

IEEE P802.3.2a™/D1.0

Draft Standard for Ethernet YANG Data Model Definition

Prepared by the

LAN/MAN

Standards

Committee

of

the

IEEE Computer Society

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Abstract: YANG models for IEEE Std 802.3 are defined in this standard. This standard also publishes these models in a machine-readable format.

Keywords: 802.3, 802.3.2, Ethernet, YANG

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Introduction

This introduction is not part of IEEE Std 802.3.2a-202x, IEEE Draft Standard for Ethernet YANG Data Model Definitions.

The YANG modules included in this standard provide YANG versions of attributes defined in IEEE Std 802.3™-2022, Clause 30, as well as derivative attributes defined in other management information bases (e.g., SNMP attributes included in IEEE Std 802.3.1, YANG versions of IETF Etherlike MIB attributes, etc.). The YANG modules defined in this standard accommodate IEEE Std 802.3-2022, excluding any currently published or future amendments.

IEEE Std 802.3 will continue to evolve. New Ethernet capabilities are anticipated to be added within the next few years as amendments to this standard.

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IEEE Standard for Ethernet YANG Data Model Definitions

1. Overview

This standard defines YANG modules for various Ethernet devices specified in IEEE Std 802.3. This includes half-duplex and full-duplex data terminal equipment (DTE) using either Carrier Sense Multiple Access/Collision Detection (CSMA/CD) or Multipoint Control Protocol (MPCP), and Power Sourcing Equipment (PSE).

1.1 Scope

This standard defines YANG data models for IEEE Std 802.3 Ethernet.

1.2 Purpose

The purpose of the standard is to define YANG modules for IEEE Std 802.3 and publish these modules in a machine-readable format.

1.3 Machine-readable YANG modules

The machine-readable files are available for download at the following URL: <https://github.com/YangModels/yang/tree/master/standard/ieee/published/802.3> as text files with a *.yang* extension, e.g., *ieee802-ether-net-interface.yang*. The use of specialized tools to view YANG modules may be useful to create tree, UML image, and HTML outputs from the YANG modules.

Like other languages, YANG (see IETF RFC 7950) has an accepted style for machine-readable files, which was followed during the development of this standard. This formatting may not be preserved when importing the machine-readable YANG modules into the PDF. In case of any formatting discrepancies, the published machine-readable files should be consulted.

1.4 Summary of YANG-based management framework

The structure of YANG-based management framework closely resembles the structure of the Internet-Standard Management Framework, described in detail in section 7 of IETF RFC 3410.

Managed objects defined using YANG modeling language are hosted on the managed device and accessed through NETCONF (see IETF RFC 7803) or RESTCONF (see IETF RFC 8040). This standard specifies YANG modules that are compliant to YANG 1.1 (see IETF RFC 7950).

1.5 Security considerations

The YANG modules defined in this standard are designed to be accessed via network management protocols, including NETCONF (see IETF RFC 7803) or RESTCONF (see IETF RFC 8040). The lowest NETCONF layer is the secure transport layer, and the mandatory-to-implement secure transport is Secure Shell (SSH) (see IETF RFC 6242) or TLS (see IETF RFC 8446). The lowest RESTCONF layer is HTTPS, and the mandatory-to-implement secure transport is TLS (see IETF RFC 8446).

The NETCONF access control model (see IETF RFC 8341) provides the means to restrict access for particular NETCONF or RESTCONF users to a pre-configured subset of all available NETCONF or RESTCONF protocol operations and content.

There are a number of data nodes defined in these YANG modules that are writable/creatable/deletable, i.e., have the config property set to true, which is the default setting. These data nodes may be considered sensitive or vulnerable in some network environments. Write operations (e.g., edit-config) to these data nodes without proper protection can have a negative effect on network operations.

Some of the readable data nodes in these YANG modules may be considered sensitive or vulnerable in some network environments. It is thus important to control read access (e.g., via get, get-config, or notification) to these data nodes.

Some of the RPC operations in these YANG modules may be considered sensitive or vulnerable in some network environments. Therefore, it is important to control access to these operations.

1.6 YANG module syntax validation

All YANG modules included in this standard are YANG 1.1 (see IETF RFC 7950) compliant and pass automated checks using tools available at the time of publication.

The following open source and/or free versions of YANG validation tools may be used: Pyang (see <https://github.com/mbj4668/pyang>), ConfD (see <http://www.tail-f.com/confd-basic>), as well as other YANG model validation tools listed at <http://www.yangvalidator.com>.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEEE Std 802®-2014, IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture.^{f, g}

IEEE Std 802d™-2017, IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture Amendment 1: Allocation of Uniform Resource Name (URN) Values in IEEE 802 Standards.

IEEE Std 802.1Q™-2014, IEEE Standard for Local and metropolitan area networks—Bridges and Bridged Networks.

IEEE Std 802.3™-2018, IEEE Standard for Ethernet.

IEEE Std 802.3.1™-2013, IEEE Standard for Management Information Base (MIB) Definitions for Ethernet.

IETF RFC 2819, Remote Network Monitoring Management Information Base, S. Waldbusser, May 2000.^h

IETF RFC 3410, *Introduction and Applicability Statements for Internet Standard Management Framework*, J. Case, R. Mundy, D. Partain, B. Stewart, December 2002.

IETF RFC 3621, *Power Ethernet MIB*, A. Berger, December 2003

IETF RFC 3635, *Definitions of Managed Objects for the Ethernet-like Interface Types*, J. Flick, September 2003.

IETF RFC 6242, *Using the NETCONF Protocol over Secure Shell (SSH)*, Wasserman M, June 2011.

IETF RFC 6991, *Common YANG Data Types*, Schoenwaelder J., July 2013.

IETF RFC 7803, *Changing the Registration Policy for the NETCONF Capability URNs Registry*, B. Leiba, February 2016.

IETF RFC 7950, *The YANG 1.1 Data Modeling Language*, Bjorklund M., August 2016.

IETF RFC 8040, *RESTCONF Protocol*, Bierman A., Bjorklund M., and Watsen K., January 2017.

IETF RFC 8342, *Network Management Datastore Architecture (NMDA)*, M. Bjorklund, J. Schoenwaelder, P. Shafer, K. Watsen, and R. Wilton, March 2018.

IETF RFC 8341, *Network Configuration Access Control Model*, A. Bierman and M. Bjorklund, March 2018.

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^hInternet Requests for Comments (RFCs) are available on the World Wide Web at the following ftp site: venera.isi.edu; login: anonymous; password: user's e-mail address; directory: in-inotes.

1 IETF RFC 8343, *A YANG Data Model for Interface Management*, Bjorklund, M., March 2018.

2
3 IETF RFC 8407, *Guidelines for Authors and Reviewers of YANG Data Model Documents*, Bierman A.,
4 October 2018.
5

6
7 IETF RFC 8446, *The Transport Layer Security (TLS) Protocol Version 1.3*, E. Rescorla, August 2018.
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3. Definitions

For the purposes of this document, the following terms and definitions apply. Some terms used in this document are defined in IEEE Std 802.3, and where alternative definitions occur in the IEEE Standards Dictionary, the IEEE Std 802.3 definition should be used. The *IEEE Standards Dictionary Online* should be consulted for terms not defined in this clause.¹

3.1 data model: A data model describes how data is represented and accessed.

3.2 YANG module: A YANG module defines a hierarchy of nodes that can be used for NETCONF-based (see IETF RFC 7803) and RESTCONF-based (see IETF RFC 8040) operations. With its definitions and the definitions it imports or includes from elsewhere, a module is self-contained and can be compiled.

¹*IEEE Standards Dictionary Online* is available at: <http://dictionary.ieee.org/>.

