DOCSIS® Provisioning of EPON Specifications DPoEv2.0

DPoE Operations and Support System Interface Specification

DPoE-SP-OSSIv2.0-I11-170510

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Document Status Sheet

Document Control Number:	DPoE-SP-OSSIv2.0-I11-170510			
Document Title:	DPoE Operations and Support System Interface Specification			
Revision History:	I01 - Released October 4, 2012 I02 - Released March 28, 2013 I03 - Released August 8, 2013 I04 - Released November 14, 2013 I05 - Released March 27, 2014 I06 - Released August 7, 2014 I07 - Released September 10, 2015 I08 - Released December 10, 2015 I09 - Released June 2, 2016 I10 - Released January 11, 2017 I11 - Released May 10, 2017			
Date:	May 10, 2017			
Status:	~~Work in Progress~~	~~Draft~~	**Issued**	~~Closed~~
Distribution Restrictions:	~~Author Only~~	~~CL/Member~~	~~CL/ Member/ Vendor~~	**Public**

Key to Document Status Codes

Work in Progress	An incomplete document, designed to guide discussion and generate feedback that may include several alternative requirements for consideration.
Draft	A document in specification format considered largely complete, but lacking review by Members and vendors. Drafts are susceptible to substantial change during the review process.
Issued	A generally public document that has undergone Member and Technology Supplier review, cross-vendor interoperability, and is for Certification testing if applicable. Issued Specifications are subject to the Engineering Change Process.
Closed	A static document, reviewed, tested, validated, and closed to further engineering change requests to the specification through CableLabs.

Trademarks

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1 INTRODUCTION

DOCSIS Provisioning of EPON (DPoE) version 2.0 specifications are a joint effort of Cable Television Laboratories (CableLabs), cable operators, vendors, and suppliers to support EPON technology using existing DOCSIS-based back office systems and processes. DPoEv2.0 specifications augment the DPoE v1.0 specifications to provide requirements for additional service capabilities and corresponding provisioning and network management capabilities.

Ethernet PON (EPON) is an [802.3] standard for a passive optical network (PON). A PON is a specific type of multi-access optical network. A multi-access optical network is an optical fiber based network technology that permits more than two network elements to transmit and receive on the same fiber.

DPoE specifications are focused on DOCSIS-based provisioning and operations of Internet Protocol (IP) using DOCSIS Internet service (which is typically referred to as High Speed Data (HSD)), or IP(HSD) for short, and Metro Ethernet services as described by Metro Ethernet Forum (MEF) standards. DPoE Networks offer IP(HSD) services, functionally equivalent to DOCSIS networks, where the DPoE System acts like a DOCSIS CMTS and the DPoE System and DPoE Optical Network Unit (ONU) together act like a DOCSIS CM.

1.1 DPoE Technology Introduction[1]

DPoE technology was established with the following common requirements already developed by operators. Each of the participant operators had previously selected 1G-EPON and 10G-EPON as the appropriate technology for one or more applications. EPON is a widely deployed technology with a sufficient and large supply of vendors offering a variety of products for each component of the access network. 2G-EPON, as described Annex A of [DPoE-PHYv2.0], uses the same 1G upstream as 1G-EPON (operates at the effective rate of 1 Gbps), but provides a 2G downstream (operates at the effective rate of 2 Gbps). With the exception of requirements specified in Annex A of [DPoE-PHYv2.0], 2G-EPON is expected to meet all of the requirements specified for 1G-EPON. 10G-EPON technology is available and is backwards compatible with 1G-EPON. A 1G-EPON network can be incrementally upgraded to 10G-EPON, adding or replacing ONUs as business needs require. 1G-EPON, 2G-EPON, and 10G-EPON are compatible with [SCTE 174].

1G-EPON and 10G-EPON, originally defined in [802.3ah] and [802.3av] respectively, support a point-to-multipoint architecture with a centralized controller called an Optical Line Terminal (OLT) and distributed low cost Layer 2 ONUs. The basic service mapping architecture in EPON is to map Ethernet (or IP) frame header information (e.g., addresses, IP Differentiated Service Code Points, Ethernet Q tag, S-VLAN/C-VLAN ID, ISID, bridge address, etc.) to a logical circuit called a Logical Link Identifier (LLID) in [802.3]. The service mapping function in DPoE specifications is similar to that used in DOCSIS specifications. Both DOCSIS and DPoE networks rely on a centralized scheduler though EPON utilizes an LLID which functions like a SID in DOCSIS to support unicast, broadcast, and multicast.

At the time when development efforts around the DPoE specifications started, there were no standard management interfaces for the ongoing operations and maintenance of the network, including fault management, performance management, security, etc. Operators already had fully working and scaled-out systems that solve these challenges for DOCSIS networks. One of the primary goals for DPoE specifications was therefore to use the existing DOCSIS back office infrastructure to scale up EPON-based business services.

[1] Revised per OSSIv2.0-N-14.0174-1 on 6/26/14 and OSSIv2.0-N-14.0189-1 on 7/10/14 by JB.

1.2 Scope

This specification identifies requirements for the adaptation or additions to DOCSIS specifications that are required to support DPoE Networks related to the Operations Support System functional area.

This specification also:

- Provides interoperability with existing DOCSIS-based back-end provisioning and management systems for EPON-based devices;
- Re-uses and extends the existing DOCSIS L2VPN specification [L2VPN] to support DPoE-based Metro Ethernet Forum (MEF) services;
- Specifies interoperable implementations for various DPoE vendors;
- Supports IPDR functionality for DPoE Networks, including enhancements to the existing DOCSIS 3.0 object model to instrument features and capabilities specific to DPoE Networks;
- Supports IPv4 and IPv6 for DPoE Networks substantively the same as DOCSIS 3.0;
- Extends the object model defined in the DOCSIS 3.0 SNMP Management Information Bases (MIBs) to address new capabilities introduced by DPoE specifications.

1.3 DPoE OSSI Specification Goals

The DPoE OSSI specification is motivated by the following objectives:

- To adapt DOCSIS-based back office provisioning and operations models to EPON in order to leverage the investment in existing management systems and accelerate time to market.
- Re-use as much of the existing DOCSIS OSSI specification as possible while providing requirements that document how existing OSSI requirements for CMTS and CM devices will be mapped to the DPoE System and DPoE ONU devices;

1.4 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.

1.5 DPoE Version 2.0 Specifications[2]

A list of the specifications included in the DPoEv2.0 series is provided in Table 1. For further information please refer to http://www.cablelabs.com/specs/specification-search/?cat=dpoe&scat=dpoe-2-0. .

Table 1 - DPoEv2.0 Series of Specifications

Designation	Title
DPoE-SP-ARCHv2.0	DPoE Architecture Specification
DPoE-SP-OAMv2.0	DPoE OAM Extensions Specification
DPoE-SP-PHYv2.0	DPoE Physical Layer Specification
DPoE-SP-SECv2.0	DPoE Security and Certificate Specification
DPoE-SP-IPNEv2.0	DPoE IP Network Element Requirements
DPoE-SP-MULPIv2.0	DPoE MAC and Upper Layer Protocols Interface Specification
DPoE-SP-MEFv2.0	DPoE Metro Ethernet Forum Specification
DPoE-SP-OSSIv2.0	DPoE Operations and Support System Interface Specification

[2] Revised per OSSIv2.0-N-15.0231-1 on 2/11/16 by JB. Revised per OSSIv2.0-N-16.0240-1 on 6/2/16 by JB.

1.6 Reference Architecture

The DPoE reference architecture shown in Figure 1 identifies the elements that a DPoE Network minimally requires to illustrate and communicate the physical hardware and logical software interfaces between the functional subsystems of the DPoE architecture. The principal elements in the architecture are the DPoE System that resides in the headend or hub site, and the DPoE ONU (D-ONU) which may be an off-the-shelf EPON ONU, EPON SFP-ONU, or an EPON ONU with additional subsystems. The remaining elements in the architecture are existing servers and systems in the operator's network. All the server elements have connectivity through an IP (TCP/IP) network. Transport of bearer traffic, and (in some cases) Layer 2 OAM Protocol Data Units (PDUs) are available through either IP or Layer 2 Ethernet-based Network Interfaces.

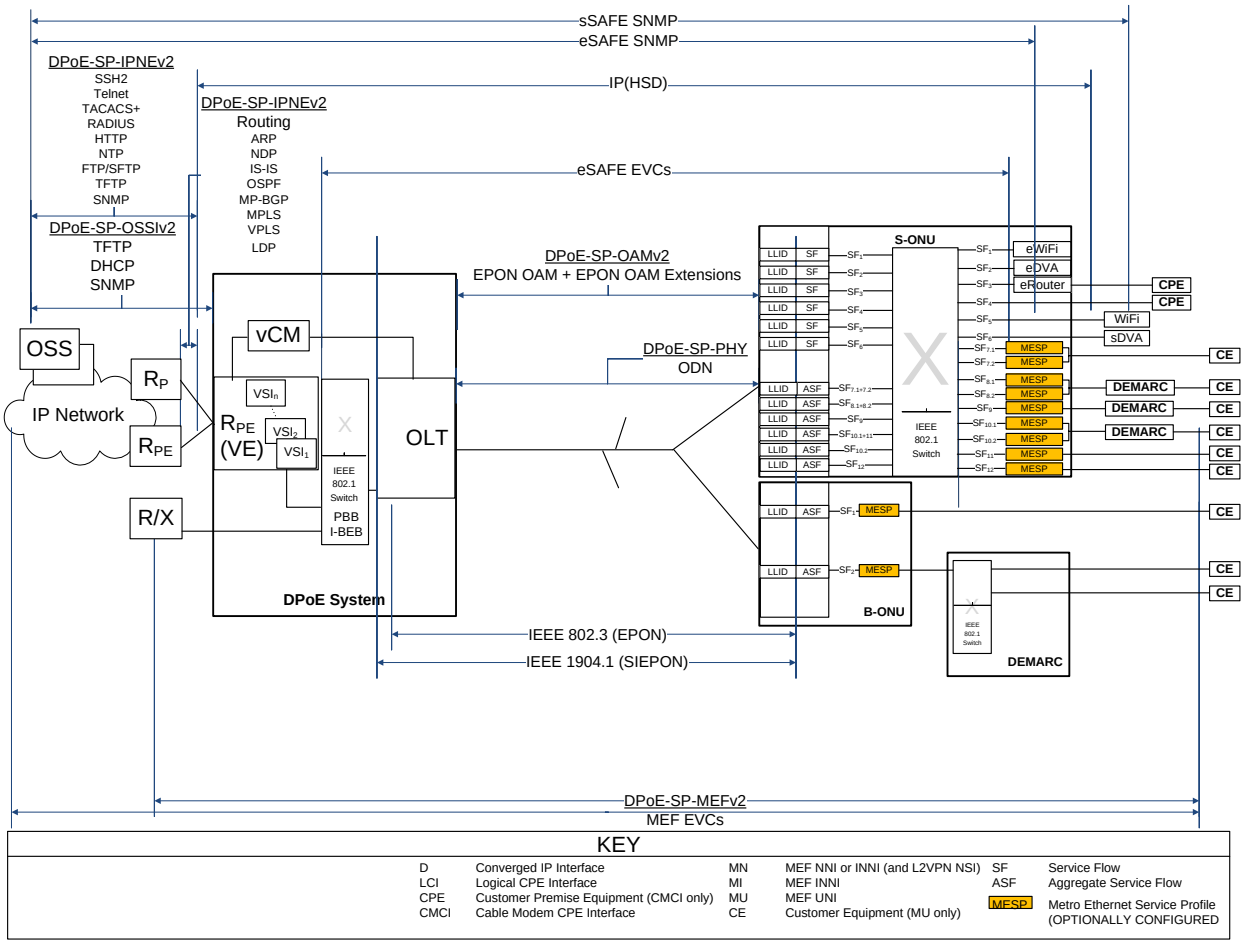

Figure 1 - DPoEv2.0 Reference Architecture[3]

[3] Replaced per OSSIv2.0-N-16.0240-1 on 6/2/16 by JB.

1.7 DPoE Interfaces and Reference Points

The DPoE interfaces and reference points shown in Figure 2 provide a basis for the description and enumeration of DPoE specifications for the DPoE architecture. Each interface or reference point indicates a point between separate subsystems. The reference points have protocols that run across them, or have a common format of bearer traffic (with no signaling protocol). All the interfaces are bi-directional interfaces that support two-way communications. The protocols in DPoE specifications operate within different layers based on the [802.3], [802.1], IETF, MEF, and CableLabs specifications. The C reference points are uni-directional for upstream (C_O) or downstream (C_S) classification, respectively.

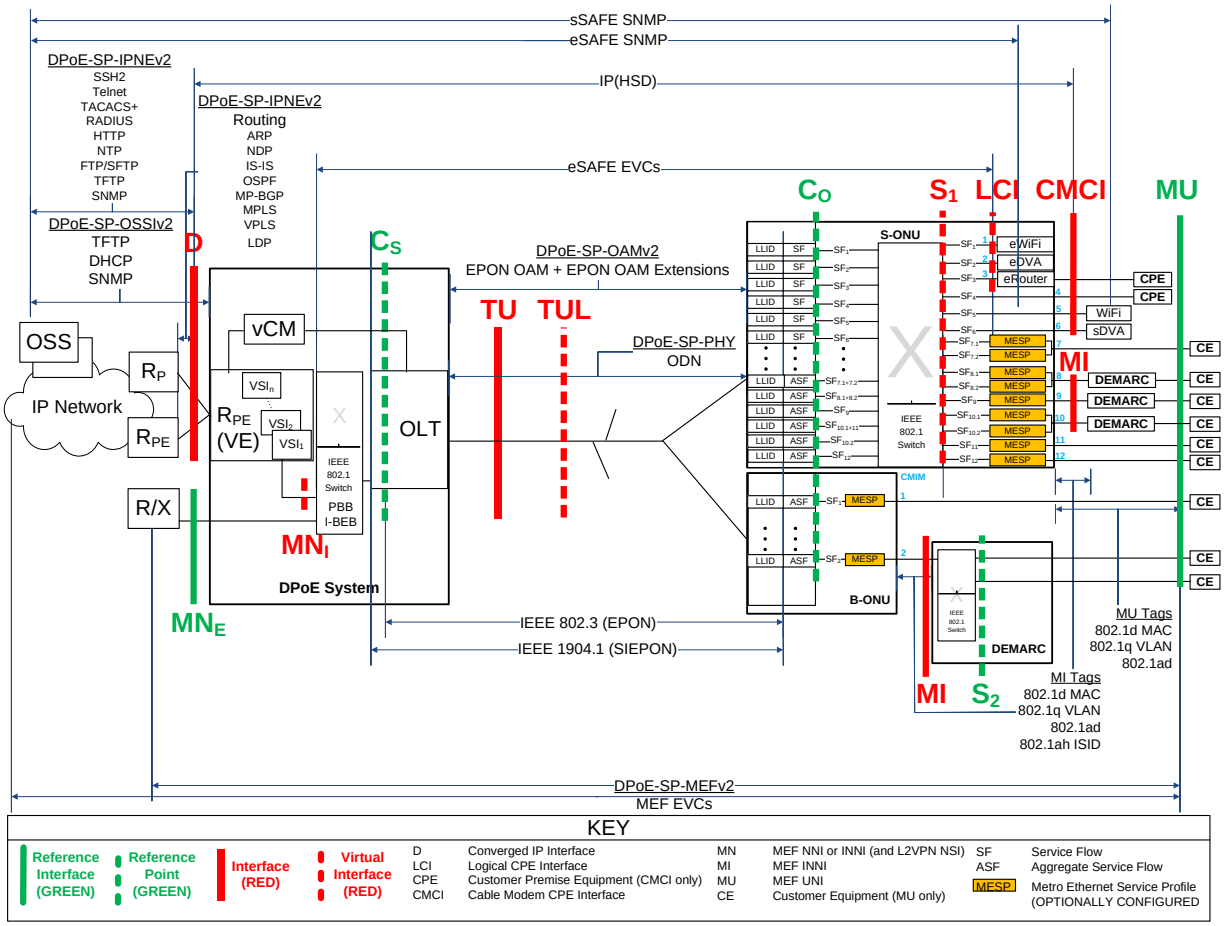

Figure 2 - DPoEv2.0 Interfaces and Reference Points [4]

[4] Replaced per OSSIv2.0-N-16.0240-1 on 6/2/16 by JB.

Table 2 - DPoEv2.0 Interface and Reference Point Descriptions

Interface or Reference Point		Interface or Reference Point Description
MN		MN is a logical concept used for the specification of requirements for MEF INNI that apply to both MNE and MNI. MN logically provides the equivalent function of a MEF INNI or L2VPN NSI. It is an NNI for Metro Ethernet services only.
	MN_E	The MN_E (MEF INNI External) interface is a substitute for the MN reference interface from DPoE version 1.0 specifications. The MN interface is an [802.3] interface for Ethernet (or MEF or L2VPN emulated) services only. It serves the role of a MEF INNI or L2VPN NSI. It is an NNI for Metro Ethernet services only.
	MN_I	The MN_I reference interface is used to describe the virtual interface between an OLT and a VPLS Virtual Switch Instance (VSI). In particular, it is used to describe the requirements for stitching VSIs to DPoE System and OLT [802.1] components such as [802.1d] bridge groups, [802.1ad] S-VLAN or C-VLAN (S-component or C-component), or [802.1ad] I-BEB (I-component) or B-BEB (B-component) backbone edge bridges. The DPoE System stitches VPLS and VPWS transport and forwarding for Metro Ethernet Services between the D interface and the MN_I reference interface[5].
D		The D interface is the DOCSIS IP NNI interface. It is an operator network-facing interface, sometimes called a Network Systems Interface (NSI) in DOCSIS specifications. The D interface allows a DPoE System to communicate with an IP network. The D interface carries all IP management traffic including OSSI and IP NE traffic. The D interface carries all DOCSIS IP service traffic, IP/MPLS/VPLS traffic, and IP/MPLS/VPWS traffic.
TU		The TU interface is the interface between the DPoE System and the D-ONU.
TUL		The TUL interface is a virtual interface representing a logical EPON on an ODN. Each ODN has at least one TUL, and each TUL represents a MAC domain.
C		The C reference point is used for explanation of traffic ingress to a DPoE classifier.
	C_O	The C_O reference point is used for explanation of traffic ingress to a D-ONU upstream classifier.
	C_S	The C_S reference point is used for explanation of traffic ingress to a DPoE System downstream classifier.
S		The S interface is an IEEE 802 interface. The S interface may be an internal interface, such as [802.3] across a SERDES (GMII or XGMII) interface in a BP-ONU (such as an SFP-ONU, SFP+ONU or XFP-ONU), or it may be an external Ethernet interface in a BB-ONU or S-ONU. S_1 is an interface for an S-ONU. S_2 is a reference point used for explanation of services with the B-ONU.
	S_1	The S_1 interfaces are the general case of all interfaces on an S-ONU. S_1 interfaces may be CMCI, LCI, MI, or MU interfaces.
	S_2	The S_2 reference point is used for explanation of traffic ingress to and egress from interfaces on a DEMARC device in a DPoE System. Although there are no specifications or requirements for the S_2 reference point, informative text refers to the S_2 reference point to provide the full context for the use of a B-ONU with a DEMARC device providing Metro Ethernet services.
LCI		The Logical CPE Interface (LCI) interface is an eDOCSIS interface as defined in [eDOCSIS]. eSAFEs are connected to LCI interfaces.
CMCI		CMCI is the DPoE interface equivalent of the DOCSIS Cable Modem CPE Interface as defined in [CMCIv3.0]. This is the service interface for DOCSIS-based IP services. Customer Premise Equipment (CPE) is connected to CMCI interfaces.

[5] MN_I is required for IP-based forwarding and transport of Metro Ethernet services with DPoE in order to provide MEF E-LAN and E-TREE services described in DPoE version 2.0. While these services can be constructed with MN_E, these specifications do not describe the process to do so.

Interface or Reference Point	Interface or Reference Point Description
MI	MI is an S interface that operates as a MEF INNI with additional requirements as specified in [DPoE-MEFv2.0]. The MI interface is an [802.3] interface (or reference point) between a D-ONU and a DEMARC device. A D-ONU that provides a MEF INNI has an MI interface. A D-ONU can have MU as an interface and an MI reference point on different S interfaces in a single D-ONU. DEMARC devices are connected to MI interfaces.
MU	MU is an S interface (or S reference interface) that operates as a MEF UNI. The MU reference interface is an [802.3] interface (or reference point) between a D-ONU or a DEMARC device and a customer's equipment. A D-ONU that directly provides a MEF UNI (MU) interface has MU as an interface. A D-ONU can have MU as an interface and an MI reference point on different S interfaces in a single D-ONU. Customer Edge (CE) devices are connected to MU interfaces.

2 REFERENCES

2.1 Normative References[6]

In order to claim compliance with this specification, it is necessary to conform to the following standards and other works as indicated, in addition to the other requirements of this specification. Notwithstanding, intellectual property rights may be required to use or implement such normative references. At the time of publication, the editions indicated were valid. All references are subject to revision, and users of this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below. References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific. For a non-specific reference, the latest version applies.

In this specification, terms "802.1ad" and "802.1ah" are used to indicate compliance with the [802.1ad] and [802.1ah] standards, respectively, now incorporated as part of [802.1Q]. For all intents and purposes, claiming compliance to [802.1Q], [802.1ad], or [802.1ah] in the scope of this specification will be treated as claiming compliance to IEEE Std 802.1Q-2011. Unless otherwise stated, claiming compliance to 802.1Q-2005 requires a specific date reference.

[802.1]	Refers to entire suite of IEEE 802.1 standards unless otherwise specified.
[802.1d]	IEEE Std 802.1d™-2004, IEEE Standard for Local and Metropolitan Area Networks: Media Access Control (MAC) Bridges.
[802.1Q]	IEEE Std 802.1Q-2011, IEEE Standard for Local and Metropolitan Area Networks - Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, August 2011.
[802.3]	IEEE Std 802.3-2012, IEEE Standard for Ethernet, December 2012.
[802.3.1]	IEEE Std. 802.3.1™ -2013, IEEE Standard for Management Information Base (MIB) Definitions for Ethernet, June 2013.
[802.3ah]	IEEE Std 802.3ah™-2004, IEEE Standard for Information technology-Telecommunications and information systems-Local and metropolitan area networks-Specific requirements, Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications, Amendment: Media Access Control Parameters, Physical Layers, and Management Parameters for Subscriber Access Networks, now part of [802.3].
[802.3av]	IEEE Std 802.3av™-2009, IEEE Standard for Information technology-Telecommunications and information systems-Local and metropolitan area networks-Specific requirements, Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Amendment 1: Physical Layer Specifications and Management Parameters for 10Gb/s Passive Optical Networks, now part of [802.3].
[DPoE-IPNEv2.0]	DOCSIS Provisioning of EPON, IP Network Element Requirements, DPoE-SP-IPNEv2.0-I06-160602, June 2, 2016, Cable Television Laboratories, Inc.
[DPoE-MEFv2.0]	DOCSIS Provisioning of EPON, Metro Ethernet Forum Specification, DPoE-SP-MEFv2.0-I05-170111, January 11, 2017, Cable Television Laboratories, Inc.
[DPoE-MULPIv2.0]	DOCSIS Provisioning of EPON, MAC and Upper Layer Protocols Interface Specification, DPoE-SP-MULPIv2.0-I11-170510, May 10, 2017, Cable Television Laboratories, Inc.
[DPoE-OAMv2.0]	DOCSIS Provisioning of EPON, OAM Extensions Specification, DPoE-SP-OAMv2.0-I11-170510, May 10, 2017, Cable Television Laboratories, Inc.

[6] Revised per OSSIv2.0-N-14.0174-1 on 6/26/14 by JB. Revised per OSSIv2.0-N-15.0231-1 on 2/11/16 by JB. Revised per OSSIv2.0-N-16.0240-1 on 6/2/16 by JB.

[DPoE-PHYv2.0] DOCSIS Provisioning of EPON, Physical Layer Specification, DPoE-SP-PHYv2.0-I05-160602, June 2, 2016, Cable Television Laboratories, Inc.

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[OSSIv3.0] Data-Over-Cable Service Interface Specifications, Operations Support System Interface Specification, CM-SP-OSSIv3.0-I30-170111, January 11, 2017, Cable Television Laboratories, Inc.

[RFC 2579] IETF RFC 2579, Textual Conventions for SMIv2, April 1999.

[RFC 2863] IETF RFC 2863, The Interfaces Group MIB, June 2000.

[RFC 2933] IETF RFC 2933, Internet Group Management Protocol MIB, K. McCloghrie, D. Farinacci, D. Thaler, October 2000.

[RFC 3164] IETF RFC 3164, C. Lonvick, The BSD syslog Protocol, August 2001.

[RFC 3411] IETF RFC 3411/STD0062, An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks, December 2002.

[RFC 3413] IETF RFC 3413/STD0062, Simple Network Management Protocol (SNMP) Applications, December 2002.

[RFC 3414] IETF RFC 3414/STD0062, User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3), December 2002.

[RFC 3415] IETF RFC 3415, View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP), December 2002.

[RFC 3416] IETF RFC 3416, Version 2 of the Protocol Operations for the Simple Network Management Protocol (SNMP), December 2002.

[RFC 3584] IETF RFC 3584, Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard and Network Management Framework, March 2000.

[RFC 3826] IETF RFC 3826, The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model, June 2004.

[RFC 4188] IETF RFC 4188, Definitions of Managed Objects for Bridges, September 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.

[RFC 5519] IETF RFC 5519, Multicast Group Membership Discovery MIB, April 2009.

2.2 Informative References[7]

This specification uses the following informative references.

[802.1ad] IEEE Std 802.1ad™-2005, IEEE Standard for Local and Metropolitan Area Networks – Virtual Bridged Local Area Networks Amendment 4: Provider Bridges, May 2006. Former amendment to 802.1Q, now part of 802.1Q-2011.

[7] Revised per OSSIv2.0-N-14.0174-1 on 6/26/14 and OSSIv2.0-N-14.0189-1 on 7/10/14 by JB. Revised per OSSIv2.0-N-15.0231-1 on 2/11/16 by JB.

[802.1ah]	IEEE Std 802.1ah-2008, IEEE Standard for Local and Metropolitan Area Networks – Virtual Bridged Local Area Networks – Amendment 6: Provider Backbone Bridges, January 2008. Former amendment to 802.1Q, now part of 802.1Q-2011.
[802.1ag]	IEEE Std 802.1ag™-2007, IEEE Standard for Local and metropolitan Area Networks – Virtual Bridged Local Area Networks Amendment 5: Connectivity Fault Management, December 2007.
[CMCIv3.0]	Data-Over-Cable Service Interface Specifications, Cable Modem to Customer Premise Equipment Interface Specification, CM-SP-CMCIv3.0- I03-170510, May 10, 2017, Cable Television Laboratories, Inc.
[DOCSIS]	Refers to entire suite of DOCSIS 3.0 specifications unless otherwise specified.
[DPoE-SP-ARCHv2.0]	DOCSIS Provisioning of EPON, DPoE Architecture Specification, DPoE-SP-ARCHv2.0-I05-160602, June 2, 2016, Cable Television Laboratories, Inc.
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[IPDR/SP v2.3]	IPDR/SP Protocol Specification, Version 2.3, IPDR.org, March 2007.
[IPDR/SP]	IPDR/SP Protocol Specification, Version 2.1, IPDR.org, November 2004.
[L2VPN]	Data-Over-Cable Service Interface Specifications, Layer 2 Virtual Private Networks, CM-SP-L2VPN-I15-150528, May 28, 2015, Cable Television Laboratories, Inc.
[MEF 7.1]	Metro Ethernet Forum, Phase 2 EMS-NMS Information Model, October 2009.
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[PC EMv1.0]	PacketCable 1.0 Event Messages Specification, PKT-SP-EM-C01-071129, November 29, 2007, Cable Television Laboratories, Inc.
[Q.840.1]	ITU-T Q.840.1: Requirements and analysis for NMS-EMS management interface of Ethernet over Transport and Metro Ethernet Network (EoT/MEN), March 2007.
[RFC 2790]	IETF RFC 2790, Host Resources MIB, March 2000.
[RFC 3014]	IETF RFC 3014, Notification Log MIB, November 2000.
[RFC 3417]	IETF RFC 3417/STD0062, Transport Mappings for the Simple Network Management Protocol, December 2002.
[RFC 3418]	IETF RFC 3418, Management Information Base (MIB) for the Simple Network Management Protocol (SNMP), June 2000.
[RFC 3419]	IETF RFC 3419, Textual Conventions for Transport Addresses, December 2002.
[RFC 3433]	IETF RFC 3433, Entity Sensor Management Information Base, December 2002.
[RFC 3635]	IETF RFC 3635, Definitions of Managed Objects for the Ethernet-like Interface Types, September 2003.
[RFC 3927]	IETF RFC 3927, Dynamic Configuration of IPv4 Link-Local Addresses, May 2005.
[RFC 4022]	IETF RFC 4022, Management Information Base for the Transmission Control Protocol (TCP), March 2005.
[RFC 4113]	IETF RFC 4113, Management Information Base for the User Datagram Protocol (UDP), June 2005.
[RFC 4131]	IETF RFC 4131, Management Information Base for Data Over Cable Service Interface Specification (DOCSIS) Cable Modems and Cable Modem Termination Systems for Baseline Privacy, September 2005.
[RFC 4133]	IETF RFC 4133, Entity MIB (Version 3), August 2005.

[RFC 4546]	IETF RFC 4546, Radio Frequency (RF) Interface Management Information Base for Data over Cable Service Interface Specifications (DOCSIS) 2.0, June 2006.
[RFC 4837]	IETF RFC 4837, Managed Objects of Ethernet Passive Optical Networks (EPON), July 2007.
[SCTE 174]	ANSI/SCTE 174 2010, Radio Frequency over Glass Fiber-to-the-Home Specification.
[YD/T 1993.1-2009]	CCSA Technical requirements for access network 2Gbps Ethernet passive optical network (2G-EPON) Part 1: Compatible mode.
[YD/T 1993.2-2010]	CCSA Technical requirements for access network 2Gbps Ethernet passive optical network (2G-EPON) Part 2: Co-exist mode.

2.3 Reference Acquisition[8]

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- CCSA, China Communications Standards Association, 52# Hua Yuan Bei Road, Haidian District, Beijng, P.R.China 100083, Telephone：+86-10-62302645,Fax：+86-10-62301849, Internet: http://www.ccsa.org.cn/english/
- Internet Engineering Task Force (IETF) Secretariat, 48377 Fremont Blvd., Suite 117, Fremont, California 94538, USA, Phone: +1-510-492-4080, Fax: +1-510-492-4001, http://www.ietf.org
- Institute of Electrical and Electronics Engineers (IEEE), +1 800 422 4633 (USA and Canada); http://www.ieee.org
- ITU: International Telecommunications Union (ITU), http://www.itu.int/home/contact/index.html
- IPDR, 13 Mizzenmast Road, Nantucket, MA, 02554; Phone: +1-508-325-6169; Fax +1-508-325-6169. Internet: http://www.ipdr.org
- Metro Ethernet Forum, 6033 W. Century Blvd, Suite 830, Los Angeles, CA 90045
  Phone: +1-310-642-2800; Fax +1-310-642-2808. Internet: http://metroethernetforum.org
- SCTE, Society of Cable Telecommunications Engineers Inc., 140 Philips Road, Exton, PA 19341
  Phone: +1-800-542-5040, Fax: +1-610-363-5898, Internet: http://www.scte.org/

[8] Revised per OSSIv2.0-N-14.0174-1 on 6/26/14 and OSSIv2.0-N-14.0189-1 on 7/10/14 by JB.

3 TERMS AND DEFINITIONS

3.1 DPoE Network Elements [9]

DPoE Network	This term means all the elements of a DPoE implementation, including at least one DPoE System, and one or more D-ONUs connected to that DPoE System.
DPoE System	This term refers to the set of subsystems within the hub site that provides the functions necessary to meet DPoE specification requirements.
DPoE ONU (D-ONU)	This term means a DPoE-capable ONU that complies with all the DPoE specifications. There are two logical types of D-ONUs. These are the DPoE Standalone ONU (S-ONU) and the DPoE Bridge ONU (B-ONU). Requirements specified for a D-ONU must be met by all ONUs.
DPoE Standalone ONU (S-ONU)	This term means a D-ONU that provides all the functions of a B-ONU and also provides at least one CMCI port. An S-ONU can optionally have one or more eSAFEs.
DPoE Bridge ONU (B-ONU)	This term means a D-ONU that is capable of [802.1] forwarding but cannot do all the encapsulation functions required to be an S-ONU. The B-ONU is a logical definition used by the specification for requirements that apply to all types of B-ONUs. The two types of B-ONUs are the BP-ONU and the BB-ONU.
DPoE Bridge Pluggable ONU (BP-ONU)	This term means a D-ONU that is a B-ONU which is pluggable. Pluggable BP-ONUs include devices such as an SFP-ONU (1G-EPON), SFP+ONU (10G-EPON), or XFP-ONU (10G-EPON).
DPoE Bridge Baseband ONU (BB-ONU)	This term means a D-ONU that is a B-ONU which has a baseband IEEE Ethernet interface. BB-ONUs include those with one or more [802.3] baseband PMDs. (See [DPoE-SP-ARCHv2.0], section 7.2.6.2 for examples.)
DEMARC	Short form of "Demarcation Device." This term means the device, owned and operated by the operator that provides the demarcation (sometimes called the UNI interface) to the customer. Some architectures describe this device as the CPE (as in DOCSIS) or the NID (as in the MEF model).

[9] Revised per OSSIv2.0-N-15.0231-1 on 2/11/16 by JB.

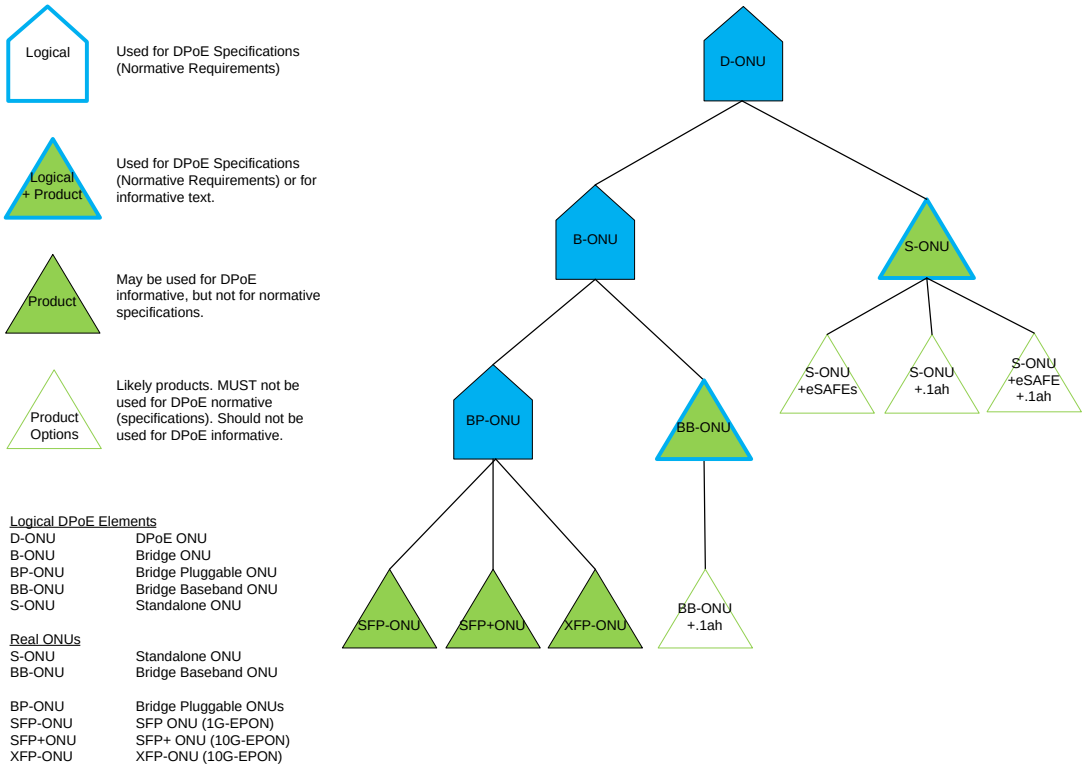


Figure 3 - D-ONU Types

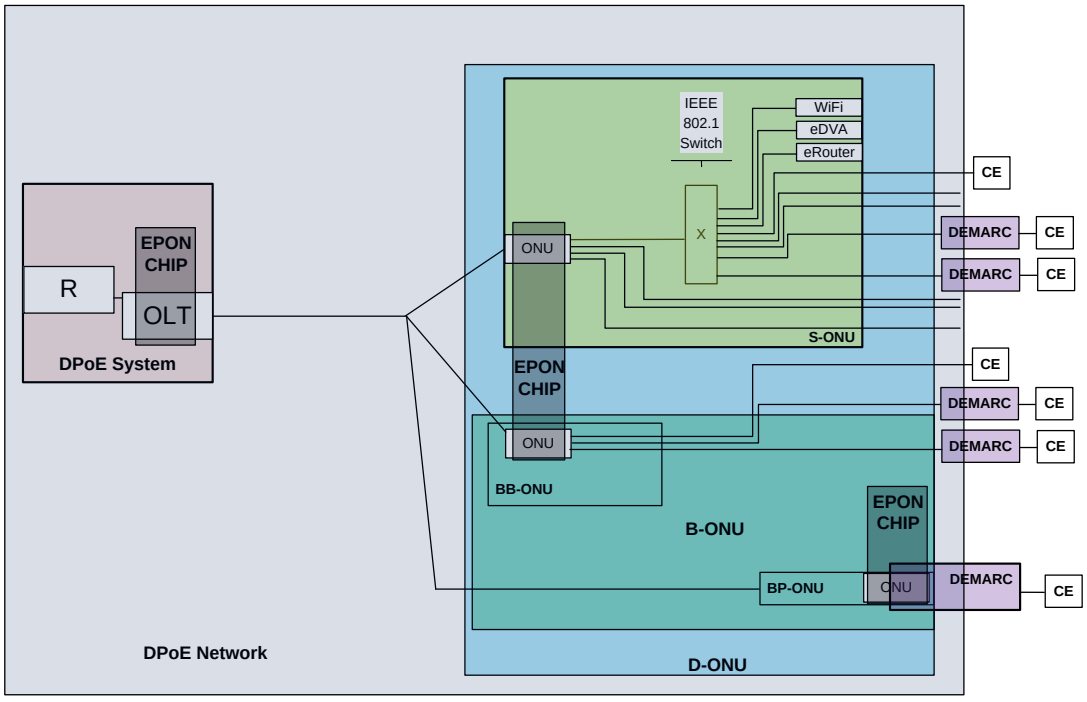


Figure 4 - DPoE Network Elements

3.2 Other Terms[10]

1G-EPON	EPON as defined in [802.3ah], now part of [802.3]
2G-EPON	EPON as defined in Annex A 2G-EPON System Definition of [DPoE-PHYv2.0]
10G-EPON	EPON as defined in [802.3ah] , now part of [802.3]
Cable Modem CPE Interface	CMCI as defined in [MULPIv3.0]
Customer Premise Equipment (CPE)	Customer Premise Equipment as defined in [DOCSIS]
Multi-Layer Switching (MLS)	A switch that can switch based on Layer 2, Layer 3, Layer 4, etc.
Ethernet Passive Optical Network (EPON)	Refers to 1G-EPON, 2G-EPON, and 10G-EPON collectively
EPON Operations and Maintenance Messaging (OAM)	EPON OAM messaging as defined in [802.3] and [DPoE-OAMv2.0]; Ethernet OAM is not the same as EPON OAM; Ethernet OAM is defined in [802.1ag]
Logical CPE Interface	LCI as defined in [eDOCSIS]
Network Interface Device (NID)	A DEMARC device in DPoE specifications

[10] Revised per OSSIv2.0-N-14.0174-1 on 6/26/14 and OSSIv2.0-N-14.0189-1 on 7/10/14 by JB.

4 ABBREVIATIONS AND ACRONYMS

This specification uses the following abbreviations:

BPI	Baseline Privacy
BSoD	Business Services over DOCSIS
CM	Cable Modem
CMCI	Cable Modem to CPE Interface
CMTS	Cable Modem Termination System
CoS	Class of Service
CPE	Customer Premise Equipment
DBC	Dynamic Bonding Changes
DCC	Dynamic Channel Changes
DCID	Downstream Channel Identifier
DHCP	Dynamic Host Configuration Protocol
DPoE	DOCSIS Provisioning of EPON
DPoE-OAM	DOCSIS Provisioning of EPON OAM
eCM	embedded Cable Modem
eDVA	embedded Digital Voice Adapter
ENNI	External Network to Network Interface
EPON	Ethernet Passive Optical Network
eSAFE	embedded Service/Application Functional Entity
EVC	Ethernet Virtual Connection
FEC	Forward error correction
Gbps	Gigabits per second (as used in the industry)
INNI	Internal Network to Network Interface
IP	Internet Protocol
IPDR	Internet Protocol Detail Record
LCI	Logical CPE Interface as defined in [eDOCSIS]
LED	Light Emitting Diode
LLID	Logical Link Identifier
L2VPN	Layer 2 Virtual Private Networks
MAC	Media Access Control
MEF	Metro Ethernet Forum
MEN	Metro Ethernet Network
MI	MEF INNI Interface at a customer premise
MN	MEF INNI Interface to operators MEN
MPCP	Multi-Point Control Protocol
MSC	Maximum Scheduled Codes
MU	MEF UNI Interface
NE	Network Element
NID	Network Interface Device

NNI	Network to Network Interface
NSI	Network Systems Interface
OAM	EPON Operations Administration and Maintenance messaging
ODN	Optical Distribution Network
OLT	Optical Line Termination
ONU	Optical Network Unit
OSC	Optical Splitter Combiner
OSS	Operations Support System
OSSI	Operations Support System Interface
PHY	PHYsical Layer
PON	Passive Optical Network
QoS	Quality of Service
R	IP Router
RCC	Receive Channel Configuration
RCP	Receive Channel Profiles
RFC	Request For Comments
RS	Reconciliation Sublayer
SAMIS	Subscriber Accounting Management Interface Specification
SLA	Service Level Agreements
SSD	Secure Software Download
UCC	Upstream Channel Changes
UCD	Upstream Channel Descriptors
UCID	Upstream Channel Identifier
UDC	Upstream Drop Classifiers
UNI	User Network Interface
vCM	virtual Cable Modem
X	IEEE Ethernet Switch (Generic)

5 DPOE PROVISIONING OF EPON OSSI

The primary goal for the DOCSIS Provisioning of EPON OSSI is that the EPON components, as much as possible, appear as existing DOCSIS components to the existing DOCSIS Operations Support System (OSS) Infrastructure.

Figure 5 summarizes the primary systems and elements involved in existing DOCSIS networks. The OSS Infrastructure contains the servers used to provision, manage, authorize, and control the network.

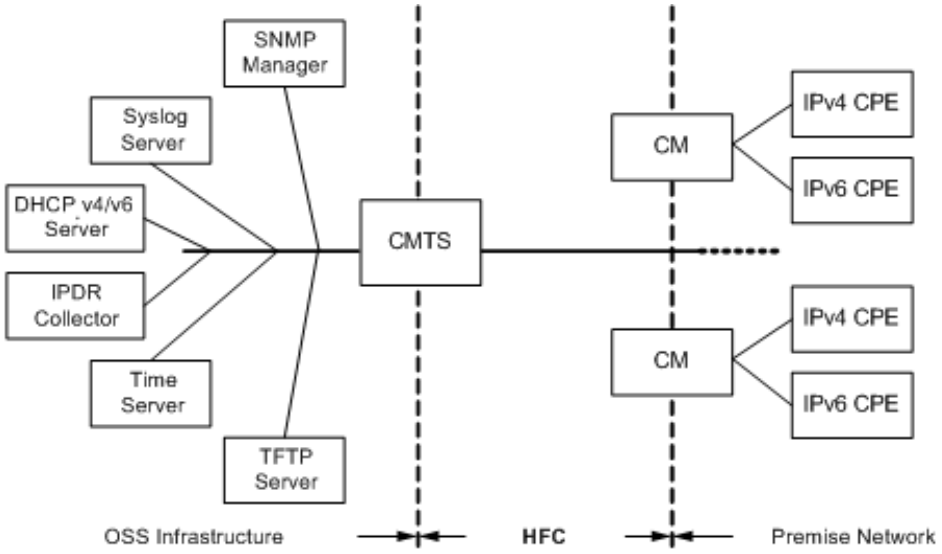


Figure 5 - DOCSIS OSSI Overview

In the DPoE Network (as shown in Figure 6), the same OSS Infrastructure components are used to manage and provision the DPoE headend device (DPoE System) containing the OLT with EPON interfaces as well as the D-ONU devices.

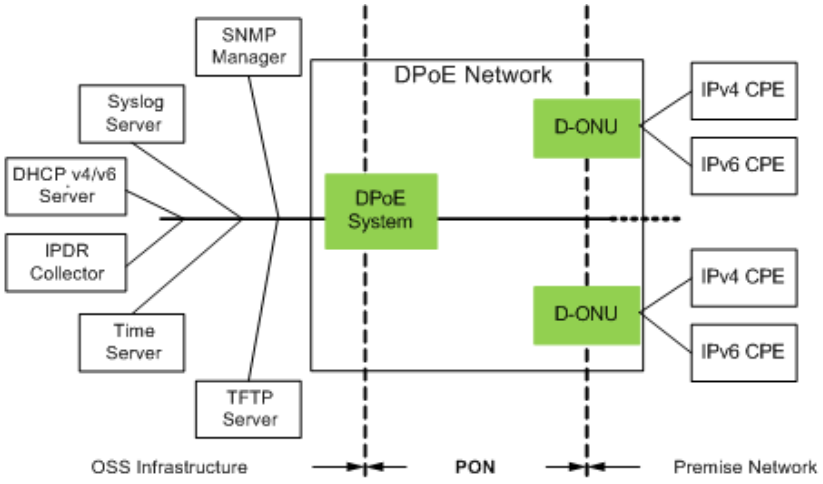


Figure 6 - DPoE OSSI Overview

Because the DPoE specifications were designed to support an existing market of ONUs that do not contain an IP stack, D-ONUs need not be directly addressable using IP. This specification requires that the DPoE System MUST obtain an IP address and modem-provisioning file from the OSS provisioning systems on behalf of the ONU as part of the modem registration process outlined in [DPoE-MULPIv2.0].

