoS treatment, they have to be mapped onto QIDs. The choice of the QID to be used inside the BSM network is thus particularly important. So the present document specifies the allocation of the QIDs and their mapping to IP QoS classes, when DiffServ is used to provide QoS at IP layer. The present document assumes the QoS functional architecture described in ETSI TS 102 462 [2].

The present document describes in detail how QIDs are defined, how they are allocated and handled by the BSM network, and the requirements needed by sending and receiving Satellite Terminals (STs) in a BSM network to provide QID management functionalities. The present document also defines the primitives that should be used across the SI-SAP when allocating QIDs, when mapping DiffServ Code Points (DSCPs) and IP services to QIDs, when mapping QIDs to SD queues.

Details on the QID mapping are presented with some examples. Some cases are presented to show the potential evolution from a simple QoS solution with quasi-static QID allocation to more sophisticated services with dynamic resource reservation.

The combination of DiffServ with multicast transmissions is out of scope of the present document, as well as the use of Explicit Congestion Notification (ECN), which was linked to DiffServ only for historical reasons, as the ECN bits are the two least significant bits of the IPv4 ToS octet. This is better explained in clause 4.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 102 357: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); Common Air interface specification; Satellite Independent Service Access Point (SI-SAP) interface: Primitives".

[2] ETSI TS 102 462: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); QoS Functional Architecture".

[3] IETF RFC 3168: "The Addition of Explicit Congestion Notification (ECN) to IP", September 2001.

[4] IETF RFC 1633: "Integrated Services in the Internet Architecture: an Overview", June 1994.

[5] IETF RFC 2210: "The Use of RSVP with IETF Integrated Services", September 1997.

[6] IETF RFC 2474: "Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers", December 1998.

[7] IETF RFC 2475: "An Architecture for Differentiated Service", December 1998.

[8] IETF RFC 2597: "Assured Forwarding PHB Group", June 1999.

[9] IETF RFC 3246: "An Expedited Forwarding PHB (Per-Hop Behavior)", March 2002.