4. Abbreviations

This standard contains the following abbreviations:

CO	Central Office
CPE	Customer Premise Equipment
CSMA/CD	carrier sense multiple access with collision detection
DTE	data terminal equipment
EFM	Ethernet in the First Mile
ELO	Ethernet Link OAM
EPON	Ethernet passive optical networks
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
NETCONF	Network Configuration Protocol
OAM	Operations, Administration, and Maintenance
PoE	Power over Ethernet
RESTCONF	RESTful Configuration Protocol
YANG	Yet Another Next Generation

5. Ethernet YANG Module

5.1 YANG module structure

Two modules defined in this clause are focused on the configuration and monitoring of IEEE Std 802.3 Ethernet interfaces. The *ieee802-ethernet-interface* YANG module contains definitions of current attributes used widely in the industry in current products, while the *ieee802-ethernet-interface-half-duplex* YANG module contains definitions of half-duplex attributes. The *ieee802-ethernet-lldp* YANG module contains definitions for configuring LLDP for IEEE Std 802.3 compliant interfaces.

This standard does not have a normative requirement for data nodes of the base ietf-interfaces YANG module, but the following data nodes are supported: name, description, type, enabled, admin-status, oper-status, if-index, and phys-address.

5.2 Mapping of IEEE Std 802.3, Clause 30 managed objects

This subclause contains the mapping between YANG data nodes included in *ieee802-ethernet-interface* (see Table 5–1), *ieee802-ethernet-interface-half-duplex* (see Table 5–4), *ieee802-ethernet-mac-merge* (see Table 5–5), and *ieee802-ethernet-lldp* (see Table 5–6) YANG modules, managed objects, and attributes defined in IEEE Std 802.3, Clause 30.

Table 5–1—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-ethernet-interface* YANG data nodes

IEEE Std 802.3, Clause 30		Reference	Corresponding <i>ieee802-ethernet-interface</i> YANG data nodes		
Managed object(s)	Attribute(s)		Container(s)	Data node(s)	R/W
oAutoNegotiation	acAutoNegAdminControl	30.6.1.2.2	interfaces/interface/ethernet/	auto-negotiation/enable	R/W
	aAutoNegAutoConfig	30.6.1.1.4		negotiation-status	R
N/A	N/A			flow-control/pause/direction	R/W
oMACControlFunctionEntity	aPAUSEMACCtrlFramesReceived	30.3.4.3		flow-control/pause/statistics/in-frames-pause	R
	aPAUSEMACCtrlFramesTransmitted	30.3.4.2		flow-control/pause/statistics/out-frames-pause	R
N/A	dot3HCOutPFCFrames				
N/A	N/A			flow-control/force-flow-control	R/W
N/A	N/A			speed	R/W
oMACEntity	aDuplexStatus	30.3.1.1.32		duplex	R/W
	aMaxFrameLength	30.3.1.1.37		max-frame-length	R
	aSlowProtocolFrameLimit	30.3.1.1.38		frame-limit-slow-protocol	R
oEXTENSION	aEXTENSIONMACCtrlStatus	30.3.8.3		mac-control-extension-control	R
N/A	N/A			capabilities/auto-negotiation	R

Table 5–1—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-ethernet-interface* YANG data nodes (continued)

IEEE Std 802.3, Clause 30		Reference	Corresponding <i>ieee802-ethernet-interface</i> YANG data nodes		
Managed object(s)	Attribute(s)		Container(s)	Data node(s)	R/W
oMACEntity	aFramesReceivedOK	30.3.1.1.5	interfaces/interface/ethernet/statistics/frame	in-frames	R
	aMulticastFramesReceivedOK	30.3.1.1.21		in-multicast-frames	R
	aBroadcastFramesReceivedOK	30.3.1.1.22		in-broadcast-frames	R
	aFrameCheckSequenceErrors + aAlignmentErrors	30.4.3.1.6, 30.4.3.1.7		in-error-fcs-frames	R
oMACEntity	aFrameTooLongErrors	30.3.1.1.25		in-error-oversize-frames	R
	aFramesLostDueToIntMACRcvError	30.3.1.1.15		in-error-mac-internal-frames	R
	aFramesTransmittedOK	30.3.1.1.2		out-frames	R
	aMulticastFramesXmittedOK	30.3.1.1.18		out-multicast-frames	R
	aBroadcastFramesXmittedOK	30.3.1.1.19		out-broadcast-frames	R
	aFramesLostDueToIntMACXmitError	30.3.1.1.12		out-error-mac-internal-frames	R
oPHYEntity	aSymbolErrorDuringCarrier	30.3.2.1.5	interfaces/interface/ethernet/statistics/phy	in-error-symbol	R
	aReceiveLPITransitions	30.3.2.1.11	interfaces/interface/ethernet/statistics/phy/lpi	in-lpi-transitions	R
	aReceiveLPIMicroseconds	30.3.2.1.9		in-lpi-time	R
	aTransmitLPITransitions	30.3.2.1.10		out-lpi-transitions	R
	aTransmitLPIMicroseconds	30.3.2.1.8		out-lpi-time	R

Table 5–1—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-ethernet-interface* YANG data nodes (continued)

IEEE Std 802.3, Clause 30		Reference	Corresponding <i>ieee802-ethernet-interface</i> YANG data nodes		
Managed object(s)	Attribute(s)		Container(s)	Data node(s)	R/W
oMACControlEntity	aUnsupportedOpcodesReceived	30.3.3.5	interfaces/interface/ethernet/statistics/mac-control	in-frames-mac-control-unknown	R
oEXTENSION	aEXTENSIONMACCtrlFramesReceived	30.3.8.2		in-frames-mac-control-extension	R
	aEXTENSIONMACCtrlFramesTransmitted	30.3.8.1		out-frames-mac-control-extension	R

Table 5–2—Mapping between IETF RFC 2819 managed objects and *ieee802-ethernet-interface* YANG data nodes

IETF RFC 2819 Attribute(s)	Corresponding <i>ieee802-ethernet-interface</i> YANG data nodes		
	Container(s)	Data node(s)	R/W
no direct object ^a	interfaces/interface/ethernet/statistics/frame	in-total-frames	R
etherStatsOctets		in-total-octets	R
etherStatsUndersizePkts + etherStatsFragments		in-error-undersize-frames	R

^a Can be calculated as: aFramesReceivedOK + aFrameCheckSequenceErrors + aAlignmentErrors + aFrameTooLongErrors + aFramesLostDueToIntMACRcvError.

Table 5–3—Mapping between IETF RFC 3635 managed objects and *ieee802-ethernet-interface* YANG data nodes

ETHERLIKE MIB Attribute(s)	Corresponding <i>ieee802-ethernet-interface</i> YANG data nodes		
	Container(s)	Data node(s)	R/W
dot3HCInPFCFrames	interfaces/interface/ethernet/	flow-control/pfc{ethernet-pfc} / statistics/in-frames-pfc	R
dot3HCOutPFCFrames		flow-control/pfc{ethernet-pfc} / statistics/out-frames-pfc	R

Table 5–4—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-ethernet-interface-half-duplex* YANG data nodes

IEEE Std 802.3, Clause 30		Reference	Corresponding <i>ieee802-ethernet-interface-half-duplex</i> YANG data nodes		
Managed object(s)	Attribute(s)		Container(s)	Data node(s)	R/W
oMACEntity	aRateControlAbility	30.3.1.1.33	interfaces/interface/ethernet	dynamic-rate-control	R/W
			interfaces/interface/ethernet/capability	dynamic-rate-control-supported	R
oPHYEntity	aSQETestErrors	30.3.2.1.4	interfaces/interface/ethernet/statistics/frame/csmacd{csma-cd}	in-errors-sqe-test	R
oMACEntity	aSingleCollisionFrames	30.3.1.1.3		out-frames-collision-single	R
	aMultipleCollisionFrames	30.3.1.1.4		out-frames-collision-multiple	R
	aFramesWithDeferredXmissions	30.3.1.1.9		out-frames-deferred	R
	aFramesAbortedDueToXSColls	30.3.1.1.11		out-frames-collisions-excessive	R
	aLateCollisions	30.3.1.1.10		out-collisions-late	R
	aCarrierSenseErrors	30.3.1.1.13		out-errors-carrier-sense	R
	aCollisionFrames	30.3.1.1.30		collision-histogram/collision-count	R
	collision-histogram/collision-count-frames			R	