Further, the DPoE System MUST provide management capabilities on behalf of the ONU for all IP-based management functions when the OSS management systems direct management requests to a given ONU. The concept of a "virtual CM" (vCM) is introduced in this specification to represent the IP-addressable management entity maintained and controlled within the DPoE System. When the DPoE System receives management requests for a vCM, it converts those requests into the appropriate DPoE OAM requests and sends the OAM requests to the D-ONU as needed. See [DPoE-OAMv2.0] for a full description of the DPoE OAM messaging. The vCM is used to map requirements that were previously required of the DOCSIS CM to requirements on the DPoE System.

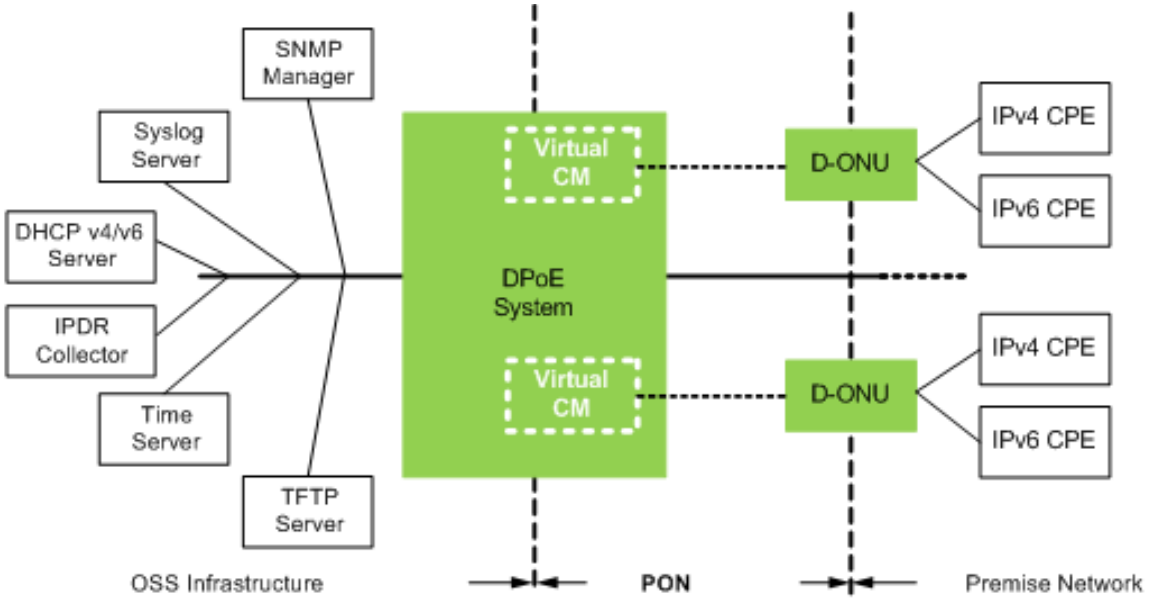


Figure 7 - DPoE Virtual CM (vCM) Concept

6 OSSI REQUIREMENTS

This section captures all of the requirements on the DPoE System and D-ONU based on the existing DOCSIS OSSI specification along with EPON-specific requirements.

Requirements in this specification may also be introduced based on requirements from other DPoE specifications, when those specifications need to modify the existing DOCSIS management model. This specification, in turn, also generates requirements on the DPoE OAM specification [DPoE-OAMv2.0] for those OAM messages transmitted between the DPoE System and D-ONU used to satisfy OSSI requirements.

6.1 DOCSIS OSSI Requirements

This section summarizes the requirements on the DPoE System and the D-ONU as specified in the DOCSIS 3.0 Operations Support System Interface Specification [OSSIv3.0].

This section includes summary requirements, explicit non-requirements (those items that are not applicable to DPoE), and notable differences between the [OSSIv3.0] specification and the DPoE System.

The following sections conform to the outline and section headings found in the [OSSIv3.0] document to more clearly provide a mapping of the DPoE OSSI requirements to the [OSSIv3.0] requirements. When references are made in this specification to the "corresponding section in [OSSIv3.0]", the corresponding section is the section with the same section heading or title, but not necessarily the same section number.

6.2 Overview

[OSSIv3.0] describes the key management features introduced in DOCSIS 3.0 and categorizes the features into the five conceptual categories of management, which are typically referred to as the FCAPS model, represented by the management categories of Fault, Configuration, Accounting, Performance, and Security.

6.2.1 DOCSIS 3.0 OSSI Key Features

[OSSIv3.0] was updated to provide management support for the major features summarized in the following table. The table has been modified with italicized text to note which features are applicable to the DPoE Network. References to the CMTS NE (Network Element) imply requirements on the DPoE System, and references to CM imply requirements on the DPoE System and vCM acting as a proxy for the D-ONU.

Table 3 - DOCSIS 3.0 OSSI Key Features

Features	Management Functional Area	OSI layer	NE	Description
Multiple Upstream Channels per port	Configuration	PHY	CMTS	Provisioning physical upstream ports that support multiple upstream receivers according to their capabilities.
Plant Topology		PHY MAC	CMTS	Provisioning flexible arrangements of US/DS channels for channel bonding configuration to reflect HFC plant topology. *Channel bonding is not supported in DPoE Networks.*
Enhanced Diagnostics	Fault	PHY MAC Network	DPoE System	Detailed log of different conditions associated with the vCM registration state and operation that may indicate plant problems affecting service availability. *Diagnostics related to the modem registration state will be supported by DPoE Networks to ensure compatibility across the DOCSIS infrastructure.*
Enhanced Performance Data Collection	Performance	PHY MAC Network	CMTS	IPDR streaming of large statistical data sets, such as DPoE System vCM Status information, with less performance impact on the DPoE System resources.

Features	Management Functional Area	OSI layer	NE	Description
Enhanced Signal Quality Monitoring		PHY	CMTS	To gather information on narrow band ingress and distortion affecting the quality of the RF signals. *As this applies to the monitoring of the RF network, this feature is not applicable to DPoE Networks. There are complementary physical layer attributes for EPON that can be used by operators in monitoring the quality of the EPON network. The specification of these attributes is presently considered outside the scope of this version of DPoE specifications.*
Usage Based Billing	Accounting	PHY MAC Network	CMTS	Update SAMIS to 3.0 specification requirements.
Enhanced Security	Configuration Fault Performance Security	MAC Network	CM CMTS	Updates to management models to support the DOCSIS 3.0 security features. *As documented in the* [DPoE-SECv2.0] *specification, a subset of these features will be supported by DPoE Networks.*
IPv6	Configuration Fault Performance	Network	CM CMTS	Updates to management models to support IPv6 provisioning, vCM IP stack management, DPoE System, and vCM IP Filtering requirements.
Channel Bonding	Configuration Fault Performance	PHY MAC	CM CMTS	Update existing management models and include new events to support DS and US channel bonding. *There is currently no need for channel bonding in EPON networks and will not be supported by DPoE specifications.*
IP Multicast	Configuration Fault Performance	MAC Network	CM CMTS	Update existing management modes to support new multicast capabilities such as SSM, IGMP v3, MLD v1 and v2.

6.2.1.1 Fault Management Features

The DOCSIS 3.0 fault management requirements were extended to include:

- Detailed events for the new DOCSIS 3.0 features.
- A new diagnostic tool that enables detection of unstable CM operations (repeated CM registrations or station maintenance retries).

The list of DOCSIS events supported by DPoE Networks is listed in Section 10.

Support for the managed objects defined in the DOCS-DIAG-MIB, as specified in [OSSIv3.0], is identified in Section 7.3.1.

6.2.1.2 Configuration Management Features

The configuration of DOCSIS features uses CM configuration files and CMTS policies. The reporting of configuration state information is done via SNMP MIB objects. This model provides a CM standard configuration with minimal operator intervention. DPoE specifications support the same provisioning model by re-using the existing CM configuration files and CMTS configuration objects/policies, and mapping those objects and attributes to the corresponding EPON objects and attributes. In a similar fashion, DPoE specifications support DOCSIS state information by mapping EPON state information to the DOCSIS SNMP MIBs.

The DOCSIS 3.0 configuration requirements include:

- Updates to CM configuration parameters to support IPv6 and channel bonding, enhanced security, and IP multicast.
- Updates to CMTS configuration in support of multiple upstream channels per port, HFC plant topology, channel bonding, security, IPv6, and IP multicast.
- Security enhancements for the CM provisioning process, such as TFTP proxy, configuration file learning, certificate revocation list, etc.

As mentioned previously, this version of the DPoE specifications does not support DOCSIS 3.0 features, such as channel bonding, so the corresponding TLVs and CM SNMP MIB objects are not supported in this version of the DPoE specifications. For the same reason, the DPoE System also will not support the configuration of those features.

This version of the DPoE specifications has been enhanced to support the configuration of a Metro Ethernet Service Profile (MESP) to be used to provision QoS attributes for Metro Ethernet services such as EPL, EVPL, and E-LAN across the Service Flows and Aggregate Service Flows being managed by the DPoE System.

6.2.1.3 Performance Management Features

The DOCSIS 3.0 performance management requirements include:

- An efficient mechanism for collecting large data sets as described above. The identified data sets are:
- The CMTS resident CM status information.
- Additional granularity of Quality of Service (QoS) statistics for bonded and non-bonded channels to aid in network capacity planning and dimensioning.
- Enhanced signal quality monitoring for granular plant status.
- Minimizing redundant information collection associated with differing services provided by the CMTS (statistics for PacketCable™ voice may incorporate large data sets for DOCSIS PHY and MAC).
- Support for CM and CMTS host resource statistics, such as memory and CPU utilization.

In addition, performance management requirements are extended to support MEF services.

6.2.1.4 Security Management Features

DOCSIS 3.0 added new features to strengthen the confidentiality of user data over the HFC network, and the authenticity of CMs using features such as software upgrade, to improve the protection of the DOCSIS network against theft of service and denial of service attacks.

Support for the DOCSIS-related security features is documented in the [DPoE-SECv2.0] specification.

[OSSIv3.0] was also updated to replace the use of NmAccess configuration objects to support SNMPv1and v2c management of CMs, because the NmAccess framework had been deprecated by the IETF. [OSSIv3.0] defined new configuration file TLVs (TLV 53 sub-TLVs) that are compatible with the SNMPv3 framework, while still supporting SNMP v1 and v2c access controls.

Support for the SNMP Coexistence TLVs is specified in [DPoE-MULPIv2.0].

6.2.1.5 Accounting Management Features

[OSSIv3.0] defines the support for the collection of usage information for use in a billing interface known as Subscriber Accounting Management Interface Specification (SAMIS). SAMIS uses the business model defined by the TeleManagement Forum (formerly IPDR.org) and IPDR streaming protocol [IPDR/SP], for the reliable and resource-efficient transmission of accounting data. Extensions are required for SAMIS to support IPv6, channel bonding, and IP Multicast.

6.3 OSSI Management Protocols

6.3.1 SNMP Protocol

The SNMP protocol was selected by [OSSIv3.0] as the primary communication protocol for management of data-over-cable services. Although SNMPv3 offers certain security advantages over previous SNMP versions, many existing management systems do not fully support SNMPv3, necessitating support of the theoretically less secure but more ubiquitous SNMPv1and SNMPv2c protocols.

The DPoE System MUST provide an SNMP Agent to provide management access to supported DPoE System MIBs. The DPoE System, on behalf of the attached D-ONUs, MUST provide an SNMP Agent to provide management access to the supported CM MIBs for the vCM. Each vCM MUST appear as a separate management entity to external management applications. Each vCM MUST respond to management requests using the IP address assigned to the vCM during address assignment as specified in the [DPoE-MULPIv2.0] specification.

The vCM MUST support restrictions on the ability to set CM MIB object values based on modem configuration file attributes.

The DPoE System SHOULD implement the SNMPv3 protocol.

The vCM SHOULD implement the SNMPv3 protocol.

The DPoE System MUST implement the SNMPv1 and SNMPv2c protocols.

The vCM MUST implement the SNMPv1 and SNMPv2c protocols.

6.3.1.1 Requirements for IPv6

Several transport domains were initially defined for SNMP (see [RFC 3417]). To support IPv6, [RFC 3419] adds a new set of transport domains, not only for SNMP, but also for any application protocol.

6.3.2 IPDR Protocol[11]

The IPDR protocol model used in the DPoE System will follow the model described in [OSSIv3.0]. When interpreting this text, the following should be considered.

When referring to the Service Definitions Instance Documents section of [OSSIv3.0], the namespace should also include the following:

Xmlnsxmlns = http://www.cablelabs.com/namespaces/DPOE/2.0/xsd/ipdr

6.3.2.1 Introduction

The IPDR protocol was selected by [OSSIv3.0] as a scalable solution for the collection of high volume management data related to performance, usage, and operational status of cable networks.

The DPoE System MUST provide an IPDR Exporter including support for all IPDR protocol requirements as described in [OSSIv3.0].

The vCM MUST NOT provide support for IPDR protocols.

[11] Revised namespace url per OSSIv2.0-N-15.0219-1 on 10/28/15 by JB.

6.3.2.2 Use of IPDR Standards

This specification defines new IPDR Service Definitions for management instrumentation beyond those specified in [OSSIv3.0]. Additional IPDR Service Definitions have been described to represent new capabilities of the DPoE specification.

6.3.2.3 IP Detail Record (IPDR) Standard

The DPoE System MUST implement all IPDR Standard requirements as described in the corresponding sections of [OSSIv3.0].

6.4 OSSI Management Objects

6.4.1 SNMP Management Information Bases (MIBs)

This section in [OSSIv3.0] defines the set of managed objects required to support the management of a CM or CMTS, as well as general requirements for expected SNMP Agent behavior for DOCSIS devices.

The [OSSIv3.0] specification has priority over the IETF MIBs and all objects. Though deprecated or optional in an IETF MIB, an object can be required by the [OSSIv3.0] specification as mandatory.

For the list of DOCSIS OSSI MIBs that will be supported by the DPoE System and vCM, see Section 7 in this document.

The following requirements were adapted from the [OSSIv3.0] specification.

The DPoE System MAY augment the required MIBs with objects from other standard or vendor-specific MIBs where appropriate.

The vCM MAY augment the required MIBs with objects from other standard or vendor-specific MIBs where appropriate.

The DPoE System MUST implement the MIB requirements in accordance with this specification, regardless of the value of an IETF MIB object's status (e.g., deprecated or optional). If not required by this specification, deprecated, obsolete, or additional objects are optional. If the DPoE System implements a deprecated, obsolete, or additional MIB object, the DPoE System MUST implement the MIB object correctly according to the MIB definition.

The vCM MUST implement the MIB requirements in accordance with this specification, regardless of the value of an IETF MIB object's status (e.g. , deprecated or optional). If the vCM implements a deprecated, obsolete, or additional MIB object, the vCM MUST implement the MIB object correctly according to the MIB definition.

If the DPoE System does not implement a deprecated, obsolete, or additional MIB object, the following conditions MUST be met:

- The DPoE System MUST NOT instantiate the MIB object.
- The DPoE System MUST respond with the appropriate error/exception condition, such as noSuchObject for SNMPv2c, when an attempt to access the MIB object is made.

If the vCM does not implement a deprecated, obsolete, or additional MIB object, the following conditions MUST be met:

- The vCM MUST NOT instantiate the MIB object.
- The vCM MUST respond with the appropriate error/exception condition, such as noSuchObject for SNMPv2c, when an attempt to access the MIB object is made.

6.4.1.1 IETF Drafts and Others

The corresponding section in the [OSSIv3.0] specification contains a table listing the new DOCSIS MIBs (Annexes) that were introduced for DOCSIS 3.0. Rather than repeat the table here, Section 7 in this document contains the support expectations for the DPoE System and vCMs.

6.4.1.2 IETF RFCs

The corresponding section in the [OSSIv3.0] specification contains a table listing the IETF RFCs that need to be supported for DOCSIS 3.0. Rather than repeat the table here, Section 7 in this document contains the support expectations for the DPoE System and vCMs.

6.4.1.3 Managed Object Requirements

The corresponding section in the [OSSIv3.0] specification contains a few general requirements on the expectations for MIB compliance for DPoE Systems (CMTS in DOCSIS) and D-ONU or vCM (which resides in the DPoE System) devices.

The following requirements were adapted from the [OSSIv3.0] specification.

The DPoE System MUST implement the compliance and syntax of the MIB objects as specified in Section 7 in this document.

The vCM MUST implement the compliance and syntax of the MIB objects as specified in Section 7 in this document.

The DPoE System MUST support a minimum of 10 available SNMP table rows, unless otherwise specified by the RFC or DOCSIS specifications.

A vCM MUST support a minimum of 10 available SNMP table rows, unless otherwise specified by the RFC or DOCSIS specifications.

The DPoE System's minimum number of available SNMP table rows SHOULD mean rows (per table) that are available to support device configuration.

The vCM's minimum number of available SNMP table rows SHOULD mean rows (per table) that are available to support device configuration.

The DPoE System used (default) SNMP table row entries MUST NOT apply to the minimum number of available SNMP table rows. The vCM used (default) SNMP table row entries MUST NOT apply to the minimum number of available SNMP table rows. That is, if the device instantiates a certain number of table rows as part of its default configuration, it must support an additional number of minimum rows beyond the default rows.

In the [OSSIv3.0] specification, this section contains a series of subsections that contain detailed implementation requirements for each of the DOCSIS 3.0 MIBs. For the DPoE System, these requirements are captured in Section 7.

6.4.2 IPDR Service Definition Schemas

The specification of IPDR service definition requirements for the DPoE System to be adapted from [OSSIv3.0] is described in Section 10 of this document.

Additional IPDR service definitions requirements for the DPoE System to support MEF capabilities described in [DPoE-MEFv2.0] and [DPoE-OAMv2.0] are described in Section 10 of this document.

6.5 OSSI for PHY, MAC and Network Layers

6.5.1 Fault Management

This section of the [OSSIv3.0] specification defines the requirements for remote monitoring/detection, diagnosis, reporting, and correction of problems.

6.5.1.1 SNMP Usage

The use of SNMP is defined as the primary mechanism to achieve the goals of fault management: remote detection, diagnosis, reporting, and correction of network faults. The DPoE System MUST support SNMP management for vCMs as long as the CM has become operational. However, there is no requirement to support SNMP management on the CMCI interfaces on the D-ONU.

The DPoE System MUST be able to generate SNMP Notifications to one or more trap receivers.

The DPoE System MUST be able to generate events to a syslog server.

The vCM MUST be able to generate SNMP Notifications to one or more trap receivers.

The vCM MUST be able to generate events to a syslog server.

6.5.1.2 Event Notification[12]

A DPoE System is required to generate asynchronous events that indicate malfunction situations and notify about important events. The three methods for reporting events are defined as:

- Local Log storage (docsDevEventTable from [RFC 4639])
- SNMP Notifications
- Syslog messages

The [OSSIv3.0] specification defines the support of DOCSIS specific events as well as IETF events. DOCSIS specific events are usually delivered in the form of SNMP notifications. The delivery of IETF Notifications to local log or syslog servers is optional.

Event notifications are enabled and disabled by configuration. The generation of IETF SNMP notifications is usually controlled by separate SNMP MIB objects (e.g., ifLinkUpDownTrapEnable).

The generation of DOCSIS specific events and the method used to report the events are controlled by the docsDevEvControlTable from [RFC 4639] as well as the CmEventCtrl and the CmtsEventCtrl objects defined in the DOCS-IF3-MIB.

The vCM events may be generated by the DPoE System on behalf of the vCM, or by the vCM itself. The DPoE System MUST provide a configuration option to select DPoE System loopback IP address as the source for any vCM events. When this configuration option is absent in the DPoE System configuration, the vCM IP address associated with the given vCM is used as the source IP address for any vCM event.

By default, the vCM MUST generate events using the source IP address associated with the given vCM. The DPoE System MUST generate events on behalf of the vCM using the source IP address associated with the given vCM. Source Addressing requirements for the vCM are described in [DPoE-MULPIv2.0].

When configured to use the DPoE System loopback IP address as the source for any vCM events, the vCM MUST generate events using the source IP address of the DPoE System loopback IP address. The DPoE System MUST generate events on behalf of the vCM using the source IP address of the DPoE System loopback IP address .

6.5.1.2.1 Format of Events

This section of the [OSSIv3.0] specification details specific requirements on how the three mechanisms are used by DOCSIS devices.

6.5.1.2.1.1 Local Logging

Local logging refers to the ability of a network device to store events in both volatile and non-volatile storage within the device. The contents of the local logs also need to be made available to management systems via SNMP queries. Storing events in local, persistent storage also can be used when failed equipment is returned for analysis (e.g., RMA).

A vCM MUST maintain Local Log events in both local-volatile storage and local non-volatile storage. The actual implementation of the non-volatile storage for the vCMs is vendor-specific (i.e., each vCM need not have a separate log file).

The DPoE System MUST maintain Local Log events for system-specific events in local-volatile storage or local non-volatile storage, or both. The DPoE System MAY retain in local non-volatile storage events designated for

[12] Revised per OSSIv2.0-N-15.0212-1 on 9/1/15 by JB.

local volatile storage. The DPoE System MAY retain, in local volatile storage, events designated for local non-volatile storage.

A vCM MUST implement a Local Log as a cyclic buffer with a minimum of ten entries. The DPoE System MUST implement its Local Log for system-specific events as a cyclic buffer. A vCM's Local Log for non-volatile storage events MUST persist across reboots. The DPoE System Local Log for system-specific events MAY persist across reboots. The vCM MUST provide access to the Local Log events through the docsDevEventTable [RFC 4639]. The DPoE System MUST provide access to the Local Log events through the docsDevEventTable [RFC 4639].

The vCM MUST implement event descriptors that are no longer than 255 characters. The DPoE System MUST implement event descriptors that are no longer than 255 characters.

Each DOCSIS event is identified by a 32-bit unsigned integer. Events are identical if their EventIds are identical. For identical events occurring consecutively, the vCM MAY choose to store only a single event. If the vCM stores as a single event multiple identical events that occur consecutively, the vCM MUST reflect in the event description the most recent event. For identical events occurring consecutively, the DPoE System MAY choose to store only a single event. If the DPoE System stores, as a single event, multiple identical events that occur consecutively, the DPoE System MUST reflect in the event description the most recent event.

- The docsDevEvIndex object from [RFC 4639] provides relative ordering of events in the log. When the DPoE System reboots, the contents of the non-volatile log MUST be synchronized with the contents of the non-volatile log in the following manner:
- The values of docsDevEvIndex maintained in the non-volatile log are renumbered starting at one.
- The local volatile log is initialized with the contents of the non-volatile log.
- The value of the last restored non-volatile docsDevEvIndex plus one will be used as the first value for events recorded in the new active session's local volatile log.

When a vCM reboots, the contents of the non-volatile log MUST be synchronized with the contents of the non-volatile log in the following manner:

- The values of docsDevEvIndex maintained in the non-volatile log are renumbered starting at one.
- The local volatile log is initialized with the contents of the non-volatile log.
- The value of the last restored non-volatile docsDevEvIndex plus one will be used as the first value for events recorded in the new active session's local volatile log.

A vCM MUST support the ability to empty the contents of the volatile and non-volatile event log based on operator request.

6.5.1.2.1.2 SNMP Notifications

A vCM operating in SNMP v1/v2c NmAccess mode MUST support SNMPv1 and SNMPv2c traps as defined in [RFC 3416].

The DPoE System operating in SNMP Coexistence mode MUST support the SNMP notification types 'trap' and 'inform' as defined in [RFC 3416] and [RFC 3413].

A vCM operating in SNMP Coexistence mode MUST support the SNMP notification types 'trap' and 'inform' as defined in [RFC 3416] and [RFC 3413].

The DPoE System MUST support the SNMP Notifications defined in DOCS-IF3-MIB [OSSIv3.0].

The DPoE System MUST support the SNMP Notifications defined in DOCS-DIAG-MIB [OSSIv3.0].

A vCM MUST support the SNMP Notifications defined in DOCS-IF3-MIB [OSSIv3.0].

6.5.1.2.1.3 SYSLOG Message Format

When a vCM sends a syslog message for a DOCSIS-defined event, it MUST use the following format:

<level>CABLEMODEM[vendor]: <eventId> text vendor-specific-text.

When the DPoE System sends a syslog message for a system-specific event, it MUST use the following format:

<level>TIMESTAMP HOSTNAME CMTS[vendor]: <eventId> text vendor-specific-text.

Where:

- level is an ASCII representation of the event priority, enclosed in angle brackets, which is constructed as an OR of the default Facility (128) and event priority (0-7). The resulting level ranges between 128 and 135.
- TIMESTAMP and HOSTNAME follow the format of [RFC 3164]. The single space after TIMESTAMP is part of the TIMESTAMP field. The single space after HOSTNAME is part of the HOSTNAME field.
- vendor is the vendor name for the vendor-specific syslog messages or DOCSIS for the standard DOCSIS messages. When generating events for the vCM, the D-ONU's vendor name MUST be used.
- eventId is an ASCII representation of the INTEGER number in decimal format, enclosed in angle brackets, which uniquely identifies the type of event. The DPoE System MUST set the eventId with the value stored in the docsDevEvId object in docsDevEventTable. For the standard DOCSIS events, this number is converted from the error code using the following rules:
- The number is an eight-digit decimal number.
- The first two digits (left-most) are the ASCII code for the letter in the Error code.
- The next four digits are filled by 2 or 3 digits between the letter and the dot in the Error code, with zero filling in the gap in the left side.
- The last two digits are filled by the number after the dot in the Error code, with zero filling in the gap in the left side.
- text contains the textual description for the standard DOCSIS event message.
- vendor-specific-text contains vendor-specific information. This field is optional.

The DPoE System MAY report non-DOCSIS events in the standard syslog message format [RFC 3164] rather than the defined DOCSIS syslog message format.

6.5.1.2.2 Bit Values for docsDevEv Reporting[13]

The following BIT values are defined for the docsDevEvReporting object in [RFC 4639] to control the reporting mechanism for a particular event:

BIT	Value	Description
0	local(0)	Indicates non-Volatile Local Log
1	traps(1)	Indicates SNMP Notifications
2	syslog(2)	Indicates Syslog
8	localVolatile(8)	Indicates Volatile Local Log
9	stdInterface(9)	Indicates that [RFC 3413] and [RFC 3014] are being used to control event reporting

The DPoE System MAY support the use of bit-9 in docsDevEvReporting to control event reporting.

The DPoE System MUST also report an event via the Local Log (volatile or non-volatile) when generating an event using SNMP Notification or syslog.

The DPoE System MUST reject and report a 'Wrong Value' error for SNMP v2c/v3 PDUs or a 'BadValue' error for SNMPv1 PDUs if a set to docsDevEvReporting is tried while setting traps(1) and/or syslog(2) with no Local Log bits also set.

[13] Revised per OSSIv2.0-N-13.0087-1 on 7/23/13 by JB.

The DPoE System MUST ignore any undefined bits in docsDevEvReporting on SNMP Set operations and report a zero value for those bits.

If the DPoE System supports both volatile and non-volatile storage, the DPoE System MUST maintain non-volatile storage when both non-volatile Local Log and volatile Local Log bits are set for a specific docsDevEvReporting event priority. The DPoE System MAY maintain the volatile storage when both non-volatile Local Log and volatile Local Log bits are set for a specific docsDevEvReporting event priority. When both non-volatile Local Log and volatile Local Log bits are set for a specific docsDevEvReporting event priority, the DPoE System MUST NOT report duplicate events in the docsDevEventTable.

6.5.1.2.3 Standard DOCSIS Events for CMs

The DOCS-CABLE-DEVICE-MIB [RFC 4639] defines the following eight priority levels for use by DOCSIS devices.

Event	Priority	Description
Emergency	1	Reserved for vendor-specific 'fatal' hardware or software errors that prevents normal system operation and causes the reporting system to reboot.
Alert	2	A serious failure, which causes the reporting system to reboot, but it is not caused by hardware or software malfunctioning.
Critical	3	A serious failure that requires attention and prevents the device from transmitting data, but could be recovered without rebooting the system.
Error	4	A failure occurred that could interrupt the normal data flow, but will not cause the modem to re-register.
Warning	5	A failure occurred that could interrupt the normal data flow, but will not cause the modem to re-register. 'Warning' level is assigned to events for which both CM and CMTS have information.
Notice	6	The event is important, but is not a failure
Informational	7	The event is of marginal importance and is not failure, but could be helpful for tracing the normal modem operation.
Debug	8	Reserved for vendor-specific non-critical events.

During vCM initialization, the vCM MUST support the following default event reporting mechanisms:

Event Priority	Local Log Non-volatile	SNMP Notification	Syslog	Local Log Volatile
Emergency	MUST	MAY	MAY	MAY
Alert	MUST	MAY	MAY	MAY
Critical	MUST	MAY	MAY	MAY
Error	MAY	MUST	MUST	MUST
Warning	MAY	MAY	MAY	MAY
Notice	MAY	MUST	MUST	MUST
Informational	MAY	MAY	MAY	MAY
Debug	MAY	MAY	MAY	MAY

A vCM MAY implement default reporting mechanisms above the minimum reporting requirements.

A vCM MUST support the modification of the default reporting mechanism by using the docsDevEvReporting object defined in DOCS-CABLE-DEVICE-MIB [RFC 4639].

A vCM MUST format notifications in accordance with Annex D of the [OSSIv3.0] specification.

6.5.1.2.4 Standard DOCSIS Events for CMTS

The [OSSIv3.0] specification uses the same event priorities for CMTS-generated events as CM-generated events; however, it specifies additional restrictions on the use of the priorities.

The 'Error' priority level is used by the DPoE System to indicate problems with a group of D-ONUs.

The 'Critical' priority level indicates a problem that affects the whole system operation but is not a faulty condition of the DPoE System.

During initialization of the DPoE System, the DPoE System MUST support the following default event reporting mechanisms for SNMP and Syslog:

Event Priority	SNMP Notification	Syslog
Emergency	MAY	MAY
Alert	MAY	MAY
Critical	MUST	MUST
Error	MUST	MUST
Warning	MUST	MUST
Notice	MUST	MUST
Informational	MAY	MAY
Debug	MAY	MAY

During initialization of the DPoE System, the DPoE System MUST support the following default event reporting mechanisms for Local Logging. The requirements on Local Logging vary depending on whether the DPoE System supports a volatile or non-volatile Local Logging mechanism:

Event Priority	Local Log Non-volatile (if only present)	Local Log Volatile (if only present)	Local Log Non-volatile (if both present)	Local Log Volatile (if both present)
Emergency	MUST	MUST	MUST	MAY
Alert	MUST	MUST	MUST	MAY
Critical	MUST	MUST	MUST	MAY
Error	MUST	MUST	MAY	MUST
Warning	MUST	MUST	MAY	MUST
Notice	MUST	MUST	MAY	MUST
Informational	MAY	MAY	MAY	MAY
Debug	MAY	MAY	MAY	MAY

The DPoE System MAY implement default reporting mechanisms above the minimum reporting requirements.

The DPoE System MAY support the modification of the default reporting mechanism by using the docsDevEvReporting object defined in DOCS-CABLE-DEVICE-MIB [RFC 4639].

The DPoE System MUST format notifications in accordance with Annex D of the [OSSIv3.0] specification.

6.5.1.2.5 Event Priorities for DOCSIS and Vendor-Specific Events

This section of the [OSSIv3.0] specification defines the use of the Event Priorities for DOCSIS and vendor-specific events for DOCSIS devices.

The use of the Emergency Event Priority is reserved for all vendor-specific events generated by the DPoE System.

The Alert through Informational Event Priorities can be used for both DOCSIS and vendor-specific events generated by the vCM.

The Alert Event Priority is reserved for all vendor-specific events generated by the DPoE System for those events related to the operation of the DPoE System, and not for events generated by vCMs.

The Critical through Informational Event Priorities can be used for both DOCSIS and vendor-specific events generated by the DPoE System.

The use of the Debug Event Priority is reserved for all vendor-specific events generated by the DPoE System.

6.5.1.3 Throttling, Limiting, and Priority for Event, Trap, and Syslog

The DPoE System MUST support SNMP TRAP/INFORM and syslog throttling and limiting as described in DOCS-CABLE-DEVICE-MIB for event messages generated by the DPoE System.

The vCM MUST support SNMP TRAP/INFORM and syslog throttling and limiting as described in DOCS-CABLE-DEVICE-MIB for event messages generated by the vCM.

6.5.1.4 SNMPv3 Notification Receiver Config File TLV

This section of the [OSSIv3.0] specification details the processing requirements for the SNMPv3 Notification Receiver TLV when present in the configuration file. The SNMPv3 Notification Receiver TLV is used to configure SNMPv3 tables for notification transmission.

A vCM MUST process the SNMPv3 Notification Receiver TLV only if the vCM is in SNMP Coexistence Mode.

Based on the SNMPv3 Notification Receiver TLV, a vCM MUST create entries in the following tables in order to cause the desired trap transmission:

- snmpNotifyTable
- snmpTargetAddrTable
- snmpTargetAddrExtTable
- snmpTargetParamsTable
- snmpNotifyFilterProfileTable
- snmpNotifyFilterTable
- snmpCommunityTable
- usmUserTable
- vacmContextTable
- vacmSecurityToGroupTable
- vacmAccessTable
- vacmViewTreeFamilyTable

A vCM MUST NOT set to 'active' an entry created using the SNMPv3 Notification Receiver TLV that does not satisfy the corresponding [RFC 3413] requirements to do so. This type of misconfiguration does not stop the vCM from registering; however, the SNMP notification process may not work as expected.

6.5.1.4.1 Mapping of TLV Fields into Created SNMPv3 Table Rows

This section of the [OSSIv3.0] specification describes how the SNMPv3 Notification Receiver TLV elements are used to populate the corresponding SNMPv3 tables.

A vCM MUST implement the population of SNMPv3 tables as described in the corresponding section of the [OSSIv3.0] specification.

6.5.1.5 Non-SNMP Fault Management Protocols

The [OSSIv3.0] specification provides for the use of other tools and techniques to examine faults at the different protocol layers.

The DPoE System MUST support IP end-station generation of ICMP error messages and processing of all ICMP (ICMPv4 and ICMPv6) messages for IP addresses on any of its D interfaces.

A vCM MUST support IP end-station generation of ICMP (ICMPv4 and ICMPv6) error messages and processing of all ICMP (ICMPv4 and ICMPv6) messages.

Due to the lack of a native IP stack on the D-ONU, the D-ONU will not respond to ICMP (ICMPv4 and ICMPv6) Echo Request messages received on its CMCI interfaces targeted towards the vCM's management IP address. A vCM MUST respond to ICMP (ICMPv4 and ICMPv6) Echo Requests on behalf of the attached D-ONUs,

6.5.2 Configuration Management

The [OSSIv3.0] specification defines two categories of configuration information: non-operational and operational.

Non-operational changes occur when a management application issues a modify command to a DPoE System, and the change doesn't affect the operating environment. An example of a non-operational change is the modification of the system contact for the DPoE System. Operational changes are those that affect the behavior of the system.

The DPoE System MUST support the use of the SNMP protocol interface for the modification of operational and non-operational information. A vCM MUST support the use of the SNMP protocol interface for the modification of operational and non-operational information.

The DPoE System can support other configuration mechanisms, such as a Command Line Interface as defined in [DPoE-IPNEv2.0].

6.5.2.1 Version Control[14]

A vCM MUST support the docsDevSwCurrentVers MIB object from the DOCS-CABLE-DEVICE-MIB to report the current firmware version of the D-ONU.

A vCM MUST report the sysDescr object value using the following fields and format:

Type	Value
HW_REV	<Hardware Version>
VENDOR	<Vendor Name>
BOOTR	<Boot ROM Version>
SW_REV	<Software Bundle>
MODEL	<Model Number>

A vCM MUST report each Type field and corresponding Value field separated with a colon followed by a single space and each Type-Value pair is separated by a semicolon followed by a single blank space. The format is shown below:

HW_REV: <value>; VENDOR: <value>; BOOTR: <value>; SW_REV: <value>; MODEL: <value>

A vCM MUST report a value of 'NONE' if the field is not supported on the D-ONU.

Other string data may be included in the sysDescr field, but a vCM MUST delimit the formatted string specified above by an opening "<<" and a closing ">>" to clearly identify the mandatory version fields.

The DPoE System MUST support the sysDescr field, but its content and format is vendor-specific.

6.5.2.2 System Configuration

A vCM MUST support system configuration by configuration file, configuration-file-based SNMP encoded objects, and SNMP Set operations. A vCM MUST support any valid configuration file as defined in the [DPoE-MULPIv2.0] specification.

The DPoE System MUST support system configuration via SNMP Set operations for objects under its control.

[14] Revised per OSSIv2.0-N-16.0246-1 on 11/1/16 by JB.

6.5.2.3 Secure Software Download

A vCM MUST use the Secure Software Download (SSD) process documented in [DPoE-SECv2.0] to upgrade the firmware for the D-ONU.

The vCM MUST support both the SNMP-initiated and configuration-file-initiated methods to trigger the Secure Software Download. A DPoE System MAY support either one or both methods to trigger Secure Software Download.

To support an SNMP-initiated upgrade, a vCM MUST have a valid X.509 code verification certificate on behalf of the D-ONU.

If the docsDevSwAdminStatus (from the DOCS-CABLE-DEVICE-MIB) object on the vCM is set to 'ignoreProvisioningUpgrade', the vCM MUST ignore any software download configuration setting and not attempt a configuration-file-initiated upgrade. A vCM MUST preserve the value of the docsDevSwAdminStatus object across reset/reboots of the vCM and, by extension, the DPoE System.

A vCM MUST use 'allowProvisioningUpgrade' as the default value for the docsDevSwAdminStatus object until it is over-written by 'ignoreProvisioningUpgrade' after a successful SNMP-initiated software upgrade or is modified by an external manager.

A vCM MUST preserve the value of the docsDevSwOperStatus object for the vCM across reset/reboots of the vCM.

After a vCM has completed a configuration-file-initiated secure software upgrade, a vCM MUST cause the D-ONU to reboot and become operational using the correct software image as described in [DPoE-MULPIv2.0]. After the vCM has registered following a reboot after a configuration-file-initiated secure software upgrade, the vCM MUST satisfy the following requirements:

- The vCM MUST report 'allowProvisioningUpgrade' as the value for the docsDevSwAdminStatus object.
- The vCM SHOULD report the filename of the software currently operating on the D-ONU as the value for the docsDevSwFilename object.
- The vCM SHOULD report the IP address of the software download server containing the software currently running on the D-ONU as the value for the docsDevSwServerAddress.
- The vCM MUST report 'completeFromProvisioning' as the value for the docsDevSwOperStatus object.
- The vCM MUST report the current version of the software that is operating on the D-ONU as the value for the docsDevSwCurrentVers object.

After the vCM has completed an SNMP-initiated secure software upgrade, the vCM MUST cause the D-ONU to reboot and become operational using the correct software image as described in [DPoE-MULPIv2.0]. After the vCM has registered following a reboot, after an SNMP-initiated secure software upgrade, the vCM MUST satisfy the following requirements:

- The vCM MUST report 'ignoreProvisioningUpgrade' as the value for the docsDevSwAdminStatus object.
- The vCM SHOULD report the filename of the software currently operating on the D-ONU as the value for the docsDevSwFilename object.
- The vCM SHOULD report the IP address of the Software Download server containing the software currently running on the D-ONU as the value for the docsDevSwServerAddress.
- The vCM MUST report 'completeFromMgmt' as the value for the docsDevSwOperStatus object.
- The vCM MUST report the current version of the software that is operating on the D-ONU as the value for the docsDevSwCurrentVers object.

If the D-ONU suffers a loss of power or resets during an SNMP-initiated upgrade, the vCM MUST resume the upgrade without manual intervention. While the upgrade is in progress, the vCM MUST report 'inProgress' as the value for the docsDevSwOperStatus object.

In the case where the vCM reaches the maximum number of TFTP Download Retries as specified in [DPoE-MULPIv2.0], the vCM MUST behave as specified in [DPoE-MULPIv2.0]. In the case where the vCM successfully downloads an image that is not intended for the D-ONU associated with the vCM, the vCM MUST behave as specified in [DPoE-MULPIv2.0].

In the case where the vCM successfully downloads an image that is determined to be corrupted, the vCM MUST reject the corrupted image. The vCM MAY re-attempt to download if the maximum number of TFTP Download Retries has not been reached. If the vCM does not retry, the D-ONU MUST continue to run the last known working firmware image and proceed to an operational state. The vCM MUST generate two notifications: one to notify that the vCM has reached the maximum number of retries, and another to notify that the image is damaged.

For the failure scenarios listed above, the vCM MUST satisfy the following requirements:

- The vCM MUST report 'allowProvisioningUpgrade' as the value for the docsDevSwAdminStatus object.
- The vCM MUST report the filename of the software image that failed the upgrade process as the value for the docsDevSwFilename object.
- The vCM MUST report the IP address of the Software Download server containing the software image that failed the upgrade process as the value for the docsDevSwServerAddress.
- The vCM MUST report 'other' as the value for the docsDevSwOperStatus object.
- The vCM MUST report the current version of the software that is operating on the D-ONU as the value for the docsDevSwCurrentVers object.

6.5.2.4 CM Configuration Files, TLV-11 and MIB OIDs/Values

The following sections of the [OSSIv3.0] specification define the use of CM configuration file TLV-11 elements and the rules for translating TLV-11 elements into SNMP PDU varbinds (SNMP MIB OID/instance and MIB OID/instance value combinations).

A vCM is expected to satisfy all requirements related to CM configuration file processing. The existing CM configuration file TLV-11 elements are still applicable to the configuration and operation of the vCM.

6.5.2.4.1 CM Configuration File TLV-11 Element Translation (to SNMP PDU)

A vCM is required to translate CM configuration file TLV-11 elements into a single SNMP PDU containing MIB OID/instance and value components (SNMP varbinds). Once a single SNMP PDU is constructed, the vCM processes the SNMP PDU and determines if the CM configuration passes or fails, based on the rules for CM configuration file processing.

In accordance with [RFC 3416], the single, generated SNMP PDU will be treated "as if simultaneous" and the vCM MUST behave consistently, regardless of the order in which TLV-11 elements appear in the CM configuration file or in the SNMP PDU.

The CM configuration file cannot contain duplicate TLV-11 elements (SNMP MIB objects with identical OIDs). If the configuration file received by the vCM contains duplicate TLV-11 elements, the vCM MUST reject the configuration file.

A vCM MUST support the 'createAndGo' row creation method (as defined in [RFC 2579]).

A vCM MAY support the 'createAndWait' row creation method (as defined in [RFC 2579]). If 'createAndWait' is supported, the intended result is to create an SNMP table row that will remain in the 'notReady' or 'notInService' state until a non-configuration SNMP PDU is received to update the SNMP table row status.

6.5.2.4.2 CM Configuration File TLV-11 Elements Not Supported by the CM

If the CM configuration file contains SNMP OIDs that are not supported by the vCM, then the vCM MUST ignore those SNMP varbinds and treat them as if they were not present.

If the vCM does not support 'createAndWait' row states, the vCM MUST ignore those objects in the associated table row.

If any CM configuration file TLV-11 elements are ignored, the vCM MUST report them via the configured notification mechanisms after the vCM is registered.

6.5.2.4.3 CM State After CM Configuration File Processing Success

After the vCM successfully processes the CM configuration file, the vCM MUST use the appropriate OAM messages, as defined in [DPoE-OAMv2.0], to configure the D-ONU to transition the vCM to an operational state.

6.5.2.4.4 CM State After CM Configuration File Processing Failure

If any CM configuration file-generated SNMP varbind performs an illegal set operation, the vCM MUST reject the configuration file. The vCM MUST NOT proceed with the registration process.

6.5.2.5 IPDR Exporter Configuration

The [OSSIv3.0] specification allows for the possibility of a management interface to configure the following aspects related to IPDR Streaming:

- Authorized collectors' access list.
- Redundant collector policies for streaming sessions.
- Configuration of time intervals for exporting.
- IPDR/SP KeepAlive ackSequenceInterval and ackTimeInterval parameters.
- Configurable document boundaries using session start/stop messages (both for time interval and event sessions with topology services).
- Configuration of single service in multiple sessions that use different export methodologies (ad-hoc/event or ad-hoc/time).

6.5.3 Accounting Management

The [OSSIv3.0] specification defines an accounting management interface for subscriber usage-based applications called Subscriber Account Management Interface Specification (SAMIS). SAMIS enables vendors of cable modems and cable modem termination systems to address the operational requirements of subscriber account management in a uniform and consistent manner.

Subscriber account management described here refers to the following business processes and terms:

- Class of Service Provisioning Processes, which are involved in the automatic and dynamic provisioning and enforcement of subscribed class of policy-based Service Level Agreements (SLAs).
- Usage-Based Billing Processes, which are involved in the processing of bills based on services rendered to, and consumed by, paying subscribers. This specification focuses primarily on bandwidth-centric usage-based billing scenarios. It complements the PacketCable Event Messages Specification [PC EMv1.0].

6.5.3.1 Subscriber Usage Billing and Class of Services

This section of the [OSSIv3.0] specification defines the high-level functional requirements for support of the SAMIS interface using IPDR.

6.5.3.2 DOCSIS Subscriber Usage Billing Requirements

The DPoE System MUST support subscriber usage billing by implementing SAMIS, based on the TM Forum's BSR specification version 3.5 [IPDR/BSR], in this version of the DPoE specifications.

6.5.4 Performance Management

The [OSSIv3.0] specification provides high-level requirements on the monitoring of the MAC and PHY interfaces using the standard interface statistics (via the IF-MIB [RFC 2863]). The DPoE System will continue to support these same statistics to provide continuity from the DOCSIS systems for the corresponding EPON interfaces.

To monitor behavior at the LLC layer, the performance management focus is on bridge traffic management via the BRIDGE-MIB [RFC 4188] as supported on the modem. The vCM also will support the BRIDGE-MIB by using DPoE OAM messages to retrieve the appropriate statistics from the D-ONU.

The [OSSIv3.0] specification emphasizes the importance of supporting the CMTS diagnostic log capabilities (DOCS-DIAG-MIB) to provide early detection of modem and plant problems. The DPoE System also will support the DOCS-DIAG-MIB to provide similar functionality to existing DOCSIS systems.

The [OSSIv3.0] specification also emphasizes the importance of supporting the objects in the DOCS-IF-MIB [RFC 4546] to track DOCSIS PHY and MAC layer attributes, such as signal-to-noise ratios, micro-reflections, and ranging retry requests. Due to the differences between the DOCSIS PHY and MAC layers and the EPON PHY and MAC layers, support for these statistics will not be possible in the DPoE Network.

6.5.4.1 Treatment and Interpretation of MIB Counters

The [OSSIv3.0] specification defines the expected behavior for all counter statistics supported by DOCSIS devices. There are specific requirements for the behavior of counter attributes in the following cases:

Case 1: The state of an interface changes resulting in an "interface counter discontinuity" as defined in [RFC 2863].

