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Second Generation DVB Interactive Satellite System (DVB-RCS2);
Part 5: Guidelines for the Implementation and Use of TS 101 545-3

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Foreword

This Technical Report (TR) has been produced by Joint Technical Committee (JTC) Broadcast of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECtrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

NOTE: The EBU/ETSI JTC Broadcast was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC Broadcast became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has active members in about 60 countries in the European broadcasting area; its headquarters is in Geneva.

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The Digital Video Broadcasting Project (DVB) is an industry-led consortium of broadcasters, manufacturers, network operators, software developers, regulatory bodies, content owners and others committed to designing global standards for the delivery of digital television and data services. DVB fosters market driven solutions that meet the needs and economic circumstances of broadcast industry stakeholders and consumers. DVB standards cover all aspects of digital television from transmission through interfacing, conditional access and interactivity for digital video, audio and data. The consortium came together in 1993 to provide global standardization, interoperability and future proof specifications.

The present document is part 5 of a multi-part deliverable covering the DVB Interactive Satellite System specification as identified below:

TS 101 545-1: "Overview and System Level specification";

EN 301 545-2: "Lower Layers for Satellite standard";

TS 101 545-3: "Higher Layers Satellite Specification";

TR 101 545-4: "Guidelines for Implementation and Use of EN 301 545-2";

TR 101 545-5: "Guidelines for the Implementation and Use of TS 101 545-3".

Introduction

TS 101 545-3 [i.1] provides the specification of the higher-layer satellite architecture, signalling, and functions required for the two way interactive satellite networks that are specified in [i.2], and [i.3] together with its implementation guidelines [i.4]. The requirements in [i.1] have been introduced to provide the best possible interoperability between terminals and hubs, defining the network functions as well as management and control capabilities to complement the lower-layer specification of the system (up to and including layer 2) given in [i.3].

The present document provides guidelines for the implementation and the usage of the higher-layer architectural elements and functions that are described in [i.1]. It is aimed that the present document completes [i.1] with implementation and configuration examples, recommended practices, and informative elaborations to help attain full terminal-hub interoperability as far as higher-layer functionalities are concerned. The present document often refers to MIB objects that are defined in [i.1] and lower-layer signalling tables/descriptors that are defined in [i.3]. In addition to [i.1] and [i.3], [i.4] contains lower-layer descriptions and recommendations that are useful to complement the discussions in the present document. This is particularly the case in the discussions on QoS support and satellite virtual networks.

The present document covers transparent star, regenerative mesh, and transparent mesh overlay network topologies.

Clause 2 provides the references. Clause 3 provides the definitions, explains symbols, and expands abbreviations.

Clause 4 provides further guidance in the reading of the present document through the introduction of reference models.

Clause 5 elaborates on IP routing support over the satellite interface, and provides guidance on dynamic routing support using OSPF. The clause also provides recommendations on the usage of OSPF in mesh satellite networks.

Clause 6 provides recommendations on IP multicast support in transparent star network topology. The clause also provides L3/L2 address mapping examples using DVB-RCS2 lower-layer signalling.

Clause 7 elaborates on the QoS model defined for DVB-RCS2. The clause refers to cardinality diagram describing the relationship among different user and control plane entities. It also provides configuration examples and recommendations for transparent star and regenerative mesh networks. QoS support in DVB-RCS2 relies on lower-layer service description and entities. The present document scope is confined to higher layers with minimal overlaps. The reader is referred to [i.3] and [i.4] for lower-layer QoS support.

Clause 8 elaborates on satellite virtual networking and virtual LANs. The clause provides recommendations on VLAN support. It also provides recommendations on mapping SVN tags to return link encapsulation fields.

Clause 9 provides an example PEP negotiation protocol that uses PEP messages that are defined in [i.1].

Clause 10 provides recommendations on default and operational SNMP configuration for the different management actors/roles in the network.

Clause 11 provides a step-by-step walkthrough of the startup procedure in DVB-RCS2 terminals.

Clause 12 provides an example of OSS-NMC interface that is aligned with 3GPP specifications. The clause also elaborates on performance management, and provides an example list of key performance indicators.

Clause 13 elaborates on Dynamic Connectivity Protocol for regenerative mesh networks. The clause also provides example state-transition diagrams and message sequence diagrams.

Clause 14 provides an encompassing description of transparent mesh overlay network support in DVB-RCS2. The clause includes elaborations on routing, multicasting, QoS support; specifically in transparent mesh overlay networks.

Clause 15 provides guidance and example message sequence diagrams on Dynamic Connectivity Protocol for transparent mesh overlay networks.

Annex A provides recommendations in regards to the integration of DVB-RCS2 interactive networks with the service layer of the Next Generation Networks (NGN) architecture. Annex B provides recommendation and guidelines for efficient deployment of secure VPNs in broadband satellite systems. Annex C elaborates on and provides recommendations for TCP transport protocol in the presence of random access user data transmission on the satellite return link.

1 Scope

The present document provides implementation and usage guidelines for higher-layer functions in DVB-RCS2 interactive satellite networks, which is defined in [i.2]. The lower-layer specification and implementation guidelines for DVB-RCS2 networks are presented in [i.3] and [i.4], respectively.

The present document covers on transparent star, regenerative mesh, and transparent mesh overlay network topologies. The recommendations and examples provided in the present document are informative.

2 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 referenced 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.

2.1 Normative references

Not applicable.

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TS 101 545-3: "Digital Video Broadcasting (DVB); Second Generation DVB Interactive Satellite System (DVB-RCS2); Part 3: Higher Layers Satellite Specification".

[i.2] ETSI TS 101 545-1: "Digital Video Broadcasting (DVB); Second Generation DVB Interactive Satellite System (DVB-RCS2); Part 1: Overview and System Level specification".

[i.3] ETSI EN 301 545-2 V1.1.1 (2012-01): "Digital Video Broadcasting (DVB); Second Generation DVB Interactive Satellite System (DVB-RCS2); Part 2: Lower Layers for Satellite standard".

[i.4] ETSI TR 101 545-4: "Digital Video Broadcasting (DVB); Second Generation DVB Interactive Satellite System (DVB-RCS2); Part 4: Guidelines for Implementation and Use of EN 301 545-2".

[i.5] IETF RFC 2328: "OSPF Version 2".

[i.6] IETF RFC 2453: "RIP Version 2".

[i.7] IETF RFC 5340: "OSPF for IPv6".

[i.8] IETF RFC 4271: "A Border Gateway Protocol 4 (BGP-4)".

[i.9] IETF RFC 5880: "Bidirectional Forwarding Detection (BFD)".

[i.10] IETF RFC 5881: "Bidirectional Forwarding Detection (BFD) for IPv4 and IPv6 (Single Hop)".

[i.11] IETF RFC 1112: "Host Extensions for IP Multicasting".

[i.12] IETF RFC 2365: "Administratively Scoped IP Multicast".

[i.13] IETF RFC 2236: "Internet Group Management Protocol, Version 2".