Table 5–5—Mapping between IEEE Std 802.3, 30.14 managed objects and *ieee802-ethernet-mac-merge* YANG data nodes

IEEE Std 802.3, 30.14		Reference	Corresponding <i>ieee802-ethernet-mac-merge</i> YANG data nodes		
Managed object(s)	Attribute(s)		Container(s)	Data node(s)	R/W
oMacMergeEntity	aMACMergeSupport	30.14.1.1	Interfaces/interface/ethernet/mac-merge/admin-status	merge-support	R
	aMACMergeStatusVerify	30.14.1.2		verify-status	R
	aMACMergeStatusTx	30.14.1.5		status-tx	R
	aMACMergeEnableTx	30.14.1.3	Interfaces/interface/ethernet/mac-merge/admin-control	merge-enable-tx	R/W
	aMACMergeVerifyDisableTx	30.14.1.4		verify-disable-tx	R/W
	aMACMergeVerifyTime	30.14.1.6		verify-time	R/W
	aMACMergeAddFragSize	30.14.1.7		frag-size	R/W
	aMACMergeFrameAssErrorCount	30.14.1.8	Interfaces/interface/ethernet/mac-merge/statistics	assembly-error-count	R
	aMACMergeFrameSmdErrorCount	30.14.1.9		smd-error-count	R
	aMACMergeFrameAssOkCount	30.14.1.10		assembly-ok-count	R
	aMACMergeFragCountRx	30.14.1.11		fragment-count-rx	R
	aMACMergeFragCountTx	30.14.1.12		fragment-count-tx	R
	aMACMergeHoldCount	30.14.1.13		hold-count	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-llDP</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
<u>oLldpXdot3Config</u>	<u>aLldpXdot3PortConfigTLVsTxEnable</u>	<u>30.12.1.1.1</u>	<u>lldp/port</u>	<u>tlvs-port-config-enable</u>	<u>R/W</u>
<u>oLldpXdot3LocSystemsGroup</u>	<u>aLldpXdot3LocPortAutoNegSupported</u>	<u>30.12.2.1.1</u>		<u>auto-negotiation-supported</u>	<u>R</u>
	<u>aLldpXdot3LocPortAutoNegEnabled</u>	<u>30.12.2.1.2</u>		<u>auto-negotiation-enabled</u>	<u>R</u>
	<u>aLldpXdot3LocPortAutoNegAdvertisedCap</u>	<u>30.12.2.1.3</u>		<u>auto-negotiation-cap</u>	<u>R</u>
	<u>aLldpXdot3LocPortOperMauType</u>	<u>30.12.2.1.4</u>		<u>operational-mau-type</u>	<u>R</u>
	<u>aLldpXdot3LocPowerPortClass</u>	<u>30.12.2.1.5</u>		<u>power-port-class</u>	<u>R</u>
	<u>aLldpXdot3LocPowerMDISupported</u>	<u>30.12.2.1.6</u>		<u>mdi-power-supported</u>	<u>R</u>
	<u>aLldpXdot3LocPowerMDIEnabled</u>	<u>30.12.2.1.7</u>		<u>mdi-power-enabled</u>	<u>R</u>
	<u>aLldpXdot3LocPowerPairControllable</u>	<u>30.12.2.1.8</u>		<u>power-pair-controllable</u>	<u>R</u>