When the state of an interface changes for a vCM, the ifCounterDiscontinuityTime for the affected interface MUST be set to the current value of sysUpTime and all counters on the interface set to zero. Setting the ifAdminStatus for an interface is not considered an interface reset.

When the state of an interface changes for the DPoE System, the ifCounterDiscontinuityTime for the affected interface MUST be set to the current value of sysUpTime and all counters on the interface set to zero. Setting the ifAdminStatus for an interface is not considered an interface reset.

Case 2: SNMP Agent Reset

An SNMP Agent Reset is defined as the reinitialization of the SNMP Agent when the device being managed by the SNMP Agent is rebooted or reset.

When the DPoE System is rebooted, the DPoE System MUST:

- set the value of sysUpTime to zero.
- set all interface ifCounterDiscontinuityTime values to zero.
- set all interface counters to zero.
- set all other counters maintained by the vCM SNMP Agent to zero.

When the vCM or D-ONU is rebooted, the vCM MUST:

- set the value of sysUpTime to zero.
- set all interface ifCounterDiscontinuityTime values to zero.
- set all interface counters to zero.
- set all other counters maintained by the vCM SNMP Agent to zero.

Case 3: Counter Rollover

When a counter reaches the maximum value for its precision within the DPoE System, then the counter value MUST roll over to zero when incremented.

When a counter reaches the maximum value for its precision within a vCM, then the counter value MUST roll over to zero when incremented.

6.5.5 Security Management

The DPoE System MUST provide SNMP responses in accordance with the SNMP framework defined in [RFC 3411] through [RFC 3416].

The vCM MUST provide SNMP responses in accordance with the SNMP framework defined in [RFC 3411] through [RFC 3416].

6.5.5.1 DPoE System SNMP Modes of Operation[15]

The DPoE System SNMP Coexistence Mode is subject to the following requirements and limitations:

- The DPoE System MUST process SNMP v1/v2c Packets as described in [RFC 3411] through [RFC 3415], and [RFC 3584]..
- If the DPoE System supports the SNMPv3 protocol, it MUST process SNMP v3 Packets as described in [RFC 3411] through [RFC 3415] and [RFC 3584]..
- SNMP Access control is determined by the SNMP-COMMUNITY-MIB [RFC 3584] and SNMP-TARGET-MIB [RFC 3413], SNMP-VIEW-BASED-ACM-MIB [RFC 3415], and SNMP-User-Based-SM-MIB [RFC 3414].
- The DPoE System MUST support the SNMP-COMMUNITY-MIB [RFC 3584] which controls SNMPv1/v2c packet community string associations to a security name to select entries for access control in the SNMP-VIEW-BASED-ACM-MIB [RFC 3415]..
- The DPoE System SHOULD support the SNMP-USER-BASED-SM-MIB [RFC 3414] and SNMP-VIEW-BASED-ACM-MIB [RFC 3415] to control SNMPv3 packets..
- The DPoE System MUST support SNMP Notification destinations as specified in the SNMP-TARGET-MIB and SNMP-NOTIFICATION-MIB [RFC 3413].

The DPoE System MAY support SNMPv3 with AES encryption as defined in [RFC 3826].

6.5.5.2 DPoE System SNMP Access Control Configuration

If the DPoE System supports SNMPv3, the DPoE System MUST support the SNMPv3 key change mechanism defined in [RFC 3414].

6.5.5.3 vCM SNMP Modes of Operation

A vCM MUST support SNMPv1, SNMPv2c, and SNMP-Coexistence [RFC 3584].

A vCM SHOULD support SNMPv3 [RFC 3414].

A vCM access control configuration MUST support SNMPv1v2c in NmAccess mode as well as SNMP-Coexistence mode.

6.5.5.4 vCM SNMP Access Control Configuration

This section in the [OSSIv3.0] specification defines the expected behavior for SNMP access control for the modem as configured by the modem configuration file. Further, it defines the expected support for the SNMP Kickstart process used to provide a set of access controls for a modem.

A vCM SHOULD support the SNMPv3 Kickstart process.

See the [OSSIv3.0] specification for more details on the expected support for SNMPv3 agent implementations, as well as the expected behavior when running in SNMP coexistence mode.

[15] Revised per OSSIv2.0-N-13.0109-1 on 10/18/13 by JB.

6.5.5.5 IPDR Streaming Protocol Security Model

The [OSSIv3.0] specification includes no additional security requirements for the use of IPDR/SP beyond those which are already specified in the [IPDR/SP] specification.

6.6 OSSI for CMCI

This section of the [OSSIv3.0] specification defines the operational mechanisms needed to support the transmission of data-over-cable services between a CM and Customer Premise Equipment (CPE) as defined in CM-SP-CMCI.

These specifications do not apply to CE connected to MU or DEMARC connected to MI.

6.6.1 SNMP Access Via CMCI[16]

[OSSIv3.0] also specifies the possibility of SNMP management prior to successful modem registration. Because the D-ONU does not have a native SNMP stack accessible via the CMCI interface, there is no requirement to support SNMP access to the ONU from the CMCI interface.

[OSSIv3.0] also contains requirements regarding the use of special IP addresses, such as 192.168.100.1, link-local methods as defined in [RFC 3927], and IPv6 link-local addresses to provide SNMP management access via the CMCI interface. As above, these requirements do not apply to the DPoE System or the D-ONU itself.

6.6.2 Console Access

[OSSIv3.0] contains requirements indicating that access to the console port on the CM is prohibited. A console port is defined as a communication path that allows the user to issue commands that affect the modem's configuration or operational status.

The D-ONU SHOULD NOT allow a communication path that permits a user to issue commands to or modify the configuration or operational status of the D-ONU from the CMCI, LCI, MU or MI interfaces. S-ONUs with eSAFEs MAY allow a communication path that permits a user or operator to issue commands to or modify the configuration or operational status of the eSAFE.

6.6.3 CM Diagnostic Capabilities

[OSSIv3.0] provides for the possibility of a diagnostic interface on the modem to be used for debugging or troubleshooting.

The D-ONU MAY have a diagnostic interface for debugging and troubleshooting purposes.

The D-ONU's diagnostic interface SHOULD be disabled by default after registration has been completed.

The D-ONU MAY provide additional controls that will enable the operator to alter or customize the diagnostic interface, such as by the configuration process, or management through the setting of a proprietary MIB.

6.6.4 Protocol Filtering[17]

Protocol Filtering in the DPoE System MUST be implemented as described in Annex F of [OSSIv3.0], with the following exceptions:

- Legacy Filters (as specified in the DOCS-CABLE-DEVICE_MIB) are not required.
- Downstream Filtering (as specified in the DOCS-SUBMGT3-MIB) is required.
- Upstream Filtering (as specified in the DOCS-SUBMGT3-MIB) is optional.

Protocol Filtering in the D-ONU MUST be implemented as described in Annex F of [OSSIv3.0], with the following exceptions:

- Legacy IP Policy Filters are not required.

[16] Revised per OSSIv2.0-N-14.0164-1 and OSSIv2.0-N-14.0174-1 on 6/26/14 by JB.
[17] Revised per OSSIv2.0-N-14.0152-1 on 5/30/14 by JB.

- A value of 'accept' for docsDevFilterIpDefault MUST be supported. Support for a value of 'discard' is not required.
- Upstream Drop Classifiers are not required to support IPv6 filtering in the current version of the specification.
- A DPoE System MUST ignore TLV 11 with the docsDevFilterIpDefault SNMP object with the value of 'discard', if this value is not supported.

Protocol Filtering in the vCM MUST be implemented as described in Annex F of [OSSIv3.0], with the following exceptions:

- The ability to add, delete, or modify Upstream Drop Classifiers (UDC) via SNMP is not required because docsQosPktClassTable is a read-only table. UDC changes, therefore, require a reset of the vCM (and the associated D-ONU).

6.7 OSSI for CM Device

The [OSSIv3.0] specification section contains requirements on the use of standard front-panel light-emitting diodes (LEDs) that present straightforward information about the registration state of the CM to facilitate customer support operations.

6.7.1 CM LED Requirements and Operation

The [OSSIv3.0] specification has more detailed requirements on the expectations for the behavior of the LEDs, as well as specific requirements on the minimum five LEDs that should be visible on the CM. Those LEDs are:

- Box: one LED labeled as Power for the overall CM status.
- DOCSIS: three LEDs labeled as DS, US, and Online.
- CPE: a minimum of one LED labeled as LINK for the link status for the CPE interface. If the CM has more than one CPE interface, then it should have a separate LED for each link.

Further, there are requirements on the order of the LEDs on the front of the ONU so that customers (or service reps) can view the logical progression of the modem through the registration process (i.e., sync, ranging, and registration).

The following sub-sections contain specific requirements on the LED behavior for the modem, based on the modem's state.

Although it is recognized that providing a uniform and common set of diagnostic LEDs is important, the specification of the LED behavior is outside the scope of this version of the DPoE specifications.

6.7.1.1 Power On, Software Application Image Validation, and Self-Test

This section intentionally left blank.

6.7.1.2 Scan for Downstream Channel

This section intentionally left blank.

6.7.1.3 Resolve CM-SG and Range

This section intentionally left blank.

6.7.1.4 Operational

This section intentionally left blank.

6.7.1.5 Data Link and Activity

This section intentionally left blank.

6.7.2 Additional CM Operation Status Visualization Features

The [OSSIv3.0] specification allows vendors to change the LED behavior if the modem is in a proprietary mode of operation. It also requires that external indicators not be used to reveal modem provisioning information.

6.7.2.1 Secure Software Download

The [OSSIv3.0] specification has requirements on the lighting of LEDs when the modem firmware is being upgraded.

Although it is recognized that providing a uniform and common set of diagnostic LEDs is important, the specification of the LED behavior is outside the scope of this version of the DPoE specifications.

6.7.3 OSSI Annexes

The [OSSIv3.0] specification includes several Annex appendices that include requirements or further clarifications on the new objects defined in the [OSSIv3.0] specification. The following table summarizes the applicability of those Annexes to this specification:

Table 4 - OSSIv3.0 Applicability to DPoE-OSSIv2.0

Annex [OSSIv3.0]	Title	Applicability to the DPoE OSSI Specification
Annex A	Detailed MIB Requirements (Normative)	Covered in this specification.
Annex B	IPDR for DOCSIS Cable Data Systems Subscriber Usage Billing Records	Refer to Section 10 of this document for clarifications and DPoE support requirements.
Annex C	Auxiliary Schemas for DOCSIS IPDR Service Definitions	Refer to Section 10 of this document for clarifications to DPoE support for [OSSIv3.0] IPDR Service Definitions.
Annex D	Format and Content for Event, SYSLOG, and SNMP Notification	Covered in this specification in Section 10.
Annex E	Application of MGMD-STD-MIB to DOCSIS 3.0 MGMD Devices	Not applicable to this version of DPoE specifications.
Annex F	Protocol Filtering	Covered in this specification in Section 6.6.4.
Annex G	Diagnostic Log	No additional clarifications are needed in this specification because this section provides more clarifying text on the Diagnostic Log objects.
Annex H	Requirements for DOCS-IFEXT2-MIB	No additional clarifications are needed in this specification because this section just includes the text of the DOCS-IFEXT2-MIB.
Annex I	Load Balancing Requirements	No additional clarifications are needed in this specification because this section provides more clarifying text on the DOCSIS Load Balancing objects.
Annex J	Enhanced Signal Quality Monitoring Requirements	Not applicable to EPON because it focuses on RF network monitoring diagnostics.
Annex K	DOCSIS 3.0 Data Type Definitions	No additional clarifications are needed in this specification because this section just lists the base data types used in the DOCSIS SNMP and IPDR object definitions.
Annex L	Security Requirements	No additional clarifications are needed in this specification because this section provides more clarifying text on the DOCSIS Security objects added in the [OSSIv3.0] specification.
Annex M	Multicast Requirements	Covered in this specification.
Annex N	CM and CMTS Status Reporting Requirements	No additional clarifications are needed in this specification because this section provides more clarifying text on the DOCSIS Monitoring objects added in the [OSSIv3.0] specification.
Annex O	Media Access Control (MAC) Requirements	No additional clarifications are needed in this specification because this section provides more clarifying text on the MAC Layer objects added in the [OSSIv3.0] specification.
Annex P	Subscriber Management Requirements	No additional clarifications are needed in this specification because this section provides more clarifying text on the Subscriber Management objects added in the [OSSIv3.0] specification.

Annex [OSSIv3.0]	Title	Applicability to the DPoE OSSI Specification
Annex Q	DOCSIS 3.0 SNMP MIB Modules	No additional clarifications are needed in this specification because this section just contains the actual text of the new MIBS defined in the [OSSIv3.0] specification.
Annex R	IPDR Service Definition Schemas	Refer to Section 10 of this document for clarifications to DPoE support for [OSSIv3.0] IPDR Service Definitions.

6.8 EPON Requirements

This section captures those OSSI requirements specific to the management and control of the EPON infrastructure.

6.8.1 Provisioning

Refer to [DPoE-IPNEv2.0] for provisioning and configuration requirements of the DPoE System.

6.8.2 EPON MIBs[18]

The DPoE System MUST implement [802.3.1] IEEE8023-DOT3-EPON-MIB

The DPoE vCM MUST implement [802.3.1] IEEE8023-DOT3-EPON-MIB.

Specific support requirements are listed in Section 6.8.2.1

6.8.2.1 IEEE823-DOT3-EPON MIB[19]

Object	vCM	DPoE System	Comments
dot3MpcpControlTable	MUST	MUST	
dot3MpcpStatTable	MUST	MUST	
dot3OmpEmulationTable	MUST	MUST	
dot3OmpEmulationStatTable	MUST	MUST	
dot3EponFecTable	MUST	MUST	This table does not provide Unerrored blocks (see DOCS-IF3-MIB).
dot3ExtPkgControlTable	MUST	MUST	
dot3ExtPkgQueueTable	MUST	MUST	
dot3ExtPkgQueueSetsTable	MUST	MUST	
dot3ExtPkgOptIfTable	MUST	MUST	Units of Power are "0.1 dBm" (Note: dBm is also known as dBmW)
dot3RecognizedMulticastIDsTable	MUST	MUST	

[18] Revised per OSSIv2.0-N-15.0213-1 on 10/12/15 by JB.
[19] Revised per OSSIv2.0-N-17.0251-1 on 4/17-17 by JB

7 SUPPORT FOR DOCSIS 3.0 OSSI MIBS[20]

The DPoE System MUST support the list of MIBs required of the CMTS, as required by [OSSIv3.0] except where noted in the following tables. The vCM MUST support the list of MIBs required of the CM, as required by [OSSIv3.0] except where noted in the following tables, on behalf of the attached ONU device.

The informative Table 8 provides a high-level summary of the applicability of each DOCSIS MIB from [OSSIv3.0] to either the vCM on the DPoE System, or the DPoE System (acting as a CMTS). An X in the column indicates whether the MIB applies to the vCM or the DPoE System. The sub-sections which follow contain the detailed normative requirements for each of the MIBs listed in Table 8.

In Table 7 the relationship between the DOCSIS 3.0 OSSI Annex A MIB requirement notation and the DPoE MIB requirement notation used throughout this section is provided.

For more detail on how specific MIB objects are supported within a MIB module, see the corresponding section for the MIB modules themselves in [OSSIv3.0]. If this specification defines the MIB table as required and the MIB objects are not further defined (Heading level 3) in this specification, refer to the DOCSIS MIB requirements from [OSSIv3.0]. The MIB objects are to be supported as specified in the DOCSIS Annex A "Detailed MIB Requirements" [OSSIv3.0]. Table 5 provides one example of a Heading level 2 MIB requirement table. In this example, mibATable is required to be supported according to the OSSIv3.0 Annex A requirements [OSSIv3.0] for both the vCM and DPoE System. In addition, mibBTable is not applicable to the vCM and is not to be implemented in the DPoE System.

Table 5 - Heading Level 2 Example MIB Requirements Table

Table Name	vCM	DPoE System	Comments
mibATable	MUST	MUST	
mibBTable		MUST NOT	Operator feedback is that this table is not applicable to an EPON network.

The following sections are adapted from the corresponding MIB tables included in Annex A in [OSSIv3.0]. Each MIB Module section (Heading level 2) provides a table that provides a high-level analysis at the table (or group) level of whether the table is applicable to DPoE Elements.

The vCM column indicates whether the table/group/object is to be supported for the vCM as specified in [OSSIv3.0]. The DPoE System column indicates whether the table/group/object is to be supported for the DPoE System as specified in [OSSIv3.0].

The Comments column is used to capture any special implementation comments regarding support for the object (or why the object need not be supported) by the DPoE System or vCM.

For some tables within a MIB Module, more implementation details are provided to lend guidance to how to support the table objects. When needed, sub-sections (Heading level 3) are provided for the MIB to provide these details. If this specification further defines MIB object details (Heading level 3) in the sub-sections below, these details and requirements supersede those specified in [OSSIv3.0]. Table 6 provides one example of a Heading level 3 MIB requirement table. In this example, mibATable is expanded to show the individual MIB object requirements, for the objects within the table, for both the vCM and DPoE System. In this case, mibAAttribute1 is required to be implemented in the DPoE System but optional in the vCM while mibAAttribute2 is required to be implemented in the vCM but is not to be implemented in the DPoE System. The key difference here is that the mibATable individual object requirements were not taken from DOCSIS OSSI Annex A since they were explicitly defined within a Heading level 3 section in the DPoE specification.

[20] Revised per OSSIv2.0-N-13.0089-3 on 7/22/13 by JB.

Table 6 - Heading Level 3 Example MIB Requirements Table

Object	vCM	DPoE System	Comments
mibATable	MUST	MUST	
mibAEntry	MUST	MUST	
mibAAttribute1	MAY	MUST	
mibAAttribute2	MUST	MUST NOT	

Table 7- Relationship between OSSIv3.0 MIB Requirement Notation and DPoE Specifications

OSSIv3.0 Requirement Type	OSSIv3.0 Table Notation	DPoE MIB Requirement Mapping	Description
Deprecated	D	Not Used	This convention is not used in the DPoE Specification.
Mandatory	M	MUST	This mapping indicates the MIB Module/Table/Group/Object is required to be supported in the DPoE Specification.
Not Applicable	NA	MUST NOT	This mapping indicates the MIB Module/Table/Group/Object is not to be implemented in the DPoE Specification.
Not Supported	N-Sup	MUST NOT	This mapping indicates the MIB Module/Table/Group/Object is not to be implemented in the DPoE Specification.
-	-	SHOULD NOT	This mapping indicates the MIB Module/Table/Group/Object should not be implemented since it is not applicable to the current version of the DPoE Specification.
Optional	O	MAY/SHOULD	This mapping indicates the MIB Module/Table/Group/Object is optional to implement in the DPoE Specification. A vendor can choose to implement or not to implement the item.
Obsolete	Ob	Not Used	This convention is not used in the DPoE Specification.

Table 8 - Relationship between OSSIv3.0 MIBS and DPoE Specifications

MIB	From	vCM	DPoE System	Comment
BRIDGE-MIB	RFC 4188	X	X	
CLAB-TOPO-MIB	***Annex Q***		***X***	***Operators do not see the architectural correlation for DPoE Networks.***
DOCS-BPI-MIB	*RFC 3083*			*Not applicable to EPON.*
DOCS-DRF-MIB	*OSSI-M*			*Not applicable to EPON.*
DOCS-CABLE-DEVICE-MIB	RFC 4639	X	X	
DOCS-DIAG-MIB	Annex Q		X	
DOCS-IETF-BPI2-MIB	RFC 4131	X	X	Baseline privacy key exchange does not apply to EPON. AES-128-bit traffic encryption is available.
DOCS-IF-MIB	RFC 4546	X	X	
DOCS-IF3-MIB	Annex Q	X	X	
DOCS-IFEXT2-MIB	*Annex H*			*This is an optional table with little value on the DPoE System. Parameters on CM are not applicable to EPON.*
DOCS-LOADBAL3-MIB	*Annex Q*			*Load balancing doesn't apply to EPON.*
DOCS-MCAST-AUTH-MIB	Annex Q		X	
DOCS-MCAST-MIB	Annex Q		X	
DOCS-QOS3-MIB	Annex Q	X	X	
DOCS-SEC-MIB	Annex Q		X	
DOCS-SUBMGT3-MIB	Annex Q		X	
ENTITY-MIB	RFC 4133	X	X	

MIB	From	vCM	DPoE System	Comment
ENTITY-SENSOR-MIB	RFC 3433	X	X	
EtherLike-MIB	RFC 3635	X	X	
HOST-RESOURCES-MIB	RFC 2790	X	X	
IF-MIB	RFC 2863	X	X	
IGMP-STD-MIB	RFC 2933		X	The D-ONU is not required to be an active participant in the IGMP protocol and does not need to snoop IGMP packets. However, if a vendor chooses to support this functionality within the D-ONU, the MGMD-STD-MIB would be implemented in place of the IGMP-STD-MIB on the vCM.
IP-MIB	RFC 4293	X	X	
MGMD-STD-MIB	RFC 5519		X	The D-ONU is not required to be an active participant in the IGMP or MLD protocols and does not need to snoop IGMP or MLD packets. However, if a vendor chooses to support this functionality within the D-ONU, the MGMD-STD-MIB would be implemented. on the vCM.
SNMP Applications	RFC 3413	X	X	
SNMP-COMMUNITY-MIB	RFC 3584	X	X	
SNMP-FRAMEWORK-MIB	RFC 3411	X	X	
SNMP-MPD-MIB	RFC 3412	X	X	
SNMP-USER-BASED-SM-MIB	RFC 3414	X	X	
SNMP-USM-DH-OBJECTS-MIB	RFC 2786	X	X	
SNMP-VIEW-BASED-ACM-MIB	RFC 3415	X	X	
SNMPv2-MIB	RFC 3418	X	X	
TCP-MIB	RFC 4022	X	X	
UDP-MIB	RFC 4113	X	X	

7.1 BRIDGE-MIB ([RFC 4188])

Table Name	vCM	DPoE System	Comments
dot1dBase	MUST	MUST	
dot1dBasePortTable	MUST	MUST	
dot1dStp	SHOULD NOT	MUST	As support for STP is currently not required for a D-DPoE ONU, the objects within this group are not applicable for vCMs.
dot1dStpPortTable	SHOULD NOT	MUST	As support for STP is currently not required for a D-DPoE ONU, this table is not applicable for vCMs.
dot1dTp	MUST	MUST	
dot1dTpFdbTable	MUST	MUST	
dot1dTpPortTable	SHOULD NOT	MUST	
dot1dStaticTable	MUST	MUST	

7.2 CLAB-TOPO-MIB ([OSSIv3.0] Annex Q)[21]

Table Name	vCM	DPoE System	Comments
clabTopoFiberNodeCfgTable		MUST NOT	This table is not applicable to an EPON network.
clabTopoChFnCfgTable		MUST NOT	This table is not applicable to an EPON network.

7.3 DOCS-CABLE-DEVICE-MIB ([RFC 4639])

Table Name	vCM	DPoE System	Comments
docsDevBase	MUST	MUST	
docsDevServer	MUST		
docsDevCpe	MUST		
docsDevCpeTable	MUST		This table could be used for pre-DOCSIS 3.0 style modem configuration files.
docsDevCpeInetTable	MUST		
docsDevNmAccessTable	MUST	MUST	These objects are used by operators to use SNMPv1/v2 to manage their networks.
docsDevSoftware	MUST	MUST	
docsDevEvent	MUST	MUST	
docsDevEvControlTable	MUST	MUST	
docsDevEventTable	MUST	MUST	
docsDevFilter	MUST	MUST NOT	
docsDevFilterLLCTable	MUST	MUST NOT	
docsDevFilterIpTable	MUST	MUST NOT	
docsDevFilterPolicyTable	MUST NOT	MUST NOT	This table is deprecated and replaced with versions that support IPv6.
docsDevFilterTosTable	MUST NOT	MUST NOT	This table is deprecated and replaced with versions that support IPv6.

7.3.1 docsDevBase

Object	vCM	DPoE System	Comments
docsDevRole	MUST	MUST	A vCM MUST return a value of 'cm' for docsDevRole. A DPoE System MUST support the values of 'cmtsActive' and 'cmtsBackup' (depending on the current role of the DPoE System).
docsDevDateTime	MUST	MUST	Set to the same value for the DPoE System and the vCMs on the DPoE System.
docsDevResetNow	MUST	MUST	When set to 'true' for the vCM, the associated D-ONU is reset and the vCM within the DPoE System is also re-initialized. When set to 'true' for the DPoE System, the DPoE System is reset.
docsDevSerialNumber	MUST	MUST	A vCM MUST set the docsDevSerialNumber object to the Serial Number of the associated D-ONU. For the DPoE System, the value is vendor-specific.
docsDevSTPControl	MUST	MAY	A vCM MUST support the values of ‘noStFilterBpdu’ and ‘noStPassBpdu’. A vCM MUST NOT support setting this value to ‘stEnabled’.

[21] Revised per OSSIv2.0-N-15.0211-1 on 9/1/15 by JB.

Object	vCM	DPoE System	Comments
docsDevIgmpModeControl	SHOULD NOT	SHOULD NOT	Not supported in DPoE Networks.
docsDevMaxCpe	MUST	SHOULD NOT	The vCM MUST return the value specified via the modem configuration file for the docsDevMaxCpe object if the vCM is supporting IP(HSD) services. If the vCM is supporting MEF services, then the vCM MUST return a value of zero for the docsDevMaxCpe object.

7.3.2 docsDevServer[22]

Object	vCM	DPoE System	Comments
docsDevServerBootState	MUST		See Section 7.3.2.1 for additional information.
docsDevServerDhcp	MUST		
docsDevServerTime	SHOULD NOT		A vCM SHOULD NOT support the object docsDevServerTime. Because ToD retrieval is not required in DPoE Networks, this object is not required to return a non-zero value for the vCM.
docsDevServerTftp	MUST		
docsDevServerConfigFile	MUST		
docsDevServerDhcpAddressType	MUST		
docsDevServerDhcpAddress	MUST		
docsDevServerTimeAddressType	SHOULD NOT		A vCM SHOULD NOT support the object docsDevServerTimeAddressType. Since ToD retrieval is not required in DPoE Networks, this object is not required to return a non-zero value for the vCM.
docsDevServerTimeAddress	SHOULD NOT		A vCM SHOULD NOT support the object docsDevServerTimeAddress. Since ToD retrieval is not required in DPoE Networks, this object is not required to return a non-zero value for the vCM.
docsDevServerConfigTftpAddressType	MUST		
docsDevServerConfigTftpAddress	MUST		

7.3.2.1 docsDevServerBootState Object Mappings

CM State	Original Comment (as defined in DOCS-CABLE-DEVICE-MIB)	DPoE Applicability
operational(1)	The device has completed loading and processing of configuration parameters, and the CMTS has completed the Registration exchange.	The OLT on the DPoE System and D-ONU have been properly configured to support the parameters in the modem configuration file.
disabled(2)	The device was administratively disabled, possibly by being refused network access in the configuration file.	The vCM has been denied access because the modem configuration file cannot be supported by the DPoE System (or D-ONU).
waitingForDhcpOffer (3)	A Dynamic Host Configuration Protocol (DHCP) Discover has been transmitted, and no offer has yet been received.	The DPoE System has generated a DHCP Discover on behalf of the vCM.
waitingForDhcpResponse (4)	A DHCP Request has been transmitted, and no response has yet been received.	The DPoE System has generated a DHCP Request on behalf of the vCM.
waitingForTimeServer (5)	A Time Request has been transmitted, and no response has yet been received.	Not applicable to DPoE.
waitingForTftp (6)	A request to the TFTP parameter server has been made, and no response received.	The DPoE System has sent a TFTP request to the TFTP server.

[22] Revised per OSSIv2.0-N-13.0075-1 on 7/22/13 by JB.

CM State	Original Comment (as defined in DOCS-CABLE-DEVICE-MIB)	DPoE Applicability
refusedByCmts (7)	The Registration Request/Response exchange with the CMTS failed.	Not applicable to DPoE.
forwardingDenied (8)	The registration process was completed, but the network access option in the received configuration file prohibits forwarding.	The OLT on the DPoE System and D-ONU have been properly configured to support the parameters in the modem configuration file, but the configuration file has blocked network access for the ONU.
other(9)	The registration process reached a point that does not fall into one of the above categories.	
unknown(10)	The device has not yet begun the registration process or is in some other indeterminate state.	The vCM is in the process of initialization.

7.3.3 docsDevSoftware

Object	vCM	DPoE System	Comments
docsDevSoftware			This group is only mandatory for the vCM.
docsDevSwServer	MAY	MAY	Object has been deprecated. Address of the TFTP Server.
docsDevSwFilename	MUST	MAY	
docsDevSwAdminStatus	MUST	MAY	If set to 'upgradeFromMgt', then the DPoE System initiates an upgrade for the D-ONU associated with the vCM.
docsDevSwOperStatus	MUST	MAY	
docsDevSwCurrentVers	MUST	MAY	Set to the current firmware revision running on the D-ONU associated with the vCM.
docsDevSwServerAddressType	MUST	MAY	
docsDevSwServerAddress	MUST	MAY	Address of the TFTP Server.
docsDevSwServerTransportProtocol	MUST	MAY	A vCM MUST support a value of 'tftp' for docsDevSwServerTransportProtocol. A vCM MAY support a value of 'http' for docsDevSwServerTransportProtocol.

7.3.4 docsDevFilterLLCTable

Object	vCM	DPoE System	Comments
docsDevFilterLLCUnmatchedAction	MUST	MUST NOT	
docsDevFilterLLCTable	MUST	MUST NOT	
docsDevFilterLLCEntry	MUST	MUST NOT	
docsDevFilterLLCIndex	MUST	MUST NOT	
docsDevFilterLLCStatus	MUST	MUST NOT	
docsDevFilterLLCIfIndex	MUST	MUST NOT	
docsDevFilterLLCProtocolType	MUST	MUST NOT	
docsDevFilterLLCProtocol	MUST	MUST NOT	
docsDevFilterLLCMatches	MUST	MUST NOT	

7.3.5 docsDevFilterIpTable[23]

Object	vCM	DPoE System	Comments
docsDevFilterIpDefault	MUST	MUST NOT	A vCM MUST support a value of 'accept' for docsDevFilterIpDefault. A vCM MAY support a value of 'discard' for docsDevFilterIpDefault. A DPoE System MUST ignore TLV 11 with the docsDevFilterIpDefault SNMP object with the value of 'discard', if this value is not supported.
docsDevFilterIpTable	MUST	MUST NOT	
docsDevFilterIpEntry	MUST	MUST NOT	
docsDevFilterIpIndex	MUST	MUST NOT	
docsDevFilterIpStatus	MUST	MUST NOT	
docsDevFilterIpControl	MUST	MUST NOT	A vCM MAY support the values of 'accept' and 'discard' for docsDevFilterIpControl. A vCM MAY support a value of 'policy' for docsDevFilterIpControl.
docsDevFilterIpIfIndex	MUST	MUST NOT	A vCM MUST apply all inbound (docsDevFilterIpDirection ‘1’) filter entries associated with docsDevFilterIpIfIndex containing the value of ‘2’ (CATV-MAC) or ‘3’ (RF-Down) to the D-ONU Network (PON) Port OAM ingress rules (0xD7/0x501). A vCM MUST apply all outbound (docsDevFilterIpDirection ‘2’) filter entries associated with docsDevFilterIpIfIndex containing the value of ‘2’ (CATV-MAC) or ‘4’ (RF-Up) to all D-ONU User (UNI) Port OAM ingress rules (0xD7/0x501).
docsDevFilterIpDirection	MUST	MUST NOT	
docsDevFilterIpBroadcast	MUST	MUST NOT	A vCM MUST support a value of 'false' for docsDevFilterIpBroadcast. A vCM MAY support a value of 'true' MAY for docsDevFilterIpBroadcast.
docsDevFilterIpSaddr	MUST	MUST NOT	
docsDevFilterIpSmask	MUST	MUST NOT	
docsDevFilterIpDaddr	MUST	MUST NOT	
docsDevFilterIpDmask	MUST	MUST NOT	
docsDevFilterIpProtocol	MUST	MUST NOT	
docsDevFilterIpSourcePortLow	MUST	MUST NOT	
docsDevFilterIpSourcePortHigh	MUST	MUST NOT	
docsDevFilterIpDestPortLow	MUST	MUST NOT	
docsDevFilterIpDestPortHigh	MUST	MUST NOT	
docsDevFilterIpMatches	MUST	MUST NOT	A vCM SHOULD implement docsDevFilterIpMatches .
docsDevFilterIpTos	MUST	MUST NOT	
docsDevFilterIpTosMask	MUST	MUST NOT	
docsDevFilterIpContinue	MUST NOT	MUST NOT	
docsDevFilterIpPolicyId	MUST NOT	MUST NOT	

The appropriate mapping between docsDevFilterIP filter, docsDevFilterIpDirection, and DPoE OAM object context for OAM Port Ingress Rules (0xD7/0501) is provided in the following table:

[23] Revised per OSSIv2.0-N-14.0152-1 on 5/30/14 and by OSSIv2.0-N-14.0159-3 on 7/7/14 by JB.

docsDevFilterIpIfIndex	docsDevFilterIpDirection	DPoE Port Ingress Rules Mapping (0xD7/0x0501)
2 (CATV-MAC)	1 (Inbound)	Network (PON) Port
2 (CATV-MAC)	2 (Outbound)	All User (UNI) Ports
3 (RF-Down)	1 (Inbound)	Network (PON) Port
4 (RF-Up)	2 (Outbound)	All User (UNI) Ports

Applying all docsDevFilterIp entries associated with the CATV-MAC and RF in this manner eliminates the need to replicate filter entries for all possible User Ports and maintains the same structure of CM configuration files used in traditional DOCSIS.

7.4 DOCS-DIAG-MIB ([OSSIv3.0] ANNEX Q)

Table Name	vCM	DPoE System	Comments
docsDiagLogGlobal		MUST	
docsDiagLogTriggersCfg		MUST	
docsDiagLogTable		MUST	
docsDiagLogDetailTable		MUST	

7.4.1 docsDiagLogTriggersCfg

Object	vCM	DPoE System	Comments
docsDiagLogTriggersCfg			
docsDiagLogIncludeTriggers		MUST	Only Bit 0 (Registration trigger) applies to DPoE Networks. Bit 1 (Ranging Retry trigger) does not apply. The default value should be '80'H.
docsDiagLogEnableAgingTriggers		MUST	Only Bit 0 (Registration trigger) applies to DPoE Networks. Bit 1 (Ranging Retry trigger) does not apply.
docsDiagLogRegTimeInterval		MUST	
docsDiagLogRegDetail		MUST	Only the bits which correspond to the supported states for the CmtsCmRegState TC are supported for DPoE Networks.
docsDiagLogRangingRetryType		MUST	This object is not applicable to DPoE Networks. The DPoE System MUST return a value of '1' for docsDiagLogRangingRetryType.
docsDiagLogRangingRetryThrhld		MUST	This object is not applicable to DPoE Networks. The DPoE System MUST return a value of '6' for docsDiagLogRangingRetryThrhld .
docsDiagLogRangingRetryStationMaintNum		MUST	This object is not applicable to DPoE Networks. The DPoE System MUST return a value of '90' for docsDiagLogRangingRetryStationMaintNum.

7.4.2 docsDiagLogTable

Object	vCM	DPoE System	Comments
docsDiagLogTable		MUST	
docsDiagLogEntry		MUST	
docsDiagLogCmMacAddr		MUST	
docsDiagLogLastUpdateTime		MUST	
docsDiagLogCreateTime		MUST	
docsDiagLogLastRegTime		MUST	

Object	vCM	DPoE System	Comments
docsDiagLogRegCount		MUST	
docsDiagLogRangingRetryCount		MUST	Does not apply to DPoE Networks. Return value of zero.

7.4.3 docsDiagLogDetailTable

Object	vCM	DPoE System	Comments
docsDiagLogDetailTable		MUST	
docsDiagLogDetailEntry		MUST	
docsDiagLogDetailTypeValue		MUST	Only the supported states for the CmtsCmRegState TC are supported for DPoE Networks for entries in this table.
docsDiagLogDetailCount		MUST	
docsDiagLogDetailLastUpdate		MUST	
docsDiagLogDetailLastErrorText		MUST	

7.5 DOCS-IETF-BPI2-MIB ([RFC 4131])

Table Name	vCM	DPoE System	Comments
docsBpi2CmtsBaseEntryTable		MUST	This table is used to support the configuration of the default key exchange lifetime.
docsBpi2CodeDownloadGroup	MUST		These objects need to be supported for Secure Software Download.
docsBpi2CmCryptoSuiteTable	SHOULD NOT		As currently defined, the algorithm objects do not support the algorithms supported by DPoE.
docsBpi2CmDeviceCertTable	MUST		These objects need to be supported to manage certificates.
docsBpi2CmtsProvisionedCmCertTable		MUST	These objects need to be supported to manage certificates.
docsBpi2CmtsCACertTable		MUST	These objects need to be supported to manage certificates.
docsBpi2CmBaseTable	MUST NOT		BPI will not be used for DPoE Networks so the objects relating to BPI are not needed.
docsBpi2CmTEKTable	MUST NOT		BPI will not be used for DPoE Networks so the objects relating to BPI are not needed.
docsBpi2CmIpMulticastMapTable	MUST NOT		BPI will not be used for DPoE Networks so the objects relating to BPI are not needed.
docsBpi2CmtsAuthEntryTable		MUST NOT	BPI will not be used for DPoE Networks so the objects relating to BPI are not needed.
docsBpi2CmtsTEKTable		MUST NOT	BPI will not be used for DPoE Networks so the objects relating to BPI are not needed.
docsBpi2CmtsIpMulticastMapTable		MUST NOT	BPI will not be used for DPoE Networks so the objects relating to BPI are not needed.
docsBpi2CmtsIpMulticastAuthTable		MUST NOT	BPI will not be used for DPoE Networks so the objects relating to BPI are not needed.

7.5.1 docsBpi2CmtsBaseEntryTable

Object	vCM	DPoE System	Comments
docsBpi2CmtsBaseEntryTable		MUST	There is an entry in this table for each MAC Domain Interface Index associated with an EPON (TU) interface on the DPoE System.
docsBpi2CmtsBaseEntryEntry		MUST	
docsBpi2CmtsDefaultAuthLifetime		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of '604800' for docsBpi2CmtsDefaultAuthLifetime .
docsBpi2CmtsDefaultTEKLifetime		MUST	Is used in DPoE Networks to configure the Encryption Key Exchange Timeout. Default is 600 seconds.
docsBpi2CmtsDefaultSelfSignedManufCertTrust		MUST	
docsBpi2CmtsCheckCertValidityPeriods		MUST	
docsBpi2CmtsAuthentInfos		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsBpi2CmtsAuthentInfos.
docsBpi2CmtsAuthRequests		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsBpi2CmtsAuthRequests.
docsBpi2CmtsAuthReplies		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsBpi2CmtsAuthReplies.
docsBpi2CmtsAuthRejects		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsBpi2CmtsAuthRejects.
docsBpi2CmtsAuthInvalids		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsBpi2CmtsAuthInvalids.
docsBpi2CmtsSAMapRequests		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsBpi2CmtsSAMapRequests.
docsBpi2CmtsSAMapReplies		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsBpi2CmtsSAMapReplies.
docsBpi2CmtsSAMapRejects		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsBpi2CmtsSAMapRejects.

7.6 DOCS-IF-MIB ([RFC 4546])[24]

Table Name	vCM	DPoE System	Comments
docsIfCmMacTable	MUST		Need to provide an entry for backwards compatibility but MAC address is the only useful entry, but it is an important one.
docsIfCmStatusTable	MAY		Most of these fields are not applicable. Operator feedback was that the resets object seemed like a quick way to see if there are basic issues.
docsIfCmtsCmStatusTable	MAY	MAY	It may be used by operators who haven't transitioned to DOCS-IF3-MIB yet.
docsIfCmtsServiceTable		MAY	

[24] Revised per OSSIv2.0-N-15.0217-2 on 10/22/15 by JB.

Table Name	vCM	DPoE System	Comments
docsIfCmtsMacToCmTable		MUST	
docsIfCmtsChannelUtilizationTable		MUST	Operators like to know their channel utilizations for monitoring/planning purposes.
docsIfDownstreamChannelTable	MUST	SHOULD	The objects in this table (frequency, width, modulation) don't apply to EPON, but DPoE specifications may need to provide a parallel table that maps an arbitrary channel ID to a wavelength.
docsIfUpstreamChannelTable	SHOULD NOT	SHOULD NOT	Similar to the comment above for the downstream.
docsIfSignalQualityTable	MUST	MUST	
docsIfCmtsMacTable		SHOULD NOT	
docsIfCmtsStatusTable		MAY	
docsIfCmtsDownChannelCounterTable		SHOULD NOT	This table was added so the operator could compute utilization on a system that didn't have the docsIfCmtsChannelUtilizationTable, because that table came later. Therefore, this table can be skipped if the utilization table is supported.
docsIfCmtsUpChannelCounterTable		SHOULD NOT	Many of the fields in this table don't make sense for EPON, and the units are in minislots. This table isn't needed if docsIfCmtsChannelUtilizationTable is supported.
docsIfQosProfileTable	MUST NOT	MUST NOT	There is no need to support 1.0 CoS in a DPoE Network.
docsIfCmServiceTable	MUST NOT		No relevance to EPON, because there is no contention region except for DISCOVERY, and there are no statistics exposed there.
docsIfCmtsModulationTable		MUST NOT	This seems like it would be completely useless/not-applicable for EPON.

7.6.1 docsIfCmMacTable

Object	vCM	DPoE System	Comments
docsIfCmMacTable	MUST		
docsIfCmMacEntry	MUST		
docsIfCmCmtsAddress	MUST		Set to the MAC Address of the EPON (TU) interface on the DPoE System connected to the D-ONU.
docsIfCmCapabilities	MUST		A vCM MUST return a value of '00' for docsIfCmRangingTimeout.
docsIfCmRangingRespTimeout			Obsolete object – replaced by the following object.
docsIfCmRangingTimeout	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmRangingTimeout.

7.6.2 docsIfCmStatusTable (Deprecated)[25]

Object	vCM	DPoE System	Comments
docsIfCmStatusTable	MAY		
docsIfCmStatusEntry	MAY		

[25] Revised per OSSIv2.0-N-15.0217-2 on 10/22/15 by JB.

Object	vCM	DPoE System	Comments
docsIfCmStatusValue	MAY		See following section for details on the implementation of this object for DPoE Networks.
docsIfCmStatusCode	MAY		
docsIfCmStatusTxPower	MAY		Units of Power are "0.1 dBm" (Note: dBm is also known as dBmW)
docsIfCmStatusResets	MAY		
docsIfCmStatusLostSyncs	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusLostSyncs.
docsIfCmStatusInvalidMaps	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusInvalidMaps.
docsIfCmStatusInvalidUcds	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusInvalidUcds.
docsIfCmStatusInvalidRangingResponses	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusInvalidRangingResponses .
docsIfCmStatusInvalidRegistrationResponses	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusInvalidRegistrationResponses.
docsIfCmStatusT1Timeouts	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusT1Timeouts.
docsIfCmStatusT2Timeouts	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusT2Timeouts.
docsIfCmStatusT3Timeouts	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusT3Timeouts.
docsIfCmStatusT4Timeouts	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusT4Timeouts.
docsIfCmStatusRangingAborteds	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusRangingAborteds.
docsIfCmStatusDocsisOperMode	MAY		A vCM MUST return a value of 'docsis11' for docsIfCmStatusDocsisOperMode.
docsIfCmStatusModulationType	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of 'unknown' for docsIfCmStatusModulationType.
docsIfCmStatusEqualizationData	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of length zero for docsIfCmStatusEqualizationData.
docsIfCmStatusUCCs	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusUCCs.
docsIfCmStatusUCCFails	MAY		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusUCCFails.

7.6.2.1 docsIfCmStatusValue Mappings

Reported by the DPoE System on behalf of the vCM.

CM State	Original Comment (as defined in DOCSIS RFIv2)	DPoE Applicability
other(1)	Any state other than below.	
notReady(2)	CM has started up, powered-on, or modem reset is complete.	The vCM is in the process of initialization.
notSynchronized(3)	CM has completed its power-up sequence but has not synchronized.	Not applicable to DPoE Networks.
phySynchronized(4)	CM has recognized a valid DOCSIS Downstream channel.	Not applicable to DPoE Networks.
usParametersAcquired(5)	CM has collected all UCDs with different channel ID fields and has found a suitable channel to begin the ranging process.	Not applicable to DPoE Networks.
rangingComplete(6)	CM has completed initial ranging.	The DPoE System has discovered all of the links configured on the D-ONU.
ipComplete(7)	An IP Address has been assigned to the CM.	An IP Address has been assigned to the vCM.
todEstablished(8)	Time-of-Day has been retrieved by the CM.	Not applicable to DPoE Networks.
securityEstablished(9)	If the CM is provisioned to use Baseline Privacy, the CM has completed the BP process.	Not applicable to DPoE Networks.
paramTransferComplete(10)	The CM has obtained its provisioning file from the TFTP server.	The DPoE System has retrieved the modem provisioning file for the vCM.
registrationComplete(11)	CM has completed registration with the CMTS; REG-RSP received from the CMTS (in DOCSIS 1.0), or REG-ACK sent to the CMTS (in DOCSIS 2.0+).	Not applicable to DPoE Networks.
operational(12)	CM is now operational.	The DPoE System and D-ONU have been properly configured to support the parameters in the modem configuration file.
accessDenied(13)	CMTS has rejected the CM's REG-REQ and has been denied access.	The vCM has been denied access because the modem configuration file cannot be supported by the DPoE System (or D-ONU).

7.6.3 docsIfCmtsCmStatusTable (Deprecated) [26]

Object	vCM	DPoE System	Comments
docsIfCmtsCmStatusTable		MAY	Although deprecated by [OSSIv3.0], it is still going to be supported for DPoE Networks.
docsIfCmtsCmStatusEntry		MAY	
docsIfCmtsCmStatusIndex		MAY	Contains the registration identifier assigned by the DPoE System to the vCM.
docsIfCmtsCmStatusMacAddress		MAY	Contains the MAC address that identifies the D-ONU for the vCM.
docsIfCmtsCmStatusIpAddress		MAY	Contains the IP Address assigned to the vCM.
docsIfCmtsCmStatusDownChannelIfIndex		MAY	Contains the Interface Index value assigned to the logical Downstream Interface on the DPoE System associated with the MAC Domain containing the D-ONU.
docsIfCmtsCmStatusUpChannelIfIndex		MAY	Contains the Interface Index value assigned to the logical Upstream Interface on the DPoE System associated with the MAC Domain containing the D-ONU.
docsIfCmtsCmStatusRxPower		MAY	Units of Power are "0.1 dBm" (Note: dBm is also known as dBmW)

[26] Revised per OSSIv2.0-N-15.0217-2 on 10/22/15 by JB.

