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DOCSIS 2.0 + IPv6 Cable Modem Standard

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1 SCOPE

1.1 Scope and Purpose

This document is an extension to the DOCSIS 2.0 family of standards, which define high-speed data-over-cable systems. For an overview of DOCSIS 2.0, refer to [RFIv2.0]. The [RFIv2.0] specification requires the CM to support IP version 4 for provisioning and management. This present document provides IPv6 provisioning and management functionality for DOCSIS 2.0 CMs, connected IPv6 eSAFEs, and external CPE devices. The term DOCSIS 2.0+IPv6 CM is used to represent such Cable Modems.

This specification identifies a relevant sub-set of requirements from [MULPIv3.0], which, when implemented on a DOCSIS 2.0 CM, allow for IPv6 provisioning and management.

IPv6 provisioning of CMs using DHCPv6 has been defined in [MULPIv3.0], including the implementation of DHCPv6 host functionality. This specification relies on such requirements specified in MULPIv3.0, and provides needed modifications to accommodate them on a DOCSIS 2.0+IPv6 CM.

IPv6 management of CMs using SNMPv2c has been defined in [MULPIv3.0] and [OSSIV3.0]; this specification provides a sub-set of those requirements which are required to manage a DOCSIS 2.0+IPv6 CM via IPv6.

IPv6 Link-Local Multicast is required for provisioning of an IPv6 Host. This specification defines additional requirements for processing of IPv6 Link-Local Multicast packets within a DOCSIS 2.0+IPv6 CM to enable its provisioning and the provisioning of eSAFEs and external CPEs.

1.2 Conventions

In this document it is assumed that the CM complies with the [RFIv2.0] specification for all behaviors not specified in this specification.

As in [MULPIv3.0], the term "CPE" includes both externally connected CPE devices and eSAFEs. The term "CMCI port" describes physical interfaces to which externally connected CPE devices can attach. The term "Logical CPE Interface" refers to an interface between the CM and an eSAFE. The term "CPE interface" refers to an interface that is either a CMCI port or a Logical CPE Interface.

1.3 Requirements

Throughout this document, the words that are used to define the significance of particular requirements are capitalized. These words are:

"MUST"	This word means that the item is an absolute requirement of this specification.
"MUST NOT"	This phrase means that the item is an absolute prohibition of this specification.
"SHOULD"	This word means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.

"SHOULD NOT"	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
"MAY"	This word means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

2 REFERENCES

2.1 Normative References

The following documents contain provisions, which, through reference in this text, constitute provisions of this document. At the time of Subcommittee approval, the editions indicated were valid. All documents are subject to revision; and while parties to any agreement based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

2.1.1 Normative References

- [MULPIv3.0] ANSI/SCTE 135-2 2013, DOCSIS 3.0 Part 2: MAC and Upper Layer Protocols.
- [OSSIV2.0] ANSI/SCTE 79-2 2016, DOCSIS 2.0 Operations Support System Interface.
- [OSSIV3.0] ANSI/SCTE 135-4 2013, DOCSIS 3.0 Part 4: Operations Support Systems Interface.
- [RFIV2.0] ANSI/SCTE 79-1 2016, DOCSIS 2.0 Part 1: Radio Frequency Interface.
- [CANN-DHCP-Reg] CL-SP-CANN-DHCP-Reg-I05-110623, June 23, 2011, Cable Television Laboratories, Inc.
- [RFC 2013] IETF RFC 2013, RFC SNMPv2 Management Information Base for the User Datagram Protocol using SMIV2, November 1996.
- [RFC 3419] IETF RFC 3419, Textual Conventions for Transport Addresses, December 2002.
- [RFC 4113] IETF RFC 4113, Management Information Base for the User Datagram Protocol (UDP), June 2005.
- [RFC 4293] IETF RFC 4293, Management Information Base for the Internet Protocol (IP), April 2006.
- [RFC 4639] IETF RFC 4639, Cable Device Management Information Base for Data-Over-Cable Service Interface Specification (DOCSIS) Compliant Cable Modems and Cable Modem Termination Systems, December 2006.

2.2 Informative References

The following documents might provide valuable information to the reader but are not required when complying with this document.

- [SECV3.0] ANSI/SCTE 135-3 2013, DOCSIS 3.0 Part 4: Security Services.
- [RFIV1.1] ANSI/SCTE 23-1 2010, DOCSIS 1.1 Part 1: Radio Frequency Interface.
- [RFC 2132] IETF RFC 2132, DHCP Options, and BOOTP Vendor Extensions, March 1997.
- [RFC 2462] IETF RFC 2462, IPv6 Stateless Address Autoconfiguration, December 1998.
- [RFC 2710] IETF RFC 2710, Multicast Listener Discovery (MLD) for IPv6, October 1999.

- [RFC 2933] IETF RFC 2933, Internet Group Management Protocol MIB, October 2000.
- [RFC 3315] IETF RFC 3315, Dynamic Host Configuration Protocol for IPv6 (DHCPv6), July 2003.
- [RFC 3513] IETF RFC 3513, Internet Protocol Version 6 (IPv6) Addressing Architecture, April 2003.
- [RFC 4291] IETF RFC 4291, IP Version 6 Addressing Architecture, February 2006.
- [RFC 4323] IETF RFC 4323, Data Over Cable System Interface Specification Quality of Service Management Information Base (DOCSIS-QoS MIB), January 2006.
- [RFC 4361] IETF RFC 4361, Node-specific Client Identifiers for Dynamic Host Configuration Protocol Version Four (DHCPv4), February 2006.
- [RFC 4605] IETF RFC 4605, Internet Group Management Protocol (IGMP) / Multicast Listener Discovery (MLD)-Based Multicast Forwarding (IGMP/MLD Proxying), August 2006.

2.3 Reference Acquisition

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- Internet Engineering Task Force (IETF), Internet: <http://www.ietf.org/>