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-lldp</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
	aLldpXdot3LocPowerPairs	30.12.2.1.9		power-pairs	R
	aLldpXdot3LocPowerClass	30.12.2.1.10		local-power-class	R
	aLldpXdot3LocLinkAggStatus	30.12.2.1.11		link-aggregation-status	R
	aLldpXdot3LocLinkAggPortId	30.12.2.1.12		aggregation-port-id	R
	aLldpXdot3LocMaxFrameSize	30.12.2.1.13		local-max-frame-size	R
	aLldpXdot3LocPowerType	30.12.2.1.14		power-type	R
	aLldpXdot3LocPowerSource	30.12.2.1.15		power-source	R
	aLldpXdot3LocPowerPriority	30.12.2.1.16		local-power-priority	R/W
	aLldpXdot3LocPDRequestedPowerValue	30.12.2.1.17		pd-requested-power-value	R
	aLldpXdot3LocPDRequestedPowerValueA	30.12.2.1.18		pd-requested-power-value-a	R
	aLldpXdot3LocPDRequestedPowerValueB	30.12.2.1.19		pd-requested-power-value-b	R
	aLldpXdot3LocPSEAllocatedPowerValue	30.12.2.1.20		pse-allocated-power-value	R
	aLldpXdot3LocPSEAllocatedPowerValueA	30.12.2.1.21		pse-allocated-power-value-a	R
	aLldpXdot3LocPSEAllocatedPowerValueB	30.12.2.1.22		pse-allocated-power-value-b	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-lldp</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
	aLldpXdot3LocPSEPoweringStatus	30.12.2.1.23		pse-powering-status	R
	aLldpXdot3LocPDPoweredStatus	30.12.2.1.24		pd-powered-status	R
	aLldpXdot3LocPowerPairsExt	30.12.2.1.25		power-pairs-ext	R
	aLldpXdot3LocPowerClassExtA	30.12.2.1.26		power-class-ext-A	R
	aLldpXdot3LocPowerClassExtB	30.12.2.1.27		power-class-ext-B	R
	aLldpXdot3LocPowerClassExt	30.12.2.1.28		power-class-ext	R
	aLldpXdot3LocPowerTypeExt	30.12.2.1.29		power-type-ext	R
	aLldpXdot3LocPDLoad	30.12.2.1.30		pd-load	R
	aLldpXdot3LocPD4PID	30.12.2.1.31		pd-4pid	R
	aLldpXdot3LocPSEMaxAvailPower	30.12.2.1.32		pse-max-avail-power	R
	aLldpXdot3LocPSEAutoclassSupport	30.12.2.1.33		pse-autoclass-support	R
	aLldpXdot3LocAutoclassCompleted	30.12.2.1.34		autoclass-completed	R
	aLldpXdot3LocAutoclassRequest	30.12.2.1.35		autoclass-request	R
	aLldpXdot3LocPowerDownRequest	30.12.2.1.36		power-down-request	R
	aLldpXdot3LocPowerDownTime	30.12.2.1.37		power-down-time	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-llDP</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
	aLldpXdot3LocMeasVoltageSupport	30.12.2.1.38		meas-voltage-support	R
	aLldpXdot3LocMeasCurrentSupport	30.12.2.1.39		meas-current-support	R
	aLldpXdot3LocMeasPowerSupport	30.12.2.1.40		meas-power-support	R
	aLldpXdot3LocMeasEnergySupport	30.12.2.1.41		meas-energy-support	R
	aLldpXdot3LocMeasurementSource	30.12.2.1.42		measurement-source	R
	aLldpXdot3LocMeasVoltageRequest	30.12.2.1.43		meas-voltage-request	R
	aLldpXdot3LocMeasCurrentRequest	30.12.2.1.44		meas-current-request	R
	aLldpXdot3LocMeasCurrentRequest	30.12.2.1.45		meas-power-request	R
	aLldpXdot3LocMeasEnergyRequest	30.12.2.1.46		meas-energy-request	R
	aLldpXdot3LocMeasVoltageValid	30.12.2.1.47		meas-voltage-valid	R
	aLldpXdot3LocMeasCurrentValid	30.12.2.1.48		meas-current-valid	R
	aLldpXdot3LocMeasPowerValid	30.12.2.1.49		meas-power-valid	R
	aLldpXdot3LocMeasEnergyValid	30.12.2.1.50		meas-energy-valid	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-ll</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
	aLldpXdot3LocMeasVoltageUncertainty	30.12.2.1.51		meas-voltage-uncertainty	R
	aLldpXdot3LocMeasCurrentUncertainty	30.12.2.1.52		meas-current-uncertainty	R
	aLldpXdot3LocMeasPowerUncertainty	30.12.2.1.53		meas-power-uncertainty	R
	aLldpXdot3LocMeasEnergyUncertainty	30.12.2.1.54		meas-energy-uncertainty	R
	aLldpXdot3LocVoltageMeasurement	30.12.2.1.55		voltage-measurement	R
	aLldpXdot3LocCurrentMeasurement	30.12.2.1.56		current-measurement	R
	aLldpXdot3LocPowerMeasurement	30.12.2.1.57		power-measurement	R
	aLldpXdot3LocEnergyMeasurement	30.12.2.1.58		energy-measurement	R
	aLldpXdot3LocPSEPowerPriceIndex	30.12.2.1.59		pse-power-price-index	R
	aLldpXdot3LocResponseTime	30.12.2.1.60		local-response	R
	aLldpXdot3LocReady	30.12.2.1.61		local-system-ready	R
	aLldpXdot3LocTxTwSys	30.12.2.1.62		tx-system-value	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-lldp</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
	aLldpXdot3LocTxTwSysEcho	30.12.2.1.63		tx-system-value-echo	R
	aLldpXdot3LocRxTwSys	30.12.2.1.64		rx-system-value	R
	aLldpXdot3LocRxTwSysEcho	30.12.2.1.65		rx-system-value-echo	R
	aLldpXdot3LocFbTwSys	30.12.2.1.66		fallback-system-value	R
	aLldpXdot3TxDllReady	30.12.2.1.67		tx-dll-ready	R
	aLldpXdot3RxDllReady	30.12.2.1.68		rx-dll-ready	R
	aLldpXdot3LocDllEnabled	30.12.2.1.69		dll-ready	R
	aLldpXdot3LocTxFw	30.12.2.1.70		tx-system-fw	R
	aLldpXdot3LocTxFwEcho	30.12.2.1.71		tx-system-fw-echo	R
	aLldpXdot3LocRxFw	30.12.2.1.72		rx-system-fw	R
	aLldpXdot3LocRxFwEcho	30.12.2.1.73		rx-system-fw-echo	R
	aLldpXdot3LocPreemptSupported	30.12.2.1.74		preemption-supported	R
	aLldpXdot3LocPreemptEnabled	30.12.2.1.75		preemption-enabled	R
	aLldpXdot3LocPreemptActive	30.12.2.1.76		preemption-active	R
	aLldpXdot3LocAddFragSize	30.12.2.1.77		additional-fragment-size	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-lldp</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
oLldpXdot3RemSystemsGroup	aLldpXdot3RemPortAutoNegSupported	30.12.3.1.1	lldp/port/remote-systems-data	auto-negotiation-supported	R
	aLldpXdot3RemPortAutoNegEnabled	30.12.3.1.2		auto-negotiation-enabled	R
	aLldpXdot3RemPortAutoNegAdvertisedCap	30.12.3.1.3		auto-negotiation-cap	R
	aLldpXdot3RemPortOperMauType	30.12.3.1.4		operational-mau-type	R
	aLldpXdot3RemPowerPortClass	30.12.3.1.5		power-port-class	R
	aLldpXdot3RemPowerMDISupported	30.12.3.1.6		mdi-power-supported	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-lldp</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
	aLldpXdot3RemPowerMDIEnabled	30.12.3.1.7		mdi-power-enabled	R
	aLldpXdot3RemPowerPairControllable	30.12.3.1.8		power-pair-controllable	R
	aLldpXdot3RemPowerPairs	30.12.3.1.9		power-pairs	R
	aLldpXdot3RemPowerClass	30.12.3.1.10		power-class	R
	aLldpXdot3RemLinkAggStatus	30.12.3.1.11		link-aggregation-status	R
	aLldpXdot3RemLinkAggPortId	30.12.3.1.12		aggregation-port-id	R
	aLldpXdot3RemMaxFrameSize	30.12.3.1.13		local-max-frame-size	R
	aLldpXdot3RemPowerType	30.12.3.1.14		power-type	R
	aLldpXdot3RemPowerSource	30.12.3.1.15		power-source	R
	aLldpXdot3RemPowerPriority	30.12.3.1.16		power-priority	RW
	aLldpXdot3RemPDRequestedPowerValue	30.12.3.1.17		pd-requested-power-value	R
	aLldpXdot3RemPDRequestedPowerValueA	30.12.3.1.18		pd-requested-power-value-a	R
	aLldpXdot3RemPDRequestedPowerValueB	30.12.3.1.19		pd-requested-power-value-b	R
	aLldpXdot3RemPSEAllocatedPowerValue	30.12.3.1.20		pse-allocated-power-value	R
	aLldpXdot3RemPSEAllocatedPowerValueA	30.12.3.1.21		pse-allocated-power-value-a	R
	aLldpXdot3RemPSEAllocatedPowerValueB	30.12.3.1.22		pse-allocated-power-value-b	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-ll</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
	aLldpXdot3RemPSEPoweringStatus	30.12.3.1.23		pse-powering-status	R
	aLldpXdot3RemPDPoweredStatus	30.12.3.1.24		pd-powered-status	R
	aLldpXdot3RemPowerPairsExt	30.12.3.1.25		power-pairs-ext	R
	aLldpXdot3RemPowerClassExtA	30.12.3.1.26		power-class-ext-A	R
	aLldpXdot3RemPowerClassExtB	30.12.3.1.27		power-class-ext-B	R
	aLldpXdot3RemPowerClassExt	30.12.3.1.28		power-class-ext	R
	aLldpXdot3RemPowerTypeExt	30.12.3.1.29		power-type-ext	R
	aLldpXdot3RemPDLoad	30.12.3.1.30		pd-load	R
	aLldpXdot3RemPD4PID	30.12.3.1.31		pd-4pid	R
	aLldpXdot3RemPSEMaxAvailPower	30.12.3.1.32		pse-max-avail-power	R
	aLldpXdot3RemPSEAutoclassSupport	30.12.3.1.33		pse-autoclass-support	R
	aLldpXdot3RemAutoclassCompleted	30.12.3.1.34		autoclass-completed	R
	aLldpXdot3RemAutoclassRequest	30.12.3.1.35		autoclass-request	R
	aLldpXdot3RemPowerDownRequest	30.12.3.1.36		power-down-request	R
	aLldpXdot3RemPowerDownTime	30.12.3.1.37		power-down-time	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-llDP</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
	aLldpXdot3RemMeasVoltageSupport	30.12.3.1.38		meas-voltage-support	R
	aLldpXdot3RemMeasCurrentSupport	30.12.3.1.39		meas-current-support	R
	aLldpXdot3RemMeasPowerSupport	30.12.3.1.40		meas-power-support	R
	aLldpXdot3RemMeasEnergySupport	30.12.3.1.41		meas-energy-support	R
	aLldpXdot3RemMeasurementSource	30.12.3.1.42		measurement-source	R
	aLldpXdot3RemMeasVoltageRequest	30.12.3.1.43		meas-voltage-request	R
	aLldpXdot3RemMeasCurrentRequest	30.12.3.1.44		meas-current-request	R
	aLldpXdot3RemMeasCurrentRequest	30.12.3.1.45		meas-power-request	R
	aLldpXdot3RemMeasEnergyRequest	30.12.3.1.46		meas-energy-request	R
	aLldpXdot3RemMeasVoltageValid	30.12.3.1.47		meas-voltage-valid	R
	aLldpXdot3RemMeasCurrentValid	30.12.3.1.48		meas-current-valid	R
	aLldpXdot3RemMeasPowerValid	30.12.3.1.49		meas-power-valid	R
	aLldpXdot3RemMeasEnergyValid	30.12.3.1.50		meas-energy-valid	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-llDP</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
	aLldpXdot3RemMeasVoltageUncertainty	30.12.3.1.51		meas-voltage-uncertainty	R
	aLldpXdot3RemMeasCurrentUncertainty	30.12.3.1.52		meas-current-uncertainty	R
	aLldpXdot3RemMeasPowerUncertainty	30.12.3.1.53		meas-power-uncertainty	R
	aLldpXdot3RemMeasEnergyUncertainty	30.12.3.1.54		meas-energy-uncertainty	R
	aLldpXdot3RemVoltageMeasurement	30.12.3.1.55		voltage-measurement	R
	aLldpXdot3RemCurrentMeasurement	30.12.3.1.56		current-measurement	R
	aLldpXdot3RemPowerMeasurement	30.12.3.1.57		power-measurement	R
	aLldpXdot3RemEnergyMeasurement	30.12.3.1.58		energy-measurement	R
	aLldpXdot3RemPSEPowerPriceIndex	30.12.3.1.59		pse-power-price-index	R
	aLldpXdot3RemTxTwSys	30.12.3.1.60		tx-system-value	R
	aLldpXdot3RemTxTwSysEcho	30.12.3.1.61		tx-system-value-echo	R
	aLldpXdot3RemRxTwSys	30.12.3.1.62		rx-system-value	R