Object	vCM	DPoE System	Comments
docsIfCmtsCmStatusTimingOffset		MAY	The value provided here is the RTT for the ONU with the units converted to the DOCSIS units (6.25 microsecs/64).
docsIfCmtsCmStatusEqualizationData		MAY	Does not apply to DPoE Networks. The DPoE System MUST return a value of length zero for docsIfCmtsCmStatusEqualizationData.
docsIfCmtsCmStatusValue		MAY	See following section for details on the implementation of this object for DPoE Networks.
docsIfCmtsCmStatusUnerroreds		MAY	
docsIfCmtsCmStatusCorrecteds		MAY	
docsIfCmtsCmStatusUncorrectables		MAY	
docsIfCmtsCmStatusSignalNoise		MAY	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIfCmtsCmStatusSignalNoise.
docsIfCmtsCmStatusMicroreflections		MAY	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIfCmtsCmStatusMicroreflections.
docsIfCmtsCmStatusExtUnerroreds		MAY	
docsIfCmtsCmStatusExtCorrecteds		MAY	
docsIfCmtsCmStatusExtUncorrectables		MAY	
docsIfCmtsCmStatusDocsisRegMode		MAY	The DPoE System MUST return a value of 'docsis11' for docsIfCmtsCmStatusDocsisRegMode.
docsIfCmtsCmStatusModulationType		MAY	Does not apply to DPoE Networks. The DPoE System MUST return a value of 'unknown' for docsIfCmtsCmStatusModulationType.
docsIfCmtsCmStatusInetAddressType		MAY	
docsIfCmtsCmStatusInetAddress		MAY	
docsIfCmtsCmStatusValueLastUpdate		MAY	Set to the value of DPoE System's sysUpTime value when the docsIfCmtsCmStatusValue for this instance changes.
docsIfCmtsCmStatusHighResolutionTimingOffset		MAY	The value provided here is the RTT for the ONU with the units converted to the DOCSIS units (6.25 microsecs/(64*256)).

7.6.3.1 docsIfCmtsCmStatusValue Mappings (Deprecated)[27]

Reported by the DPoE System for each vCM known to the DPoE System. This object replaced with docsIf3CmtsCmRegStatusValue.

CMTS State for CM	Original Comment (as defined in DOCS-IF-MIB [RFC 4546])	DPoE Applicability
other(1)	Any state other than below.	
ranging(2)	The CMTS has received an Initial Ranging Request message from the CM, and the ranging process is not yet complete.	The DPoE System has discovered an EPON logical link on the D-ONU.
rangingAborted(3)	The CMTS has sent a Ranging Abort message to the CM.	The DPoE System did not discover all of the links configured on the ONU within the timeout specified by the DOCSIS MULPI T9 timeout value.
rangingComplete(4)	The CMTS has sent a Ranging Complete message to the CM.	The DPoE System has discovered all of the links configured on the D-ONU.
ipComplete(5)	The CMTS has received a DHCP reply message and forwarded it to the CM.	An IP Address has been assigned to the vCM.

[27] Revised per OSSIv2.0-N-15.0217-2 on 10/22/15 by JB.

CMTS State for CM	Original Comment (as defined in DOCS-IF-MIB [RFC 4546])	DPoE Applicability
registrationComplete(6)	The CMTS has sent a Registration Response message to the CM.	Not applicable to DPoE.
accessDenied(7)	The CMTS has sent a Registration Aborted message to the CM.	The DPoE System puts the vCM in this state if the modem configuration file cannot be supported by the DPoE System (or D-ONU).
operational(8)	Value 8 is considered reserved and should not be defined in future revisions of this MIB module to avoid conflict with documented implementations that support value 8 to indicate operational state after completing the BPI initialization process.	The DPoE System puts the vCM in this state when the OLT on the DPoE System and D-ONU have been properly configured to support the parameters in the modem configuration file.
registeredBPIInitializing(9)	Baseline Privacy (BPI) is enabled and the CMTS is in the process of completing BPI initialization. This state MAY last for a significant length of time if failures occur during the initialization process. After completion of BPI initialization, the CMTS will report registrationComplete(6).	Not applicable to DPoE Networks.

7.6.4 docsIfDownstreamChannelTable[28]

Object	vCM	DPoE System	Comments
docsIfDownChannelId	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIfDownChannelId The vCM MUST return a value of zero for docsIfDownChannelId
docsIfDownChannelFrequency	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIfDownChannelFrequency The vCM MUST return a value of zero for docsIfDownChannelFrequency
docsIfDownChannelWidth	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIfDownChannelWidth The vCM MUST return a value of zero for docsIfDownChannelWidth
docsIfDownChannelModulation	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIfDownChannelModulation The vCM MUST return a value of zero for docsIfDownChannelModulation
docsIfDownChannelInterleave	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIfDownChannelInterleave The vCM MUST return a value of zero for docsIfDownChannelInterleave
docsIfDownChannelPower	MUST	SHOULD	Units of Power are "0.1 dBm" (Note: dBm is also known as dBmW) The DPoE System reports the transmitted power for the downstream channel. The vCM reports the ONU received power for the downstream channel.

[28] Revised per OSSIv2.0-N-15.0217-2 on 10/22/15 by JB. Revised per OSSIv2.0-N-17.0251-1 on 4/17-17 by JB

Object	vCM	DPoE System	Comments
docsIfDownChannelAnnex	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIfDownChannelAnnex The vCM MUST return a value of zero for docsIfDownChannelAnnex
docsIfDownChannelStorageType	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIfDownChannelStorageType The vCM MUST return a value of zero for docsIfDownChannelStorageType

7.6.5 docsIfSignalQualityTable[29]

Object	vCM	DPoE System	Comments
docsIfSigQIncludesContention	MUST	MUST NOT	The DPoE System MUST return a value of zero for docsIfDownChannelStorageType The vCM MUST return a value of zero for docsIfSigQIncludesContention
docsIfSigQUnerroreds	MUST	MUST	
docsIfSigQCorrecteds	MUST	MUST	
docsIfSigQUncorrectables	MUST	MUST	
docsIfSigQSignalNoise	MAY	MAY	
docsIfSigQMicroreflections	MUST	MUST	The DPoE System MUST return a value of zero for docsIfSigQMicroreflections The vCM MUST return a value of zero for docsIfSigQMicroreflections
docsIfSigQEqualizationData	MUST	MUST	The DPoE System MUST return a value of zero for docsIfSigQEqualizationData The vCM MUST return a value of zero for docsIfSigQEqualizationData
docsIfSigQExtUnerroreds	MUST	MUST	
docsIfSigQExtCorrecteds	MUST	MUST	
docsIfSigQExtUncorrectables	MUST	MUST	

7.6.6 docsIfCmtsServiceTable

Object	vCM	DPoE System	Comments
docsIfCmtsServiceTable		MUST	Although defined as a read-write table, for DPoE Networks this table need only be supported as a read-only table.
docsIfCmtsServiceEntry		MUST	
docsIfCmtsServiceId		MUST	
docsIfCmtsServiceCmStatusIndex		MUST	Object has been deprecated due to its limited range (0..65535). Contains the registration identifier assigned by the DPoE System to the vCM associated with the SID.
docsIfCmtsServiceAdminStatus		MUST	Used to disable or delete SIDs. The DPoE System SHOULD return a value of 'enabled' for docsIfCmtsServiceAdminStatus .

[29] Revised per OSSIv2.0-N-15.0217-2 on 10/22/15 by JB.

Object	vCM	DPoE System	Comments
docsIfCmtsServiceQosProfile		MUST	Does not apply to DPoE because this only applies to 1.0 CoS. The DPoE System MUST return a value of zero for docsIfCmtsServiceQosProfile.
docsIfCmtsServiceCreateTime		MUST	Set to the value of DPoE System's sysUpTime value when the SID is created.
docsIfCmtsServiceInOctets		MUST	
docsIfCmtsServiceInPackets		MUST	
docsIfCmtsServiceNewCmStatusIndex		MUST	Contains the registration identifier assigned by the DPoE System to the vCM associated with the SID.

7.6.7 docsIfCmtsChannelUtilizationTable

Object	vCM	DPoE System	Comments
docsIfCmtsChannelUtilizationTable		MUST	This table is indexed by Interface Index, docsIfCmtsChannelUtIfType, and docsIfCmtsChannelUtId. Depending on the value of docsIfCmtsChannelUtIfType, the Interface Index value corresponds to the logical downstream or upstream interface associated with the EPON (TU) interface.
docsIfCmtsChannelUtilizationEntry		MUST	
docsIfCmtsChannelUtIfType		MUST	Set to docsCableDownstream for the logical downstream interface or docsCableUpstream for the logical upstream interface.
docsIfCmtsChannelUtId		MUST	Specifies the channel identifier. This value should be set to one (i.e., one channel in the downstream or upstream direction).
docsIfCmtsChannelUtUtilization		MUST	For DPoE Networks, the channel utilization should be expressed as the percentage of the potential bandwidth for the interface which is being currently used.

7.7 DOCS-IF3-MIB ([OSSIv3.0] Annex Q)[30]

Table Name	vCM	DPoE System	Comments
docsIf3CmStatusTable	MUST		Most of these objects are not applicable to EPON. Some, like resets, can be mapped to corresponding EPON values. Operator feedback was that monitoring resets would also be an important statistic.
docsIf3CmCapabilities	SHOULD NOT		Not needed for the current version. Could be used to support more than one capability in the future.
docsIf3CmtsCmRegStatusTable		MUST	Must be implemented because some of the fields are valid for D-ONUs. The addressing objects are the more valuable objects.
docsIf3CmtsCmCtrlCmd		MUST	These commands apply to EPON, with the exception of muting. Operators feel that this object is of particular use for disabling customer access.
docsIf3CmEventCtrlTable	MUST		Operators feel that this is probably used as a TLV 11 OID.
docsIf3CmtsEventCtrlTable		MUST	
docsIf3CmtsEventNotif		MUST	
docsIf3CmEventNotif	MUST		

[30] Revised per OSSIv2.0-N-15.0217-2 on 10/22/15 by JB.

Table Name	vCM	DPoE System	Comments
docsIf3MdNodeStatusTable		SHOULD NOT	DPoE Networks may want to support this table in the future even though the topology is very simple (assuming the concept of a serving group is kept).
docsIf3MdDsSgStatusTable		SHOULD NOT	If the concept of a channel identifier is kept for DPoE Networks, then this table should be supported.
docsIf3MdUsSgStatusTable		SHOULD NOT	If the concept of a channel identifier is kept for DPoE Networks, then this table should be supported.
docsIf3CmStatusUsTable	MUST		This table added to replace the deprecated docsIfCmStatusTable.
docsIf3CmtsCmUsStatusTable		MUST	This table added to replace the deprecated docsIfCmtsCmStatusTable.
docsIf3MdCfgTable		MUST	
docsIf3DsChSetTable		SHOULD NOT	Could be provided so that DPoE Networks can have a single DS channel in a Channel set.
docsIf3UsChSetTable		SHOULD NOT	Could be provided so that DPoE Networks can have a single US channel in a Channel set.
docsIf3CmDpvStatsTable	SHOULD NOT		This version of DPoE specifications does not support DOCSIS DPV.
docsIf3MdChCfgTable		SHOULD NOT	This table isn't needed in the short-term, but may be needed in future versions.
docsIf3CmMdCfgTable	SHOULD NOT		This table is used to override the CM IP provisioning.
docsIf3MdUsToDsChMappingTable		MUST NOT	Not applicable for EPON.
docsIf3BondingGrpCfgTable		MUST NOT	No bonding is supported or needed in an EPON network.
docsIf3DsBondingGrpStatusTable		MUST NOT	No bonding is supported or needed in an EPON network.
docsIf3UsBondingGrpStatusTable		MUST NOT	No bonding is supported or needed in an EPON network.
docsIf3RccCfgTable		MUST NOT	This appears to be completely related to the DOCSIS PHY (and support for multiple US channels).
docsIf3RxChCfgTable		MUST NOT	More configuration objects related to multiple US channel support.
docsIf3RxModuleCfgTable		MUST NOT	More configuration objects related to multiple US channel support.
docsIf3RccStatusTable		MUST NOT	No RCCs to report.
docsIf3RxChStatusTable	MUST NOT	MUST NOT	No RCCS and no Receive Channels to report status on.
docsIf3RxModuleStatusTable	MUST NOT	MUST NOT	No RCCs, and no Receive Modules.
docsIf3SignalQualityExtTable	MUST NOT	MUST NOT	Specific to DOCSIS PHY.
docsIf3CmtsSignalQualityExtTable		MUST NOT	Specific to DOCSIS PHY.
docsIf3CmtsSpectrumAnalysisMeasTable		MUST NOT	Specific to DOCSIS PHY.
docsIf3UsChExtTable	MUST NOT	MUST NOT	Specific to DOCSIS PHY.

7.7.1 docsIf3CmStatusTable

Object	vCM	DPoE System	Comments
docsIf3CmStatusTable	MUST		
docsIf3CmStatusEntry	MUST		
docsIf3CmStatusValue	MUST		See following section for details on the implementation of this object for DPoE Networks.

Object	vCM	DPoE System	Comments
docsIf3CmStatusCode	MUST		
docsIf3CmStatusResets	MUST		
docsIf3CmStatusLostSyncs	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusLostSyncs .
docsIf3CmStatusInvalidMaps	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusInvalidMaps.
docsIf3CmStatusInvalidUcds	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusInvalidUcds.
docsIf3CmStatusInvalidRangingRsps	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusInvalidRangingRsps.
docsIf3CmStatusInvalidRegRsps	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusInvalidRegRsps.
docsIf3CmStatusT1Timeouts	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusT1Timeouts.
docsIf3CmStatusT2Timeouts	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusT2Timeouts.
docsIf3CmStatusUCCsSuccesses	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusUCCsSuccesses.
docsIf3CmStatusUCCFails	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusUCCFails.

7.7.1.1 CmRegState Textual Convention/docsIf3CmStatusValue

Reported by the DPoE System on behalf of the vCM.

CM State	Original Comment (as defined in DOCS-IF3-MIB)	Applicability to DPoE
other	Indicates any state not described below.	
notReady	Indicates that the CM has not started the registration process yet.	The vCM is in the process of initialization.
notSynchronized	Indicates that the CM has not initiated or completed the synchronization of the downstream physical layer.	Not applicable to DPoE Networks.
phySynchronized	Indicates that the CM has completed the synchronization of the downstream physical layer.	Not applicable to DPoE Networks.
dsTopologyResolutionInProgress	Indicates that the CM is attempting to determine its MD-DS-SG.	Not applicable to DPoE Networks.
usParametersAcquired	Indicates that the CM has completed the upstream parameters acquisition or have completed the downstream and upstream service groups resolution, whether the CM is registering in a pre-3.0 or a 3.0 CMTS.	Not applicable to DPoE Networks.
rangingInProgress	Indicates that the CM has initiated the ranging process.	The DPoE System has discovered a link on the ONU.
rangingComplete	Indicates that the CM has completed initial ranging and received a Ranging Status of success from the CMTS in the RNG-RSP message.	The DPoE System has discovered all of the Links configured on the D-ONU.

CM State	Original Comment (as defined in DOCS-IF3-MIB)	Applicability to DPoE
eaeInProgress	Indicates that the CM has sent an Auth Info message for EAE.	The D-ONU associated with the vCM is currently being authenticated by the DPoE System.
dhcpv4InProgress	Indicates that the CM has sent a DHCPv4 DISCOVER to gain IP connectivity.	The DPoE System has generated a DHCPv4 DISCOVER message to obtain an IPv4 address.
dhcpv6InProgress	Indicates that the CM has sent a DHCPv6 Solicit message.	The DPoE System has generated a DHCPv6 SOLICIT message to obtain an IPv6 address.
dhcpv4Complete	Indicates that the CM has received a DHCPv4 ACK message from the CMTS.	An IPv4 address has been assigned to the vCM.
dhcpv6Complete	Indicates that the CM has received a DHCPv6 Reply message from the CMTS.	An IPv6 address has been assigned to the vCM.
todEstablished	Indicates that the CM has successfully acquired time of day. If the ToD is acquired after the CM is operational, this value should not be reported.	Not applicable to DPoE Networks.
securityEstablished	Indicates that the CM has successfully completed the BPI initialization process.	The connection to the D-ONU has been secured and the D-ONU's certificate has been authenticated by the DPoE System.
configFileDownloadComplete	Indicates that the CM has completed the configuration file download process.	The DPoE System has retrieved the modem provisioning file for the vCM.
registrationInProgress	Indicates that the CM has sent a Registration Request (REG-REQ or REG-REQ-MP).	The DPoE System is in the process of sending OAM messages to the D-ONU based on the contents of the provisioning file.
registrationComplete	Indicates that the CM has successfully completed the Registration process with the CMTS.	Not applicable to DPoE Networks.
accessDenied	Indicates that the CM has received a registration aborted notification from the CMTS.	The vCM has been denied access because the modem configuration file cannot be supported by the DPoE System (or D-ONU).
operational	Indicates that the CM has completed all necessary initialization steps and is operational.	The OLT on the DPoE System and D-ONU have been properly configured to support the parameters in the modem configuration file.
bpiInit	Indicates that the CM has started the BPI initialization process as indicated in the CM configuration file. If the CM already performed EAE, this state is skipped by the CM.	Not applicable to DPoE Networks.
forwardingDisabled	Indicates that the registration process was completed, but the network access option in the received configuration file prohibits forwarding.	The OLT on the DPoE System and D-ONU have been properly configured to support the parameters in the modem configuration file, but the configuration file has blocked network access for the ONU.
rfMuteAll	Indicates that the CM is instructed to mute all channels in the CM-CTRL-REQ message from CMTS.	Not applicable to DPoE Networks. It could be used to note when an upstream laser has been administratively disabled.

7.7.2 docsIf3CmtsCmRegStatusTable

Object	vCM	DPoE System	Comments
docsIf3CmtsCmRegStatusTable		MUST	
docsIf3CmtsCmRegStatusEntry		MUST	
docsIf3CmtsCmRegStatusId		MUST	Contains the registration identifier assigned by the DPoE System to the vCM.
docsIf3CmtsCmRegStatusMacAddr		MUST	Contains the MAC Address that identifies the D-ONU for the vCM.

Object	vCM	DPoE System	Comments
docsIf3CmtsCmRegStatusIPv6Addr		MUST	Contains the IP address assigned to the vCM.
docsIf3CmtsCmRegStatusIPv6LinkLocal		MUST	
docsIf3CmtsCmRegStatusIPv4Addr		MUST	Contains the IP address assigned to the vCM.
docsIf3CmtsCmRegStatusValue		MUST	See following section for details on the implementation of this object for DPoE Networks.
docsIf3CmtsCmRegStatusMdIfIndex		MUST	Contains the Interface Index value assigned to the logical MAC Domain on the DPoE System for the EPON (TU) interface connected to the D-ONU.
docsIf3CmtsCmRegStatusMdCmSgId		MUST	Not applicable to this version of DPoE specifications. The DPoE System MUST return a value of zero for docsIf3CmtsCmRegStatusMdCmSgId.
docsIf3CmtsCmRegStatusRcpId		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIf3CmtsCmRegStatusRcpId.
docsIf3CmtsCmRegStatusRccStatusId		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIf3CmtsCmRegStatusRccStatusId.
docsIf3CmtsCmRegStatusRcsId		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIf3CmtsCmRegStatusRcsId.
docsIf3CmtsCmRegStatusTcsId		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsIf3CmtsCmRegStatusTcsId.
docsIf3CmtsCmRegStatusQosVersion		MUST	The DPoE System MUST return a value of 'docsis11' for docsIf3CmtsCmRegStatusQosVersion.
docsIf3CmtsCmRegStatusLastRegTime		MUST	
docsIf3CmtsCmRegStatusAddrResolutionReqs		MUST	

7.7.2.1 CmtsCmRegState Textual Convention/ docsIf3CmtsCmRegStatusValue

Reported by the DPoE System for each vCM known to the DPoE System.

CMTS State for CM	Original Comment (as defined in DOCS-IF3-MIB)	Applicability to DPoE
Other	Indicates any state not described below.	
initialRanging	Indicates that the CMTS has received an Initial Ranging Request message from the CM, and the ranging process is not yet complete.	The DPoE System has received a registration message from the D-ONU.
rangingAutoAdjComplete	Indicates that the CM has completed initial ranging and the CMTS sends a Ranging Status of success in the RNG-RSP.	The DPoE System has received registration acknowledgement for all links on the ONU.
startEae	Indicates that the CMTS has received an Auth Info message for EAE from the CM.	The D-ONU associated with the vCM is in the process of being authenticated by the DPoE System.
startDhcpv4	Indicates that the CMTS has received a DHCPv4 DISCOVER message from the CM.	The DPoE System has generated a DHCPv4 DISCOVER message to obtain an IPv4 address for the vCM.
startDhcpv6	Indicates that the CMTS has received a DHCPv6 Solicit message from the CM.	The DPoE System has generated a DHCPv6 SOLICIT message to obtain an IPv6 address for the vCM.

CMTS State for CM	Original Comment (as defined in DOCS-IF3-MIB)	Applicability to DPoE
dhcpv4Complete	Indicates that the CMTS has sent a DHCPv4 ACK message to the CM.	An IPv4 address has been assigned to the vCM.
dhcpv6Complete	Indicates that the CMTS has sent a DHCPv6 Reply message to the CM.	An IPv6 address has been assigned to the vCM.
startConfigFileDownload	Indicates that the CM has started the config file download. If the TFTP Proxy feature is not enabled, the CMTS may not report this state.	The DPoE System has sent a TFTP request for the provisioning file for the vCM.
configFileDownloadComplete	Indicates that the CM has completed the config file download process. If the TFTP Proxy feature is not enabled, the CMTS is not required to report this state.	The DPoE System has retrieved the modem provisioning file for the vCM.
startRegistration	Indicates that the CMTS has received a Registration Request (REG-REQ or REG-REQ-MP) from the CM.	The DPoE System is in the process of sending OAM messages to the D-ONU based on the contents of the provisioning file.
registrationComplete	Indicates that the CMTS has received a Registration Acknowledge (REG-ACK) with a confirmation code of okay/success.	Not applicable to DPoE Networks.
operational	Indicates that the CM has completed all necessary initialization steps and is operational.	The OLT on the DPoE System and D-ONU have been properly configured to support the parameters in the modem configuration file.
bpiInit	Indicates that the CMTS has received an Auth Info or Auth Request message as part of BPI Initialization.	Not applicable to DPoE Networks.
forwardingDisabled	Indicates that the registration process was completed, but the network access option in the received configuration file prohibits forwarding.	The OLT on the DPoE System and D-ONU have been properly configured to support the parameters in the modem configuration file, but the configuration file has blocked network access for the ONU.
rfMuteAll	Indicates that the CM is instructed to mute all channels in the CM-CTRL-REQ message from CMTS.	Not applicable to this version of DPoE specifications. It could be used to note when an upstream laser has been administratively disabled.

7.7.3 docsIf3CmtsCmCtrlCmd

Object	vCM	DPoE System	Comments
docsIf3CmtsCmCtrlCmd			
docsIf3CmtsCmCtrlCmdMacAddr		MUST	MAC Address of D-ONU to which to direct the request.
docsIf3CmtsCmCtrlCmdMuteUsChId		MUST	Not applicable to DPoE Networks. Applies to use of RF Mute command.The DPoE System MUST return a value of zero for docsIf3CmtsCmCtrlCmdMuteUsChId.
docsIf3CmtsCmCtrlCmdMuteInterval		MUST	Not applicable to this version of DPoE specifications. Applies to use of RF Mute command. The DPoE System MUST return a value of '1' for docsIf3CmtsCmCtrlCmdMuteInterval.
docsIf3CmtsCmCtrlCmdDisableForwarding		MUST	
docsIf3CmtsCmCtrlCmdCommit		MUST	The 'mute' option is not supported by DPoE Networks. 'cmReinit' causes the vCM (and D-ONU) to be reset. 'disableForwarding' causes traffic to stop (or start) being forwarded by the D-ONU depending on the value of docsIf3CmtsCmCtrlCmdDisableForwarding.

7.7.4 docsIf3CmStatusUsTable[31]

Object	vCM	DPoE System	Comments
docsIf3CmStatusUsTxPower	MUST		Transmitted Power level on per ONU basis. Units of Power are "0.1 dBm" (Note: dBm is also known as dBmW)
docsIf3CmStatusUsT3Timeouts	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusT3Timeouts.
docsIf3CmStatusUsT4Timeouts	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusT4Timeouts. .
docsIf3CmStatusUsRangingAborteds	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIfCmStatusRangingAborteds
docsIf3CmStatusUsModulationType	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusUsModulationType
docsIf3CmStatusUsEqData	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusUsEqData.
docsIf3CmStatusUsT3Exceededs	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusUsT3Exceededs
docsIf3CmStatusUsIsMuted	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusUsIsMuted
docsIf3CmStatusUsRangingStatus	MUST		Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmStatusUsRangingStatus

7.7.5 docsIf3CmtsCmUsStatusTable[32]

Object	vCM	DPoE System	Comments
docsIf3CmtsCmUsStatusModulationType		MUST	Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmtsCmUsStatusModulationType ..
docsIf3CmtsCmUsStatusRxPower		MUST	Received power level on per ONU basis. Units of Power are "0.1 dBm" (Note: dBm is also known as dBmW)
docsIf3CmtsCmUsStatusSignalNoise		MUST	Signal to noise ratio on per ONU basis. Units of measure are '.1 dB'"
docsIf3CmtsCmUsStatusMicroreflections		MUST	Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmtsCmUsStatusMicroreflections
docsIf3CmtsCmUsStatusEqData		MUST	Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmtsCmUsStatusEqData
docsIf3CmtsCmUsStatusUnerroreds		MUST	A vCM MUST return a value of zero for docsIf3CmtsCmUsStatusUnerroreds if FEC is not supported for 1G-EPON or 2G-EPON ONU.

[31] Revised per OSSIv2.0-N-15.0217-2 on 10/22/15 by JB. Revised per OSSIv2.0-N-17.0251-1 on 4/17-17 by JB
[32] Revised per OSSIv2.0-N-15.0217-2 on 10/22/15 by JB. Revised per OSSIv2.0-N-17.0251-1 on 4/17-17 by JB

Object	vCM	DPoE System	Comments
docsIf3CmtsCmUsStatusCorrecteds		MUST	A vCM MUST return a value of zero for docsIf3CmtsCmUsStatusUnerroreds if FEC is not supported for 1G-EPON or 2G-EPON ONU.
docsIf3CmtsCmUsStatusUncorrectables		MUST	A vCM MUST return a value of zero for docsIf3CmtsCmUsStatusUnerroreds if FEC is not supported for 1G-EPON or 2G-EPON ONU.
docsIf3CmtsCmUsStatusHighResolutionTiming Offset		MUST	Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmtsCmUsStatusHighResolutionTimingOffset
docsIf3CmtsCmUsStatusIsMuted		MUST	Does not apply to DPoE Networks. A vCM MUST return a value of zero for docsIf3CmtsCmUsStatusIsMuted
docsIf3CmtsCmUsStatusRangingStatus		MUST	

7.7.6 docsIf3MdCfgTable[33]

Object	vCM	DPoE System	Comments
docsIf3MdCfgTable		MUST	
docsIf3MdCfgEntry		MUST	
docsIf3MdCfgMddInterval		MUST	Not applicable to DPoE Networks as this relates to the transmission of DOCSIS MDD messages.The DPoE System MUST return the default value 2000 for docsIf3MdCfgMddInterval.
docsIf3MdCfgIpProvMode		MUST	Required to provision IpProvMode of vCMs on a particular Mac Domain. The default value of this attribute MUST be determined by the system level default value defined in [DPoE-IPNEv2.0]. The "alternate" and "dual-stack" values for this attribute are not supported by DPoE Networks.If an attempt is made to set docsIf3MdCfgIpProvMode to "alternate" or "dual-stack", the DPoE System MUST reject the set.
docsIf3MdCfgCmStatusEvCtlEnabled		MUST	Not applicable to DPoE Networks. The DPoE System MUST return the value 'false' for docsIf3MdCfgCmStatusEvCtlEnabled.
docsIf3MdCfgUsFreqRange		MUST	Not applicable to DPoE Networks. This relates to advertising the supported DOCSIS upstream frequency range on a particular Mac Domain.The DPoE System MUST return the default value standard for docsIf3MdCfgUsFreqRange.
docsIf3MdCfgMcastDsidFwdEnabled		MUST	Not applicable to DPoE Networks. The DPoE System MUST return the value 'false' for docsIf3MdCfgMcastDsidFwdEnabled.
docsIf3MdCfgMultRxChModeEnabled		MUST	Not applicable to DPoE Networks. The DPoE System MUST return the value false for docsIf3MdCfgMultRxChModeEnabled.
docsIf3MdCfgMultTxChModeEnabled		MUST	Not applicable to DPoE Networks. The DPoE System MUST return the value 'false' for docsIf3MdCfgMultTxChModeEnabled.
docsIf3MdCfgEarlyAuthEncrCtrl		MUST	The DPoE System MUST implement docsIf3MdCfgEarlyAuthEncrCtrl as defined by [DPoE-SECv2.0].

[33] Revised per OSSIv2.0-N-13.0078-2 and OSSIv2.0-N-13.0094-3 on 7/22/13 by JB. Revised per OSSIv2.0-N-14.0164-1 on 6/26/14 by JB.

Object	vCM	DPoE System	Comments
docsIf3MdCfgTftpProxyEnabled		MUST	Not applicable to DPoE Networks. TFTP Proxy is not required on a DPoE System. Unlike DOCSIS where the CM requests and parses the CM config file, a vCM instance on the DPoE System parses CM config files. The DPoE System MUST return the value 'false' for docsIf3MdCfgTftpProxyEnabled.
docsIf3MdCfgSrcAddrVerifEnabled		MUST	
docsIf3MdCfgDownChannelAnnex		MUST	Not applicable to DPoE Networks. The DPoE System MUST return the default value 'unknown' for docsIf3MdCfgDownChannelAnnex.
docsIf3MdCfgCmUdcEnabled		MUST	
docsIf3MdCfgSendUdcRulesEnabled		MUST	
docsIf3MdCfgServiceTypeIdList		MUST	Not applicable to DPoE Networks. The DPoE System MUST return the default value " " for docsIf3MdCfgServiceTypeIdList.
docsIf3MdCfgBpi2EnforceCtr		MUST	Not applicable to DPoE Networks. The DPoE System MUST return the value 'disable' for docsIf3MdCfgBpi2EnforceCtr.

7.8 DOCS-IFEXT2-MIB ([OSSIv3.0] Annex H)

The majority of the objects in this MIB are related to SCDMA support, specifically the Maximum Scheduled Codes (MSC) feature.

Table Name	vCM	DPoE System	Comments
docsIfExt2CmtsUpChannelTable		MUST NOT	SCDMA is not supported for EPON.
docsIfExt2CmMscStatusTable	MUST NOT		SCDMA is not supported for EPON.
docsIfExt2CmtsMscGlobalEnable		MUST NOT	SCDMA is not supported for EPON.
docsIfExt2CmtsCmMscStatusTable		MUST NOT	SCDMA is not supported for EPON.
docsIfExt2CmtsUpChannelMscTable		MUST NOT	SCDMA is not supported for EPON.

7.9 DOCS-MCAST-AUTH-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoE System	Comments
docsMcastAuthCtrl		MUST	
docsMCastAuthCmtsCmStatusTable		MUST	
docsMcastAuthProfileSessRuleTable		MUST	
docsMcastAuthStaticSessRuleTable		MAY	
docsMcastAuthProfilesTable		MUST	

7.9.1 docsMcastAuthCmtsCmStatusTable

Object	vCM	DPoE System	Comments
docsMcastAuthCmtsCmStatusTable		MUST	
docsMcastAuthCmtsCmStatusEntry		MUST	
docsMcastAuthCmtsCmStatusCfgProfileNameList		MUST	
docsMcastAuthCmtsCmStatusCfgListId		MUST	

Object	vCM	DPoE System	Comments
docsMcastAuthCmtsCmStatusMaxNumSess		MUST	For DPoE Networks, this attribute is redefined as the default maximum number of multicast sessions authorized to be dynamically joined by clients reached through each CMIM interface. The definition differs from DOCSIS in two ways. First, the attribute is a per-interface value for DPoE versus a per-CM value. Second, the attribute is a default that can be overridden for a particular interface by the value of dpoeMcastAuthCmtsCmStatusIfaceMaxNumSess.
docsMcastAuthCmtsCmStatusCfgParamFlag		MUST	

7.10 DOCS-MCAST-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoE System	Comments
docsMcastCmtsGrpCfgTable		MUST	
docsMcastCmtsGrpEncryptCfgTable		MUST	
docsMcastCmtsGrpPhsCfgTable		MUST NOT	PHS is not applicable to DPoE Networks.
docsMcastCmtsGrpQosCfgTable		MUST	
docsMcastCmtsReplSessTable		MUST	
docsMcastDefGrpSvcClass		MUST	
docsMcastDsidPhsTable		MUST NOT	PHS is not applicable to DPoE Networks.

7.10.1 docsMcastCmtsGrpCfgTable[34]

Object	vCM	DPoE System	Comments
docsMcastCmtsGrpCfgTable		MUST	
docsMcastCmtsGrpCfgEntry		MUST	
docsMcastCmtsGrpCfgId		MUST	
docsMcastCmtsGrpCfgRulePriority		MUST	
docsMcastCmtsGrpCfgPrefixAddrType		MUST	
docsMcastCmtsGrpCfgSrcPrefixAddr		MUST	
docsMcastCmtsGrpCfgSrcPrefixLen		MUST	
docsMcastCmtsGrpCfgGrpPrefixAddr		MUST	
docsMcastCmtsGrpCfgGrpPrefixLen		MUST	
docsMcastCmtsGrpCfgTosLow		MUST	
docsMcastCmtsGrpCfgTosHigh		MUST	
docsMcastCmtsGrpCfgTosMask		MUST	
docsMcastCmtsGrpCfgQosConfigId		MUST	
docsMcastCmtsGrpCfgEncryptConfigId		MUST	
docsMcastCmtsGrpCfgPhsConfigId		MUST	Not Applicable to DPoE Networks. The DPoE System MUST return the value 0 for docsMcastCmtsGrpCfgPhsConfigId.
docsMcastCmtsGrpCfgRowStatus		MUST	

[34] Revised per OSSIv2.0-N-13.0078-2 on 7/22/13 by JB.

7.10.2 docsMcastCmtsGrpEncryptCfgTable[35]

The DPoE Network only supports AES-128 encryption. The DPoE System contains one entry within this table that can be associated with docsMcastCmtsGrpCfgTable entries specifying that resulting multicast sessions will be encrypted with AES-128.

Object	vCM	DPoE System	Comments
docsMcastCmtsGrpEncryptCfgTable		MUST	
docsMcastCmtsGrpEncryptCfgEntry		MUST	
docsMcastCmtsGrpEncryptCfgId		MUST	
docsMcastCmtsGrpEncryptCfgCtrl		MUST	DPoE System MUST return the value “cmts(1)” for docsMcastCmtsGrpEncryptCfgCtrl.
docsMcastCmtsGrpEncryptCfgAlg		MUST	DPoE System MUST return the value ‘aes128CbcMode’ for docsMcastCmtsGrpEncryptCfgAlg.
docsMcastCmtsGrpEncryptCfgRowStatus		MUST	

7.10.3 docsMcastCmtsGrpQosCfgTable

Object	vCM	DPoE System	Comments
docsMcastCmtsGrpQosCfgTable		MUST	
docsMcastCmtsGrpQosCfgEntry		MUST	
docsMcastCmtsGrpQosCfgId		MUST	
docsMcastCmtsGrpQosCfgServiceClassName		MUST	
docsMcastCmtsGrpQosCfgQosCtrl		MUST	
docsMcastCmtsGrpQosCfgAggSessLimit		MUST	
docsMcastCmtsGrpQosCfgAppId		MUST	
docsMcastCmtsGrpQosCfgRowStatus		MUST	

7.10.4 docsMcastCmtsReplSessTable[36]

Object	vCM	DPoE System	Comments
docsMcastCmtsReplSessTable		MUST	
docsMcastCmtsReplSessEntry		MUST	
docsMcastCmtsReplSessPrefixAddrType		MUST	
docsMcastCmtsReplSessGrpPrefix		MUST	
docsMcastCmtsReplSessSrcPrefix		MUST	
docsMcastCmtsReplSessMdlfIndex		MUST	
docsMcastCmtsReplSessDcsId		MUST	The DPoE System MUST return the DCID associated with the multicast service flow docsMcastCmtsReplSessDcsId.
docsMcastCmtsReplSessServiceFlowId		MUST	
docsMcastCmtsReplSessDsid		MUST	The DPoE System MUST return the mLLID of the multicast service flow docsMcastCmtsReplSessDsid.
docsMcastCmtsReplSessSaid		MUST	Not Applicable to DPoE Networks. The DPoE System MUST return the value ‘zero' for docsMcastCmtsReplSessSaid.

[35] Revised per OSSIv2.0-N-13.0078-2 on 7/22/13 by JB.
[36] Revised per OSSIv2.0-N-13.0078-2 on 7/22/13 by JB.

7.10.5 docsMcastDefGrpSvcClass

Object	vCM	DPoE System	Comments
docsMcastDefGrpSvcClass		MUST	
docsMcastDefGrpSvcClassDef		MUST	

7.11 DOCS-QOS3-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoE System	Comments
docsQosPktClassTable	MUST	MUST	
docsQosParamSetTable	MUST	MUST	Not all parameters apply to EPON. (See the comments for docsQosServiceFlowTable table.)
docsQosServiceFlowTable	MUST	MUST	This table is supported, but not all objects apply. For instance, there is no DSID or Channel Set ID.
docsQosServiceFlowStatsTable	MUST	MUST	
docsQosServiceFlowLogTable		SHOULD NOT	This table does not seem to be valuable in the presence of the Subscriber Usage records provided by IPDR. Operators do not need this table in the current version of the specification.
docsQosServiceClassTable		MUST	
docsQosCmtsMacToSrvFlowTable		MUST	
docsQosGrpServiceFlowTable		MUST	
docsQosGrpPktClassTable		MUST	
docsQosDynamicServiceStatsTable	SHOULD NOT	SHOULD NOT	Currently not applicable to EPON. There is no dynamic service messaging defined between the DPoE System and D-ONUs in the current version of the specification.
docsQosUpstreamStatsTable		MUST NOT	This is not applicable to EPON.
docsQosPhsTable	MUST NOT	MUST NOT	PHS is not applicable to EPON.
docsQosServiceFlowSidClusterTable	MUST NOT	MUST NOT	No upstream channel bonding in EPON, so this is not needed.
docsQosUpChCounterExtTable		MUST NOT	This is not applicable to EPON.
docsQosServiceFlowCcfStatsTable		MUST NOT	This is not applicable to EPON.
docsQosCmServiceUsStatsTable	MUST NOT		This is not applicable to EPON.
docsQosCmtsDsidTable		MUST NOT	No downstream bonding in EPON, so this is not needed.
docsQosCmtsDebugDsidTable		MUST NOT	No downstream bonding in EPON.
docsQosCmtsDebugDsidStatsTable		MUST NOT	No downstream bonding in EPON.
docsQosCmDsidTable	MUST NOT		No downstream bonding in EPON.

7.11.1 docsQosPktClassTable[37]

The docsQosPktClassTable is augmented by new management objects as defined in the dpoePktClassTable and MUST be supported by the DPoE System. The dpoePktClassTable provides new management objects which are applicable only to the DPoE System in addition to the following docsQosPktClassTable objects as described in [OSSIv3.0].

[37] Revised per OSSIv2.0-N-13.1111-1 on 3/10/14 by JB.

The docsQosPktClassMibBitMap object MUST be supported by the DPoE System for backwards-compatibility when DOCSIS-style classifiers are used in the modem configuration file. The DPoE System MUST implement the dpoePktClassBitMap object when new DPoE Classifiers are used.

The docsQosPktClassUserPriLow and docsQos-PktClassUserPriHigh objects MUST be supported by the DPoE System for backwards-compatibility when DOCSIS-style classifiers are used in the modem configuration file. The DPoE System MUST implement the dpoePktClassCVlanPCP object to identify a single priority when new DPoE Classifiers are used.

Object	vCM	DPoE System	Comments
docsQosPktClassTable	MUST	MUST	
docsQosPktClassEntry	MUST	MUST	
docsQosPktClassId	MUST	MUST	
docsQosPktClassDirection	MUST	MUST	
docsQosPktClassPriority	MUST	MUST	
docsQosPktClassIpTosLow	MUST	MUST	
docsQosPktClassIpTosHigh	MUST	MUST	
docsQosPktClassIpTosMask	MUST	MUST	
docsQosPktClassIpProtocol	MUST	MUST	
docsQosPktClassIpSourceAddr	MUST	MUST	
docsQosPktClassIpSourceMask	MUST	MUST	
docsQosPktClassIpDestAddr	MUST	MUST	
docsQosPktClassIpDestMask	MUST	MUST	
docsQosPktClassSourcePortStart	MUST	MUST	
docsQosPktClassSourcePortEnd	MUST	MUST	
docsQosPktClassDestPortStart	MUST	MUST	
docsQosPktClassDestPortEnd	MUST	MUST	
docsQosPktClassDestMacAddr	MUST	MUST	
docsQosPktClassDestMacMask	MUST	MUST	
docsQosPktClassSourceMacAddr	MUST	MUST	
docsQosPktClassEnetProtocolType	MUST	MUST	This MIB object will always be interpreted as the value contained "after" the 802.1 header, independent of what tagging convention is used. A vCM MUST support a value of 'ethertype(1)' for docsQosPktClassEnetProtocolType. The DPoE System MUST support a value of 'ethertype(1)' for docsQosPktClassEnetProtocolType. A vCM MUST NOT support a value of 'mac(3)' for docsQosPktClassEnetProtocolType. The DPoE System MUST NOT support a value of 'mac(3)' for docsQosPktClassEnetProtocolType. The value 'mac(3)' does not apply to DPoE Networks.A vCM MAY support other values for docsQosPktClassEnetProtocolType. The DPoE System MAY support other values for docsQosPktClassEnetProtocolType.
docsQosPktClassEnetProtocol	MUST	MUST	

Object	vCM	DPoE System	Comments
docsQosPktClassUserPriLow	MUST	MUST	
docsQosPktClassUserPriHigh	MUST	MUST	
docsQosPktClassVlanId	MUST	MUST	
docsQosPktClassState	MUST	MUST	Only 'active' is currently supported for DPoE Networks. The DPoE System MUST return a value of 'active' for docsQosPktClassState. A vCM MUST return a value of 'active' for docsQosPktClassState.
docsQosPktClassPkts	MUST	MUST	If the capability is not supported the DPoE System MUST return a value of 'zero' for docsQosPktClassPkts. If the capability is not supported the vCM MUST return a value of 'zero' for docsQosPktClassPkts.
docsQosPktClassBitMap	MUST	MUST	
docsQosPktClassIpAddrType	MUST	MUST	
docsQosPktClassFlowLabel	MUST	MUST	
docsQosPktClassCmInterfaceMask	MUST	MUST	

7.11.2 docsQosParamSetTable[38]

Object	vCM	DPoE System	Comments
docsQosParamSetTable	MUST	MUST	This table has separate entries (Active, Admitted, Provisioned) for each service flow. For this version of DPoE specifications, all of the entries will be present in the table, but they all will have the 'provisioned' values.
docsQosParamSetEntry	MUST	MUST	
docsQosParamSetServiceClassName	MUST	MUST	
docsQosParamSetPriority	MUST	MUST	When an SF is associated with a MESP, the DPoE System MUST return 0 for docsQosParamSetPriority in the table rows associated with the SF. When an SF is associated with a MESP, the vCM MUST return 0 for docsQosParamSetPriority in the table rows associated with the SF.
docsQosParamSetMaxTrafficRate	MUST	MUST	When an SF is associated with a MESP, the DPoE System MUST return 0 for docsQosParamSetMaxTrafficRate in the table rows associated with the SF. When an SF is associated with a MESP, the vCM MUST return 0 for docsQosParamSetMaxTrafficRate in the table rows associated with the SF.
docsQosParamSetMaxTrafficBurst	MUST	MUST	When an SF is associated with a MESP, the DPoE System MUST return 0 for docsQosParamSetMaxTrafficBurst in the table rows associated with the SF. When an SF is associated with a MESP, the vCM MUST return 0 for docsQosParamSetMaxTrafficBurst in the table rows associated with the SF.

[38] Revised per OSSIv2.0-N-15.0214-1 on 10/20/15 by JB.