Table 5–6—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-lldp* YANG data nodes

<u>IEEE Std 802.3, Clause 30</u>		<u>Reference</u>	<u>Corresponding <i>ieee802-ethernet-lldp</i> YANG data nodes</u>		
<u>Managed object(s)</u>	<u>Attribute(s)</u>		<u>Container(s)</u>	<u>Data node(s)</u>	<u>R/W</u>
	aLldpXdot3RemRxTwSysEcho	30.12.3.1.63		rx-system-value-echo	R
	aLldpXdot3RemFbTwSys	30.12.3.1.64		fallback-system-value	R
	aLldpXdot3RemTxFw	30.12.3.1.65		tx-system-fw	R
	aLldpXdot3RemTxFwEcho	30.12.3.1.66		tx-system-fw-echo	R
	aLldpXdot3RemRxFw	30.12.3.1.67		rx-system-fw	R
	aLldpXdot3RemRxFwEcho	30.12.3.1.68		rx-system-fw-echo	R
	aLldpXdot3RemPreemptSupported	30.12.3.1.69		preemption-supported	R
	aLldpXdot3RemPreemptEnabled	30.12.3.1.70		preemption-enabled	R
	aLldpXdot3RemPreemptActive	30.12.3.1.71		preemption-active	R
	aLldpXdot3RemAddFragSize	30.12.3.1.72		additonal-fragment-size	R

5.3 YANG module definition^j

The YANG module tree hierarchy uses terms defined in IETF RFC 8407.

5.3.1 Tree hierarchy

```

module: ieee802-ethernet-interface
  augment /if:interfaces/if:interface:
    +--rw ethernet
      +--rw auto-negotiation!
        | +--rw enable?                boolean
        | +--ro negotiation-status?    enumeration
      +--rw duplex?                    duplex-type
      +--rw speed?                     eth-if-speed-type
      +--rw flow-control
        | +--rw pause {ethernet-pause}?
        | | +--rw direction?           pause-fc-direction-type
        | | +--ro statistics
        | |   +--ro in-frames-pause?    yang:counter64
        | |   +--ro out-frames-pause?   yang:counter64
        | +--rw pfc {ethernet-pfc}?
        | | +--rw enable?               boolean
        | | +--ro statistics
        | |   +--ro in-frames-pfc?      yang:counter64
        | |   +--ro out-frames-pfc?     yang:counter64
        | +--rw force-flow-control?    boolean
      +--ro max-frame-length?          uint16
      +--ro mac-control-extension-control? boolean
      +--ro frame-limit-slow-protocol? uint64
      +--ro capabilities
        | +--ro auto-negotiation?      boolean
      +--ro statistics
        +--ro frame
          | +--ro in-total-frames?      yang:counter64
          | +--ro in-total-octets?      yang:counter64
          | +--ro in-frames?            yang:counter64
          | +--ro in-multicast-frames?  yang:counter64
          | +--ro in-broadcast-frames?  yang:counter64
          | +--ro in-error-fcs-frames?  yang:counter64
          | +--ro in-error-undersize-frames? yang:counter64
          | +--ro in-error-oversize-frames? yang:counter64
          | +--ro in-error-mac-internal-frames? yang:counter64
          | +--ro out-frames?            yang:counter64
          | +--ro out-multicast-frames?  yang:counter64
          | +--ro out-broadcast-frames?  yang:counter64
          | +--ro out-error-mac-internal-frames? yang:counter64
        +--ro phy
          | +--ro in-error-symbol?      yang:counter64
          | +--ro lpi
          | | +--ro in-lpi-transitions?  yang:counter64
          | | +--ro in-lpi-time?         decimal64

```

^jCopyright release for YANG modules: Users of this standard may freely reproduce the YANG module contained in this subclause so that it can be used for its intended purpose.

```
1          |      +--ro out-lpi-transitions?   yang:counter64
2          |      +--ro out-lpi-time?         decimal64
3          +--ro mac-control
4              +--ro in-frames-mac-control-unknown?   yang:counter64
5              +--ro in-frames-mac-control-extension? yang:counter64
6              +--ro out-frames-mac-control-extension? yang:counter64
7
8
9 module: ieee802-ethernet-interface-half-duplex
10   augment /if:interfaces/if:interface/ieee802-eth-if:ethernet:
11     +--rw dynamic-rate-control?   dynamic-rate-control-type {dynamic-
12 rate-control}?
13   augment /if:interfaces/if:interface/ieee802-eth-if:ethernet/ieee802-
14 eth-if:capabilities:
15     +--ro dynamic-rate-control-supported?   boolean {dynamic-rate-con-
16 trol}?
17   augment /if:interfaces/if:interface/ieee802-eth-if:ethernet/ieee802-
18 eth-if:statistics/ieee802-eth-if:frame:
19     +--ro csma-cd {csma-cd}?
20       +--ro in-errors-sqe-test?           yang:counter64
21       +--ro out-frames-collision-single?   yang:counter64
22       +--ro out-frames-collision-multiple? yang:counter64
23       +--ro out-frames-deferred?          yang:counter64
24       +--ro out-frames-collisions-excessive? yang:counter64
25       +--ro out-collisions-late?          yang:counter64
26       +--ro out-errors-carrier-sense?     yang:counter64
27       +--ro collision-histogram* [collision-count]
28         +--ro collision-count             yang:counter64
29         +--ro collision-count-frames?     yang:counter64
30
31 module ieee802-ethernet-mac-merge
32   augment /if:interfaces/if:interface/ieee802-eth-if:ethernet:
33     +--rw mac-merge {mac-merge}?
34     +--rw admin-control
35       | +--rw merge-enable-tx?   enumeration
36       | +--rw verify-disable-tx? enumeration
37       | +--rw verify-time?      uint16
38       | +--rw frag-size?        uint8
39     +--ro admin-status
40       | +--ro merge-support?     enumeration
41       | +--ro verify-status?     enumeration
42       | +--ro status-tx?         enumeration
43     +--ro statistics
44       | +--ro assembly-error-count? yang:counter64
45       | +--ro smd-error-count?      yang:counter64
46       | +--ro assembly-ok-count?    yang:counter64
47       | +--ro fragment-count-rx?    yang:counter64
48       | +--ro fragment-count-tx?    yang:counter64
49       | +--ro hold-count?           yang:counter64
50
51 module: ieee802-ethernet-lldp
52   augment /lldp:lldp/lldp:port:
53     +--rw tlvs-port-config-enable?   bits
54     +--ro auto-negotiation-supported? boolean
55     +--ro auto-negotiation-enabled?  boolean
```

1	+++ro auto-negotiation-cap?	binary
2	+++ro operational-mau-type?	int32
3	+++ro power-port-class?	port-class-type
4	+++ro mdi-power-supported?	boolean
5	+++ro mdi-power-enabled?	boolean
6	+++ro power-pair-controlable?	boolean
7	+++ro power-pairs?	pse-pinout-type
8	+++ro local-power-class?	pse-power-class-type
9	+++ro link-aggregation-status?	bits
10	+++ro aggregation-port-id?	int32
11	+++ro local-max-frame-size?	int32
12	+++ro power-type?	bits
13	+++ro power-source?	power-source-type
14	+++rw local-power-priority?	power-priority-type
15	+++ro pd-requested-power-value?	int32
16	+++ro pd-requested-power-value-a?	int32
17	+++ro pd-requested-power-value-b?	int32
18	+++ro pse-allocated-power-value?	int32
19	+++ro pse-allocated-power-value-a?	int32
20	+++ro pse-allocated-power-value-b?	int32
21	+++ro pse-powering-status?	powering-status-type
22	+++ro pd-powered-status?	powered-status-type
23	+++ro power-pairs-ext?	power-pairs-type
24	+++ro power-class-ext-A?	power-class-ext-AB-type
25	+++ro power-class-ext-B?	power-class-ext-AB-type
26	+++ro power-class-ext?	power-class-ext-type
27	+++ro power-type-ext?	power-type
28	+++ro pd-load?	boolean
29	+++ro pd-4pid?	boolean
30	+++ro pse-max-avail-power?	int32
31	+++ro pse-autoclass-support?	boolean
32	+++ro autoclass-completed?	boolean
33	+++ro autoclass-request?	boolean
34	+++rw power-down-request?	int32
35	+++rw power-down-time?	int32
36	+++ro meas-voltage-support?	boolean
37	+++ro meas-current-support?	boolean
38	+++ro meas-power-support?	boolean
39	+++ro meas-energy-support?	boolean
40	+++rw measurement-source?	bits
41	+++ro meas-voltage-request?	boolean
42	+++ro meas-current-request?	boolean
43	+++ro meas-power-request?	boolean
44	+++ro meas-energy-request?	boolean
45	+++ro meas-voltage-valid?	boolean
46	+++ro meas-current-valid?	boolean
47	+++ro meas-power-valid?	boolean
48	+++ro meas-energy-valid?	boolean
49	+++ro meas-voltage-uncertainty?	int32
50	+++ro meas-current-uncertainty?	int32
51	+++ro meas-power-uncertainty?	int32
52	+++ro meas-energy-uncertainty?	int32
53	+++ro voltage-measurement?	int32
54	+++ro current-measurement?	int32

```

1      +---ro power-measurement?                int32
2      +---ro energy-measurement?              int32
3      +---ro pse-power-price-index?           int32
4      +---ro local-response?                  int32
5      +---ro local-system-ready?              boolean
6      +---ro tx-system-value?                  int32
7      +---ro tx-system-value-echo?            int32
8      +---ro rx-system-value?                  int32
9      +---ro rx-system-value-echo?            int32
10     +---ro fallback-system-value?            int32
11     +---ro tx-dll-ready?                     boolean
12     +---ro rx-dll-ready?                     boolean
13     +---ro dll-enabled?                      boolean
14     +---ro tx-system-fw?                     boolean
15     +---ro tx-system-fw-echo?                boolean
16     +---ro rx-system-fw?                     boolean
17     +---ro rx-system-fw-echo?                boolean
18     +---ro preemption-supported?             boolean
19     +---ro preemption-enabled?               boolean
20     +---ro preemption-active?                boolean
21     +---ro additional-fragment-size?         int32
22     augment /lldp:lldp/lldp:port/lldp:remote-systems-data:
23     +---ro auto-negotiation-supported?       boolean
24     +---ro auto-negotiation-enabled?         boolean
25     +---ro auto-negotiation-cap?             binary
26     +---ro operational-mau-type?             int32
27     +---ro power-port-class?                 port-class-type
28     +---ro mdi-power-supported?              boolean
29     +---ro mdi-power-enabled?                boolean
30     +---ro power-pair-controlable?           boolean
31     +---ro power-pairs?                      pse-pinout-type
32     +---ro power-class?                      pse-power-class-type
33     +---ro link-aggregation-status?          bits
34     +---ro aggregation-port-id?              int32
35     +---ro local-max-frame-size?             int32
36     +---ro power-type?                       bits
37     +---ro power-source?                     power-source-type
38     +---ro power-priority?                   power-priority-type
39     +---ro pd-requested-power-value?         int32
40     +---ro pd-requested-power-value-a?       int32
41     +---ro pd-requested-power-value-b?       int32
42     +---ro pse-allocated-power-value?        int32
43     +---ro pse-allocated-power-value-a?      int32
44     +---ro pse-allocated-power-value-b?      int32
45     +---ro pse-powering-status?              powering-status-type
46     +---ro pd-powered-status?                powered-status-type
47     +---ro power-pairs-ext?                  power-pairs-type
48     +---ro power-class-ext-A?                power-class-ext-AB-type
49     +---ro power-class-ext-B?                power-class-ext-AB-type
50     +---ro power-class-ext?                  power-class-ext-type
51     +---ro power-type-ext?                   power-type
52     +---ro pd-load?                          boolean
53     +---ro pd-4pid?                          boolean
54     +---ro pse-max-avail-power?              int32

```



```

1      +---ro pse-autoclass-support?          boolean
2      +---ro autoclass-completed?           boolean
3      +---ro autoclass-request?             boolean
4      +---ro power-down-request?            int32
5      +---ro power-down-time?               int32
6      +---ro meas-voltage-support?          boolean
7      +---ro meas-current-support?          boolean
8      +---ro meas-power-support?            boolean
9      +---ro meas-energy-support?            boolean
10     +---ro meas-energy-support?            boolean
11     +---ro measurement-source?            bits
12     +---ro meas-voltage-request?          boolean
13     +---ro meas-current-request?          boolean
14     +---ro meas-power-request?            boolean
15     +---ro meas-energy-request?            boolean
16     +---ro meas-voltage-valid?            boolean
17     +---ro meas-current-valid?            boolean
18     +---ro meas-power-valid?              boolean
19     +---ro meas-energy-valid?              boolean
20     +---ro meas-voltage-uncertainty?      int32
21     +---ro meas-current-uncertainty?      int32
22     +---ro meas-power-uncertainty?        int32
23     +---ro meas-energy-uncertainty?        int32
24     +---ro voltage-measurement?           int32
25     +---ro current-measurement?           int32
26     +---ro power-measurement?             int32
27     +---ro energy-measurement?            int32
28     +---ro pse-power-price-index?         int32
29     +---ro tx-system-value?               int32
30     +---ro tx-system-value-echo?          int32
31     +---ro rx-system-value?               int32
32     +---ro rx-system-value-echo?          int32
33     +---ro fallback-system-value?         int32
34     +---ro tx-system-fw?                  boolean
35     +---ro tx-system-fw-echo?             boolean
36     +---ro rx-system-fw?                  boolean
37     +---ro rx-system-fw-echo?             boolean
38     +---ro preemption-supported?          boolean
39     +---ro preemption-enabled?            boolean
40     +---ro preemption-active?             boolean
41     +---ro additional-fragment-size?      int32
42
43 module: ieee802-dot1ab-lldp
44   +---rw lldp
45     +---rw message-fast-tx?                uint32
46     +---rw message-tx-hold-multiplier?     uint32
47     +---rw message-tx-interval?            uint32
48     +---rw reinit-delay?                   uint32
49     +---rw tx-credit-max?                  uint32
50     +---rw tx-fast-init?                   uint32
51     +---rw notification-interval?          uint32
52     +---ro remote-statistics
53       | +---ro last-change-time?          yang:timestamp
54       | +---ro remote-inserts?            yang:zero-based-counter32
55       | +---ro remote-deletes?            yang:zero-based-counter32