Object	vCM	DPoE System	Comments
docsQosParamSetMinReservedRate	MUST	MUST	When an SF is associated with a MESP, the DPoE System MUST return 0 for docsQosParamSetMinReservedRate in the table rows associated with the SF. When an SF is associated with a MESP, the vCM MUST return 0 for docsQosParamSetMinReservedRate in the table rows associated with the SF.
docsQosParamSetMinReservedPkt	MUST	MUST	Not applicable to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetMinReservedPkt. A vCM MUST return a value of zero for docsQosParamSetMinReservedPkt.
docsQosParamSetActiveTimeout	MUST	MUST	Not applicable to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetActiveTimeout. A vCM MUST return a value of zero for docsQosParamSetActiveTimeout.
docsQosParamSetAdmittedTimeout	MUST	MUST	Not applicable to DPoE Networks. The DPoE System MUST return a value of '200' for docsQosParamSetAdmittedTimeout. A vCM MUST return a value of '200' for docsQosParamSetAdmittedTimeout.
docsQosParamSetMaxConcatBurst	MUST	MUST	When an SF is associated with a MESP, the DPoE System MUST return 0 for docsQosParamSetMaxConcatBurst in the table rows associated with the SF. When an SF is associated with a MESP, the vCM MUST return 0 for docsQosParamSetMaxConcatBurst in the table rows associated with the SF .
docsQosParamSetSchedulingType	MUST	MUST	Only 'undefined' must be reported for downstream parameter sets for the docsQosParamSetSchedulingType object. When an upstream SF is associated with a MESP, the DPoE System SHOULD return 'realTimePollingService' for docsQosParamSetSchedulingType in the table row associated with the upstream SF. When an upstream SF is associated with a MESP, the vCM SHOULD return 'realTimePollingService' for docsQosParamSetSchedulingType in the table row associated with the upstream SF.
docsQosParamSetNomPollInterval	MUST	MUST	
docsQosParamSetTolPollJitter	MUST	MUST	
docsQosParamSetUnsolicitGrantSize	MUST	MUST	
docsQosParamSetNomGrantInterval	MUST	MUST	
docsQosParamSetTolGrantJitter	MUST	MUST	
docsQosParamSetGrantsPerInterval	MUST	MUST	

Object	vCM	DPoE System	Comments
docsQosParamSetTosAndMask	MUST	MUST	A vCM MUST support a value of 0x00 for docsQosParamSetTosAndMask. A vCM MAY support other values for docsQosParamSetTosAndMask . The DPoE System MUST support a value of 0x00 for docsQosParamSetTosAndMask. The DPoE System MAY support other values for docsQosParamSetTosAndMask.
docsQosParamSetTosOrMask	MUST	MUST	
docsQosParamSetMaxLatency	MUST	MUST	Not applicable to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetMaxLatency. A vCM MUST return a value of zero for docsQosParamSetMaxLatency.
docsQosParamSetType	MUST	MUST	
docsQosParamSetRequestPolicyOct	MUST	MUST	The only bit field that is supported by DPoE specifications is 'piggybackReqWithData'.
docsQosParamSetBitMap	MUST	MUST	Only those TLVs in the bitfield which are supported by DPoE specifications should be set.
docsQosParamSetServiceFlowId	MUST	MUST	
docsQosParamSetRequiredAttrMask	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetRequiredAttrMask. A vCM MUST return a value of zero for docsQosParamSetRequiredAttrMask.
docsQosParamSetForbiddenAttrMask	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetForbiddenAttrMask. A vCM MUST return a value of zero for docsQosParamSetForbiddenAttrMask.
docsQosParamSetAttrAggrRuleMask	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetAttrAggrRuleMask. A vCM MUST return a value of zero for docsQosParamSetAttrAggrRuleMask.
docsQosParamSetAppId	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetAppId. A vCM MUST return a value of zero for docsQosParamSetAppId.
docsQosParamSetMultiplierContentionReqWindow	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of '8' for docsQosParamSetMultiplierContentionReqWindow. A vCM MUST return a value of '8' for docsQosParamSetMultiplierContentionReqWindow.
docsQosParamSetMultiplierBytesReq	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of '4' for docsQosParamSetMultiplierBytesReq. A vCM MUST return a value of '4' for docsQosParamSetMultiplierBytesReq.

Object	vCM	DPoE System	Comments
docsQosParamSetMaxReqPerSidCluster	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetMaxReqPerSidCluster. A vCM MUST return a value of zero for docsQosParamSetMaxReqPerSidCluster.
docsQosParamSetMaxOutstandingBytesPerSidCluster	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetMaxOutstandingBytesPerSidCluster. A vCM MUST return a value of zero for docsQosParamSetMaxOutstandingBytesPerSidCluster.
docsQosParamSetMaxTotBytesReqPerSidCluster	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetMaxTotBytesReqPerSidCluster. A vCM MUST return a value of zero for docsQosParamSetMaxTotBytesReqPerSidCluster.
docsQosParamSetMaxTimeInSidCluster	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetMaxTimeInSidCluster. A vCM MUST return a value of zero for docsQosParamSetMaxTimeInSidCluster.
docsQosParamSetPeakTrafficRate	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetPeakTrafficRate. A vCM MUST return a value of zero for docsQosParamSetPeakTrafficRate.
docsQosParamSetDsResequencing	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetDsResequencing. A vCM MUST return a value of zero for docsQosParamSetDsResequencing.
docsQosParamSetMinimumBuffer	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetMinimumBuffer. A vCM MUST return a value of zero for docsQosParamSetMinimumBuffer.
docsQosParamSetTargetBuffer	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosParamSetTargetBuffer. A vCM MUST return a value of zero for docsQosParamSetTargetBuffer.
docsQosParamSetHCMaxTrafficRate	MUST	MUST	
docsQosParamSetHCMinReservedRate	MUST	MUST	
docsQosParamSetHCPeakTrafficRate	MUST	MUST	

7.11.3 docsQosServiceFlowTable[39]

Object	vCM	DPoE System	Comments
docsQosServiceFlowTable	MUST	MUST	
docsQosServiceFlowEntry	MUST	MUST	
docsQosServiceFlowId	MUST	MUST	
docsQosServiceFlowSID	MUST	MUST	
docsQosServiceFlowDirection	MUST	MUST	
docsQosServiceFlowPrimary	MUST	MUST	
docsQosServiceFlowParamSetTypeStatus	MUST	MUST	For DPoE Networks, all three bits (active, admitted, provisioned) of the docsQosServiceFlowParamSetTypeStatus object MUST be set for entries in the docsQosServiceFlowTable.
docsQosServiceFlowChSetId	MUST	MUST	The DPoE System MUST return the DCID or UCID for the channel associated with the service flow. A vCM MUST return the DCID or UCID for the channel associated with the service flow.
docsQosServiceFlowAttrAssignSuccess	MUST	MUST	Does not apply to DPoE Networks. Return value of 'false'. The DPoE System MUST return a value of false for docsQosServiceFlowAttrAssignSuccess. A vCM MUST return a value of false for docsQosServiceFlowAttrAssignSuccess.
docsQosServiceFlowDsid	MUST	MUST	For multicast Group Service Flows, the DPoE System MUST return the value of the mLLID associated with the GSF for docsQosServiceFlowDsid. For all remaining cases, the DPoE System MUST return a value of zero for docsQosServiceFlowDsid. For multicast Group Service Flows, a vCM MUST return the value of the mLLID associated with the GSF for docsQosServiceFlowDsid. For all remaining cases, a vCM MUST return a value of zero for docsQosServiceFlowDsid.
docsQosServiceFlowMaxReqPerSidCluster	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceFlowMaxReqPerSidCluster. A vCM MUST return a value of zero for docsQosServiceFlowMaxReqPerSidCluster.
docsQosServiceFlowMaxOutstandingBytesPerSidCluster	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceFlowMaxOutstandingBytesPerSidCluster. A vCM MUST return a value of zero for docsQosServiceFlowMaxOutstandingBytesPerSidCluster.
docsQosServiceFlowMaxTotBytesReqPerSidCluster	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceFlowMaxTotBytesReqPerSidCluster. A vCM MUST return a value of zero for docsQosServiceFlowMaxTotBytesReqPerSidCluster.
docsQosServiceFlowMaxTimeInSidCluster	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceFlowMaxTimeInSidCluster. A vCM MUST return a value of zero for docsQosServiceFlowMaxTimeInSidCluster.

[39] Revised per OSSIv2.O-N-13.0073-1 on 7/19/13 by JB.

7.11.4 docsQosServiceFlowStatsTable

Object	vCM	DPoE System	Comments
docsQosServiceFlowStatsTable	MUST	MUST	
docsQosServiceFlowStatsEntry	MUST	MUST	
docsQosServiceFlowPkts	MUST	MUST	
docsQosServiceFlowOctets	MUST	MUST	
docsQosServiceFlowTimeCreated	MUST	MUST	
docsQosServiceFlowTimeActive	MUST	MUST	
docsQosServiceFlowPHSUnknowns	MUST	MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceFlowPHSUnknowns. A vCM MUST return a value of zero for docsQosServiceFlowPHSUnknowns.
docsQosServiceFlowPolicedDropPkts	MUST	MUST	
docsQosServiceFlowPolicedDelayPkts	MUST	MUST	Not supported in DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceFlowPolicedDelayPkts. A vCM MUST return a value of zero for docsQosServiceFlowPolicedDelayPkts.

7.11.5 docsQosServiceClassTable[40]

Object	vCM	DPoE System	Comments
docsQosServiceClassTable		MUST	
docsQosServiceClassEntry		MUST	
docsQosServiceClassName		MUST	
docsQosServiceClassStatus		MUST	
docsQosServiceClassPriority		MUST	
docsQosServiceClassMaxTrafficRate		MUST	
docsQosServiceClassMaxTrafficBurst		MUST	
docsQosServiceClassMinReservedRate		MUST	
docsQosServiceClassMinReservedPkt		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassMinReservedPkt.
docsQosServiceClassMaxConcatBurst		MUST	
docsQosServiceClassNomPollInterval		MUST	
docsQosServiceClassTolPollJitter		MUST	
docsQosServiceClassUnsolicitGrantSize		MUST	
docsQosServiceClassNomGrantInterval		MUST	
docsQosServiceClassTolGrantJitter		MUST	
docsQosServiceClassGrantsPerInterval		MUST	
docsQosServiceClassMaxLatency		MUST	
docsQosServiceClassActiveTimeout		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassActiveTimeout.
docsQosServiceClassAdmittedTimeout		MUST	Does not apply to DPoE Networks. Return value of '200'. The DPoE System MUST return a value of zero for docsQosServiceClassAdmittedTimeout.

[40] Revised per OSSIv2.0-N-15.0214-1 on 10/20/15 by JB.

Object	vCM	DPoE System	Comments
docsQosServiceClassSchedulingType		MUST	
docsQosServiceClassRequestPolicy		MUST	The only bit field which is supported by DPoE specifications is 'piggybackReqWithData'.
docsQosServiceClassTosAndMask		MUST	A vCM MUST support a value of 0x00 for docsQosServiceClassTosAndMask . A vCM MAY support other values for docsQosServiceClassTosAndMask . The DPoE System MUST support a value of 0x00 for docsQosServiceClassTosAndMask. The DPoE System MAY support other values for docsQosServiceClassTosAndMask.
docsQosServiceClassTosOrMask		MUST	
docsQosServiceClassDirection		MUST	
docsQosServiceClassStorageType		MUST	
docsQosServiceClassDSCPOverwrite		MUST	
docsQosServiceClassRequiredAttrMask		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassRequiredAttrMask .
docsQosServiceClassForbiddenAttrMask		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassForbiddenAttrMask.
docsQosServiceClassAttrAggrRuleMask		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassAttrAggrRuleMask.
docsQosServiceClassAppId		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassAppId.
docsQosServiceClassMultiplierContentionReqWindow		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of '8' for docsQosServiceClassMultiplierContentionReqWindow.
docsQosServiceClassMultiplierBytesReq		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of '4' for docsQosServiceClassMultiplierBytesReq.
docsQosServiceClassMaxReqPerSidCluster		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassMaxReqPerSidCluster .
docsQosServiceClassMaxOutstandingBytesPerSidCluster		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassMaxOutstandingBytesPerSidCluster.
docsQosServiceClassMaxTotBytesReqPerSidCluster		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassMaxTotBytesReqPerSidCluster.
docsQosServiceClassMaxTimeInSidCluster		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassMaxTimeInSidCluster.
docsQosServiceClassPeakTrafficRate		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassPeakTrafficRate.
docsQosServiceClassDsResequencing		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsQosServiceClassDsResequencing.
docsQosServiceClassHCMaxTrafficRate		MUST	
docsQosServiceClassHCMinReservedRate		MUST	

Object	vCM	DPoE System	Comments
docsQosServiceClassHCPeakTrafficRate		MUST	

7.11.6 docsQosCmtsMacToSrvFlowTable

Object	vCM	DPoE System	Comments
docsQosCmtsMacToSrvFlowTable		MUST	
docsQosCmtsMacToSrvFlowEntry		MUST	
docsQosCmtsCmMac		MUST	Contains the MAC address assigned to the D-ONU corresponding to the vCM.
docsQosCmtsServiceFlowId		MUST	Contains the Service Flow Identifier associated with the vCM.
docsQosCmtsIfIndex		MUST	Contains the Interface Index value assigned to the logical MAC Domain on the DPoE System for the EPON (TU) interface connected to the D-ONU.

7.11.7 docsQosGrpServiceFlowTable

Object	vCM	DPoE System	Comments
docsQosGrpServiceFlowTable		MUST	
docsQosGrpServiceFlowEntry		MUST	
docsQosGrpServiceFlowIsDef		MUST	
docsQosGrpServiceFlowQosConfigId		MUST	
docsQosGrpServiceFlowNumSess		MUST	

7.11.8 docsQosGrpPktClassTable

Object	vCM	DPoE System	Comments
docsQosGrpPktClassTable		MUST	
docsQosGrpPktClassEntry		MUST	
docsQosGrpPktClassGrpConfigId		MUST	

7.12 DOCS-SEC-MIB ([OSSIv3.0] Annex Q)[41]

Table Name	vCM	DPoE System	Comments
docsSecCmtsServerCfgTftpOptions		MUST	Not applicable to DPoE Networks. Return a value of ''H. Only support an SNMP Access Type of RO.
docsSecCmtsServerCfgConfigFileLearningEnable		MUST	Not applicable to DPoE Networks because there can be no mismatch between the contents of the modem configuration file and a REG-REQ. Always return a value of 'false'. Only support an SNMP Access Type of RO

[41] Revised per OSSIv2.0-N-13.0067-1 on 2/22/13 by JB.

Table Name	vCM	DPoE System	Comments
docsSecCmtsEncryptAlgPriority		MUST	In the current implementation, DPoE Networks are limited in which encryption algorithms can be supported. In the future, there may be support for this object, depending on which encryption algorithms get supported for EPON. For the current version, always return an empty list. Only support an SNMP Access Type of RO.
docsSecCmtsSavControlCmAuthEnable		MUST	
docsSecSavCmAuthTable		MUST	
docsSecSavCfgListTable		MUST	
docsSevSavStaticListTable		MUST	
docsSecCmtsCmSavStatsTable		MUST	
docsSecCmtsCertificateCertRevocationMethod		MUST	This is needed in support of CM certificate authentication.
docsSecCmtsCertRevocationList		MUST	This is needed in support of CM certificate authentication.
docsSecCmtsOnlineCertStatusProtocol		MUST	This is needed in support of CM certificate authentication.
docsSecCmtsCmEaeExclusionTable		MUST NOT	EAE is not supported for DPoE Networks.
docsSecCmtsCmBpi2EnforceExclusionTable		MUST NOT	BPI+ is not applicable to DPoE Networks.

7.13 DOCS-SUBMGT3-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoE System	Comments
docsSubMgt3Base		MUST	
docsSubMgt3CpeCtrlTable		MUST	
docsSubMgt3CpeIpTable		MUST	
docsSubMgt3GrpTable		MUST	
docsSubMgt3FilterGrpTable		MUST	The DPoE System MUST support downstream filtering. The DPoE System MAY support upstream filtering.

7.13.1 docsSubMgt3Base

Object	vCM	DPoE System	Comments
docsSubmgt3Base			
docsSubmgt3BaseCpeMaxIpv4Def		MUST	
docsSubmgt3BaseCpeMaxIpv6PrefixDef		MUST	
docsSubmgt3BaseCpeActiveDef		MUST	
docsSubmgt3BaseCpeLearnableDef		MUST	
docsSubmgt3BaseSubFilterDownDef		MUST	
docsSubmgt3BaseSubFilterUpDef		MUST	
docsSubmgt3BaseCmFilterDownDef		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsSubmgt3BaseCmFilterDownDef .

Object	vCM	DPoE System	Comments
docsSubmgt3BaseCmFilterUpDef		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsSubmgt3BaseCmFilterUpDef.
docsSubmgt3BasePsFilterDownDef		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsSubmgt3BasePsFilterDownDef.
docsSubmgt3BasePsFilterUpDef		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsSubmgt3BasePsFilterUpDef.
docsSubmgt3BaseMtaFilterDownDef		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsSubmgt3BaseMtaFilterDownDef.
docsSubmgt3BaseMtaFilterUpDef		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsSubmgt3BaseMtaFilterUpDef.
docsSubmgt3BaseStbFilterDownDef		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsSubmgt3BaseStbFilterDownDef.
docsSubmgt3BaseStbFilterUpDef		MUST	Does not apply to DPoE Networks. The DPoE System MUST return a value of zero for docsSubmgt3BaseStbFilterUpDef .

7.14 ENTITY-MIB ([RFC 4133])

Table Name	vCM	DPoE System	Comments
entPhysicalTable	MUST	MUST	
entAliasMappingTable	MUST	MUST	
entPhysicalContainsTable	MUST	MUST	
entLastChangeTime	MUST	MUST	

7.15 ENTITY-SENSOR-MIB ([RFC 3433])

Table Name	vCM	DPoE System	Comments
entPhysSensorTable	MUST	MUST	

7.16 EtherLike-MIB ([RFC 3635])

Table Name	vCM	DPoE System	Comments
dot3StatsTable	MUST	MUST	
dot3CollTable	MUST	MUST	
dot3ControlTable	MUST	MUST	Only needed for interfaces that support PAUSE.
dot3PauseTable	MUST	MUST	Only needed for interfaces that support PAUSE.

7.16.1 dot3StatsTable[42]

Object	vCM	DPoE System	Comments
dot3StatsTable	MUST	MUST	
dot3StatsEntry	MUST	MUST	
dot3StatsIndex	MUST	MUST	
dot3StatsAlignmentErrors	MAY	MUST	
dot3StatsFCSErrors	MAY	MUST	
dot3StatsInternalMacTransmitErrors	MAY	MUST	
dot3StatsFrameTooLongs	MAY	MUST	
dot3StatsInternalMacReceiveErrors	MAY	MUST	
dot3StatsSymbolErrors	MAY	MUST	
dot3StatsSingleCollisionFrames	MAY	MAY	
dot3StatsMultipleCollisionFrames	MAY	MAY	
dot3StatsDeferredTransmissions	MAY	MAY	
dot3StatsLateCollisions	MAY	MAY	
dot3StatsExcessiveCollisions	MAY	MAY	
dot3StatsCarrierSenseErrors	MAY	MAY	
dot3StatsDuplexStatus	MUST	MAY	
dot3StatsSQETestErrors	MAY		

7.17 HOST-RESOURCES-MIB ([RFC 2790])

Table Name	vCM	DPoE System	Comments
hrDeviceTable	MUST	MUST	
hrMemorySize	MUST	MUST	
hrStorageTable	MUST	MUST	
hrSWRunTable	MUST	MUST	
hrSWRunPerfTable	MUST	MUST	
hrProcessorTable	MUST	MUST	

7.18 IF-MIB ([RFC 2863])[43]

Table Name	vCM	DPoE System	Comments
ifNumber	MUST	MUST	
ifTableLastChange	MUST	MUST	
ifTable	MUST	MUST	
ifXTable	MUST	MUST	A vCM MUST support configuration of the ifAlias object on the vCM associated with a D-ONU to allow the object to be used to hold the UNI Identifier.
ifStackTable	MUST	MUST	
ifStackLastChange	MUST	MUST	
ifRcvAddressTable	MAY	SHOULD NOT	

[42] Added per OSSIv2.O-N-13.0073-1 on 7/19/13 by JB.
[43] Revised per OSSIv2.O-N-13.0089-3 on 7/19/13 by JB.

Table Name	vCM	DPoE System	Comments
ifTestTable	MUST NOT	MUST NOT	

7.18.1 DPoE Interface Table Implementation Considerations[44]

In Annex A.2 of the [OSSIv3.0] specification, there are specific requirements regarding the population of the ifTable, ifXTable, and the ifStackTable for DOCSIS interfaces. This section describes the expectations for the creation of these DOCSIS interfaces for the DPoE System, as well as differences between DPoE specifications and DOCSIS specifications.

A MAC Domain is the representation of a TUL Interface to the DOCSIS OSS. A single EPON (TU) interface MAY support multiple MAC Domains (TULs). A single MAC Domain MAY support multiple downstream interfaces and multiple upstream interfaces. The DPoE System MUST create entries in its ifTable for MAC Domain interfaces (ifType=docsCableMacLayer) associated with each EPON (TU) interface on the DPoE System. The DPoE System MUST create entries in its ifTable for Downstream interfaces (ifType=docsCableDownstream), and Upstream interfaces (ifType=docsCableUpstream) associated with each MAC Domain interface on the DPoE System. This is needed to provide parity with the existing DOCSIS implementations where DOCSIS MIBs refer to MAC Domain, Downstream, and Upstream interfaces.

The following table describes any special processing for the DPoE System logical interfaces for the ifTable/ifXTable:

MIB Objects	DPoE MAC Domain	DPoE-Downstream	DPoE-Upstream
IfTable			
ifIndex	Vendor-specific	Vendor-specific	Vendor-specific
ifDescr	Vendor-specific	Vendor-specific	Vendor-specific
ifType	127	128	129
ifMtu	4000 (1G or 2G) 9000 (10G)	4000 (1G or 2G) 9000 (10G)	4000 (1G) 9000 (10G)
ifSpeed	0	1000000000, 2000000000, or 4,294,967,295	1000000000 or 4,294,967,295
ifPhysAddress:	MAC Address of the EPON interface	Empty-String	Empty-String
ifAdminStatus: [For DPoE System: When a managed system initializes, all interfaces start with ifAdminStatus in the up(1) state. As a result of either explicit management or configuration information saved via other non-SNMP methods (i.e., CLI commands) retained by the managed system, ifAdminStatus is then changed to either the down(2) or testing(3) states (or remains in the up(1) state).]	up(1), down(2), testing(3)	Follows from MAC Domain	Follows from MAC Domain
ifOperStatus:	up(1), down(2), testing(3), dormant(5), notPresent(6)	Follows from MAC Domain	Follows from MAC Domain
ifXTable			
ifHighSpeed	0	1000, 2000, or 10000	1000 or 10000
ifPromiscuousMode	true,false	false	true,false

The DPoE System MAC Domain ifMtu attribute MUST report the smallest ifMtu value of any Downstream or Upstream interface associated with the MAC Domain.

[44] Revised per OSSIv2.0-N-14.0137-1 on 5/30/14 and OSSIv2.0-N-14.0189-1 on 7/10/14 by JB.

The DPoE System MUST support ifInDiscards that includes frames dropped due to any of the reasons described in section 5 of [DPoE-MEFv2.0].

The DPoE System MUST create entries in its ifStackTable that map the Downstream and Upstream interfaces to their associated MAC Domain interface on the EPON (TU) interface.

A vCM MUST create entries in its ifTable for a MAC Domain interface (ifType=docsCableMacLayer), a Downstream interface (ifType=docsCableDownstream), and an Upstream interface (ifType=docsCableUpStream) for the EPON interface on the D-ONU.

The following table describes any special processing for the vCM logical interfaces for the ifTable/ifXTable:

MIB Objects	vCM MAC Domain	vCM-Downstream	vCM-Upstream
IfTable			
ifIndex	2	3	4
ifDescr			
ifType	127	128	129
ifMtu	4000 (1G or 2G) 9000 (10G)	4000 (1G or 2G) 9000 (10G)	4000 (1G) 9000 (10G)
ifSpeed	0	1000000000, 2000000000, or 4,294,967,295	1000000000 or 4,294,967,295
ifPhysAddress:	MAC Address of the EPON interface	Empty-String	Empty-String
ifAdminStatus: [For DPoE System: When a managed system initializes, all interfaces start with ifAdminStatus in the up(1) state. As a result of either explicit management or configuration information saved via other non-SNMP methods (i.e., CLI commands) retained by the managed system, ifAdminStatus is then changed to either the down(2) or testing(3) states (or remains in the up(1) state).]	up(1), down(2), testing(3)	Follows from MAC Domain	Follows from MAC Domain
ifOperStatus:	up(1), down(2), testing(3), dormant(5), notPresent(6)	Follows from MAC Domain	Follows from MAC Domain
ifXTable			
ifHighSpeed	0	1000, 2000, or 10000	1000 or 10000
ifPromiscuousMode	true	true	false

The vCM MAC Domain ifMtu attribute MUST report the smallest ifMtu value of any Downstream or Upstream interface associated with the MAC Domain.

A vCM MUST create entries in its ifStackTable that map the Downstream and Upstream interfaces to their associated MAC Domain interface on the EPON interface.

The vCM MUST support the following MIB objects in the ifTable of the IF-MIB for each D-ONU S interface:

- ifAlias. This writeable object is used to provision the MU Identifier or MI Identifier. As an example, the Service Provider might use "SC-DPoE-System-DPoE-ONU1-Port1" as a UNI Identifier to signify Port 1 on 'D-ONU1' on the 'Santa Clara DPoE System'. TLV-11 should be used to set ifAlias.
- ifType. This read-only object stores the MEF UNI Physical Medium and Mac Layer.
- ifSpeed. This read-only object stores the Speed of the MEF UNI.
- ifMtu. This read-only object stores the Maximum Transmission Unit (MTU) size of the MEF UNI as specified in [DPoE-MULPIv2.0].

The vCM MUST support the dot3StatsDuplexStatus MIB object in the dot3StatsTable of the EtherLike-MIB. This object stores the Mode of the MEF UNI.

7.19 IGMP-STD-MIB ([RFC 2933])

The D-ONU is not required to be an active participant in the IGMP protocol and does not need to snoop IGMP packets. However, if a vendor chooses to support this functionality within the D-ONU, the MGMD-STD-MIB MAY be implemented in place of the IGMP-STD-MIB on the vCM.

7.20 IP-MIB ([RFC 4293])

Table Name	vCM	DPoE System	Comments
ipv4GeneralGroup	MUST	MUST	These groups/tables are not as important for the remote device, especially given that IP connectivity to the D-ONU is being spoofed by the DPoE System.
ipv6GeneralGroup2	MUST	MUST	
ipv4InterfaceTable	SHOULD NOT	MUST	
ipv6InterfaceTable	MUST	MUST	
ipSystemStatsTable	MUST	MUST	
ipIfStatsTable	MUST	MUST	
ipAddressPrefixTable	MUST	MUST	
ipAddressTable	MUST	MUST	
ipNetToPhysicalTable	MUST	MUST	
ipDefaultRouterTable	MUST	MUST	
icmpStatsTable	SHOULD NOT	MUST	
icmpMsgStatsTable	SHOULD NOT	MUST	
ipv6RouterAdvertTable	MUST	MUST	

7.21 MGMD-STD-MIB ([RFC 5519])

The DPoE System MUST support the MGMD-STD-MIB. The D-ONU is not required to be an active participant in the IGMP or MLD protocols and does not need to snoop IGMP or MLD packets. However, if a vendor chooses to support this functionality within the D-ONU, the MGMD-STD-MIB MAY be implemented. on the vCM.

Table Name	vCM	DPoE System	Comments
mgmdRouterInterfaceTable	MAY	MUST	
mgmdRouterCacheTable	MAY	MUST	
mgmdInverseRouterCacheTable	MAY	MUST	
mgmdRouterSrcListTable	MAY	MUST	

7.22 SNMPv2-MIB ([RFC 3418])

Table Name	vCM	DPoE System	Comments
SystemGroup	MUST	MUST	
sysORTable	MUST	MUST	
SNMPGroup	MUST	MUST	

Table Name	vCM	DPoE System	Comments
snmpSetGroup	MUST	MUST	

7.23 TCP-MIB ([RFC 4022])

Table Name	vCM	DPoE System	Comments
tcpBaseGroup	MUST	MUST	These groups/tables are not as important for the remote device given that IP connectivity to the D-ONU is being spoofed by the DPoE System.
tcpHCGroup	MUST	MUST	
tcpConnectionTable	MUST	MUST	
tcpListenerTable	MUST	MUST	

7.24 UDP-MIB ([RFC 4113])

Table Name	vCM	DPoE System	Comments
UDPGroup	MUST	MUST	These groups/tables are not as important for the remote device given that IP connectivity to the D-ONU is being spoofed by the DPoE System.
udpEndpointTable	MUST	MUST	

7.25 DOCS-L2VPN-MIB ([L2VPN])[45]

There are dependencies from this MIB on the Q-BRIDGE-MIB, which is currently not listed on the set of MIBs to be supported by the DPoE System.

Table Name	vCM	DPoE System	Comments
docsL2vpnIdToIndexTable		MUST	
docsL2vpnIndexToIdTable		MUST	
docsL2vpnCmTable		MUST	
docsL2vpnVpnCmTable		MUST	
docsL2vpnVpnCmStatsTable		MUST	
docsL2vpnPortStatusTable		SHOULD NOT	The only object reported in this table is the Group SAID for the VPN on a particular CMTS MAC Domain. As the use of Security Association Identifiers is currently not specified for DPoE Networks, this table need not be supported.
docsL2vpnSfStatusTable		MUST	
docsL2vpnPktClassTable		MUST	
docsL2vpnCmNsiTable		MUST	
docsL2vpnCmVpnCpeTable		SHOULD NOT	This table is required only when implementing multipoint forwarding. Multipoint forwarding is not supported in DPoE Networks.
docsL2vpnVpnCmCpeTable		SHOULD NOT	This table is required only when implementing multipoint forwarding. Multipoint forwarding is not supported in DPoE Networks.

[45] Revised per OSSIv2.O-N-13.0073-1 on 7/19/13 by JB.

Table Name	vCM	DPoE System	Comments
docsL2vpnDot1qTpFdbExtTable		SHOULD NOT	This table is required only when implementing multipoint forwarding. Multipoint forwarding is not supported in DPoE Networks.
docsL2vpnDot1qTpGroupExtTable		SHOULD NOT	This table is required only when implementing multipoint forwarding. Multipoint forwarding is not supported in DPoE Networks.

7.25.1 docsL2vpnCmTable

Object	vCM	DPoE System	Comments
docsL2vpnCmCompliantCapability		MUST	
docsL2vpnCmDutFilteringCapability		MUST	Per the DPoE MULPI specification, Downstream Unencrypted Traffic (DUT) Filtering (TLV 45) is not supported in DPoE Networks. The DPoE System MUST return a value of 'false' for the docsL2vpnCmDutFilteringCapability object.
docsL2vpnCmDutCMIM		MUST	Per the DPoE MULPI specification, Downstream Unencrypted Traffic (DUT) Filtering (TLV 45) is not supported in DPoE Networks. The DPoE System MUST return a value of '1' for docsL2vpnCmDutCMIM in bit position 0.
docsL2vpnCmDhcpSnooping		MUST	

7.25.2 docsL2vpnVpnCmTable

Object	vCM	DPoE System	Comments
docsL2vpnVpnCmCMIM		MUST	
docsL2vpnVpnCmIndividualSAId		MUST	The concept of a Security Association is not supported in DPoE Networks. The DPoE System MUST return a value of zero for docsL2vpnVpnCmIndividualSAId.
docsL2vpnVpnCmVendorSpecific		MUST	The L2VPN vendor-specific TLV (43.5.43) is not supported in DPoE Networks. The DPoE System MUST return a zero-length octetstring for the docsL2vpnVpnCmVendorSpecific object.

7.25.3 docsL2vpnVpnCmStatsTable[46]

Object	vCM	DPoE System	Comments
docsL2vpnVpnCmStatsUpstreamPkts		MUST	
docsL2vpnVpnCmStatsUpstreamBytes		MUST	
docsL2vpnVpnCmStatsUpstreamDiscards		MUST	
docsL2vpnVpnCmStatsDownstreamPkts		MUST	
docsL2vpnVpnCmStatsDownstreamBytes		MUST	
docsL2vpnVpnCmStatsDownstreamDiscards		MUST	

[46] Revised per OSSIv2.O-N-13.0073-1 on 7/19/13 by JB.

8 SUPPORT FOR MEF PERFORMANCE MANAGEMENT REQUIREMENTS

8.1 MEF Usage Statistics

[DPoE-MEFv2.0] describes "MEF Usage Accounting Requirements" based on the concept of a "Traffic Performance Data Set" from [Q.840.1]. In addition, [DPoE-MEFv2.0] describes reporting requirements for L2CP frames and octets in both Upstream and Downstream Service Flow cases.

Per [DPoE-MEFv2.0], the following set of statistics MUST be instrumented by the DPoE System for all Service Flows:

- GreenFrameCount
- YellowFrameCount
- RedFrameCount
- GreenOctetCount
- YellowOctetCount
- RedOctetCount
- L2CPFrameCount
- L2CPOctetCount
- L2CPDiscardedFrames
- L2CPDiscardedOctets

These statistics are provided for each Service Flow. Some of these statistics can only be measured on the ONU. While the exact specification of the monitoring points for this data is beyond the scope of this specification, it is expected that the ingress counters would be measured on the ONU.

If an operator is not using color marking, the same set of statistics would still be available. In this case, the values for "yellow" would always be 0, and the "red" counters would measure discarded traffic. The "green" counters would provide measures of the total traffic passed.

The SNMP table used to support these statistics is the following:

- dpoeMEFSvcFlowUsageTable

The DPoE system MUST implement the dpoeMEFSvcFlowUsageTable. The vCM SHOULD NOT implement the dpoeMEFSvcFlowUsageTable.

8.2 MI and MU Interface Statistics

The MI and MU interfaces should support all the statistics defined in the standard IfTable (RFC 2863).

This data should be provided by the D-ONU.

The statistics include ifInDiscards and ifOutDiscards from the standard ifTable.

This data will be supported by the vCM SNMP agent.

The SNMP agents for the DPoE System and the vCM SHOULD support the table dpoeMEFIfStatsTable to provide L2CP statistics for the MI and MU interfaces.

This will not be included in an IPDR service definition.

8.3 MN Interface Statistics

The MN interface should support all the statistics defined in the standard IfTable (RFC2863).

9 SUPPORT FOR DPOE MIBS[47]

This section describes DPoE MIB objects specific to DPoE implementations. The formal MIB module definition is provided in Annex B of this document.

The DPoE MIB is organized into the following tables:

- dpoeASFTable – contains objects describing the relationship between an ASF instance and an associated MESP.
- dpoeMESPTable – contains objects describing each MESP instance. (At this time all performance monitoring information specified in the MESP has been left out of the MIB.
- dpoePktClassTable – augments the existing dosQosPktClassTable to add the classifier objects supported by the DPoE system.
- dpoeServiceFlowTable – augments the existing docsQos3ServiceFlowTable to provide references for an ASF and MESP.
- dpoeAsfServiceFlowTable – this table provides a way to identify the list of service flows associated with a specific ASF.
- dpoeMEFIfStatsTable – this table provides access to L2CP counters for the MI and MU interfaces.
- dpoeMEFSvcFlowUsageTable – this table provides access to the L2CP and usage counters required for each MEF service flow.
- dpoeMEFSvcFlowCosUsageTable - this table provides access to usage counters required for MEF service flow for each COS.
- dpoeMcastAuthCmtsCmStatusProfileTable – this table extends the docsMcastAuthCmtsCmStatusTable to allow the filtering of multicast join requests based on the D-ONU interface (CMIM) of origin. CMIMs can be specified per profile in the CM configuration file.
- docsMcastAuthStaticSessRuleTable – this table extends the docsMcastAuthStaticSessRuleTable to allow the filtering of multicast join requests based on the D-ONU interface (CMIM) of origin. CMIMs can be specified per static session rule in the CM configuration file.
- dpoeMcastAuthCmtsCmStatusIfaceTable – this read-only table is implemented by the DPoE System. It's an extension of the docsMcastAuthCmtsCmStatusTable, providing additional matching criteria per D-ONU interface. Table entries are created in response to TLVs present in a CM configuration file.
- dpoeMcastCmSessTable – this table is implemented within the vCM. It provides information on the multicast configuration of the associated D-ONU.

The table below also identifies MIB support requirements for both the DPoE System and vCM. (This will be confirmed over the course of the review, however in order for this to work, some clarification in the table indexes is required). The values for the ASF and MESP indexes are the values from the DOCSIS configuration file for both the vCM and the DPoE System.

Each of the objects in the table below also has a reference to the associated DOCSIS configuration file TLV where appropriate.

[47] Revised per OSSIv2.0-N-13.0078-2 on 7/22/13 by JB.

9.1 DPOE-MIB

Table Name	vCM	DPoE System	Comments
dpoeMespTable	MUST	MUST	
dpoePktClassTable	MUST	MUST	
dpoeServiceFlowTable	MUST	MUST	
dpoeAsfServiceFlowTable	MUST	MUST	
dpoeMEFIfStatsTable	SHOULD	SHOULD	
dpoeMEFSvcFlowUsageTable		MUST	
dpoeMEFSvcFlowCosUsageTable		MUST	
dpoeMcastAuthCmtsCmStatusProfileTable		MUST	
dpoeMcastAuthStaticSessRuleTable		SHOULD	
dpoeMcastAuthCmtsCmStatusIfaceTable		MUST	
dpoeMcastCmSessTable	MUST		

9.1.1 dpoeMespTable

Object	vCM	DPoE System	Comments
dpoeMespTable	MUST	MUST	
dpoeMespEntry	MUST	MUST	
dpoeMESPBpCir	MUST	MUST	
dpoeMESPBpCbs	MUST	MUST	
dpoeMESPBpEir	MUST	MUST	
dpoeMESPBpEbs	MUST	MUST	
dpoeMESPBpCf	MUST	MUST	
dpoeMESPBpCm	MUST	MUST	
dpoeMESPBpCif	MUST	MUST	
dpoeMESPBpGreen	MUST	MUST	
dpoeMESPBpYellow	MUST	MUST	
dpoeMESPBpRed	MUST	MUST	
dpoeMESPBpCpCrStatus	MUST	MUST	
dpoeMESPBpCpCrField	MUST	MUST	
dpoeMESPBpCrGreen	MUST	MUST	
dpoeMESPBpCrYellow	MUST	MUST	
dpoeMESPBpCrRed	MUST	MUST	

9.1.2 dpoePktClassTable

Object	vCM	DPoE System	Comments
dpoePktClassTable	MUST	MUST	
dpoePktClassBitMap	MUST	MUST	
dpoePktClassCTagTPID	MUST	MUST	
dpoePktClassCTagPCP	MUST	MUST	
dpoePktClassCTagCFI	MUST	MUST	
dpoePktClassCTagVID	MUST	MUST	
dpoePktClassCTagTCI	MUST	MUST	
dpoePktClassSTagTPID	MUST	MUST	
dpoePktClassSTagPCP	MUST	MUST	
dpoePktClassSTagDEI	MUST	MUST	
dpoePktClassSTagVID	MUST	MUST	
dpoePktClassSTagTCI	MUST	MUST	
dpoePktClassITagTPID	MUST	MUST	
dpoePktClassITagPCP	MUST	MUST	
dpoePktClassITagUCA	MUST	MUST	
dpoePktClassITagDEI	MUST	MUST	
dpoePktClassITagSID	MUST	MUST	
dpoePktClassITagTCI	MUST	MUST	
dpoePktClassBTagTPID	MUST	MUST	
dpoePktClassBTagPCP	MUST	MUST	
dpoePktClassBTagDEI	MUST	MUST	
dpoePktClassBTagVID	MUST	MUST	
dpoePktClassBTagTCI	MUST	MUST	
dpoePktClassBTagBDA	MUST	MUST	
dpoePktClassBTagBSA	MUST	MUST	

9.1.3 dpoeServiceFlowTable

Object	vCM	DPoE System	Comments
dpoeServiceFlowTable	MUST	MUST	
dpoeServiceFlowEntry	MUST	MUST	
dpoeServiceFlowAsfId	MUST	MUST	
dpoeServiceFlowUpTPIDTrans	MUST	MUST	
dpoeServiceFlowDnTPIDTrans	MUST	MUST	
dpoeServiceFlowUpSTPIDTrans	MUST	MUST	
dpoeServiceFlowDnSTPIDTrans	MUST	MUST	
dpoeServiceFlowUpBTPIDTrans	MUST	MUST	
dpoeServiceFlowDnBTPIDTrans	MUST	MUST	
dpoeServiceFlowUpITPIDTrans	MUST	MUST	
dpoeServiceFlowDnITPIDTrans	MUST	MUST	

9.1.4 dpoeAsfServiceFlowTable

Object	vCM	DPoE System	Comments
dpoeAsfServiceFlowTable	MUST	MUST	
dpoeAsfServiceFlowEntry	MUST	MUST	
dpoeAsfServiceFlowAsfId	MUST	MUST	
dpoeAsfServiceFlowId	MUST	MUST	

9.1.5 dpoeSubmgt3FilterGrpTable

Object	vCM	DPoE System	Comments
dpoeSubmgt3FilterGrpTable	MUST	MUST	
dpoeSubmgt3FilterGrpEntry	MUST	MUST	
dpoeSubmgt3FilterGrpCTagMatch	MUST	MUST	
dpoeSubmgt3FilterGrpCTagTPID	MUST	MUST	
dpoeSubmgt3FilterGrpCTagPCP	MUST	MUST	
dpoeSubmgt3FilterGrpCTagCFI	MUST	MUST	
dpoeSubmgt3FilterGrpCTagVID	MUST	MUST	
dpoeSubmgt3FilterGrpCTagTCI	MUST	MUST	
dpoeSubmgt3FilterGrpSTagMatch		MUST	
dpoeSubmgt3FilterGrpSTagTPID		MUST	
dpoeSubmgt3FilterGrpSTagPCP		MUST	
dpoeSubmgt3FilterGrpSTagDEI		MUST	
dpoeSubmgt3FilterGrpSTagVID		MUST	
dpoeSubmgt3FilterGrpSTagTCI		MUST	
dpoeSubmgt3FilterGrpITagMatch		MUST	
dpoeSubmgt3FilterGrpITagTPID		MUST	
dpoeSubmgt3FilterGrpITagPCP		MUST	
dpoeSubmgt3FilterGrpITagUCA		MUST	
dpoeSubmgt3FilterGrpITagDEI		MUST	
dpoeSubmgt3FilterGrpITagSID		MUST	
dpoeSubmgt3FilterGrpITagTCI		MUST	
dpoeSubmgt3FilterGrpBTagMatch		MUST	
dpoeSubmgt3FilterGrpBTagTPID		MUST	
dpoeSubmgt3FilterGrpBTagPCP		MUST	
dpoeSubmgt3FilterGrpBTagDEI		MUST	
dpoeSubmgt3FilterGrpBTagVID		MUST	
dpoeSubmgt3FilterGrpBTagTCI		MUST	
dpoeSubmgt3FilterGrpBTagBDA		MUST	
dpoeSubmgt3FilterGrpBTagBSA		MUST	
dpoeSubmgt3FilterGrpMplsMatch		MUST	
dpoeSubmgt3FilterGrpMplsLabel		MUST	
dpoeSubmgt3FilterGrpMplsTc		MUST	

9.1.6 dpoeMespServiceClassTable

Object	vCM	DPoE System	Comments
dpoeMespServiceClassTable		MUST	
dpoeMespServiceClassEntry		MUST	
dpoeMespServiceClassName		MUST	
dpoeMESPServiceClassBpCir		MUST	
dpoeMESPServiceClassBpCbs		MUST	
dpoeMESPServiceClassBpEir		MUST	
dpoeMESPServiceClassBpEbs		MUST	
dpoeMESPServiceClassBpCf		MUST	
dpoeMESPServiceClassBpCm		MUST	
dpoeMESPServiceClassBpCif		MUST	
dpoeMESPServiceClassBpGreen		MUST	
dpoeMESPServiceClassBpYellow		MUST	
dpoeMESPServiceClassBpRed		MUST	
dpoeMESPServiceClassBpCpCrStatus		MUST	
dpoeMESPServiceClassBpCpCrField		MUST	
dpoeMESPServiceClassBpCrGreen		MUST	
dpoeMESPServiceClassBpCrYellow		MUST	
dpoeMESPServiceClassBpCrRed		MUST	

9.1.7 dpoeMEFIfStatsTable

Object	vCM	DPoE System	Comments
dpoeMEFIfStatsTable	SHOULD	SHOULD	
dpoeMEFIfStatsEntry	SHOULD	SHOULD	
dpoeMEFIfStatsIngressL2CPFrameCount	SHOULD	SHOULD	
dpoeMEFIfStatsIngressL2CPOctetCount	SHOULD	SHOULD	
dpoeMEFIfStatsEgressL2CPFrameCount	SHOULD	SHOULD	
dpoeMEFIfStatsEgressL2CPOctetCount	SHOULD	SHOULD	
dpoeMEFIfStatsIngressL2CPDiscardedFrames	SHOULD	SHOULD	
dpoeMEFIfStatsIngressL2CPDiscardedOctets	SHOULD	SHOULD	

9.1.8 dpoeMEFSvcServiceFlowUsageTable

Object	vCM	DPoE System	Comments
dpoeMEFSvcFlowUsageTable		MUST	
dpoeMEFSvcFlowUsageEntry		MUST	
dpoeMEFSvcFlowUsageGreenFrameCount		MUST	
dpoeMEFSvcFlowUsageYellowFrameCount		MUST	
dpoeMEFSvcFlowUsageRedFrameCount		MUST	
dpoeMEFSvcFlowUsageGreenOctetCount		MUST	
dpoeMEFSvcFlowUsageYellowOctetCount		MUST	
dpoeMEFSvcFlowUsageRedOctetCount		MUST	
dpoeMEFSvcFlowUsageL2CPFrameCount		MUST	
dpoeMEFSvcFlowUsageL2CPOctetCount		MUST	

Object	vCM	DPoE System	Comments
dpoeMEFSvcFlowUsageL2CPDiscardedFrames		MUST	
dpoeMEFSvcFlowUsageL2CPDiscardedOctets		MUST	

9.1.9 dpoeMEFSvcServiceFlowCosUsageTable

Object	vCM	DPoE System	Comments
dpoeMEFSvcFlowCosUsageTable		MUST	
dpoeMEFSvcFlowCosUsageEntry		MUST	
dpoeMEFSvcFlowCosValue		MUST	
dpoeMEFSvcFlowCosUsageGreenFrameCount		MUST	
dpoeMEFSvcFlowCosUsageYellowFrameCount		MUST	
dpoeMEFSvcFlowCosUsageRedFrameCount		MUST	
dpoeMEFSvcFlowCosUsageGreenOctetCount		MUST	
dpoeMEFSvcFlowCosUsageYellowOctetCount		MUST	
dpoeMEFSvcFlowCosUsageRedOctetCount		MUST	

9.1.10 dpoeMcastAuthCmtsCmStatusProfileTable

Object	vCM	DPoE System	Comments
dpoeMcastAuthCmtsCmStatusProfileTable		MUST	
dpoeMcastAuthCmtsCmStatusProfileEntry		MUST	
dpoeMcastAuthCmtsCmStatusProfileCmInterfaceMask		MUST	

9.1.11 dpoeMcastAuthCmtsCmStatusIfaceTable

Object	vCM	DPoE System	Comments
dpoeMcastAuthCmtsCmStatusIfaceTable		MUST	
dpoeMcastAuthCmtsCmStatusIfaceEntry		MUST	
dpoeMcastAuthCmtsCmStatusIfaceCmInterfaceBitPos		MUST	
dpoeMcastAuthCmtsCmStatusIfaceMaxNumSess		MUST	

9.1.12 dpoeMcastAuthStaticSessRuleTable

Object	vCM	DPoE System	Comments
dpoeMcastAuthStaticSessRuleTable		SHOULD	
dpoeMcastAuthStaticSessRuleEntry		SHOULD	
dpoeMcastAuthStaticSessRuleCmInterfaceMask		SHOULD	

9.1.13 dpoeMcastCmSessTable

Object	vCM	DPoE System	Comments
dpoeMcastCmSessTable	MUST		
dpoeMcastCmSessEntry	MUST		
dpoeMcastCmSessPrefixAddrType	MUST		
dpoeMcastCmSessGrpPrefix	MUST		

Object	vCM	DPoE System	Comments
dpoeMcastCmSessSrcPrefix	MUST		
dpoeMcastCmSessCmInterfaceMask	MUST		
dpoeMcastCmSessMllid	MUST		
dpoeMcastCmSessEncrypted	MUST		

9.1.14 Virtual Cable Modem specific MIB objects

Object	vCM	DPoE System	Comments
dpoeVcmDynCfgState	MUST		
dpoeVcmDynCfgNow	MUST		Read-write attribute.