```

```

1      | +--ro remote-drops?          yang:zero-based-counter32
2      | +--ro remote-ageouts?      yang:zero-based-counter32
3      +--ro local-system-data
4      | +--ro chassis-id-subtype?   ieee:chassis-id-subtype-
5  type
6      | +--ro chassis-id?           ieee:chassis-id-type
7      | +--ro system-name?          string
8      | +--ro system-description?   string
9      | +--ro system-capabilities-supported? lldp-types:system-capabil-
10 ities-map
11      | +--ro system-capabilities-enabled? lldp-types:system-capabil-
12 ities-map
13      +--rw port* [name dest-mac-address]
14      +--rw name                    if:interface-
15 ref
16      +--rw dest-mac-address        ieee:mac-
17 address
18      +--rw admin-status?           enumeration
19      +--rw notification-enable?    boolean
20      +--rw tlvs-tx-enable?         bits
21      +--rw message-fast-tx?        uint32
22      +--rw message-tx-hold-multiplier? uint32
23      +--rw message-tx-interval?    uint32
24      +--rw reinit-delay?           uint32
25      +--rw tx-credit-max?          uint32
26      +--rw tx-fast-init?           uint32
27      +--rw notification-interval?  uint32
28      +--rw management-address-tx-port* [address-subtype man-address]
29      | +--rw address-subtype      identityref
30      | +--rw man-address          lldp-types:man-addr-type
31      | +--rw tx-enable?           boolean
32      | +--ro addr-len?            uint32
33      | +--ro if-subtype?          lldp-types:man-addr-if-subtype
34      | +--ro if-id?               uint32
35      +--ro port-id-subtype?        ieee:port-
36 id-subtype-type
37      +--ro port-id?                ieee:port-
38 id-type
39      +--ro port-desc?              string
40      +--ro tx-statistics
41      | +--ro total-frames?         yang:counter32
42      | +--ro total-length-errors?  yang:counter32
43      +--ro rx-statistics
44      | +--ro total-ageouts?        yang:zero-based-counter32
45      | +--ro total-discarded-frames? yang:counter32
46      | +--ro error-frames?         yang:counter32
47      | +--ro total-frames?         yang:counter32
48      | +--ro total-discarded-tlvs? yang:counter32
49      | +--ro total-unrecognized-tlvs? yang:counter32
50      +--ro remote-systems-data* [time-mark remote-index]
51      | +--ro time-mark
52 yang:timeticks
53      | +--ro remote-index          uint32
54      | +--ro remote-too-many-neighbors? boolean
55

```

```

1          | +--ro remote-changes?                boolean
2          | +--ro chassis-id-subtype?            ieee:chas-
3 sis-id-subtype-type
4          | +--ro chassis-id?                    ieee:chas-
5 sis-id-type
6          | +--ro port-id-subtype?              ieee:port-
7 id-subtype-type
8          | +--ro port-id?                      ieee:port-
9 id-type
10         | +--ro port-desc?                    string
11         | +--ro system-name?                  string
12         | +--ro system-description?           string
13         | +--ro system-capabilities-supported? lldp-
14 types:system-capabilities-map
15         | +--ro system-capabilities-enabled?   lldp-
16 types:system-capabilities-map
17         | +--ro management-address* [address-subtype address]
18         | | +--ro address-subtype             identityref
19         | | +--ro address                     lldp-types:man-addr-type
20         | | +--ro if-subtype?                 lldp-types:man-addr-if-subtype
21         | | +--ro if-id?                     uint32
22         | +--ro remote-unknown-tlv* [tlv-type]
23         | | +--ro tlv-type                   uint32
24         | | +--ro tlv-info?                  binary
25         | +--ro remote-org-defined-info* [info-identifier info-subtype
26 info-index]
27         | | +--ro info-identifier             uint32
28         | | +--ro info-subtype                uint32
29         | | +--ro info-index                 uint32
30         | | +--ro remote-info?                binary
31         | +--ro ieee802-eth-lldp:auto-negotiation-supported? boolean
32         | +--ro ieee802-eth-lldp:auto-negotiation-enabled?   boolean
33         | +--ro ieee802-eth-lldp:auto-negotiation-cap?        binary
34         | +--ro ieee802-eth-lldp:operational-mau-type?        int32
35         | +--ro ieee802-eth-lldp:power-port-class?           port-
36 class-type
37         | +--ro ieee802-eth-lldp:mdi-power-supported?         boolean
38         | +--ro ieee802-eth-lldp:mdi-power-enabled?          boolean
39         | +--ro ieee802-eth-lldp:power-pair-controlable?      boolean
40         | +--ro ieee802-eth-lldp:power-pairs?                 pse-pin-
41 out-type
42         | +--ro ieee802-eth-lldp:power-class?                 pse-power-
43 class-type
44         | +--ro ieee802-eth-lldp:link-aggregation-status?     bits
45         | +--ro ieee802-eth-lldp:aggregation-port-id?         int32
46         | +--ro ieee802-eth-lldp:local-max-frame-size?        int32
47         | +--ro ieee802-eth-lldp:power-type?                  bits
48         | +--ro ieee802-eth-lldp:power-source?                power-
49 source-type
50         | +--ro ieee802-eth-lldp:power-priority?              power-
51 priority-type
52         | +--ro ieee802-eth-lldp:pd-requested-power-value?    int32
53         | +--ro ieee802-eth-lldp:pse-allocated-power-value?   int32
54         | +--ro ieee802-eth-lldp:tx-system-value?             int32
55