10 SUPPORTED DPOE EVENTS

The tables in this section summarize the format and content for event, syslog, and SNMP notifications required by features specific to DPoE. Each row specifies a possible event that may be generated by a vCM, DPoE System or both. These events are to be reported through local event logging, and may be accompanied by syslog or SNMP notification.

The "Process" and "Sub-Process" columns indicate in which stage the event occurs.

The "vCM Priority" and "DPoE System Priority" columns indicate the priority the event is assigned in the vCM or DPoE System. These priorities are the same as is reported in the docsDevEvLevel object in the cable device MIB [RFC 4639] and in the LEVEL field of the syslog. The DPoE System MUST NOT generate an event for which no priority is specified in the "DPoE System Priority" column. The vCM MUST NOT generate an event for which no priority is specified in the "vCM Priority" column.

The "Event Message" column specifies the event text, which is reported in the docsDevEvText object of the cable device MIB and the text field of the syslog. The format of some event messages include the "<TAGS>" keyword, as described in Annex D of [OSSIv3.0].

The "Event ID" column indicates a unique identification number for the event, which is assigned to the docsDevEvId object in the cable device MIB and the <eventId> field of the syslog.

The "Notification Name" column specifies the SNMP notification, which notifies this event to an SNMP notification receiver.

The syslog format is described in Section 6.5.1.2.1.3 of this specification.

10.1 Interface Status

These events are defined in the [DPoE-MEFv2.0] specification.

Table 9 - DPoE Events Extensions

Process	Sub-Process	vCM Priority	DPoE System Priority	Event Message	Message Notes and Detail	Error Code Set	Event ID	Notification Name
Interface Status	Ethernet Interface	Critical	Critical	Ethernet Interface link down	For Local Log & Syslog, append: ifIndex: <P1>; ifAdminStatus: <P2>; ifAlias: <P3> P1 = ifIndex from ifTable for Ethernet Interface P2 = ifAdminStatus from ifTable for Ethernet Interface P3 =ifAlias from ifTable for Ethernet Interface	P001.1	80000101	linkDown [RFC 2863]

Process	Sub-Process	vCM Priority	DPoE System Priority	Event Message	Message Notes and Detail	Error Code Set	Event ID	Notification Name
Interface Status	Ethernet Interface	Notice	Notice	Ethernet Interface link up	For Local Log & Syslog, append: ifIndex: <P1>; ifAdminStatus: <P2>; ifAlias: <P3> P1 = ifIndex from ifTable for Ethernet Interface P2 = ifAdminStatus from ifTable for Ethernet Interface P3 =ifAlias from ifTable for Ethernet Interface	P001.2	80000102	linkUp [RFC 2863]

10.2 Dynamic D-ONU Configuration Update

The Dynamic D-ONU Configuration Update process is described in [DPoE-MULPIv2.0]. The table below defines the events associated with each of the five stages of the update process. The stage associated with a particular event is identified in the "Sub-Process" column.

Process	Sub-Process	vCM Priority	DPoE System Priority	Event Message	Event ID	Notification Name
Dynamic Configuration Update						
Dynamic Config	Download In Progress	Warning		Dyn Config Failed – Download<TAGS>	95000100	CM: docsIf3CmEventNotif
Dynamic Config	Validation In Progress	Warning		Dyn Config Failed – Validation<TAGS>	95000101	CM: docsIf3CmEventNotif
Dynamic Config	Resource Validation	Warning		Dyn Config Failed – Resource Validation<TAGS>	95000102	CM: docsIf3CmEventNotif
Dynamic Config	Update (Apply changes)	Error		Dyn Config Failed – Update<TAGS>	95000103	CM: docsIf3CmEventNotif
Dynamic Config	Update	Informational		Dyn Config Complete<TAGS>	95000104	CM: docsIf3CmEventNotif

11 SUPPORT FOR DOCSIS EVENTS

This section defines those DOCSIS events (as defined in Appendix D of [OSSIv3.0]) that will need to be supported by the DPoE System.

The following tables are adapted from the corresponding table of events defined in Annex D in [OSSIv3.0] and enumerate whether support is required for a particular event by the DPoE System in this version of the specification. Note that not all columns from Annex D are found in the following table, only those columns that help provide context for the event's definition.

Entries in bold italics indicate that the event is not applicable to the current version of the specification. Entries in italics indicate that the event is not supported by the DPoE specifications.

The table columns are:

- **Process** – Process name as defined in Annex D.
- **Sub-Process** – Sub-Process name as defined in Annex D.
- **vCM** – Indicates whether the event should be generated by the DPoE System on behalf of the vCM representing the D-ONU.
- **DPoE System** – Indicates whether the event should be generated by the DPoE System.
- **Event Message** – Event Message text as defined in Annex D.
- **Event ID** – Event ID for the event as defined in Annex D.
- **Comments** – Used to capture any special implementation comments regarding support for the event within DPoE Networks or why the event need not be supported for DPoE Networks.

11.1 Authentication and Encryption

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
BPKM	AUTH-FSM	MUST	MUST	Auth Reject – No Information<TAGS>	66030102	This event can be used by the DPoE System for modem authentication errors not covered by other Auth Reject event messages.
BPKM	AUTH-FSM	MUST	MUST	Auth Reject – Unauthorized CM<TAGS>	66030103	This event can be generated by the DPoE System if the DPoE System implements a local "black list" which excludes specific D-ONU MAC Addresses.
BPKM	***AUTH-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Auth Reject – Unauthorized SAID<TAGS>***	***66030104***	***SAIDs are not applicable to DPoE Networks.***
BPKM	AUTH-FSM	MUST	MUST	Auth Reject – Permanent Authorization Failure<TAGS>	66030108	Permanent Authorization is used for a number of different error conditions including errors related to the use of the certificates, such as unknown manufacturers, invalid signatures, ASN.1 parsing failures, and certificate revocation.
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Reject – Time of Day not acquired<TAGS>*	*66030109*	*TOD is not needed in a DPoE System.*
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Reject – EAE disabled<TAGS>*	*66030110*	*EAE cannot be disabled in DPoE Networks.*

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
BPKM	AUTH-FSM	MUST	MUST	CM Certificate Error<TAGS>	66030111	
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Invalid – No Information<TAGS>*	*66030202*	*This is not applicable to DPoE Networks.*
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Invalid – Unauthorized CM<TAGS>*	*66030203*	
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Invalid – Unsolicited<TAGS>*	*66030205*	
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Invalid – Invalid Key Sequence Number<TAGS>*	*66030206*	*No BPI key exchange in DPoE Networks.*
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Invalid – Message (Key Request) Authentication Failure<TAGS>*	*66030207*	*No BPI key exchange in DPoE Networks.*
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Unsupported Crypto Suite<TAGS>*	*66030300*	*There is no way for the OLT to determine if an ONU cannot support the intended crypto suite.*
BPKM	AUTH-FSM	MUST		Authorized<TAGS>	66040100	This event can be generated by the DPoE System for the vCM when the D-ONU successfully authorizes with the DPoE System.
BPKM	*AUTH-FSM*	*MUST NOT*		*Auth Pend<TAGS>*	*66040200*	
BPKM	*AUTH-FSM*	*MUST NOT*		*Auth Comp<TAGS>*	*66040300*	
BPKM	*AUTH-FSM*	*MUST NOT*		*Stop<TAGS>*	*66040400*	
BPKM	CERTIFICATE REVOCATION		MUST	Failed to retrieve CRL from <P1>	66030400	
BPKM	CERTIFICATE REVOCATION		MUST	Failed to retrieve OCSP status	66030401	
BPKM	CERTIFICATE REVOCATION		MUST	CRL data not available when validating CM certificate chain<TAGS>	66030402	
BPKM	*TEK-FSM*	*MUST NOT*	*MUST NOT*	*Key Reject – No Information<TAGS>*	*66050102*	*No Traffic Key exchange in DPoE Networks.*
BPKM	***TEK-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Key Reject – Unauthorized SAID<TAGS>***	***66050103***	***SAIDs are not applicable to DPoE Networks.***
BPKM	*TEK-FSM*	*MUST NOT*	*MUST NOT*	*TEK Invalid – No Information<TAGS>*	*66050203*	*No Traffic Key exchange in DPoE Networks.*
BPKM	*TEK-FSM*	*MUST NOT*	*MUST NOT*	*TEK Invalid – Invalid Key Sequence Number<TAGS>*	*66050206*	*No Traffic Key exchange in DPoE Networks.*
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***		***SA Map State Machine Started<TAGS>***	***66060100***	***SAIDs are not applicable to DPoE Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Unsupported Crypto Suite<TAGS>***	***66060200***	***SAIDs are not applicable to DPoE Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***		***Map Request Retry Timeout<TAGS>***	***66060300***	***SAIDs are not applicable to DPoE Networks.***

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***		***Unmap<TAGS>***	***66060400***	***SAIDs are not applicable to DPoE Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Map Reject – Downstream Traffic Flow Not Mapped to BPI+ SAID (EC=8)<TAGS>***	***66060510***	***SAIDs are not applicable to DPoE Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Map Reject – Not Authorized for Requested Downstream Traffic Flow (EC=7)<TAGS>***	***66060509***	***SAIDs are not applicable to DPoE Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Mapped to Existing SAID<TAGS>***	***66060600***	***SAIDs are not applicable to DPoE Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Mapped to New SAID<TAGS>***	***66060700***	***SAIDs are not applicable to DPoE Networks.***
Init (BPI+)	*DOCSIS 1.0 CONFIG FILE*	*MUST NOT*	*MUST NOT*	*Missing BP Configuration Setting TLV Type: <P1><TAGS>*	*66010100*	*Baseline Privacy TLV 17s are not supported by DPoE Networks.*
Init (BPI+)	*DOCSIS 1.0 CONFIG FILE*	*MUST NOT*	*MUST NOT*	*Invalid BP Configuration Setting Value: <P1> for Type: <P2><TAGS>*	*66010200*	*Baseline Privacy TLV 17s are not supported by DPoE Networks.*

11.2 DBC, DCC and UCC

Because Dynamic Bonding Changes (DBC), Dynamic Channel Changes (DCC), and Upstream Channel Changes (UCC) are not applicable to DPoE Networks, these events are not supported. The DPoE System MUST NOT support any of the DBC, DCC, and UCC events defined in Annex D of [OSSIv3.0] since these are not applicable to DPoE Networks. The vCM MUST NOT support any of the DBC, DCC, and UCC events defined in Annex D of [OSSIv3.0] since these are not applicable to DPoE Networks.

11.3 DHCP, TOD and TFTP

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
DHCP		MUST		DHCP RENEW sent – No response for <P1><TAGS>	68010100	
DHCP		MUST		DHCP REBIND sent – No response for <P1><TAGS>	68010200	
DHCP		MUST		DHCP RENEW WARNING – Field invalid in response <P1> option<TAGS>	68010300	
DHCP		MUST		DHCP RENEW FAILED - Critical field invalid in response	68010301	
DHCP		MUST		DHCP REBIND WARNING – Field invalid in response <TAGS>	68010400	
DHCP		MUST		DHCP REBIND FAILED - Critical field invalid in response	68010401	

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
DHCP		MUST		DHCP Reconfigure received<TAGS>	68010500	
DHCP		MUST		DHCP Renew - lease parameters <P1> modified<TAGS>	68010600	
DHCP		MUST		Primary lease failed, IPv4 fallback initiated<TAGS>	68010700	
Init	DHCP	MUST		DHCP FAILED – Discover sent, no offer received<TAGS>	68000100	
Init	DHCP	MUST		DHCP FAILED – Request sent, No response<TAGS>	68000200	
Init	DHCP	MUST		DHCP WARNING - Non-critical field invalid in response <TAGS>	68000300	
Init	DHCP	MUST		DHCP FAILED – Critical field invalid in response <TAGS>	68000301	
Init	DHCP	MUST		DHCP failed – RS sent, no RA received<TAGS>	68001200	
Init	DHCP	MUST		DHCP Failed – Invalid RA<TAGS>	68001201	
Init	DHCP	MUST		DHCP failed – DHCP Solicit sent, No DHCP Advertise received<TAGS>	68001202	
Init	DHCP	MUST		DHCP failed – DHCP Request sent, No DHCP REPLY received<TAGS>	68001203	
Init	DHCP	MUST		Primary address acquired, secondary failed<TAGS>	68001204	
Init	DHCP	MUST		Primary address failed, secondary active<TAGS>	68001205	
Init	IPv6 Address Acquisition	MUST		Link-Local address failed DAD<TAGS>	68001301	
Init	IPv6 Address Acquisition	MUST		DHCP lease address failed DAD<TAGS>	68001302	
Init	*TOD*	*MUST NOT*		*ToD request sent – No Response received<TAGS>*	*68000401*	*TOD is not applicable to DPoE Networks.*
Init	*TOD*	*MUST NOT*		*ToD Response received – Invalid data format<TAGS>*	*68000402*	*TOD is not applicable to DPoE Networks.*
Init	TFTP	MUST		TFTP failed – Request sent – No Response<TAGS>	68000500	
Init	TFTP	MUST		TFTP failed – configuration file NOT FOUND<TAGS>	68000600	
Init	TFTP	MUST		TFTP Failed – OUT OF ORDER packets<TAGS>	68000700	
Init	TFTP	MUST		TFTP file complete – but failed Message Integrity check MIC<TAGS>	68000800	
Init	TFTP	MUST		TFTP file complete – but missing mandatory TLV<TAGS>	68000900	

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
Init	TFTP	MUST		TFTP Failed – file too big<TAGS>	68001000	
Init	*TFTP*	*MUST NOT*		*TFTP file complete- but doesn't enable 2.0 Mode – conflicts with current US channel type<TAGS>*	*68001100*	
Init	TFTP	MUST		TFTP Request Retries exceeded, CM unable to register	68001101	
TOD		*MUST*		*ToD request sent- No Response received<TAGS>*	*68000403*	*TOD is not applicable to DPoE Networks.*
TOD		*MUST*		*ToD Response received – Invalid data format<TAGS>*	*68000404*	*TOD is not applicable to DPoE Networks.*

11.4 Secure Software Download

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
SW Upgrade	SW UPGRADE INIT	MUST		SW Download INIT – Via NMS	69010100	
SW Upgrade	SW UPGRADE INIT	MUST		SW Download INIT – Via Config file <P1>	69010200	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW Upgrade Failed during download – Max retry exceed (3)	69010300	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW Upgrade Failed Before Download – Server not Present	69010400	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW upgrade Failed before download – File not Present	69010500	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW upgrade Failed before download –TFTP Max Retry Exceeded	69010600	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW upgrade Failed after download –Incompatible SW file	69010700	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW upgrade Failed after download – SW File corruption	69010800	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Disruption during SW download – Power Failure	69010900	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Disruption during SW download – RF removed	69011000	Although no RF interfaces exist in DPoE Networks, perhaps this event could be used for EPON network issues.
SW Upgrade	SW UPGRADE SUCCESS	MUST		SW download Successful – Via NMS	69011100	
SW Upgrade	SW UPGRADE SUCCESS	MUST		SW download Successful – Via Config file	69011200	

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Improper Code File Controls	69020100	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Code File Manufacturer CVC Validation Failure	69020200	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Code File Manufacturer CVS Validation Failure	69020300	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Code File Co-Signer CVC Validation Failure	69020400	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Code File Co-Signer CVS Validation Failure	69020500	
SW Upgrade	VERIFICATION OF CVC	MUST		Improper Configuration File CVC Format	69020600	
SW Upgrade	VERIFICATION OF CVC	MUST		Configuration File CVC Validation Failure	69020700	
SW Upgrade	VERIFICATION OF CVC	MUST		Improper SNMP CVC Format	69020800	
SW Upgrade	VERIFICATION OF CVC	MUST		SNMP CVC Validation Failure	69020900	

11.5 Registration and TLV-11

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
Init	REGISTRATION RESPONSE	MAY		REG-RSP – invalid format or not recognized;<TAGS>	73000100	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	REGISTRATION RESPONSE	MAY		REG RSP not received<TAGS>	73000200	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	REGISTRATION RESPONSE	MAY		REG RSP bad SID <P1><TAGS>	73000300	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Service unavailable – Other<TAGS>*	*73000400*	*This is generated for 1.0-style modem registration, which is not supported for DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Service unavailable – Unrecognized configuration setting<TAGS>*	*73000401*	*This is generated for 1.0-style modem registration, which is not supported for DPoE Networks.*

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Service unavailable – Temporarily unavailable<TAGS>*	*73000402*	*This is generated for 1.0-style modem registration, which is not supported for DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Service unavailable – Permanent<TAGS>*	*73000403*	*This is generated for 1.0-style modem registration, which is not supported for DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Registration rejected authentication failure: CMTS MIC invalid<TAGS>*	*73000500*	*CMTS MIC verification is not needed on the DPoE System.*
Init	*3.0 SPECIFIC REGISTRATION REQUEST*		*MUST NOT*	*Registration authentication failure: REG REQ rejected –TLV parameters do not match learned config file TLV parameters<TAGS>*	*73000501*	*There is no way for this to happen in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*REG REQ has Invalid MAC header<TAGS>*	*73010100*	*This is generated for 1.0-style modem registration, which is not supported for DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*REG REQ has Invalid SID or not in use<TAGS>*	*73010200*	*This is generated for 1.0-style modem registration, which is not supported for DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*REG REQ missed Required TLVs<TAGS>*	*73010400*	*This is generated for 1.0-style modem registration, which is not supported for DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad DS FREQ – Format Invalid<TAGS>*	*73010500*	*There is no DS frequency in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad DS FREQ – Not in use<TAGS>*	*73010501*	*There is no DS frequency in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad DS FREQ – Not Multiple of 62500 Hz<TAGS>*	*73010502*	*There is no DS frequency in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad US CH – Invalid or Unassigned<TAGS>*	*73010600*	*There are no US settings in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad US CH – Change followed with (RE-) Registration REQ<TAGS>*	*73010601*	*There are no US settings in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad US CH – Overload<TAGS>*	*73010700*	*There are no US settings in DPoE Networks.*
Init	REGISTRATION REQUEST		MUST	Network Access has Invalid Parameter<TAGS>	73010800	
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Class of Service – Invalid Configuration<TAGS>*	*73010900*	*CoS TLVs are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Class of Service – Unsupported class<TAGS>*	*73011000*	*CoS TLVs are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Class of Service – Invalid class ID or out of range<TAGS>*	*73011100*	*CoS TLVs are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max DS Bit Rate – Invalid Format<TAGS>*	*73011200*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max DS Bit Rate Unsupported Setting<TAGS>*	*73011201*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max US Bit – Invalid Format<TAGS>*	*73011300*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max US Bit Rate – Unsupported Setting<TAGS>*	*73011301*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad US Priority Configuration – Invalid Format<TAGS>*	*73011400*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad US Priority Configuration – Setting out of Range<TAGS>*	*73011401*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Guaranteed Min US CH Bit rate Configuration setting – Invalid Format<TAGS>*	*73011500*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Guaranteed Min US CH Bit rate Configuration setting – Exceed Max US Bit Rate<TAGS>*	*73011501*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Guaranteed Min US CH Bit rate Configuration setting – Out of Range<TAGS>*	*73011502*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max US CH Transmit Burst configuration setting – Invalid Format<TAGS>*	*73011600*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max US CH Transmit Burst configuration setting – Out of Range<TAGS>*	*73011601*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoE Networks.*
Init	***REGISTRATION REQUEST***		***SHOULD NOT***	***Invalid Modem Capabilities configuration setting<TAGS>***	***73011700***	***Modem Capabilities is not currently supported in DPoE Networks, but could be supported in future revisions.***
Init	REGISTRATION REQUEST		MUST	Configuration file contains parameter with the value outside of the range<TAGS>	73011800	
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Unspecified reason<TAGS>	73020100	This event would be generated by the DPoE System if a vCM registration is rejected for some reason not covered by one of the following event messages.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Unrecognized configuration setting<TAGS>	73020101	In the DPoE System, this event would be generated if the configuration file contains settings that are unknown.

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Major service flow error<TAGS>	73020110	
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Major classifier error<TAGS>	73020111	
Init	*1.1 and 2.0 SPECIFIC REGISTRATION REQUEST*		*MUST NOT*	*REG REQ rejected – Major PHS rule error<TAGS>*	*73020112*	*PHS is not supported for DPoE Networks.*
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Multiple major errors<TAGS>	73020113	This event is generated by the DPoE System if the modem configuration file contains major service flow and classifier errors.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Message syntax error <P1><TAGS>	73020114	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Primary service flow error <P1><TAGS>	73020115	Generated if a service flow id is not specified or made active.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – temporary no resource<TAGS>	73020102	This event would be generated if there are not enough resources on the DPoE System to support the modem configuration file.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Permanent administrative<TAGS>	73020103	Generated by the DPoE System to indicate that the modem configuration will not be supported unless a change is made to the CMTS configuration.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Required parameter not present <P1><TAGS>	73020104	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	*1.1 and 2.0 SPECIFIC REGISTRATION REQUEST*		*MUST NOT*	*REG REQ rejected – Header suppression setting not supported<TAGS>*	*73020105*	*Header suppression is not supported in DPoE Networks.*
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Multiple errors<TAGS>	73020106	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – duplicate reference-ID or index in message<TAGS>	73020107	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – parameter invalid for context <P1><TAGS>	73020108	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	*1.1 and 2.0 SPECIFIC REGISTRATION REQUEST*		*MUST NOT*	*REG REQ rejected – Authorization failure<TAGS>*	*73020109*	

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
Init	1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE	MUST		REG RSP contains service flow parameters that CM cannot support <P1><TAGS>	73025100	
Init	1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE	MUST		REG RSP contains classifier parameters that CM cannot support <P1><TAGS>	73025101	
Init	*1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE*	*MUST NOT*		*REG RSP contains PHS parameters that CM cannot support <P1><TAGS>*	*73025102*	*PHS is not supported in DPoE Networks.*
Init	1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE	MAY		Registration RSP rejected unspecified reason<TAGS>	73025103	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE	MAY		Registration RSP rejected message syntax error <P1><TAGS>	73025104	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE	MAY		Registration RSP rejected message too big <P1><TAGS>	73025105	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	2.0 SPECIFIC REGISTRATION RESPONSE	MAY		REG-RSP received after REG-ACK. Returning to 1.x transmit mode<TAGS>	73026100	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	REGISTRATION ACKNOWLEDGEMENT		MUST	REG aborted no REG-ACK<TAGS>	73030100	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	REGISTRATION Acknowledgement		MUST	REG ACK rejected unspecified reason<TAGS>	73030200	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	REGISTRATION ACKNOWLEDGEMENT		MUST	REG ACK rejected message syntax error<TAGS>	73030300	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	TLV-11 PARSING	MUST		TLV-11 – unrecognized OID<TAGS>	73040100	
Init	TLV-11 PARSING	MUST		TLV-11 – Illegal Set operation failed<TAGS>	73040200	
Init	TLV-11 PARSING	MUST		TLV-11 – Failed to set duplicate elements<TAGS>	73040300	
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MAY	REG REQ rejected – Message too big <P1><TAGS>	73020116	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.

Process	Sub-Process	vCM	DPoE System	Event Message	Event ID	Comments
Init	Waiting for REG-RSP or REG-RSP-MP	MAY		T6 Timeout and retries exceeded<TAGS>	73027100	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	CM Complete Registration	MUST		Cannot create US Primary Service Flow<TAGS>	73050100	
Init	*CM Complete Registration*	*MUST NOT*		*Received REG-RSP while in REG-HOLD1 state<TAGS>*	*73050200*	
Init	*CM Complete Registration*	*MUST NOT*		*Received REG-RSP while in REG-HOLD2 state<TAGS>*	*73050300*	
Init	Waiting for REG-REQ or REG-REQ-MP		MAY	T9 Timeout – Never received REG-REQ or all REG-REQ-MP fragments<TAGS>	73021100	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	*CMTS Registration*		*MUST NOT*	*Missing RCP in REG-REQ or REG-REQ-MP<TAGS>*	*73055100*	*Channel bonding is not supported in DPoE Networks.*
Init	*CMTS Registration*		*MUST NOT*	*Received Non-Queue-Depth Based Bandwidth Request and Multiple Transmit Channel mode is enabled<TAGS>*	*73055200*	*Channel bonding is not supported in DPoE Networks.*
Init	*CMTS Registration*		*MUST NOT*	*Received Queue-Depth Based Bandwidth Request when Multiple Transmit Channel mode is not enabled<TAGS>*	*73055300*	*Channel bonding is not supported in DPoE Networks.*
Init	*CMTS Registration*		*MUST NOT*	*Received REG-ACK with TCS - Partial Service<TAGS>*	*73055400*	*Channel bonding is not supported in DPoE Networks.*
Init	*CMTS Registration*		*MUST NOT*	*Received REG-ACK with RCS - Partial Service<TAGS>*	*73055500*	*Channel bonding is not supported in DPoE Networks.*
Init	CMTS Registration		MAY	T6 Timer expires and Retries Exceeded<TAGS>	73055600	Depending on the implementation of the vCM registration within the DPoE System, this event may not be generated.
Init	*CMTS Registration*		*MUST NOT*	*Initializing Channel Timeout<TAGS>*	*73055700*	*Channel bonding is not supported in DPoE Networks.*
Init	*CMTS Registration*		*MUST NOT*	*REG-REQ-MP received when no MDD present<TAGS>*	*73055800*	*DOCSIS-specific message is not applicable to DPoE Networks.*

11.6 QoS

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
Service Flow	*Service Flow Assignment*		*MUST NOT*	*Attribute Masks for SF (SFID <P1>) do not satisfy those in the SCN <P2>.*	*75010100*	

11.7 General

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
		MUST NOT		*A transmit opportunity was missed because the MAP arrived too late.*	*78000100*	*There are no MAP messages in DPoE Networks.*

11.8 Ranging

Most of the following events do not apply to DPoE Networks as they are specific to the DOCSIS ranging process. However, a few of these events can be provided by the DPoE System to emulate ranging issues when links are lost on the EPON network.

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
Init	*RANGING*	*MUST NOT*		*No Maintenance Broadcasts for Ranging opportunities received – T2 time-out<TAGS>*	*82000100*	
Init	*RANGING*	*MUST NOT*		*No Ranging Response received – T3 time-out<TAGS>*	*82000200*	
Init	*RANGING*	*MUST NOT*		*Ranging Request Retries exhausted<TAGS>*	*82000300*	
Init	*RANGING*	*MUST NOT*		*Received Response to Broadcast Maintenance Request, But no Unicast Maintenance opportunities received – T4 time out<TAGS>*	*82000400*	
Init	*RANGING*	*MUST NOT*		*Started Unicast Maintenance Ranging – No Response received – T3 time-out<TAGS>*	*82000500*	
Init	*RANGING*	*MUST NOT*		*Unicast Maintenance Ranging attempted – No response – Retries exhausted<TAGS>*	*82000600*	
Init	RANGING	MUST		Unicast Ranging Received Abort Response – Re-initializing MAC<TAGS>	82000700	Used to report an interruption in the ranging process as commanded by the DPoE System
Init	*RANGING*	*MUST NOT*		*16 consecutive T3 timeouts while trying to range on upstream channel <P1><TAGS>*	*82000800*	
Init	*RANGING*	*MUST NOT*		*B-INIT-RNG Failure – Retries exceeded<TAGS>*	*82000900*	
Init	*RANGING*		*MUST NOT*	*No Ranging Requests received from POLLED CM (CMTS generated polls);<CM-MAC>;*	*82010100*	
Init	*RANGING*		*MUST NOT*	*Retries exhausted for polled CM (report MAC address). After 16 R101.0 errors<CM-MAC>;*	*82010200*	
Init	*RANGING*		*MUST NOT*	*Unable to Successfully Range CM (report MAC address) Retries Exhausted;<CM-MAC>;*	*82010300*	
Init	RANGING		MUST	Failed to receive Periodic RNG-REQ from modem (SID X), timing-out SID;<CM-MAC>	82010400	Used to report a Link Loss from the connected ONU.
Init	*RANGING*		*MUST NOT*	*CM transmitted B-INIT-RNG-REQ with MD-DS-SG ID of zero;<CM-MAC>*	*82010500*	

11.9 Dynamic Services

Dynamic Services are not supported in this version of the DPoE specifications.

11.10 Downstream Acquisition

The Downstream Acquisition section of the events includes events related to DOCSIS SYNC Timing issues, Receive Channel Configuration (RCC), Receive Channel Profiles (RCP), and Upstream Channel Descriptors (UCD). The vCM MUST NOT support any of the Downstream Acquisition events defined in Annex D of [OSSIv3.0] since these are not applicable to DPoE Networks.

11.11 Diagnostic Log

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
Diag	LogSize		MUST	Diagnostic log size reached high threshold. Enabled detectors: <P1>;Log maximum size: <P2>.	86000100	
Diag	LogSize		MUST	Diagnostic log size dropped to low threshold. Enabled detectors: <P1>;Log maximum size: <P2>.	86000200	
Diag	LogSize		MUST	Diagnostic log size reached full threshold. Enabled detectors: <P1>;Log maximum size: <P2>.	86000300	

11.12 IPDR

The DPoE System MUST support events described in the IPDR section of [OSSIv3.0], Annex D.

11.13 Multicast

Multicast is supported in this version of the DPoE specifications.

11.14 CM-Status

The CM-Status section of Annex D describes events related to the receipt of CM-STATUS messages from the CM at unexpected times in the DOCSIS ranging and registration process. This message is not supported in this version of the DPoE specifications.

11.15 CM-CTRL

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
CM-CTRL	***CM-CTRL***	***SHOULD NOT***	***SHOULD NOT***	***CM-CTRL – Command: <P1> (if P1= mute Add Interval: <P2> ChannelID: <P3>) (If P1 = forwarding Add Action: <P4>) <TAGS>***	***76000100***	
CM-CTRL	*CM-CTRL*	*MUST NOT*	*MUST NOT*	*CM-CTRL- Invalid message format<TAGS>*	*76000200*	

12 SUPPORT FOR MEF IPDR SERVICE DEFINITIONS

12.1 Requirements for MEF IPDR Service Definitions

This section defines MEF IPDR service definition that is required as part of DPoEv2.0 and MUST be implemented by the DPoE System.

This IPDR record provides information on the MEF services provided by the DPoE system.Each record MUST map to one COS value for each instance of a MEF service on an ONU. The attributes provided in this record are derived from the "Traffic Management Performance Measurements" specified in [MEF 7.1].

The IPDR Collector will use the contents of this IPDR record to generate aggregate statistics for ASF service flows. The IPDR Collector will take the records for individual service flows within an ASF, and generate the data for specific ASFs. The IPDR service definition will not include ASFs. The attribute DPOE-MEF:ASFId is provided to allow the association between a service flow and an ASF to be made.

The Detailed MEF IPDR Service Definition is in Section 6.4.2.

Attribute Name	Description
DOCSIS-CMTS:CmtsHostName	Defined in DOCSIS 3.0
DOCSIS-CMTS:CmtsSysUpTime	Defined in DOCSIS 3.0
DOCSIS-CMTS:CmtsMdIfName	Defined in DOCSIS 3.0
DOCSIS-CMTS:CmtsMdIfIndex	Defined in DOCSIS 3.0
DOCSIS-CM:CmMacAddr	Defined in DOCSIS 3.0
DOCSIS-REC:RecType	Defined in DOCSIS 3.0
DOCSIS-REC:RecCreationTime	Defined in DOCSIS 3.0
DOCSIS-QOS:ServiceIdentifier	Defined in DOCSIS 3.0
DPOE-MEF:ServiceL2VPNId	Layer 2 VPN ID for this service (used to identify the service)
DPOE-MEF:ASFId	ASF Identifier for this service
DPOE-MEF-USAGE:GreenFrameCount	Number of frames marked with color green
DPOE-MEF:YellowFrameCount	Number of frames marked with color yellow
DPOE-MEF:RedFrameCount	Number of frames marked with color red
DPOE-MEF:GreenOctetCount	Number of octets passed in frames marked as green
DPOE-MEF:YellowOctetCount	Number of octets passed in frames marked as yellow
DPOE-MEF:RedOctetCount	Number of octets passed in frames marked as red

The counters for red frames and octets will always be 0 for downstream service flows.

13 SUPPORT FOR DOCSIS 3.0 OSSI IPDR SERVICE DEFINITIONS

The following table provides a high-level summary of the applicability of each of the DOCSIS 3.0 IPDR service definitions to the DPoE System.Acting as a DOCSIS 3.0 CMTS, the DPoE System MUST produce IPDR records consistent with requirements described in the corresponding sections of [OSSIv3.0].

The following table provides a high-level summary of the applicability of each DOCSIS service definitions taken from [OSSIv3.0] and applied to the DPoE System. Consistent with the conventions established in [OSSIv3.0] the value in the "DPoE System" column indicates whether or not the service definition is applicable to DPoE.

Table 10 - Relationship between OSSI 3.0 and DPoE 2.0 IPDR Service Definitions

Service Definition	From	DPoE System	Comment
DOCSIS-SAMIS-TYPE-1	[OSSIv3.0]	MUST	
DOCSIS-SAMIS-TYPE-2	[OSSIv3.0]	MUST	
DOCSIS-CMTS-TOPO-TYPE	[OSSIv3.0]		*Not applicable to EPON.*
DOCSIS-CPE-TYPE	[OSSIv3.0]	MUST	Only will apply for HSD interface on CMCI Interface.
DOCSIS-CMTS-CM-REG-STATUS-TYPE	[OSSIv3.0]	MUST	
DOCSIS-CMTS-CM-US-STATS-TYPE	[OSSIv3.0]		*Not applicable to EPON*
DOCSIS-CMTS-CM-US-UTIL-STATS-TYPE	[OSSIv3.0]		*Not applicable to EPON*
DOCSIS-CMTS-CM-DS-UTIL-STATS-TYPE	[OSSIv3.0]	MUST	
DOCSIS-DIAG-LOG-TYPE	[OSSIv3.0]	MUST	
DOCSIS-DIAG-LOG-DETAILTYPE	[OSSIv3.0]	MUST	
DOCSIS-DIAG-LOG-EVENT-TYPE	[OSSIv3.0]	MUST	
DOCSIS-SPECTRUM-MEASUREMENT-TYPE	[OSSIv3.0]		*Not applicable to EPON.*
DOCSIS-CMTS-CM-SERVICE-FLOW	[OSSIv3.0]	MUST	

The following sections examine the applicable IPDR service definitions from Table 8. Each section describes one [OSSIv3.0] service definition and evaluates the applicability of each record attribute within it.

The DPoE System's IPDR Exporter is the source of IPDR records (acting as a CMTS). It is assumed that all necessary data for the DPoE System to complete the required IPDR record attributes described in this specification is made available by either the OLT or ONU(s). The details of where or how this supporting data is gathered and presented to the DPoE System in order to populate the required IPDR record attributes is beyond the scope of this specification.

The data provided in these attributes will be sourced from the DPoE System. There are some cases where some further explanation is required for specific attributes, and this is provided in the "Comment" field of the table.

The following sections are adapted from the corresponding sections included in Annex B and Annex C in [OSSIv3.0]. For each service definition, this section includes a table providing an evaluation of whether the record attributes apply to the DPoE System.

The field in the "DPoE System" column indicates whether or not the record attribute is applicable to DPoE. An "X" in the column field indicates that the service definition record attribute applies to the DPoE System and MUST be implemented. An empty field indicates that the record attribute does not apply to the DPoE System and SHOULD NOT be supported.

In all IPDR records the DPoE System MUST provide an entry for every record attribute, whether it is required or not. In the cases where the attribute is not required, a default value MUST be provided. This default value is indicated in the tables below.

13.1 Requirements for DOCSIS SAMIS Service Definitions

The generation of the Subscriber Usage Billing records is the top priority when generating IPDR records.

The DPoE System MUST support the generation of Subscriber Usage Billing Service records as defined by the [OSSIv2.0] specification.

The DPoE System MUST support the generation of Type 1 Subscriber Usage Billing records as defined by the [OSSIv3.0] specification.

The DPoE System MUST support the generation of Type 2 (Optimized Format) Subscriber Usage Billing records as defined by the [OSSIv3.0] specification.

13.1.1 DOCSIS-SAMIS-TYPE-1

Attribute Name	DPoE System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsIpv4Addr	MUST	
DOCSIS-CMTS:CmtsIpv6Addr	MUST	
DOCSIS-CMTS:CmtsMdIfName	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-CM:CmIpv4Addr	MUST	
DOCSIS-CM:CmIpv6Addr	MUST	
DOCSIS-CM:CmIpv6LinkLocalAddr	MUST	
DOCSIS-CM:CmQosVersion	MUST	
DOCSIS-CM:CmRegStatusValue	MUST	
DOCSIS-CM:CmLastRegTime	MUST	
DOCSIS-REC:RecType	MUST	
DOCSIS-REC:RecCreationTime	MUST	
DOCSIS-QOS:ServiceFlowChSet		The DPoE System MUST set to 0.
DOCSIS-QOS:ServiceAppId		The DPoE System MUST set to 0.
DOCSIS-QOS:ServiceDsMulticast	MUST	
DOCSIS-QOS:ServiceIdentifier	MUST	
DOCSIS-QOS:ServiceGateId		The DPoE System MUST set to 0.
DOCSIS-QOS:ServiceClassName	MUST	
DOCSIS-QOS:ServiceDirection	MUST	
DOCSIS-QOS:ServiceOctetsPassed	MUST	This object represents the MEF Service Flow.
DOCSIS-QOS:ServicePktsPassed	MUST	Monitored at DPoE System
DOCSIS-QOS:ServiceSlaDropPkts	MUST	Monitored at DPoE System
DOCSIS-QOS:ServiceSlaDelayPkts	MUST	Monitored at DPoE System
DOCSIS-QOS:ServiceTimeCreated	MUST	
DOCSIS-QOS:ServiceTimeActive	MUST	

13.1.2 DOCSIS-SAMIS-TYPE-2

Attribute Name	DPoE System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsMdIfName	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-REC:RecType	MUST	
DOCSIS-REC:RecCreationTime	MUST	
DOCSIS-QOS:ServiceFlowChSet		The DPoE system MUST set to 0 .
DOCSIS-QOS:ServiceAppId		The DPoE system MUST set to 0.
DOCSIS-QOS:ServiceDsMulticast	MUST	
DOCSIS-QOS:ServiceIdentifier	MUST	
DOCSIS-QOS:ServiceGateId		The DPoE system MUST set to 0.
DOCSIS-QOS:ServiceClassName	MUST	
DOCSIS-QOS:ServiceDirection	MUST	
DOCSIS-QOS:ServiceOctetsPassed	MUST	Monitored at DPoE System
DOCSIS-QOS:ServicePktsPassed	MUST	Monitored at DPoE System
DOCSIS-QOS:ServiceSlaDropPkts	MUST	Monitored at DPoE System (Need to clarify meaning of this attribute)
DOCSIS-QOS:ServiceSlaDelayPkts	MUST	Monitored at DPoE System (Need to clarify meaning of this attribute)
DOCSIS-QOS:ServiceTimeCreated	MUST	
DOCSIS-QOS:ServiceTimeActive	MUST	

13.2 Requirements for DOCSIS Spectrum Measurement Service Definition

The DPoE System MUST NOT support generation of the Upstream Spectrum Measurement records.

13.3 Requirements for DOCSIS Diagnostic Log Service Definitions

The DPoE System MUST support the generation of Diagnostic Log records.

The supported Diagnostic Log triggers will be limited to those CM registration states which are supported by the DPoE System.

13.3.1 DOCSIS-DIAG-LOG-TYPE

Attribute Name	DPoE System	Comments
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-DIAG-LOG:LastUpdateTime	MUST	
DOCSIS-DIAG-LOG:CreateTime	MUST	
DOCSIS-DIAG-LOG:LastRegTime	MUST	
DOCSIS-DIAG-LOG:RegCount	MUST	
DOCSIS-DIAG-LOG:RangingRetryCount	MUST	The DPoE system MUST set to 0 .
DOCSIS-REC:RecType	MUST	

13.3.2 DOCSIS-DIAG-LOG-DETAILTYPE

Attribute Name	DPoE System	Comments
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-DIAG-LOG-DETAIL:TypeValue	MUST	
DOCSIS-DIAG-LOG-DETAIL:Count	MUST	
DOCSIS-DIAG-LOG-DETAIL:LastUpdate	MUST	
DOCSIS-DIAG-LOG-DETAIL:LastErrorText	MUST	
DOCSIS-REC:RecType	MUST	

13.3.3 DOCSIS-DIAG-LOG-EVENT-TYPE

Attribute Name	DPoE System	Comments
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-DIAG-LOG:TriggerFlagValue	MUST	
DOCSIS-DIAG-LOG-DETAIL:TypeValue	MUST	
DOCSIS-DIAG-LOG-DETAIL:LastErrorText	MUST	
DOCSIS-REC:RecType	MUST	

13.4 Requirements for CMTS CM Registration Status Service Definition

The DPoE System MUST support the generation of CMTS CM Registration Status Information records.

13.4.1 DOCSIS-CMTS-CM-REG-STATUS-TYPE

Attribute Name	DPoE System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsMdIfName	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-CMTS-CM-NODE-CH:CmtsMdCmSgId		The DPoE system MUST set to 0.
DOCSIS-CMTS-CM-NODE-CH:CmtsRcpId		The DPoE system MUST set to 0.
DOCSIS-CMTS-CM-NODE-CH:CmtsRccStatusId		The DPoE system MUST set to 0.
DOCSIS-CMTS-CM-NODE-CH:CmtsRcsId		The DPoE system MUST set to 0.
DOCSIS-CMTS-CM-NODE-CH:CmtsTcsId		The DPoE system MUST set to 0.
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-CM:CmIpv4Addr	MUST	
DOCSIS-CM:CmIpv6Addr	MUST	
DOCSIS-CM:CmIpv6LinkLocalAddr	MUST	
DOCSIS-CM:CmQosVersion	MUST	This will always be set to '1.1 QoS Mode'
DOCSIS-CM:CmRegStatusValue	MUST	
DOCSIS-CM:CmLastRegTime	MUST	
DOCSIS-REC:RecType	MUST	
DOCSIS-REC:RecCreationTime	MUST	

13.5 Requirements for CMTS CM Upstream Status Service Definitions

The DPoE System SHOULD NOT support the generation of CMTS CM Upstream Status records.

13.6 Requirements for CMTS Topology Service Definition

The DPoE System SHOULD NOT support the generation of CMTS Topology records.

The only reason to provide support for these records would be to provide compatibility with applications that are building topology diagrams for operator use.

13.7 Requirements for CPE Service Definition

13.7.1 DOCSIS-CPE-TYPE

Attribute Name	DPoE System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsMdIfName	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-REC:RecType	MUST	
DOCSIS-CPE:CpeMacAddr	MUST	
DOCSIS-CPE:CpeIpv4AddrList	MUST	Gleaned from DHCP requests on DPoE system.
DOCSIS-CPE:CpeIpv6AddrList	MUST	Gleaned from DHCP requests on DPoE system.
DOCSIS-CPE:CpeFqdn	MUST	DPoE System resolves name by using DNS lookup.

13.8 Requirements for CMTS Upstream Utilization Statistics Service Definition

The DPoE System SHOULD NOT support the generation of CMTS Upstream Utilization Statistics records.

13.9 Requirements for CMTS Downstream Utilization Statistics Service Definition

The DPoE System MUST support the generation of CMTS Downstream Utilization Statistics records.

13.9.1 DOCSIS-CMTS-CM-DS-UTIL-STATS-TYPE

Attribute Name	DPoE System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-CMTS-DS-UTIL:DsChId	MUST	
DOCSIS-CMTS-DS-UTIL:DsUtilInterval	MUST	The time interval, in seconds, over which the channel utilization is calculated.
DOCSIS-CMTS-DS-UTIL:DsUtilIndexPercentage	MUST	The calculated and truncated utilization index percentage for the downstream interface.
DOCSIS-CMTS-DS-UTIL:DsUtilTotalBytes	MUST	The total number of bytes transported by the downstream interface.

Attribute Name	DPoE System	Comments
DOCSIS-CMTS-DS-UTIL:DsUtilUsedBytes	MUST	The total number of DOCSIS data bytes transported by the downstream interface. The number of data bytes is defined as the total number of bytes transported in DOCSIS payloads minus the number of stuff bytes transported in DOCSIS payloads.
DOCSIS-REC:RecType	MUST	

13.10 Requirements for CMTS CM Service Flow Service Definition

The DPoE System MUST support the generation of CMTS CM Service Flow records.

13.10.1 DOCSIS-CMTS-CM-SERVICE-FLOW

Attribute Name	DPoE System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsMdIfName	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-REC:RecType	MUST	
DOCSIS-REC:RecCreationTime	MUST	
DOCSIS-QOS:ServiceFlowChSet		The DPoE system MUST set to 0.
DOCSIS-QOS:ServiceAppId		The DPoE system MUST set to 0.
DOCSIS-QOS:ServiceDsMulticast	MUST	
DOCSIS-QOS:ServiceIdentifier	MUST	
DOCSIS-QOS:ServiceGateId		The DPoE system MUST set to 0.
DOCSIS-QOS:ServiceClassName	MUST	
DOCSIS-QOS:ServiceDirection	MUST	
DOCSIS-SERVICE-FLOW:ServiceTrafficPriority	MUST	
DOCSIS-SERVICE-FLOW:ServiceMaxSustained	MUST	
DOCSIS-SERVICE-FLOW:ServiceMaxBurst	MUST	
DOCSIS-SERVICE-FLOW:ServiceMinReservedRate	MUST	
DOCSIS-SERVICE-FLOW:ServiceMinReservedPktSize		The DPoE system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceIpTos	MUST	
DOCSIS-SERVICE-FLOW:ServicePeakRate		
DOCSIS-SERVICE-FLOW:ServiceSchedule	MUST	
DOCSIS-SERVICE-FLOW:ServiceNomPollInterval	MUST	
DOCSIS-SERVICE-FLOW:ServiceTolPollJitter		The DPoE system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceUGSize		The DPoE system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceNomGrantInterval		The DPoE system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceTolGrantJitter		The DPoE system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceGrantsPerInterval		The DPoE system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServicePacketClassifiers	MUST	
DOCSIS-QOS:ServiceTimeCreated	MUST	

Annex A IPDR Service Definition Schemas (Normative)

This Appendix describes the IPDR Service Definition schemas.

Table 11 - MEF Usage Information Attributes

Category	Attribute Name	Type	Presence	Permitted Values
Which	ServiceIdentifier	unsignedShort	Optional	32-bit Integer
Which	ServiceL2VPNId	string	Optional	1..16
Who	ASFId	unsignedInt	Optional	0..65535
What	GreenFrameCount	unsignedLong	Required	64-bit counter in decimal notation
What	YellowFrameCount	unsignedLong	Required	64-bit counter in decimal notation
What	RedFrameCount	unsignedLong	Required	64-bit counter in decimal notation
What	GreenOctetCount	unsignedLong	Required	64-bit counter in decimal notation
What	YellowOctetCount	unsignedLong	Required	64-bit counter in decimal notation
What	RedOctetCount	unsignedLong	Required	64-bit counter in decimal notation

A.1 ServiceIdentifier

This is one of two ways of designating the service to which this group of statistics apply. It is the service flow identifier for this service.

Reference: [OSSIv3.0], Section C.6.4

A.2 ServiceL2VPNId

This is one of 2 ways of designating the service that these statistics apply to. It is the layer2 VPN id designated for this service.

Reference: [L2VPN]

A.3 ASFId[48]

This field is provided to allow the data to be easily aggregated for an ASF. This provides the ASF associated with this service. It is an optional field.

Reference: dpoeAsfServiceFlowId

A.4 GreenFrameCount

The total number of frames that are marked with color green.

Reference: dpoeMEFSvcFlowUsageGreenFrameCount

A.5 YellowFrameCount

The total number of frames that are marked with color yellow.

Reference: dpoeMEFSvcFlowUsageYellowFrameCount

A.6 RedFrameCount

The total number of frames that are marked with color red.

Reference: dpoeMEFSvcFlowUsageRedFrameCount

[48] Revised per OSSIv2.0-N-15.0219-1 on 10/28/15 by JB.

A.7 GreenOctetCount

The total number of octets from frames that are marked with color green.

Reference: dpoeMEFSvcFlowUsageGreenOctetCount

A.8 YellowOctetCount

The total number of octets from frames that are marked with color yellow.

Reference: dpoeMEFSvcFlowUsageYellowOctetCount

A.9 RedOctetCount

The total number of octets from frames that are marked with color red.

Reference: dpoeMEFSvcFlowUsageGreenRedCount

A.10 DPOE-MEF-USAGE-TYPE_3.5.1-A.1.xsd[49]

The full schema text can be found at http://www.cablelabs.com/namespaces/DPOE/2.0/xsd/ipdr/DPOE-MEF-USAGE-TYPE/.

```
<?xml version="1.0" encoding="UTF-8"?>
<schema
xmlns="http://www.w3.org/2001/XMLSchema"
      xmlns:DOCSIS-CMTS=
"http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CMTS"
      xmlns:DOCSIS-CM=
"http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CM"
      xmlns:DOCSIS-QOS=
"http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-QOS"
      xmlns:DOCSIS-REC=
"http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-REC"
      xmlns:DPOE-MEF-SERVICE-FLOW=
"http://www.cablelabs.com/namespaces/DPOE/2.0/xsd/ipdr/DPOE-MEF-SERVICE-FLOW"
      xmlns:ipdr="http://www.ipdr.org/namespaces/ipdr"
      targetNamespace=
"http://www.cablelabs.com/namespaces/DPOE/2.0/xsd/ipdr/DPOE-MEF-USAGE-TYPE"
      elementFormDefault="qualified"
      attributeFormDefault="unqualified" version="1.0">

      <import namespace="http://www.ipdr.org/namespaces/ipdr"
            schemaLocation="http://www.ipdr.org/public/IPDRDoc3.5.1.xsd"/>
      <import namespace=
"http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CMTS"
schemaLocation=
"http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CMTS/DOCSIS-
CMTS_3.5.1-A.1.xsd"/>
      <import namespace=
      "http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CM"
      schemaLocation=
"http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-CM/DOCSIS-
CM_3.5.1-A.3.xsd"/>
      <import namespace=
      "http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-QOS"
      schemaLocation=
```

[49] Revised per OSSIv2.0-N-15.0219-1 on 10/28/15 by JB.

```
"http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-QOS/DOCSIS-
QOS_3.5.1-A.1.xsd"/>
      <import namespace=
      "http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr/DOCSIS-REC"
      schemaLocation="http://www.cablelabs.com/namespaces/DOCSIS/3.0/xsd/ipdr
      /DOCSIS-REC/DOCSIS-REC_3.5.1-A.1.xsd"/>
      <import namespace=
      "http://www.cablelabs.com/namespaces/DPOE/2.0/xsd/ipdr/DPOE-MEF-
      SERVICE-FLOW"
      schemaLocation=
"http://www.cablelabs.com/namespaces/DPOE/2.0/xsd/ipdr/DPOE-MEF-SERVICE-
FLOW_3.5.1-A.1.xsd"/>

      <include schemaLocation="http://www.ipdr.org/public/IPDRTypes.xsd">
            <annotation>
                  <documentation>
            Import auxiliary schemas for global element references.
            </documentation>
            </annotation>
      </include>
      <annotation>
            <documentation>
            DPOE-MEF-USAGE-TYPE is an IPDR Service Definition schema defining
the DPOE Metro Ethernet Forum service usage data
        and is based on the inclusive streaming model where all fields are
included in each streamed record.
            </documentation>
            <documentation>
                  <ipdr:reference>
                DPOE 2.0 Operations Support System Interface Specification
DPoE-SP-OSSIv2.0
         </ipdr:reference>
            </documentation>
      </annotation>
      <complexType name=" DPOE-MEF-USAGE-TYPE">
            <complexContent>
                  <extension base="ipdr:IPDRType">
                        <sequence>
                              <element ref="DOCSIS-CMTS:CmtsHostName"/>
                              <element ref="DOCSIS-CMTS:CmtsSysUpTime"/>
                              <element ref="DOCSIS-CMTS:CmtsMdIfName"/>
                              <element ref="DOCSIS-CMTS:CmtsMdIfIndex"/>
                              <element ref="DOCSIS-CM:CmMacAddr"/>
                              <element ref="DOCSIS-REC:RecType"/>
                              <element ref="DOCSIS-REC:RecCreationTime"/>
                              <element ref="DOCSIS-QOS:ServiceIdentifier"/>
                              <element ref=
                                  "DPOE-MEF-SERVICE-FLOW:ServiceL2VPNId"/>
                              <element ref="DPOE-MEF-SERVICE-FLOW:ASFId"/>
                              <element ref=
                                  "DPOE-MEF-SERVICE-FLOW:GreenFrameCount"/>
                              <element ref=
                                  "DPOE-MEF-SERVICE-FLOW:YellowFrameCount"/>
                              <element ref=
                                  "DPOE-MEF-SERVICE-FLOW:RedFrameCount"/>
                              <element ref=
                                  "DPOE-MEF-SERVICE-FLOW:GreenOctetCount"/>
```

```
                              <element ref=
                                  "DPOE-MEF-SERVICE-FLOW:YellowOctetCount"/>
                              <element ref=
                                  "DPOE-MEF-SERVICE-FLOW:RedOctetCount"/>
                        </sequence>
                  </extension>
            </complexContent>
      </complexType>
</schema>
```

A.11 DPOE-MEF-SERVICE-FLOW_3.5.1-A.1.xsd[50]

The full schema text can be found at http://www.cablelabs.com/namespaces/DPOE/2.0/xsd/ipdr/DPOE-MEF-SERVICE-FLOW/

```
<?xml version="1.0" encoding="UTF-8"?>
<schema

      xmlns="http://www.w3.org/2001/XMLSchema"
      targetNamespace=
      "http://www.cablelabs.com/namespaces/DPOE/2.0/xsd/ipdr/DPOE-MEF-
SERVICE-FLOW"
      xmlns:DPOE-MEF-SERVICE-FLOW=
      "http://www.cablelabs.com/namespaces/DPOE/2.0/xsd/ipdr/DPOE-MEF-
SERVICE-FLOW"
      xmlns:ipdr="http://www.ipdr.org/namespaces/ipdr"
      version="1.0"
      elementFormDefault="qualified"
      attributeFormDefault="unqualified">

      <import namespace="http://www.ipdr.org/namespaces/ipdr"
            schemaLocation="http://www.ipdr.org/public/IPDRDoc3.5.1.xsd"/>
      <include schemaLocation="http://www.ipdr.org/public/IPDRTypes.xsd"/>
      <annotation>
            <documentation>
               DPOE-MEF-SERVICE-FLOW_3.5.1-A.1 is an auxiliary schema which
defines DPOE MEF Usage information.
            </documentation>
            <documentation>
                  <ipdr:reference>
                  DPOE 2.0 Operations Support System Interface Specification
DPoE-SP-OSSIv2.0
                  </ipdr:reference>
            </documentation>
      </annotation>
      <element name="ServiceL2VPNId" type="unsignedShort">
            <annotation>
                  <documentation>
                  Layer 2 VPN ID for this service (used to identify the
service)
            </documentation>
            </annotation>
      </element>
```

[50] Revised per OSSIv2.0-N-15.0219-1 on 10/28/15 by JB.

```
      <element name="ASFId" type="unsignedInt">
            <annotation>
                  <documentation>
                  Aggregate service flow Identifier for this service
            </documentation>
            </annotation>
      </element>
      <element name="GreenFrameCount" type="unsignedLong">
            <annotation>
                  <documentation>
            Contains a 64-bit absolute counter for the green frame count
      </documentation>
            </annotation>
      </element>
      <element name="YellowFrameCount" type="unsignedLong">
            <annotation>
                  <documentation>
            Contains a 64-bit absolute counter for the yellow frame count
      </documentation>
            </annotation>
      </element>
      <element name="RedFrameCount" type="unsignedLong">
            <annotation>
                  <documentation>
            Contains a 64-bit absolute counter for the red frame count
      </documentation>
            </annotation>
      </element>
      <element name="GreenOctetCount" type="unsignedLong">
            <annotation>
                  <documentation>
            Contains a 64-bit absolute counter for the green octet count
      </documentation>
            </annotation>
      </element>
      <element name="YellowOctetCount" type="unsignedLong">
            <annotation>
                  <documentation>
            Contains a 64-bit absolute counter for the yellow octet count
      </documentation>
            </annotation>
      </element>
      <element name="RedOctetCount" type="unsignedLong">
            <annotation>
                  <documentation>
            Contains a 64-bit absolute counter for the red octet count
      </documentation>
            </annotation>
      </element>
</schema>
```

Annex B DPoE MIB Requirements (Normative)

This Annex defines the DPoE MIB module and MIB variables required for DPoEv2.0 vCM and System devices.

B.1 MIB-Object Details

B.1.1 DOCS-DPOE-MIB[51]

```
DOCS-DPOE-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32,
    Integer32,
    Counter64               FROM SNMPv2-SMI

    TEXTUAL-CONVENTION,
    TruthValue,
    MacAddress              FROM SNMPv2-TC

    MODULE-COMPLIANCE,
    OBJECT-GROUP            FROM SNMPv2-CONF

    SnmpAdminString         FROM SNMP-FRAMEWORK-MIB -- RFC 2580

    ifIndex                 FROM IF-MIB

    InetAddressType,
    InetAddress             FROM INET-ADDRESS-MIB    -- RFC 4001

    docsQos3PktClassEntry
                            FROM DOCS-QOS3-MIB

    docsSubmgt3FilterGrpEntry
                            FROM DOCS-SUBMGT3-MIB

    docsIf3CmtsCmRegStatusId
                            FROM DOCS-IF3-MIB

    docsQosServiceFlowId,
    docsQosServiceFlowEntry
                            FROM DOCS-QOS-MIB

    docsMcastAuthProfilesName,
    docsMcastAuthProfileSessRuleId,
    docsMcastAuthStaticSessRuleCfgListId,
    docsMcastAuthStaticSessRuleId
                            FROM DOCS-MCAST-AUTH-MIB

    clabProjDocsis,
    DocsL2vpnIfList         FROM CLAB-DEF-MIB;
```

[51] Revised per OSSIv2.0-N-14.0174-1 on 6/26/14 by JB.

```
dpoeMIB MODULE-IDENTITY
    LAST-UPDATED  "201111040000Z"  -- November 4th, 2011
    ORGANIZATION  "CableLabs"
    CONTACT-INFO
        "Postal: Cable Television Laboratories, Inc.
        858 Coal Creek Circle
        Louisville, Colorado 80027-9750
        U.S.A.
        Phone:  +1 303-661-9100
        Fax:   +1 303-661-9199
        E-mail: mibs@cablelabs.com"
    DESCRIPTION
        "This is the management MIB for devices complying with the DOCSIS
DPoE Feature."
    REVISION "201111040000Z"
    DESCRIPTION
        "Initial version."
    ::= { clabProjDocsis 25}

----------------------------------------------------------------
--
-- Textual Conventions
--
DpoeMESPDisableEnable ::= TEXTUAL-CONVENTION

    STATUS      current
    DESCRIPTION
            "Disable and Enable options for binary capabilities in the
             MESP table."

    SYNTAX      INTEGER {
                        disabled (0),
                        enabled (1)
                        }

DpoeMESPFieldId ::= TEXTUAL-CONVENTION

    STATUS      current
    DESCRIPTION
            "Identifies a specific field in the frame being classified."

    SYNTAX      INTEGER {
                        ipV4Tos(0),
                        ipV6Dscp(1),
                        spcp(2),
                        cpcp(3),
                        ipcp(4),
                        bpcp(5),
                        sdei(6),
                        cdei(7),
                        idei(8),
                        bdei(9),
                        mplsexp(10)
                        }

----------------------------------------------------------------
```

```
-- MIB Organization
--
dpoeMIBNotifications OBJECT IDENTIFIER ::= { dpoeMIB 0 }  -- Placeholder for
notifications
dpoeMIBObjects OBJECT IDENTIFIER ::= { dpoeMIB 1 }
dpoeMEFConfig OBJECT IDENTIFIER ::= { dpoeMIBObjects 1 }
dpoeMEFStats OBJECT IDENTIFIER ::= { dpoeMIBObjects 2 }
dpoeMultiCast OBJECT IDENTIFIER ::= { dpoeMIBObjects 3 }
dpoeVcm OBJECT IDENTIFIER ::= { dpoeMIBObjects 4 }
dpoeMIBConformance  OBJECT IDENTIFIER ::= { dpoeMIB 2 }

--
-- DPOE MIB Objects
--

-----------------------------------------------------------------------
--
-- The following set of tables define the MEF configuration data that
-- is supported by the DPoE system.
--
-----------------------------------------------------------------------

-----------------------------------------------------------------------
--
-- Metro Ethernet Service Profile Table
--
-- This table contains one row for each service flow that is using an MESP.
-- The ifIndex of the MAC Domain is provided as an additional index for
convenience.
--
-----------------------------------------------------------------------


dpoeMESPTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpoeMESPEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table contains the attributes for each Metro Ethernet Service
Profile in
            use by a service flow or ASF."
    ::= {  dpoeMEFConfig 1 }

dpoeMESPEntry OBJECT-TYPE
    SYNTAX      DpoeMESPEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "The table is indexed by the ifIndex of the associated MAC Domain
and the
            service flow ID"
    INDEX { ifIndex, docsQosServiceFlowId  }
    ::= { dpoeMESPTable 1 }

DpoeMESPEntry ::= SEQUENCE
    {
      dpoeMESPBpCir           INTEGER,
```

```
      dpoeMESPBpCbs           INTEGER,
      dpoeMESPBpEir           INTEGER,
      dpoeMESPBpEbs           INTEGER,
      dpoeMESPBpCf            DpoeMESPDisableEnable,
      dpoeMESPBpCm            DpoeMESPDisableEnable,
      dpoeMESPBpCif           DpoeMESPFieldId,
      dpoeMESPBpGreen         INTEGER,
      dpoeMESPBpYellow        INTEGER,
      dpoeMESPBpRed           INTEGER,
      dpoeMESPBpCpCrStatus    DpoeMESPDisableEnable,
      dpoeMESPBpCpCrField     DpoeMESPFieldId,
      dpoeMESPBpCrGreen       INTEGER,
      dpoeMESPBpCrYellow      INTEGER,
      dpoeMESPBpCrRed         INTEGER
    }

dpoeMESPBpCir OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbit/s"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Committed
Information Rate
             (CIR) associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 1 }

dpoeMESPBpCbs  OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbytes"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Committed Burst Size
(CBS)
             associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 2 }

dpoeMESPBpEir  OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbit/s"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Excess Information
Rate
             (EIR) associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 3 }

dpoeMESPBpEbs  OBJECT-TYPE
    SYNTAX      INTEGER
```

```
    UNITS       "kbytes"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Excess Burst Size
(EBS)
             associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."

    ::= { dpoeMESPEntry 4 }

dpoeMESPBpCf  OBJECT-TYPE
    SYNTAX      DpoeMESPDisableEnable
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Coupling Flag (CF)
associated
             with the given MESP. Two values are supported i.e., 0 when the
coupling flag
             is disabled and 1 when the coupling flag is enabled.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { disabled }
    ::= { dpoeMESPEntry 5 }

dpoeMESPBpCm  OBJECT-TYPE
    SYNTAX      DpoeMESPDisableEnable
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to indicate the Color Mode (CM) for processing
incoming
             frames associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { disabled }
    ::= { dpoeMESPEntry 6 }

dpoeMESPBpCif  OBJECT-TYPE
    SYNTAX      DpoeMESPFieldId
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This field is used to indicate which field within the incoming
frames
             is used to retrieve color information.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 7 }

dpoeMESPBpGreen  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```
            "This attribute provides the value of the field identified
dpoeMESPBpCif which
             is used to represent green frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 8 }

dpoeMESPBpYellow  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute provides the value of the field identified
dpoeMESPBpCif which
             is used to represent yellow frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 9 }

dpoeMESPBpRed  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute provides the value of the field identified
dpoeMESPBpCif which
             is used to represent red frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 10 }

dpoeMESPBpCpCrStatus  OBJECT-TYPE
    SYNTAX      DpoeMESPDisableEnable
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute is used to indicate the Color Marking (CR)
operation associated
             with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 11 }

dpoeMESPBpCpCrField  OBJECT-TYPE
    SYNTAX      DpoeMESPFieldId
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute indicates which of the fields within the incoming
frames is used
             to save color information to.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 12 }

dpoeMESPBpCrGreen  OBJECT-TYPE
    SYNTAX      INTEGER
```

```
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
             dpoeMESPBpCpCrField to represent green frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 13 }

dpoeMESPBpCrYellow  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
             dpoeMESPBpCpCrField to represent yellow frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 14 }

dpoeMESPBpCrRed  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
             dpoeMESPBpCpCrField to represent red frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoeMESPEntry 15 }


-------------------------------------------------------------------------
--
-- DPoE Packet Classifier Table
--
-- This table augments the table docsQos3PktClassTable from the DOCSIS-QOS3-
MIB.
-- The attributes for this table are the set of new classifier properties
that
-- are defined in the DPoE 2.0 Specifications.
--
-------------------------------------------------------------------


dpoePktClassTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpoePktClassEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table to provide the additional classifier parameters defined in
DPoE v2.0."
    ::= { dpoeMEFConfig 2 }
```

```
dpoePktClassEntry OBJECT-TYPE
    SYNTAX      DpoePktClassEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Additional classifier attributes from DPoE v2.0"
    AUGMENTS {docsQos3PktClassEntry}
    ::= { dpoePktClassTable 1 }

DpoePktClassEntry ::= SEQUENCE
    {
      dpoePktClassBitMap      BITS,
      dpoePktClassCTagTPID    INTEGER,
      dpoePktClassCTagPCP     INTEGER,
      dpoePktClassCTagCFI     INTEGER,
      dpoePktClassCTagVID     INTEGER,
      dpoePktClassCTagTCI     INTEGER,
      dpoePktClassSTagTPID    INTEGER,
      dpoePktClassSTagPCP     INTEGER,
      dpoePktClassSTagDEI     INTEGER,
      dpoePktClassSTagVID     INTEGER,
      dpoePktClassSTagTCI     INTEGER,
      dpoePktClassITagTPID    INTEGER,
      dpoePktClassITagPCP     INTEGER,
      dpoePktClassITagUCA     INTEGER,
      dpoePktClassITagDEI     INTEGER,
      dpoePktClassITagSID     INTEGER,
      dpoePktClassITagTCI     INTEGER,
      dpoePktClassBTagTPID    INTEGER,
      dpoePktClassBTagPCP     INTEGER,
      dpoePktClassBTagDEI     INTEGER,
      dpoePktClassBTagVID     INTEGER,
      dpoePktClassBTagTCI     INTEGER,
      dpoePktClassBTagBDA     INTEGER,
      dpoePktClassBTagBSA     INTEGER

    }

dpoePktClassBitMap OBJECT-TYPE
     SYNTAX      BITS {
                       ctagTPID(0),
                       ctagPCP(1),
                       ctagCFI(2),
                       ctagVID(3),
                       ctagTCI(4),
                       stagTPID(5),
                       stagPCP(6),
                       stagDEI(7),
                       stagVID(8),
                       stagTCI(9),
                       itagTPID(10),
                       itagPCP(11),
                       itagUCA(12),
                       itagDEI(13),
                       itagSID(14),
                       itagTCI(15),
                       btagTPID(16),
```

```
                        btagPCP(17),
                        btagDEI(18),
                        btagVID(19),
                        btagTCI(20),
                        btagBDA(21),
                        btagBSA(22)
                       }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute indicates which parameter encodings
              from this specific table that were actually present in the
              packet classifier encoding signaled in the DOCSIS message that
created
              or modified the classifier.
              A bit of this attribute is set to 1 if the parameter indicated
              by the comment was present in the classifier encoding,
              and to 0 otherwise.
              Note that BITS are encoded most significant bit first,
            so that if, for example, bits 6 and 7 are set, this attribute
              is encoded as the octet string '030000'H."

    ::= { dpoePktClassEntry 1 }

dpoePktClassCTagTPID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] C-TPID field.

             If this parameter is not specified for an entry, then the DPoE
System MUST use a default
             value of 0x8100 for the [802.1ad] C-TPID field. Other values of
[802.1ad] C-TPID may be
             provisioned, as required.

             The DPoE System MUST NOT match Ethernet frames without the
[802.1ad] C-TPID to this entry.
             The D-ONU MUST NOT match Ethernet frames without the [802.1ad]
C-TPID to this entry.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { '8100'H }
    ::= { dpoePktClassEntry 2 }

dpoePktClassCTagPCP OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] C-PCP field.

             If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
```

```
            frames without [802.1ad] C-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] C-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 3 }

dpoePktClassCTagCFI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] C-CFI field.

            If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
            frames without [802.1ad] C-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] C-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 4 }

dpoePktClassCTagVID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] C-VID field.

            If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
            frames without [802.1ad] C-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] C-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 5 }

dpoePktClassCTagTCI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] C-TCI field.

            If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
```

```
            frames without [802.1ad] C-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] C-Tag to
            this entry.

            The DPoE System MUST reject any CM config file with C-TCI TLV
present when C-PCP TLV,
            C-CFI TLV or C-VID TLV is present.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 6 }

dpoePktClassSTagTPID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] S-TPID field.

            If this parameter is not specified for an entry, then the DPoE
System MUST use a default
            value of 0x88a8 for the [802.1ad] S-TPID field. Other values of
[802.1ad] S-TPID may be
            provisioned, as required.

            The DPoE System MUST NOT match Ethernet frames without the
[802.1ad] S-Tag to this entry.
            The D-ONU MUST NOT match Ethernet frames without the [802.1ad]
S-Tag to this entry.

            The  value of this attribute is derived from TLV TBD."
    DEFVAL { '88a8'H }
    ::= { dpoePktClassEntry 7 }

dpoePktClassSTagPCP OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] S-PCP field.

            If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
            frames without [802.1ad] S-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] S-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 8 }

dpoePktClassSTagDEI OBJECT-TYPE
    SYNTAX      INTEGER
```

```
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] S-DEI field.

             If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
             frames without [802.1ad] S-Tag to this entry. If this parameter
is specified for an
             entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] S-Tag to
             this entry.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 9 }

dpoePktClassSTagVID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] S-SID field.

             If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
             frames without [802.1ad] S-Tag to this entry. If this parameter
is specified for an
             entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] S-Tag to
             this entry.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 10 }

dpoePktClassSTagTCI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] S-TCI field.

             If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
             frames without [802.1ad] S-Tag to this entry. If this parameter
is specified for an entry,
             the D-ONU MUST NOT match Ethernet frames without the [802.1ad]
S-Tag to this entry.

             The DPoE System MUST reject any CM config file with S-TCI TLV
present when S-PCP TLV,
             S-DEI TLV or S-VID TLV is present.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 11 }
```

```
dpoePktClassITagTPID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] I-TPID field.

             If this parameter is not specified for an entry, then the DPoE
System MUST use a default
             value of 0x88e7 for the [802.1ah] I-TPID field. Other values of
[802.1ah] I-TPID may be
             provisioned, as required.

             The DPoE System MUST NOT match Ethernet frames without the
[802.1ah] I-TAG tag to this
             entry. The D-ONU MUST NOT match Ethernet frames without the
[802.1ah] I-TAG tag to
             this entry.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { '88e7'H }
    ::= { dpoePktClassEntry 12 }

dpoePktClassITagPCP OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] I-PCP field.

             If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
             packets without the [802.1ah] I-Tag to this entry. If this
parameter is specified for
             an entry, the D-ONU MUST NOT match Ethernet packets without the
[802.1ah] I-Tag
             to this entry.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 13 }

dpoePktClassITagUCA OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] I-UCA field.

             If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
             packets without the [802.1ah] I-Tag to this entry. If this
parameter is specified for
```

```
            an entry, the D-ONU MUST NOT match Ethernet packets without the
[802.1ah] I-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 14 }

dpoePktClassITagDEI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
           "The values of the field specify the matching parameters for the
[802.1ah] I-DEI field.

            If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
            packets without the [802.1ah] I-Tag to this entry. If this
parameter is specified for
            an entry, the D-ONU MUST NOT match Ethernet packets without the
[802.1ah] I-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 15 }

dpoePktClassITagSID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
           "The values of the field specify the matching parameters for the
[802.1ah] I-SID field.

            If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
            packets without the [802.1ah] I-Tag tag to this entry. If this
parameter is specified
            for an entry, the D-ONU MUST NOT match Ethernet packets without
the [802.1ah]
            I-Tag tag to this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 16 }

dpoePktClassITagTCI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
           "The values of the field specify the matching parameters for the
[802.1ah] I-TCI field.

            If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
            packets without the [802.1ah] I-Tag to this entry. If this
parameter is specified for
```

```
            an entry, the D-ONU MUST NOT match Ethernet packets without the
[802.1ah] I-Tag to
            this entry.

            The DPoE System MUST reject any CM config file with I-TCI TLV
present when I-SID TLV,
            or I-PCP TLV or I-DEI TLV or I-UCA TLV is present.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 17 }

dpoePktClassBTagTPID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] B-TPID field.

            If this parameter is not specified for an entry, then the DPoE
System MUST use a
            default value of 0x88a8 for the [802.1ah] B-TPID field. Other
values of [802.1ah]
            B-TPID may be provisioned, as required.

            The DPoE System MUST NOT match Ethernet frames without the
[802.1ah] B-Tag to this
            entry. The D-ONU MUST NOT match Ethernet frames without the
[802.1ah] B-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    DEFVAL { '88a8'H }
    ::= { dpoePktClassEntry 18 }

dpoePktClassBTagPCP OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] B-PCP field.

            If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
            frames without [802.1ah] B-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ah] B-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 19 }

dpoePktClassBTagDEI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
```

```
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] B-DEI field.

             If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
             frames without [802.1ah] B-Tag to this entry. If this parameter
is specified for an
             entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ah] B-Tag to
             this entry.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 20 }

dpoePktClassBTagVID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] B-VID field.

             If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
             frames without [802.1ah] B-Tag to this entry. If this parameter
is specified for an
             entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ah] B-Tag to
             this entry.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 21 }

dpoePktClassBTagTCI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] B-TCI field.

             If this parameter is specified for an entry, the DPoE System
MUST NOT match Ethernet
             packets without the [802.1ah] B-Tag to this entry. If this
parameter is specified for
             an entry, the D-ONU MUST NOT match Ethernet packets without the
[802.1ah] B-Tag to
             this entry.

             The DPoE System MUST reject any CM config file with B-TCI TLV
present when B-PCP TLV,
             B-DEI TLV or B-VID TLV is present.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 22 }
```

```
dpoePktClassBTagBDA OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The value of the field specifies the matching value for the
backbone MAC destination
             address. If this parameter is omitted, then comparison of the
backbone MAC
             destination address for this entry is irrelevant.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 23 }

dpoePktClassBTagBSA OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The value of the field specifies the matching value for the
backbone MAC
             source address. If this parameter is omitted, then comparison of
the backbone
             MAC source address for this entry is irrelevant.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpoePktClassEntry 24 }


--------------------------------------------------------------------------
--
-- DPOE Service Flow Tables
--
-- The first table augments the table docsQosServiceFlowTable from the
DOCSIS-QOS-MIB.
-- This table provides a mapping from service flow to associated ASF where
appropriate.
-- It also shows the TPID translation values configured for the service flow.
--
-- The second table provides a mechanism for the user to efficiently find the
set of
-- service flows that are assoicated with a specific ASF.
--
-------------------------------------------------------------------


dpoeServiceFlowTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpoeServiceFlowEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table to provide the additional service flow data specified in
DPoE v2.0."
    ::= { dpoeMEFConfig 3 }

dpoeServiceFlowEntry OBJECT-TYPE
```

```
    SYNTAX      DpoeServiceFlowEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Additional service flow attributes from DPoE v2.0"
    AUGMENTS {docsQosServiceFlowEntry}
    ::= { dpoeServiceFlowTable 1 }

DpoeServiceFlowEntry ::= SEQUENCE
    {
      dpoeServiceFlowAsfId          Unsigned32,
      dpoeServiceFlowUpTPIDTrans    INTEGER,
      dpoeServiceFlowDnTPIDTrans    INTEGER,
      dpoeServiceFlowUpSTPIDTrans   INTEGER,
      dpoeServiceFlowDnSTPIDTrans   INTEGER,
      dpoeServiceFlowUpBTPIDTrans   INTEGER,
      dpoeServiceFlowDnBTPIDTrans   INTEGER,
      dpoeServiceFlowUpITPIDTrans   INTEGER,
      dpoeServiceFlowDnITPIDTrans   INTEGER
    }

dpoeServiceFlowAsfId OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The identifier for the Aggregated Service Flow as defined in the
CM config file.
             The value 0 means that no ASF is defined."
    ::= { dpoeServiceFlowEntry 1 }

dpoeServiceFlowUpTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the outermost tag as defined in TLV
43.5.14.1"
    ::= { dpoeServiceFlowEntry 2 }

dpoeServiceFlowDnTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the outermost tag as defined in TLV
43.5.14.2"
    ::= { dpoeServiceFlowEntry 3 }


dpoeServiceFlowUpSTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the S-TPID as defined in TLV 43.5.14.3"
    ::= { dpoeServiceFlowEntry 4 }
```

```
dpoeServiceFlowDnSTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the S-TPID as defined in TLV 43.5.14.4"
    ::= { dpoeServiceFlowEntry 5 }

dpoeServiceFlowUpBTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the B-TPID as defined in TLV 43.5.14.5"
    ::= { dpoeServiceFlowEntry 6 }

dpoeServiceFlowDnBTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the B-TPID as defined in TLV 43.5.14.6"
    ::= { dpoeServiceFlowEntry 7 }

dpoeServiceFlowUpITPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the I-TPID as defined in TLV 43.5.14.7"
    ::= { dpoeServiceFlowEntry 8 }

dpoeServiceFlowDnITPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the I-TPID as defined in TLV 43.5.14.8"
    ::= { dpoeServiceFlowEntry 9 }

dpoeAsfServiceFlowTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpoeAsfServiceFlowEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "This table provides a way to map from an ASF Id to the
associated set of service
             flows"
    ::= { dpoeMEFConfig 4 }

dpoeAsfServiceFlowEntry OBJECT-TYPE
    SYNTAX      DpoeAsfServiceFlowEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
            "This table is indexed by the ifIndex of the MAC domain, the ASF
Id and Service flow id."
    INDEX { ifIndex, dpoeAsfServiceFlowAsfId, dpoeAsfServiceFlowId }
    ::= { dpoeAsfServiceFlowTable 1 }

DpoeAsfServiceFlowEntry ::= SEQUENCE
    {
      dpoeAsfServiceFlowAsfId       Unsigned32,
      dpoeAsfServiceFlowId          Unsigned32
    }

dpoeAsfServiceFlowAsfId OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The identifier for the Aggregated Service Flow as defined in the
CM config file."
    ::= { dpoeAsfServiceFlowEntry 1 }

dpoeAsfServiceFlowId OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The identifier for service flow associated with this ASF."
    ::= { dpoeAsfServiceFlowEntry 2 }

-------------------------------------------------------------------------
--
-- DPoE Filter Group Table
--
-- This table augments the table docsSubmgt3FilterGrpTable from the DOCS-
SUBMGT3-MIB.
-- The attributes for this table are the set of new classifier properties
that
-- are defined in the DPoE 2.0 Specifications.
--
-------------------------------------------------------------------


dpoeSubmgt3FilterGrpTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpoeSubmgt3FilterGrpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is applicable to the DPoE System.
         It describes a set of filter or classifier
         criteria. Classifiers are assigned by group to the
         individual vCMs. That assignment is made via the
         Frame Classification TLV encodings sent to a vCM instance
         within the DPoE System during registration or in their
         absence, default values configured in the DPoE System.
         A Filter Group ID (GrpId) is a set of rules that correspond
         to the expansion of a UDC Group ID into individual drop
         classification rules."
    ::= { dpoeMEFConfig 5 }
```

```
dpoeSubmgt3FilterGrpEntry OBJECT-TYPE
    SYNTAX      DpoeSubmgt3FilterGrpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of dpoeSubmgt3FilterGrpTable, augmenting
         a row of docsSubmgt3FilterGrpTable.
         The DPoE System persists all instances of the FilterGrp object
         across reinitializations."
    AUGMENTS {docsSubmgt3FilterGrpEntry}
    ::= { dpoeSubmgt3FilterGrpTable 1 }

DpoeSubmgt3FilterGrpEntry ::= SEQUENCE
    {
    dpoeSubmgt3FilterGrpCTagMatch       BITS,
      dpoeSubmgt3FilterGrpCTagTPID        Unsigned32,
      dpoeSubmgt3FilterGrpCTagPCP         Unsigned32,
      dpoeSubmgt3FilterGrpCTagCFI         Unsigned32,
      dpoeSubmgt3FilterGrpCTagVID         Unsigned32,
      dpoeSubmgt3FilterGrpCTagTCI         Unsigned32,
    dpoeSubmgt3FilterGrpSTagMatch       BITS,
      dpoeSubmgt3FilterGrpSTagTPID        Unsigned32,
      dpoeSubmgt3FilterGrpSTagPCP         Unsigned32,
      dpoeSubmgt3FilterGrpSTagDEI         Unsigned32,
      dpoeSubmgt3FilterGrpSTagVID         Unsigned32,
      dpoeSubmgt3FilterGrpSTagTCI         Unsigned32,
    dpoeSubmgt3FilterGrpITagMatch       BITS,
      dpoeSubmgt3FilterGrpITagTPID        Unsigned32,
      dpoeSubmgt3FilterGrpITagPCP         Unsigned32,
      dpoeSubmgt3FilterGrpITagUCA         Unsigned32,
      dpoeSubmgt3FilterGrpITagDEI         Unsigned32,
      dpoeSubmgt3FilterGrpITagSID         Unsigned32,
      dpoeSubmgt3FilterGrpITagTCI         Unsigned32,
    dpoeSubmgt3FilterGrpBTagMatch       BITS,
      dpoeSubmgt3FilterGrpBTagTPID        Unsigned32,
      dpoeSubmgt3FilterGrpBTagPCP         Unsigned32,
      dpoeSubmgt3FilterGrpBTagDEI         Unsigned32,
      dpoeSubmgt3FilterGrpBTagVID         Unsigned32,
      dpoeSubmgt3FilterGrpBTagTCI         Unsigned32,
      dpoeSubmgt3FilterGrpBTagBDA         MacAddress,
      dpoeSubmgt3FilterGrpBTagBSA         MacAddress,
    dpoeSubmgt3FilterGrpMplsMatch       BITS,
    dpoeSubmgt3FilterGrpMplsLabel       Unsigned32,
    dpoeSubmgt3FilterGrpMplsTc          Unsigned32
    }

dpoeSubmgt3FilterGrpCTagMatch OBJECT-TYPE
    SYNTAX      BITS {
                        matchTPID(0),
                        matchVID(1),
                        matchCFI(2),
                        matchPCP(3),
                        matchTCI(4)
                    }
    MAX-ACCESS  read-create
    STATUS      current
```

```
    DESCRIPTION
        "When matchTPID is set to 1, the [802.1ad] C-Tag will be included in
         the match criteria for this classifier.  The C-Tag will be
identified
         via the C-TPID value specified in dpoeSubmgt3FilterGrpCTagTPID.

         By default, the contents of the C-TCI portion of the C-Tag are not
         part of the match criteria.  C-TCI fields can be included in the
         match criteria for this classifier by setting the associated
         bits to 1.

         The entire C-TCI field is identified by matchTCI.  Setting
         this bit will include the contents of dpoeSubmgt3FilterGrpCTagTCI
         in the match criteria of this classifier.

         The C-TCI sub-fields are identified by matchVID, matchCFI and
         matchPCP.  Setting these bits will include the contents of
         dpoeSubmgt3FilterGrpCTagVID, dpoeSubmgt3FilterGrpCTagCFI,
         or dpoeSubmgt3FilterGrpCTagPCP in the match criteria of this
         classifier.

         The matchTCI bit and the bits for the sub-fields of the
         C-TCI are mutually exclusive.  If the matchTCI bit is set, the
         bits for the sub-fields (matchVID, matchCFI, matchPCP) must be
         cleared.  If one or more of the sub-field bits are set, the matchTCI
         bit must be cleared."
    DEFVAL { {} }
    ::= { dpoeSubmgt3FilterGrpEntry 1 }

dpoeSubmgt3FilterGrpCTagTPID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the
         [802.1ad] C-TPID field.
         The default value of this field is 0x8100."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.5"
    DEFVAL { 33024 }   -- 0x8100
    ::= { dpoeSubmgt3FilterGrpEntry 2 }

dpoeSubmgt3FilterGrpCTagPCP OBJECT-TYPE
    SYNTAX      Unsigned32 (0..7)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         C-PCP field, a sub-field of the C-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.7"
    ::= { dpoeSubmgt3FilterGrpEntry 3 }

dpoeSubmgt3FilterGrpCTagCFI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1)
```

```
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         C-CFI field, a sub-field of the C-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.8"
    ::= { dpoeSubmgt3FilterGrpEntry 4 }

dpoeSubmgt3FilterGrpCTagVID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..4095)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         C-VID field, a sub-field of the C-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.6"
    ::= { dpoeSubmgt3FilterGrpEntry 5 }

dpoeSubmgt3FilterGrpCTagTCI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute represents the classifier value for the [802.1ad]
         C-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.10"
    ::= { dpoeSubmgt3FilterGrpEntry 6 }

dpoeSubmgt3FilterGrpSTagMatch OBJECT-TYPE
    SYNTAX      BITS {
                        matchTPID(0),
                        matchVID(1),
                        matchDEI(2),
                        matchPCP(3),
                        matchTCI(4)
                    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "When matchTPID is set to 1, the [802.1ad] S-Tag will be included in
         the match criteria for this classifier.  The S-Tag will be
identified
         via the S-TPID value specified in dpoeSubmgt3FilterGrpSTagTPID.

         By default, the contents of the S-TCI portion of the S-Tag are not
         part of the match criteria.  S-TCI fields can be included in the
         match criteria for this classifier by setting the associated
         bits to 1.

         The entire S-TCI field is identified by matchTCI.  Setting
         this bit will include the contents of dpoeSubmgt3FilterGrpSTagTCI
```

```
         in the match criteria of this classifier.

         The S-TCI sub-fields are identified by matchVID, matchDEI and
         matchPCP.  Setting these bits will include the contents of
         dpoeSubmgt3FilterGrpSTagVID, dpoeSubmgt3FilterGrpSTagDEI,
         or dpoeSubmgt3FilterGrpSTagPCP in the match criteria of this
         classifier.

         The matchTCI bit and the bits for the sub-fields of the
         S-TCI are mutually exclusive.  If the matchTCI bit is set, the
         bits for the sub-fields (matchVID, matchDEI, matchPCP) must be
         cleared.  If one or more of the sub-field bits are set, the matchTCI
         bit must be cleared."
    DEFVAL { {} }
    ::= { dpoeSubmgt3FilterGrpEntry 7 }

dpoeSubmgt3FilterGrpSTagTPID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the
         [802.1ad] S-TPID field.
         The default value of this field is 0x88a8."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.1"
    DEFVAL { 34984 }   -- 0x88a8
    ::= { dpoeSubmgt3FilterGrpEntry 8 }

dpoeSubmgt3FilterGrpSTagPCP OBJECT-TYPE
    SYNTAX      Unsigned32 (0..7)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         S-PCP field, a sub-field of the S-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.3"
    ::= { dpoeSubmgt3FilterGrpEntry 9 }

dpoeSubmgt3FilterGrpSTagDEI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         S-DEI field, a sub-field of the S-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.4"
    ::= { dpoeSubmgt3FilterGrpEntry 10 }

dpoeSubmgt3FilterGrpSTagVID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..4095)
    MAX-ACCESS  read-create
```

```
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         S-VID field, a sub-field of the S-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.2"
    ::= { dpoeSubmgt3FilterGrpEntry 11 }

dpoeSubmgt3FilterGrpSTagTCI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute represents the classifier value for the [802.1ad]
         S-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.9"
    ::= { dpoeSubmgt3FilterGrpEntry 12 }

dpoeSubmgt3FilterGrpITagMatch OBJECT-TYPE
    SYNTAX      BITS {
                        matchTPID(0),
                        matchSID(1),
                        matchUCA(2),
                        matchDEI(3),
                        matchPCP(4),
                        matchTCI(5)
                    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "When matchTPID is set to 1, the [802.1ah] I-Tag will be included in
         the match criteria for this classifier.  The I-Tag will be
identified
         via the I-TPID value specified in dpoeSubmgt3FilterGrpITagTPID.

         By default, the contents of the I-TCI portion of the I-Tag are not
         part of the match criteria.  I-TCI fields can be included in the
         match criteria for this classifier by setting the associated
         bits to 1.

         The entire I-TCI field is identified by matchTCI.  Setting
         this bit will include the contents of dpoeSubmgt3FilterGrpITagTCI
         in the match criteria of this classifier.

         The I-TCI sub-fields are identified by matchSID, matchUCU, matchDEI,
         and matchPCP.  Setting these bits will include the contents of
         dpoeSubmgt3FilterGrpITagSID, dpoeSubmgt3FilterGrpITagUCA,
         dpoeSubmgt3FilterGrpITagDEI or dpoeSubmgt3FilterGrpITagPCP in the
         match criteria of this classifier.

         The matchTCI bit and the bits for the sub-fields of the
         I-TCI are mutually exclusive.  If the matchTCI bit is set, the
         bits for the sub-fields (matchSID, matchUCA, matchDEI, matchPCP)
must
```

```
          be cleared.  If one or more of the sub-field bits are set, the
          matchTCI bit must be cleared."
    DEFVAL { {} }
    ::= { dpoeSubmgt3FilterGrpEntry 13 }

dpoeSubmgt3FilterGrpITagTPID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the
         [802.1ah] I-TPID field.
         The default value of this field is 0x88e7."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.1"
    DEFVAL { 35047 }           -- 0x88e7
    ::= { dpoeSubmgt3FilterGrpEntry 14 }

dpoeSubmgt3FilterGrpITagPCP OBJECT-TYPE
    SYNTAX      Unsigned32 (0..7)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         I-PCP field, a sub-field of the I-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.4"
    ::= { dpoeSubmgt3FilterGrpEntry 15 }

dpoeSubmgt3FilterGrpITagUCA OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         I-UCA field, a sub-field of the I-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.6"
    ::= { dpoeSubmgt3FilterGrpEntry 16 }

dpoeSubmgt3FilterGrpITagDEI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         I-DEI field, a sub-field of the I-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.5"
    ::= { dpoeSubmgt3FilterGrpEntry 17 }

dpoeSubmgt3FilterGrpITagSID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..16777215)
```

```
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         I-SID field, a sub-field of the I-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.2"
    ::= { dpoeSubmgt3FilterGrpEntry 18 }

dpoeSubmgt3FilterGrpITagTCI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..4294967295)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         I-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.3"
    ::= { dpoeSubmgt3FilterGrpEntry 19 }

dpoeSubmgt3FilterGrpBTagMatch OBJECT-TYPE
    SYNTAX      BITS {
                        matchTPID(0),
                        matchVID(1),
                        matchDEI(2),
                        matchPCP(3),
                        matchTCI(4),
                        matchDA(5),
                        matchSA(6)
                    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "When matchTPID is set to 1, the [802.1ah] B-Tag will be included in
         the match criteria for this classifier.  The B-Tag will be
identified
         via the B-TPID value specified in dpoeSubmgt3FilterGrpBTagTPID.

         By default, the contents of the B-TCI portion of the B-Tag are not
         part of the match criteria.  B-TCI fields can be included in the
         match criteria for this classifier by setting the associated
         bits to 1.

         The entire B-TCI field is identified by matchTCI.  Setting
         this bit will include the contents of dpoeSubmgt3FilterGrpBTagTCI
         in the match criteria of this classifier.

         The B-TCI sub-fields are identified by matchVID, matchDEI and
         matchPCP.  Setting these bits will include the contents of
         dpoeSubmgt3FilterGrpBTagVID, dpoeSubmgt3FilterGrpBTagDEI,
         or dpoeSubmgt3FilterGrpBTagPCP in the match criteria of this
         classifier.

         The matchTCI bit and the bits for the sub-fields of the
         B-TCI are mutually exclusive.  If the matchTCI bit is set, the
```

```
         bits for the sub-fields (matchVID, matchDEI, matchPCP) must be
         cleared.  If one or more of the sub-field bits are set, the matchTCI
         bit must be cleared.

         By default, the B-DA and B-SA portions of the B-Tag are not part of
         the match criteria.  These fields can be included in the
         match criteria for this classifier by setting the associated
         bits to 1.
         Setting the matchDA bit will include the contents of
         dpoeSubmgt3FilterGrpBTagBDA in the match criteria of this
classifier.
         Setting the matchSA bit will include the contents of
         dpoeSubmgt3FilterGrpBTagBSA in the match criteria of this
classifier."
    DEFVAL { {} }
    ::= { dpoeSubmgt3FilterGrpEntry 20 }


dpoeSubmgt3FilterGrpBTagTPID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the
         [802.1ah] B-TPID field.
         The default value of this field is 0x88a8."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.7"
    DEFVAL { 34984 }   -- 0x88a8
    ::= { dpoeSubmgt3FilterGrpEntry 21 }

dpoeSubmgt3FilterGrpBTagPCP OBJECT-TYPE
    SYNTAX      Unsigned32 (0..7)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         B-PCP field, a sub-field of the B-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.9"
    ::= { dpoeSubmgt3FilterGrpEntry 22 }

dpoeSubmgt3FilterGrpBTagDEI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         B-DEI field, a sub-field of the B-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.10"
    ::= { dpoeSubmgt3FilterGrpEntry 23 }

dpoeSubmgt3FilterGrpBTagVID OBJECT-TYPE
```

```
    SYNTAX      Unsigned32 (0..4095)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         B-VID field, a sub-field of the B-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.11"
    ::= { dpoeSubmgt3FilterGrpEntry 24 }

dpoeSubmgt3FilterGrpBTagTCI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         B-TCI field."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.8"
    ::= { dpoeSubmgt3FilterGrpEntry 25 }

dpoeSubmgt3FilterGrpBTagBDA OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The value of the field specifies the classifier value for the
         backbone MAC destination address."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.12"
    ::= { dpoeSubmgt3FilterGrpEntry 26 }

dpoeSubmgt3FilterGrpBTagBSA OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The value of the field specifies the classifier value for the
         backbone MAC source address."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.13"
    ::= { dpoeSubmgt3FilterGrpEntry 27 }

dpoeSubmgt3FilterGrpMplsMatch OBJECT-TYPE
    SYNTAX      BITS {
                        matchLabel(0),
                        matchTc(1)
                    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "By default, the top MPLS Label Stack Entry is not included
         in the match criteria of this classifier.
```

```
         Setting the matchLabel bit will include the contents of
         dpoeSubmgt3FilterGrpMplsLabel in the match criteria of this
classifier.
         Setting the matchTc bit will include the contents of
         dpoeSubmgt3FilterGrpMplsTc in the match criteria of this
classifier."
    DEFVAL { {} }
    ::= { dpoeSubmgt3FilterGrpEntry 28 }

dpoeSubmgt3FilterGrpMplsLabel OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1048575)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The value of this field specifies the classifier value to compare
         with the 20-bit Label portion of the top MPLS Label Stack Entry."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.17.2"
    ::= { dpoeSubmgt3FilterGrpEntry 29 }

dpoeSubmgt3FilterGrpMplsTc OBJECT-TYPE
    SYNTAX      Unsigned32 (0..7)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The value of this field specifies the classifier value to compare
         with the 3-bit Traffic Class field of the top MPLS Label Stack
Entry."
    REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.17.1"

    ::= { dpoeSubmgt3FilterGrpEntry 30 }



----------------------------------------------------------------------
--
-- Metro Ethernet Service Profile Service Class Table
--
-- This table contains one row for each MESP configured on the DPoEsystem.
-- These rows are created on the DPoE System, and then referenced by name
-- from the config file.
--
----------------------------------------------------------------------

dpoeMESPServiceClassTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpoeMESPServiceClassEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table contains the attributes for each Metro Ethernet Service
Profile defined as
             a service class on the DPoE System."
    ::= {  dpoeMEFConfig 6 }
```

```
dpoeMESPServiceClassEntry OBJECT-TYPE
    SYNTAX      DpoeMESPServiceClassEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "The table is indexed by the name given to the MESP Service
Class"
    INDEX { dpoeMESPServiceClassName  }
    ::= { dpoeMESPServiceClassTable 1 }

DpoeMESPServiceClassEntry ::= SEQUENCE
    {
      dpoeMESPServiceClassName            SnmpAdminString,
      dpoeMESPServiceClassBpCir           INTEGER,
      dpoeMESPServiceClassBpCbs           INTEGER,
      dpoeMESPServiceClassBpEir           INTEGER,
      dpoeMESPServiceClassBpEbs           INTEGER,
      dpoeMESPServiceClassBpCf            DpoeMESPDisableEnable,
      dpoeMESPServiceClassBpCm            DpoeMESPDisableEnable,
      dpoeMESPServiceClassBpCif           DpoeMESPFieldId,
      dpoeMESPServiceClassBpGreen         INTEGER,
      dpoeMESPServiceClassBpYellow        INTEGER,
      dpoeMESPServiceClassBpRed           INTEGER,
      dpoeMESPServiceClassBpCpCrStatus    DpoeMESPDisableEnable,
      dpoeMESPServiceClassBpCpCrField     DpoeMESPFieldId,
      dpoeMESPServiceClassBpCrGreen       INTEGER,
      dpoeMESPServiceClassBpCrYellow      INTEGER,
      dpoeMESPServiceClassBpCrRed         INTEGER
    }

dpoeMESPServiceClassName OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(1..15))
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "This key indicates the Service Class Name for the Metro Ethernet
Service Profile. This
            name is used as a reference in the config file. "
    ::= { dpoeMESPServiceClassEntry 1 }

dpoeMESPServiceClassBpCir OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbit/s"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Committed
Information Rate
             (CIR) associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 2 }

dpoeMESPServiceClassBpCbs  OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbytes"
```

```
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Committed Burst Size
(CBS)
             associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 3 }

dpoeMESPServiceClassBpEir  OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbit/s"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Excess Information
Rate
             (EIR) associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 4 }

dpoeMESPServiceClassBpEbs  OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbytes"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Excess Burst Size
(EBS)
             associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 5 }

dpoeMESPServiceClassBpCf  OBJECT-TYPE
    SYNTAX      DpoeMESPDisableEnable
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Coupling Flag (CF)
associated
             with the given MESP. Two values are supported i.e., 0 when the
coupling flag
             is disabled and 1 when the coupling flag is enabled.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { disabled }
    ::= { dpoeMESPServiceClassEntry 6 }

dpoeMESPServiceClassBpCm  OBJECT-TYPE
    SYNTAX      DpoeMESPDisableEnable
    MAX-ACCESS  read-create
```

```
    STATUS      current
    DESCRIPTION
            "The field is used to indicate the Color Mode (CM) for processing
incoming
             frames associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { disabled }
    ::= { dpoeMESPServiceClassEntry 7 }

dpoeMESPServiceClassBpCif  OBJECT-TYPE
    SYNTAX      DpoeMESPFieldId
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This field is used to indicate which field within the incoming
frames
             is used to retrieve color information.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 8 }

dpoeMESPServiceClassBpGreen  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the value of the field identified
dpoeMESPBpCif which
             is used to represent green frame color.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 9 }

dpoeMESPServiceClassBpYellow  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the value of the field identified
dpoeMESPBpCif which
             is used to represent yellow frame color.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 10 }

dpoeMESPServiceClassBpRed  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the value of the field identified
dpoeMESPBpCif which
             is used to represent red frame color.
```

```
              The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 11 }

dpoeMESPServiceClassBpCpCrStatus  OBJECT-TYPE
    SYNTAX      DpoeMESPDisableEnable
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute is used to indicate the Color Marking (CR)
operation associated
             with the given MESP.

              The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 12 }

dpoeMESPServiceClassBpCpCrField  OBJECT-TYPE
    SYNTAX      DpoeMESPFieldId
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute indicates which of the fields within the incoming
frames is used
             to save color information to.

              The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 13 }

dpoeMESPServiceClassBpCrGreen  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
             dpoeMESPBpCpCrField to represent green frame color.

              The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 14 }

dpoeMESPServiceClassBpCrYellow  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
             dpoeMESPBpCpCrField to represent yellow frame color.

              The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 15 }
```

```
dpoeMESPServiceClassBpCrRed  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
             dpoeMESPBpCpCrField to represent red frame color.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpoeMESPServiceClassEntry 16 }

-------------------------------------------------------------------------
--
-- DPOE MEF Performance Management Statistics
--
-- The following tables provide access to the additional statistics required
to support
-- the performance management requirements defined in the DPoE MEF
specification.
--
-------------------------------------------------------------------------


-------------------------------------------------------------------------
--
-- This table provides the additional statistics required on the MI and MU
-- interfaces.
--
-------------------------------------------------------------------------

dpoeMEFIfStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpoeMEFIfStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table to provide the MEF statistics for the MI and MU
            interfaces on the D-ONU"
    ::= { dpoeMEFStats 1 }

dpoeMEFIfStatsEntry OBJECT-TYPE
    SYNTAX      DpoeMEFIfStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Statistics for the MI and MU interfaces"
    INDEX {ifIndex}
    ::= { dpoeMEFIfStatsTable 1 }

DpoeMEFIfStatsEntry ::= SEQUENCE
    {
      dpoeMEFIfIngressL2CPFrameCount      Counter64,
      dpoeMEFIfIngressL2CPOctetCount      Counter64,
      dpoeMEFIfEgressL2CPFrameCount       Counter64,
      dpoeMEFIfEgressL2CPOctetCount       Counter64,
      dpoeMEFIfIngressL2CPDiscardedFrames Counter64,
```

```
      dpoeMEFIfIngressL2CPDiscardedOctets Counter64
    }

dpoeMEFIfIngressL2CPFrameCount  OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of upstream L2CP frames received on this
interface."
    ::= { dpoeMEFIfStatsEntry 1 }

dpoeMEFIfIngressL2CPOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from upstream L2CP frames received on
this interface."
    ::= { dpoeMEFIfStatsEntry 2 }

dpoeMEFIfEgressL2CPFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of downstream L2CP frames sent on this
interface."
    ::= { dpoeMEFIfStatsEntry 3 }

dpoeMEFIfEgressL2CPOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from downstream L2CP frames sent on
this interface."
    ::= { dpoeMEFIfStatsEntry 4 }

dpoeMEFIfIngressL2CPDiscardedFrames OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of L2CP frames discarded on this interface."
    ::= { dpoeMEFIfStatsEntry 5 }

dpoeMEFIfIngressL2CPDiscardedOctets OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from L2CP frames discarded on this
interface."
    ::= { dpoeMEFIfStatsEntry 6 }
```

```
-------------------------------------------------------------------------
--
-- The following 2 tables provide access to the MEF usage data defined in
-- in the DPoE MEF specification. This is a subset of the data defined in
-- MEF Technical Specification 7.1.
--
-- This data is provided for each service flow defined on a D-ONU, and for
-- each COS value within each service flow. As a result 2 tables are defined
-- to provide the appropriate indexes for accessing the data.
--
-- The 2 tables are:
--
--    dpoeMEFSvcFlowUsageTable
--    dpoeMEFSvcFlowCosUsageTable
--
-------------------------------------------------------------------------

dpoeMEFSvcFlowUsageTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpoeMEFSvcFlowUsageEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table to provide the MEF usage statistics for each service
            flow on the D-ONU."
    ::= { dpoeMEFStats 2 }

dpoeMEFSvcFlowUsageEntry OBJECT-TYPE
    SYNTAX      DpoeMEFSvcFlowUsageEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Statistics for the MEF Usage usage data on a service flow."
    INDEX {docsQosServiceFlowId }
    ::= { dpoeMEFSvcFlowUsageTable 1 }

DpoeMEFSvcFlowUsageEntry ::= SEQUENCE
    {
      dpoeMEFSvcFlowUsageGreenFrameCount        Counter64,
      dpoeMEFSvcFlowUsageYellowFrameCount       Counter64,
      dpoeMEFSvcFlowUsageRedFrameCount          Counter64,
      dpoeMEFSvcFlowUsageGreenOctetCount        Counter64,
      dpoeMEFSvcFlowUsageYellowOctetCount       Counter64,
      dpoeMEFSvcFlowUsageRedOctetCount          Counter64,
      dpoeMEFSvcFlowUsageL2CPFrameCount         Counter64,
      dpoeMEFSvcFlowUsageL2CPOctetCount         Counter64,
      dpoeMEFSvcFlowUsageL2CPDiscardedFrames    Counter64,
      dpoeMEFSvcFlowUsageL2CPDiscardedOctets    Counter64
    }

dpoeMEFSvcFlowUsageGreenFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color green."
    ::= { dpoeMEFSvcFlowUsageEntry 1 }
```

```
dpoeMEFSvcFlowUsageYellowFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color yellow."
    ::= { dpoeMEFSvcFlowUsageEntry 2 }


dpoeMEFSvcFlowUsageRedFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color red.
             For the downstream service flows this will always be 0"
    ::= { dpoeMEFSvcFlowUsageEntry 3 }


dpoeMEFSvcFlowUsageGreenOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
color green."
    ::= { dpoeMEFSvcFlowUsageEntry 4 }


dpoeMEFSvcFlowUsageYellowOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
yellow."
    ::= { dpoeMEFSvcFlowUsageEntry 5 }


dpoeMEFSvcFlowUsageRedOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
color red.
            For the downstream service flows this will always be 0"
    ::= { dpoeMEFSvcFlowUsageEntry 6 }

dpoeMEFSvcFlowUsageL2CPFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of  L2CP frames sent on this service flow."
    ::= { dpoeMEFSvcFlowUsageEntry 7 }
```

```
dpoeMEFSvcFlowUsageL2CPOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from  L2CP frames sent on this
service flow."
    ::= { dpoeMEFSvcFlowUsageEntry 8 }

dpoeMEFSvcFlowUsageL2CPDiscardedFrames OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of L2CP frames discarded on this service flow."
    ::= { dpoeMEFSvcFlowUsageEntry 9 }

dpoeMEFSvcFlowUsageL2CPDiscardedOctets OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of L2CP octets discarded  on this service
flow."
    ::= { dpoeMEFSvcFlowUsageEntry 10 }



dpoeMEFSvcFlowCosUsageTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpoeMEFSvcFlowCosUsageEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table to provide the MEF usage statistics for each service
            flow on the D-ONU."
    ::= { dpoeMEFStats 3 }

dpoeMEFSvcFlowCosUsageEntry OBJECT-TYPE
    SYNTAX      DpoeMEFSvcFlowCosUsageEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Statistics for the MEF Usage usage data on a service flow."
    INDEX {docsQosServiceFlowId, dpoeMEFSvcFlowCosValue }
    ::= { dpoeMEFSvcFlowCosUsageTable 1 }

DpoeMEFSvcFlowCosUsageEntry ::= SEQUENCE
    {
      dpoeMEFSvcFlowCosValue                        INTEGER,
      dpoeMEFSvcFlowCosUsageGreenFrameCount         Counter64,
      dpoeMEFSvcFlowCosUsageYellowFrameCount        Counter64,
      dpoeMEFSvcFlowCosUsageRedFrameCount           Counter64,
      dpoeMEFSvcFlowCosUsageGreenOctetCount         Counter64,
      dpoeMEFSvcFlowCosUsageYellowOctetCount        Counter64,
      dpoeMEFSvcFlowCosUsageRedOctetCount           Counter64
    }
```

```
dpoeMEFSvcFlowCosValue OBJECT-TYPE
    SYNTAX      INTEGER (0..7)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The Class of service value for this entry. The value is the
COS+1. The value
            will be in the range 1 to 8"
    ::= { dpoeMEFSvcFlowCosUsageEntry 1 }

dpoeMEFSvcFlowCosUsageGreenFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color green."
    ::= { dpoeMEFSvcFlowCosUsageEntry 2 }


dpoeMEFSvcFlowCosUsageYellowFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color yellow."
    ::= { dpoeMEFSvcFlowCosUsageEntry 3 }


dpoeMEFSvcFlowCosUsageRedFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color red.
            For downstream service flows this value will always be 0."
    ::= { dpoeMEFSvcFlowCosUsageEntry 4 }


dpoeMEFSvcFlowCosUsageGreenOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
color green."
    ::= { dpoeMEFSvcFlowCosUsageEntry 5 }


dpoeMEFSvcFlowCosUsageYellowOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
color yellow."
```

```
    ::= { dpoeMEFSvcFlowCosUsageEntry 6 }


dpoeMEFSvcFlowCosUsageRedOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
color red.
            For downstream service flows this value will always be 0."
    ::= { dpoeMEFSvcFlowCosUsageEntry 7 }


-------------------------------------------------------------------------
--
-- This section of the MIB provides the extensions to DOCSIS required
-- for multi-cast support in the DPoE system
--
-------------------------------------------------------------------------

-------------------------------------------------------------------------
--
-- DPoE extension of docsMcastAuthCmtsCmStatusTable.
--
-- Table that extends the docsMcastAuthCmtsCmStatusTable with
-- additional authorization criteria per profile.
--
-------------------------------------------------------------------------


dpoeMcastAuthCmtsCmStatusProfileTable OBJECT-TYPE
     SYNTAX      SEQUENCE OF DpoeMcastAuthCmtsCmStatusProfileEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This table is applicable to the DPoE System. It's an
         extension of the docsMcastAuthCmtsCmStatusCfgProfileNameList within
the
         docsMcastAuthCmtsCmStatusTable, providing additional matching
         criteria per profile as specified in the CM configuration file."
     ::= { dpoeMultiCast 1}

dpoeMcastAuthCmtsCmStatusProfileEntry OBJECT-TYPE
     SYNTAX      DpoeMcastAuthCmtsCmStatusProfileEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
         "The conceptual row of dpoeMcastAuthCmtsCmStatusProfileTable."
     INDEX {
             docsIf3CmtsCmRegStatusId,
             docsMcastAuthProfilesName
           }
     ::= { dpoeMcastAuthCmtsCmStatusProfileTable 1 }

DpoeMcastAuthCmtsCmStatusProfileEntry ::= SEQUENCE {
     dpoeMcastAuthCmtsCmStatusProfileCmInterfaceMask
```

```
                DocsL2vpnIfList
     }

dpoeMcastAuthCmtsCmStatusProfileCmInterfaceMask OBJECT-TYPE
     SYNTAX      DocsL2vpnIfList
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "This attribute identifies the D-ONU interfaces associated with this
         Multicast Authorization Profile.
         The D-ONU interfaces are identified via the CMIM, where a bit set to
1 specifies
         that join requests from the interface are allowed to be compared
with
         this set of profile rules.
         The CMIM value is received via the CM configuration file within TLV
43.10.
         If a CMIM is not specified, all interfaces are valid and the default
value
         will be reported."
     ::= { dpoeMcastAuthCmtsCmStatusProfileEntry 1 }


--------------------------------------------------------------------
--
-- DPoE extension of docsMcastAuthStaticSessRuleTable.
--
-- Table that extends the docsMcastAuthStaticSessRuleTable with
-- additional authorization criteria.
--
--------------------------------------------------------------------


dpoeMcastAuthStaticSessRuleTable OBJECT-TYPE
     SYNTAX      SEQUENCE OF DpoeMcastAuthStaticSessRuleEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This table is applicable to the DPoE System.  It's an
         extension of the docsMcastAuthStaticSessRuleTable, providing
         additional matching criteria to be applied during the authorization
         process.  When an entry is created in the
docsMcastAuthStaticSessRuleTable,
         the DPoE System will create a matching entry in this table.
Attributes
         should reflect the values received in the vCM config file.  If a
         value wasn't specified in the vCM config file, the default value
must
         be applied."
     ::= { dpoeMultiCast 2}

dpoeMcastAuthStaticSessRuleEntry OBJECT-TYPE
     SYNTAX      DpoeMcastAuthStaticSessRuleEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
         "The conceptual row of dpoeMcastAuthStaticSessRuleTable."
```

```
     INDEX {
             docsMcastAuthStaticSessRuleCfgListId,
             docsMcastAuthStaticSessRuleId
           }
     ::= { dpoeMcastAuthStaticSessRuleTable 1 }

DpoeMcastAuthStaticSessRuleEntry ::= SEQUENCE {
     dpoeMcastAuthStaticSessRuleCmInterfaceMask
                  DocsL2vpnIfList
     }

dpoeMcastAuthStaticSessRuleCmInterfaceMask OBJECT-TYPE
     SYNTAX      DocsL2vpnIfList
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "This attribute specifies the D-ONU interfaces on which join requests
         are authorized for this static session rule.
         The D-ONU interfaces are identified via the CMIM, where a bit set to
1 specifies
         that join requests from the interface are allowed to be compared
with
         this static session rule.
         The CMIM value is received via the CM configuration file within TLV
43.10.
         If a CMIM is not specified, all interfaces are valid and the default
value
         will be reported."
     ::= { dpoeMcastAuthStaticSessRuleEntry 1 }


--------------------------------------------------------------------
--
-- DPoE extension of docsMcastAuthCmtsCmStatusTable.
--
-- Table that extends the docsMcastAuthCmtsCmStatusTable with
-- additional authorization criteria per D-ONU interface.
--
--------------------------------------------------------------------

dpoeMcastAuthCmtsCmStatusIfaceTable OBJECT-TYPE
     SYNTAX      SEQUENCE OF DpoeMcastAuthCmtsCmStatusIfaceEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This table is applicable to the DPoE System.  It's an
         extension of the docsMcastAuthCmtsCmStatusTable, providing
additional
         matching criteria per D-ONU interface as specified in the CM
configuration file."
     ::= { dpoeMultiCast 3}

dpoeMcastAuthCmtsCmStatusIfaceEntry OBJECT-TYPE
     SYNTAX      DpoeMcastAuthCmtsCmStatusIfaceEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
```

```
          "The conceptual row of dpoeMcastAuthCmtsCmStatusIfaceTable."
     INDEX {
             docsIf3CmtsCmRegStatusId,
             dpoeMcastAuthCmtsCmStatusIfaceCmInterfaceBitPos
           }
     ::= { dpoeMcastAuthCmtsCmStatusIfaceTable 1 }

DpoeMcastAuthCmtsCmStatusIfaceEntry ::= SEQUENCE {
     dpoeMcastAuthCmtsCmStatusIfaceCmInterfaceBitPos   Unsigned32,
     dpoeMcastAuthCmtsCmStatusIfaceMaxNumSess          Unsigned32
     }


dpoeMcastAuthCmtsCmStatusIfaceCmInterfaceBitPos OBJECT-TYPE
     SYNTAX      Unsigned32
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "This attribute specifies a bit position within the CMIM, used as an
index
         to this table to identify a particular D-ONU interface.
         will be reported."
     ::= { dpoeMcastAuthCmtsCmStatusIfaceEntry 1 }

dpoeMcastAuthCmtsCmStatusIfaceMaxNumSess OBJECT-TYPE
     SYNTAX      Unsigned32
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "This attribute indicates the maximum number of multicast sessions
         to be authorized for the associated D-ONU interface.
         This value is provided via the CM configuration file as part
         of TLV 43.10.  If this value is missing, the
         docsMcastAuthCmtsCmStatusMaxNumSess attribute of the associated
         docsMcastAuthCmtsCmStatusEntry is used to determine
         the maximum number of multicast sessions that may be authorized for
         the entire D-ONU."
     ::= { dpoeMcastAuthCmtsCmStatusIfaceEntry 2 }

-----------------------------------------------------------------------
--
-- DPoE vCM Multicast Session Table
--
-- This table applies to the vCM instances.  Each row represents a
-- multicast session the D-ONU has been configured to forward.  Each
-- entry includes the CMIM and LLID associated with the session as well
-- as a packet count.
--
-----------------------------------------------------------------------

dpoeMcastCmSessTable OBJECT-TYPE
     SYNTAX      SEQUENCE OF DpoeMcastCmSessEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This table is applicable to the vCM representing the D-ONU.
```

```
         It contains an entry for each multicast session the D-ONU is
configured
         to forward."
     ::= { dpoeMultiCast 4}

dpoeMcastCmSessEntry OBJECT-TYPE
     SYNTAX      DpoeMcastCmSessEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "The conceptual row of dpoeMcastCmSessTable.
         The entry is indexed by the (S,G) pair."
     INDEX { dpoeMcastCmSessPrefixAddrType,
             dpoeMcastCmSessGrpPrefix,
             dpoeMcastCmSessSrcPrefix
           }
     ::= { dpoeMcastCmSessTable 1 }

dpoeMcastCmSessEntry ::= SEQUENCE {
     dpoeMcastCmSessPrefixAddrType     InetAddressType,
     dpoeMcastCmSessGrpPrefix          InetAddress,
     dpoeMcastCmSessSrcPrefix          InetAddress,
     dpoeMcastCmSessCmInterfaceMask    DocsL2vpnIfList,
     dpoeMcastCmSessMllid              Unsigned32,
     dpoeMcastCmSessEncrypted          TruthValue
     }

dpoeMcastCmSessPrefixAddrType OBJECT-TYPE
     SYNTAX      InetAddressType
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This attribute defines the address type for the GrpPrefix
        and SrcPrefix addresses."
     ::= { dpoeMcastCmSessEntry 1 }

dpoeMcastCmSessGrpPrefix OBJECT-TYPE
     SYNTAX      InetAddress
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This attribute defines the group G of a particular
         (S,G) IP multicast session."
     ::= { dpoeMcastCmSessEntry 2 }

dpoeMcastCmSessSrcPrefix OBJECT-TYPE
     SYNTAX      InetAddress
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This attribute identifies a specific Multicast Source
         Address.  A Source Address that is all zeros is defined
         as 'all source addresses  (*, G)'."
     REFERENCE
        "RFC 3569.
         RFC 3306."
     ::= { dpoeMcastCmSessEntry 3 }
```

```
dpoeMcastCmSessCmInterfaceMask OBJECT-TYPE
     SYNTAX      DocsL2vpnIfList
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "This attribute represents the bitmap of the interfaces
        communicated to the D-ONU."
     ::= { dpoeMcastCmSessEntry 4 }

dpoeMcastCmSessMllid OBJECT-TYPE
     SYNTAX  Unsigned32
     MAX-ACCESS  read-only
     STATUS  current
     DESCRIPTION
        "An object that identifies the Logical Link
         Identifier (LLID) associated with the Group Service Flow (GSF)
         containing this multicast session.  Note that a GSF
         may contain multiple multicast sessions.  As such, multiple
         entries in this table may report the same value, identifying
         the entries as belonging to the same GSF. "
     REFERENCE   "[802.3], 30.3.5.1.4."
     ::= { dpoeMcastCmSessEntry 5 }

dpoeMcastCmSessEncrypted OBJECT-TYPE
     SYNTAX      TruthValue
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "Set to 'true' if multicast session is encrypted."
     ::= { dpoeMcastCmSessEntry 6 }


-------------------------------------------------------------------
--
-- This section of the MIB provides the definition of objects to be
-- supported by the SNMP agent in the virtual cable modem in the
-- DPoE system. The objects in this section will not be supported by
-- the SNMP agent for the DPoE system itself.
--
-------------------------------------------------------------------

dpoeVcmDynCfgState OBJECT-TYPE
     SYNTAX INTEGER {
           notStarted(1),
           downloadInProgress(2),
           downloadFailed(3),
           validationInProgress(4),
           validationFailed(5),
           resourceValidationInProgress(6),
           resourceValidationFailed(7),
           updateInProgress(8),
           updateFailed(9),
           updateComplete(10)
           }
     MAX-ACCESS  read-only
     STATUS      current
```

```
     DESCRIPTION
        "This attribute provides the current state of the
         vCM / D-ONU Dynamic Config Update process"
     REFERENCE
        "DPoE 2.0 MAC and Upper Layer Protocols Interface
         Specification, Dynamic D-ONU Configuration Update Mechanism
         section."
     ::= { dpoeVcm 1 }

dpoeVcmDynCfgNow OBJECT-TYPE
      SYNTAX TruthValue
      MAX-ACCESS read-write
      STATUS current
      DESCRIPTION
            "Setting this object to true(1) will cause the vCM/D-ONU to
            initiate the dynamic D-ONU Configuration update process
            as described in section 9.5 of DPoE-SP-MULPIv2.0.

            Reading this object always returns false(2)."
      ::= { dpoeVcm 2 }

-----------------------------------------------------------------------
--
-- Conformance definitions
--

dpoeCompliances  OBJECT IDENTIFIER ::= { dpoeMIBConformance 1 }
dpoeGroups       OBJECT IDENTIFIER ::= { dpoeMIBConformance 2 }

dpoeBaseCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
            "Mandatory in all DPoE Systems and vCMs implementing DPoE V2.0."
    MODULE
    MANDATORY-GROUPS {dpoeBaseGroup}
    GROUP dpoeMefStatsGroup
    DESCRIPTION
            "The dpoeMefStatsGroup is required for DPoE Systems and VcMs that
support MEF statistics"
            ::= {dpoeCompliances 1}

dpoeSystemCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
            "Mandatory in all DPoE Systems implementing DPoE V2.0."
    MODULE
    MANDATORY-GROUPS{dpoeDpoeSystemsGroup}
    GROUP dpoeDpoeSystemsOptionalGroup
    DESCRIPTION
            "This group contains the optional attributes for DPoE Systems"
            ::= {dpoeCompliances 2}

dpoeVcmCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
            "Mandatory in all virtual cable modems implemented in the DPoE
            system."
```

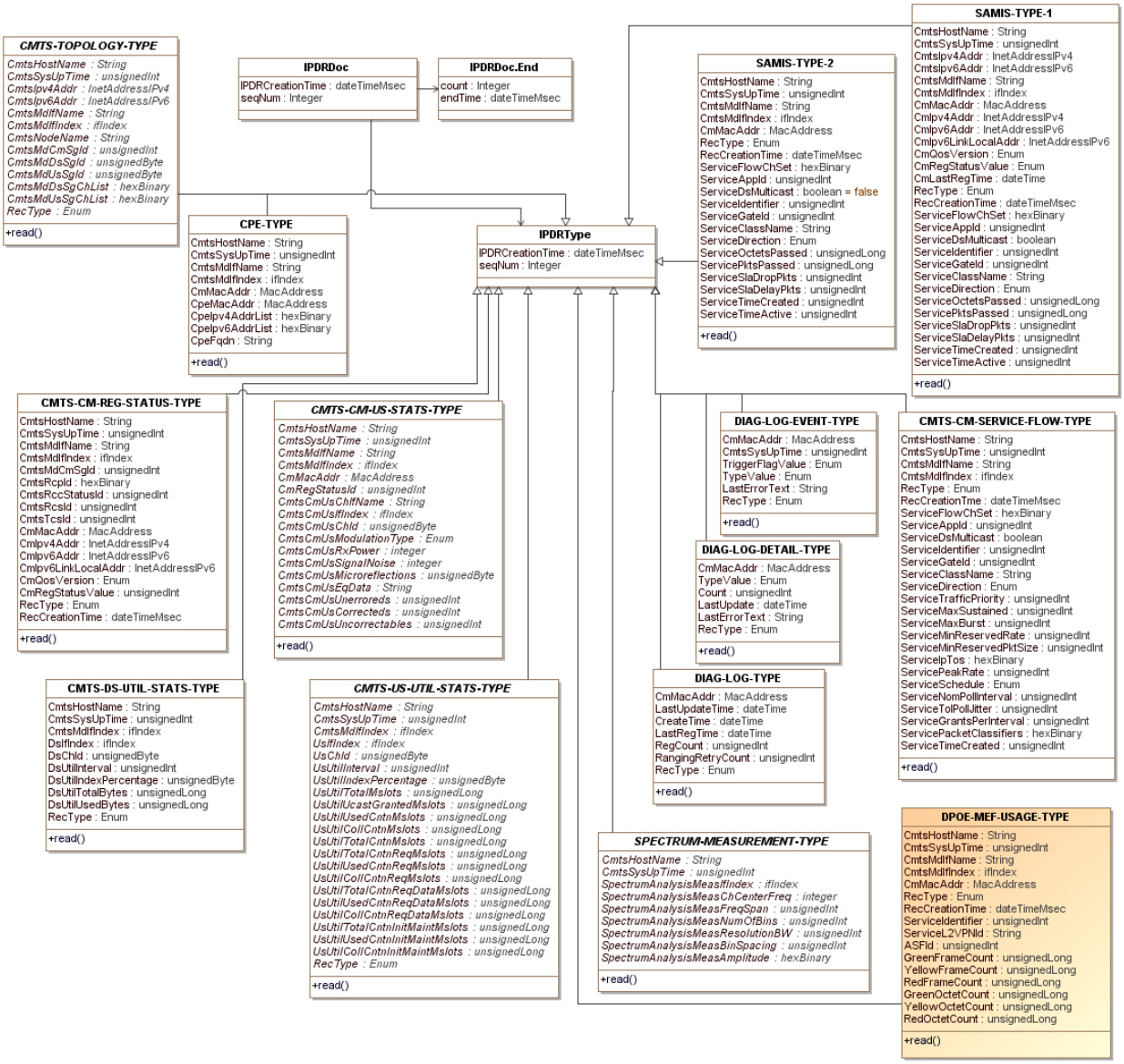
```
    MODULE
    MANDATORY-GROUPS {dpoeVcmOnlyGroup}
                ::= {dpoeCompliances 3}

dpoeBaseGroup OBJECT-GROUP
    OBJECTS {
      dpoeMESPBpCir,
      dpoeMESPBpCbs,
      dpoeMESPBpEir,
      dpoeMESPBpEbs,
      dpoeMESPBpCf,
      dpoeMESPBpCm,
      dpoeMESPBpCif,
      dpoeMESPBpGreen,
      dpoeMESPBpYellow,
      dpoeMESPBpRed,
      dpoeMESPBpCpCrStatus,
      dpoeMESPBpCpCrField,
      dpoeMESPBpCrGreen,
      dpoeMESPBpCrYellow,
      dpoeMESPBpCrRed,
      dpoePktClassBitMap,
      dpoePktClassCTagTPID,
      dpoePktClassCTagPCP,
      dpoePktClassCTagCFI,
      dpoePktClassCTagVID,
      dpoePktClassCTagTCI,
      dpoePktClassSTagTPID,
      dpoePktClassSTagPCP,
      dpoePktClassSTagDEI,
      dpoePktClassSTagVID,
      dpoePktClassSTagTCI,
      dpoePktClassITagTPID,
      dpoePktClassITagPCP,
      dpoePktClassITagUCA,
      dpoePktClassITagDEI,
      dpoePktClassITagSID,
      dpoePktClassITagTCI,
      dpoePktClassBTagTPID,
      dpoePktClassBTagPCP,
      dpoePktClassBTagDEI,
      dpoePktClassBTagVID,
      dpoePktClassBTagTCI,
      dpoePktClassBTagBDA,
      dpoePktClassBTagBSA,
      dpoeServiceFlowAsfId,
      dpoeServiceFlowUpTPIDTrans,
      dpoeServiceFlowDnTPIDTrans,
      dpoeServiceFlowUpSTPIDTrans,
      dpoeServiceFlowDnSTPIDTrans,
      dpoeServiceFlowUpBTPIDTrans,
      dpoeServiceFlowDnBTPIDTrans,
      dpoeServiceFlowUpITPIDTrans,
      dpoeServiceFlowDnITPIDTrans,
      dpoeAsfServiceFlowAsfId,
      dpoeAsfServiceFlowId
    }
```

```
    STATUS current
    DESCRIPTION
            "A collection of objects required for DPOE 2.0 classification."
    ::= { dpoeGroups 1 }

dpoeDpoeSystemsGroup OBJECT-GROUP
    OBJECTS {
      dpoeSubmgt3FilterGrpCTagMatch,
          dpoeSubmgt3FilterGrpCTagTPID,
          dpoeSubmgt3FilterGrpCTagPCP,
          dpoeSubmgt3FilterGrpCTagCFI,
          dpoeSubmgt3FilterGrpCTagVID,
          dpoeSubmgt3FilterGrpCTagTCI,
      dpoeSubmgt3FilterGrpSTagMatch,
          dpoeSubmgt3FilterGrpSTagTPID,
          dpoeSubmgt3FilterGrpSTagPCP,
          dpoeSubmgt3FilterGrpSTagDEI,
          dpoeSubmgt3FilterGrpSTagVID,
          dpoeSubmgt3FilterGrpSTagTCI,
      dpoeSubmgt3FilterGrpITagMatch,
          dpoeSubmgt3FilterGrpITagTPID,
          dpoeSubmgt3FilterGrpITagPCP,
          dpoeSubmgt3FilterGrpITagUCA,
          dpoeSubmgt3FilterGrpITagDEI,
          dpoeSubmgt3FilterGrpITagSID,
          dpoeSubmgt3FilterGrpITagTCI,
      dpoeSubmgt3FilterGrpBTagMatch,
          dpoeSubmgt3FilterGrpBTagTPID,
          dpoeSubmgt3FilterGrpBTagPCP,
          dpoeSubmgt3FilterGrpBTagDEI,
          dpoeSubmgt3FilterGrpBTagVID,
          dpoeSubmgt3FilterGrpBTagTCI,
          dpoeSubmgt3FilterGrpBTagBDA,
          dpoeSubmgt3FilterGrpBTagBSA,
      dpoeSubmgt3FilterGrpMplsMatch,
      dpoeSubmgt3FilterGrpMplsLabel,
      dpoeSubmgt3FilterGrpMplsTc,
      dpoeMEFSvcFlowUsageGreenFrameCount,
      dpoeMEFSvcFlowUsageYellowFrameCount,
      dpoeMEFSvcFlowUsageRedFrameCount,
      dpoeMEFSvcFlowUsageGreenOctetCount,
      dpoeMEFSvcFlowUsageYellowOctetCount,
      dpoeMEFSvcFlowUsageRedOctetCount,
      dpoeMEFSvcFlowUsageL2CPFrameCount,
      dpoeMEFSvcFlowUsageL2CPOctetCount,
      dpoeMEFSvcFlowUsageL2CPDiscardedFrames,
      dpoeMEFSvcFlowUsageL2CPDiscardedOctets,
      dpoeMEFSvcFlowCosValue,
      dpoeMEFSvcFlowCosUsageGreenFrameCount,
      dpoeMEFSvcFlowCosUsageYellowFrameCount,
      dpoeMEFSvcFlowCosUsageRedFrameCount,
      dpoeMEFSvcFlowCosUsageGreenOctetCount,
      dpoeMEFSvcFlowCosUsageYellowOctetCount,
      dpoeMEFSvcFlowCosUsageRedOctetCount,
      dpoeMcastAuthCmtsCmStatusProfileCmInterfaceMask,
      dpoeMcastAuthCmtsCmStatusIfaceCmInterfaceBitPos,
      dpoeMcastAuthCmtsCmStatusIfaceMaxNumSess,
```

```
      dpoeMESPServiceClassBpCir,
      dpoeMESPServiceClassBpCbs,
      dpoeMESPServiceClassBpEir,
      dpoeMESPServiceClassBpEbs,
      dpoeMESPServiceClassBpCf,
      dpoeMESPServiceClassBpCm,
      dpoeMESPServiceClassBpCif,
      dpoeMESPServiceClassBpGreen,
      dpoeMESPServiceClassBpYellow,
      dpoeMESPServiceClassBpRed,
      dpoeMESPServiceClassBpCpCrStatus,
      dpoeMESPServiceClassBpCpCrField,
      dpoeMESPServiceClassBpCrGreen,
      dpoeMESPServiceClassBpCrYellow,
      dpoeMESPServiceClassBpCrRed
    }
    STATUS current
    DESCRIPTION
            "A collection of objects only supported on the DPOE System."
    ::= { dpoeGroups 2 }

dpoeVcmOnlyGroup OBJECT-GROUP
    OBJECTS {
        dpoeMcastCmSessCmInterfaceMask,
        dpoeMcastCmSessMllid,
        dpoeMcastCmSessEncrypted,
        dpoeVcmDynCfgState,
        dpoeVcmDynCfgNow
    }
    STATUS current
    DESCRIPTION
            "A collection of objects only supported on the virtual cable
modem"
    ::= { dpoeGroups 3 }

dpoeMefStatsGroup OBJECT-GROUP
    OBJECTS {
            dpoeMEFIfIngressL2CPFrameCount,
            dpoeMEFIfIngressL2CPOctetCount,
            dpoeMEFIfEgressL2CPFrameCount,
            dpoeMEFIfEgressL2CPOctetCount,
            dpoeMEFIfIngressL2CPDiscardedFrames,
            dpoeMEFIfIngressL2CPDiscardedOctets
    }
    STATUS current
    DESCRIPTION
            "A collection of objects required on DPoE system and Vcm when MEF
stats are being supported"
    ::= { dpoeGroups 4 }

dpoeDpoeSystemsOptionalGroup OBJECT-GROUP
    OBJECTS {
            dpoeMcastAuthStaticSessRuleCmInterfaceMask
    }
    STATUS current
    DESCRIPTION
            "A collection of optional objects on DPoE systems"
```

```
    ::= { dpoeGroups 5 }

END
```

Appendix I DOCSIS 3.0 IPDR Service Definitions (Informative)



Appendix II Acknowledgments

On behalf of our industry, we would like to thank the following individuals for their contributions to the development of this specification, listed in alphabetical order of company affiliation.

Contributor	Company Affiliation
John Dickinson, Edwin Mallette	Bright House Networks
Paul Gray, Andrew Chagnon	Broadcom
Curtis Knittle, Brian Hedstrom, Jason Schnitzer, Glenn Russell	CableLabs
Chris Hoppe	Cisco
Mehmet Toy, Shamim Akhtar	Comcast
Victor Blake	Independent Consultant
Brian Basile, Graham Higgins	Motorola
Michael Peters, Christopher Griffith	Sumitomo
Robert Harris	Time Warner Cable
Peng Zhang	ZTE

Steve Burroughs - CableLabs

Appendix III Revision History

III.1 Engineering Change incorporated into DPoE-SP-OSSIv2.0-I02-130328

ECN	ECN Date	Summary	Author
OSSIv2.0-N-13.0067-1	02/21/2013	Reference to docsSecCmtsCertificateRevocationMethod should be docsSecCmtsCertificateCertRevocationMethod	Andrew Chagnon

III.2 Engineering Changes incorporated into DPoE-SP-OSSIv2.0-I03-130808

ECN	ECN Date	Summary	Author
OSSIv2.0-N-13.0073-1	3/21/2013	Return value for docsQosServiceFlowAttrAssignSuccess should be 'false'	Andrew Chagnon
OSSIv2.0-N-13.0075-1	5/9/2013	Change-docsDevServer	Dave Setzke
OSSIv2.0-N-13.0078-2	5/16/2013	OSSIv2.0 Omnibus Changes	Dave Setzke
OSSIv2.0-N-13.0087-1	6/20/2013	Clarify local log memory type(s)	Steve Burroughs
OSSIv2.0-N-13.0089-3	7/11/2013	Clarify Implementation of DOCSISv3.0 MIB Objects referred to in DPoEv2.0 OSSI Spec., add required MIB Object ifStackLastChange and MIB Object requirements for mgmdInverseRouterCacheTable and mgmdRouterSrcListTable.	Dave Setzke
OSSIv2.0-N-13.0092-1	7/11/2013	Change docsDevBase MIB Objects to agree with DOCSISv3.0 requirements	Dave Setzke
OSSIv2.0-N-13.0094-3	7/11/2013	Add Support for EAE Ctrl MIB	Stuart Hoggan

III.3 Engineering Change incorporated into DPoE-SP-OSSIv2.0-I04-131114

ECN	ECN Date	Summary	Author
OSSIv2.0-N-13.0109-1	10/17/2013	Align DPoE System OSSIv2.0 SNMPv3 requirements with DOCSISv3.0	Dave Setzke

III.4 Engineering Changes incorporated into DPoE-SP-OSSIv2.0-I05-140327

ECN	ECN Date	Summary	Author
OSSIv2.0-N-13.0111-1	1/17/2014	Clarify docsQosPktClassPkts MIB Object requirement	Dave Setzke
OSSIv2.0-N-13.0113-1	12/12/2013	Clarify requirements specified in Section 7.12 and 7.4.2 plus Section 9 edits	Dave Setzke

III.5 Engineering Changes incorporated into DPoE-SP-OSSIv2.0-I06-140807

ECN	ECN Date	Summary	Author
OSSIv2.0-N-14.0137-1	3/27/2014	Support for larger MTUs	Marek Hajduczenia
OSSIv2.0-N-14.0152-1	5/15/2014	docsDevFilterIpDefault and DPoE System behavior	Marek Hajduczenia
OSSIv2.0-N-14.0159-2	7/10/14	Interpretation of docsDevFilterIpIfIndex = 2 (CATV MAC), 3 (RF-Down) and 4 (RF-Up) values	Marek Hajduczenia
OSSIv2.0-N-14.0164-1	7/03/14	Removal of Dual Provisioning Mode	Jun Tan
OSSIv2.0-N-14.0174-1	7/03/14	Alignment and cleanup of 802.3 references	Marek Hajduczenia
OSSIv2.0-N-14.0189-1	7/10/14	DPoEv1 OSSI Edits to support 2G-EPON	Lane Johnson

III.6 Engineering Changes incorporated into DPoE-SP-OSSIv2.0-I07-150910

ECN	ECN Date	Summary	Author
OSSIv2.0-N-15.0211-1	5/21/2015	DPoE_EC_Request_OSSIv2.0_NOLL_042015	Kevin Noll
OSSIv2.0-N-15.0212-1	7/23/2015	TLV18 for MEF services	Marek Hajduczenia

III.7 Engineering Changes incorporated into DPoE-SP-OSSIv2.0-I08-151210

ECN	ECN Date	Summary	Author
OSSIv2.0-N-15.0213-1	10/1/2015	Add IEEE8023-DOT3-EPON-MIB Requirements	Steve Burroughs
OSSIv2.0-N-15.0214-1	10/1/2015	DPoE HC Counters Update	Steve Burroughs
OSSIv2.0-N-15.0217-2	10/1/2015	Update Power Level and FEC reporting	Steve Burroughs
OSSIv2.0-N-15.0219-1	11/5/2015	DPoE 2.0 IPDR Corrections and Updates	Steve Burroughs

III.8 Engineering Changes incorporated into DPoE-SP-OSSIv2.0-I09-160602

ECN	ECN Date	Summary	Author
OSSIv2.0-N-15.0231-1	12/31/2015	Remove DEMARC Specification References and Attributes	Steve Burroughs
OSSIv2.0-N-16.0240-1	3/31/2016	DPoE 2.0 OSSI - Retire SOAM Specification	Steve Burroughs

III.9 Engineering Change incorporated into DPoE-SP-OSSIv2.0-I10-170111

ECN	ECN Date	Summary	Author
OSSIv2.0-N-16.0246-1	10/20/2016	Update ONU SYSDESCR Reporting Contents	Steve Burroughs

III.10 Engineering Change incorporated into DPoE-SP-OSSIv2.0-I11-170510

ECN	ECN Date	Summary	Author
OSSIv2.0-N-17.0251-1	4/13/2017	Clarify optical power units in MIB objects	Janet Bean