```

```

1      | +--ro ieee802-eth-lldp:tx-system-value-echo?      int32
2      | +--ro ieee802-eth-lldp:rx-system-value?        int32
3      | +--ro ieee802-eth-lldp:rx-system-value-echo?    int32
4      | +--ro ieee802-eth-lldp:fallback-system-value?   int32
5      | +--ro ieee802-eth-lldp:tx-system-fw?           boolean
6      | +--ro ieee802-eth-lldp:tx-system-fw-echo?      boolean
7      | +--ro ieee802-eth-lldp:rx-system-fw?           boolean
8      | +--ro ieee802-eth-lldp:rx-system-fw-echo?      boolean
9      | +--ro ieee802-eth-lldp:preemption-supported?    boolean
10     | +--ro ieee802-eth-lldp:preemption-enabled?      boolean
11     | +--ro ieee802-eth-lldp:preemption-active?       boolean
12     | +--ro ieee802-eth-lldp:additional-fragment-size? int32
13     | +--rw ieee802-eth-lldp:tlvs-port-config-enable? bits
14     | +--ro ieee802-eth-lldp:auto-negotiation-supported? boolean
15     | +--ro ieee802-eth-lldp:auto-negotiation-enabled? boolean
16     | +--ro ieee802-eth-lldp:auto-negotiation-cap?    binary
17     | +--ro ieee802-eth-lldp:operational-mau-type?    int32
18     | +--ro ieee802-eth-lldp:power-port-class?        port-
19
20     class-type
21     | +--ro ieee802-eth-lldp:mdi-power-supported?      boolean
22     | +--ro ieee802-eth-lldp:mdi-power-enabled?        boolean
23     | +--ro ieee802-eth-lldp:power-pair-controlable?   boolean
24     | +--ro ieee802-eth-lldp:power-pairs?              pse-pinout-
25
26     type
27     | +--ro ieee802-eth-lldp:local-power-class?        pse-power-
28
29     class-type
30     | +--ro ieee802-eth-lldp:link-aggregation-status?  bits
31     | +--ro ieee802-eth-lldp:aggregation-port-id?      int32
32     | +--ro ieee802-eth-lldp:local-max-frame-size?     int32
33     | +--ro ieee802-eth-lldp:power-type?               bits
34     | +--ro ieee802-eth-lldp:power-source?             power-
35
36     source-type
37     | +--rw ieee802-eth-lldp:local-power-priority?     power-
38
39     priority-type
40     | +--ro ieee802-eth-lldp:pd-requested-power-value? int32
41     | +--ro ieee802-eth-lldp:pse-allocated-power-value? int32
42     | +--ro ieee802-eth-lldp:local-response-time?      int32
43     | +--ro ieee802-eth-lldp:local-system-ready?       boolean
44     | +--ro ieee802-eth-lldp:reduced-operation-power-value? int32
45     | +--ro ieee802-eth-lldp:tx-system-value?          int32
46     | +--ro ieee802-eth-lldp:tx-system-value-echo?     int32
47     | +--ro ieee802-eth-lldp:rx-system-value?          int32
48     | +--ro ieee802-eth-lldp:rx-system-value-echo?     int32
49     | +--ro ieee802-eth-lldp:fallback-system-value?    int32
50     | +--ro ieee802-eth-lldp:tx-dll-ready?             boolean
51     | +--ro ieee802-eth-lldp:rx-dll-ready?             boolean
52     | +--ro ieee802-eth-lldp:dll-enabled?              boolean
53     | +--ro ieee802-eth-lldp:tx-system-fw?             boolean
54     | +--ro ieee802-eth-lldp:tx-system-fw-echo?        boolean
55     | +--ro ieee802-eth-lldp:rx-system-fw?             boolean
56     | +--ro ieee802-eth-lldp:rx-system-fw-echo?        boolean
57     | +--ro ieee802-eth-lldp:preemption-supported?     boolean
58     | +--ro ieee802-eth-lldp:preemption-enabled?       boolean
59     | +--ro ieee802-eth-lldp:preemption-active?        boolean
60
61
62
63
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65

```

```

1      +--ro ieee802-eth-lldp:additional-fragment-size?      int32
2
3      notifications:
4      +---n remote-table-change
5      +--ro remote-insert?      -> /lldp/remote-statistics/remote-inserts
6      +--ro remote-delete?      -> /lldp/remote-statistics/remote-deletes
7      +--ro remote-drops?      -> /lldp/remote-statistics/remote-drops
8      +--ro remote-ageouts?      -> /lldp/remote-statistics/remote-ageouts
9
10
11
12  module: ietf-interfaces
13  +--rw interfaces
14  |   +--rw interface* [name]
15  |   |   +--rw name      string
16  |   |   +--rw description?      string
17  |   |   +--rw type      identityref
18  |   |   +--rw enabled?      boolean
19  |   |   +--rw link-up-down-trap-enable?      enumeration {if-mib}?
20  |   |   +--ro admin-status      enumeration {if-mib}?
21  |   |   +--ro oper-status      enumeration
22  |   |   +--ro last-change?      yang:date-and-time
23  |   |   +--ro if-index      int32 {if-mib}?
24  |   |   +--ro phys-address?      yang:phys-address
25  |   |   +--ro higher-layer-if*      interface-ref
26  |   |   +--ro lower-layer-if*      interface-ref
27  |   |   +--ro speed?      yang:gauge64
28  |   |   +--ro statistics
29  |   |   |   +--ro discontinuity-time      yang:date-and-time
30  |   |   |   +--ro in-octets?      yang:counter64
31  |   |   |   +--ro in-unicast-pkts?      yang:counter64
32  |   |   |   +--ro in-broadcast-pkts?      yang:counter64
33  |   |   |   +--ro in-multicast-pkts?      yang:counter64
34  |   |   |   +--ro in-discards?      yang:counter32
35  |   |   |   +--ro in-errors?      yang:counter32
36  |   |   |   +--ro in-unknown-protos?      yang:counter32
37  |   |   |   +--ro out-octets?      yang:counter64
38  |   |   |   +--ro out-unicast-pkts?      yang:counter64
39  |   |   |   +--ro out-broadcast-pkts?      yang:counter64
40  |   |   |   +--ro out-multicast-pkts?      yang:counter64
41  |   |   |   +--ro out-discards?      yang:counter32
42  |   |   |   +--ro out-errors?      yang:counter32
43  |   |   +--ro interfaces-state
44  |   |   |   x--ro interface* [name]
45  |   |   |   |   x--ro name      string
46  |   |   |   |   x--ro type      identityref
47  |   |   |   |   x--ro admin-status      enumeration {if-mib}?
48  |   |   |   |   x--ro oper-status      enumeration
49  |   |   |   |   x--ro last-change?      yang:date-and-time
50  |   |   |   |   x--ro if-index      int32 {if-mib}?
51  |   |   |   |   x--ro phys-address?      yang:phys-address
52  |   |   |   |   x--ro higher-layer-if*      interface-state-ref
53  |   |   |   |   x--ro lower-layer-if*      interface-state-ref
54  |   |   |   |   x--ro speed?      yang:gauge64
55  |   |   |   |   x--ro statistics
56  |   |   |   |   |   x--ro discontinuity-time      yang:date-and-time
57  |   |   +--ro interfaces-state
58  |   |   |   x--ro interface* [name]
59  |   |   |   |   x--ro name      string
60  |   |   |   |   x--ro type      identityref
61  |   |   |   |   x--ro admin-status      enumeration {if-mib}?
62  |   |   |   |   x--ro oper-status      enumeration
63  |   |   |   |   x--ro last-change?      yang:date-and-time
64  |   |   |   |   x--ro if-index      int32 {if-mib}?
65  |   |   |   |   x--ro phys-address?      yang:phys-address
66  |   |   |   |   x--ro higher-layer-if*      interface-state-ref
67  |   |   |   |   x--ro lower-layer-if*      interface-state-ref
68  |   |   |   |   x--ro speed?      yang:gauge64
69  |   |   |   |   x--ro statistics
70  |   |   |   |   |   x--ro discontinuity-time      yang:date-and-time

```

```

1          x--ro in-octets?                yang:counter64
2          x--ro in-unicast-pkts?          yang:counter64
3          x--ro in-broadcast-pkts?        yang:counter64
4          x--ro in-multicast-pkts?        yang:counter64
5          x--ro in-discards?              yang:counter32
6          x--ro in-errors?                yang:counter32
7          x--ro in-unknown-protos?        yang:counter32
8          x--ro out-octets?                yang:counter64
9          x--ro out-unicast-pkts?          yang:counter64
10         x--ro out-broadcast-pkts?        yang:counter64
11         x--ro out-multicast-pkts?        yang:counter64
12         x--ro out-discards?              yang:counter32
13         x--ro out-errors?                yang:counter32
14
15
16
17
18 module: ietf-routing
19     +--rw routing
20     |   +--rw router-id?                  yang:dotted-quad {router-id}?
21     |   +--ro interfaces
22     |   |   +--ro interface*   if:interface-ref
23     |   +--rw control-plane-protocols
24     |   |   +--rw control-plane-protocol* [type name]
25     |   |   |   +--rw type                identityref
26     |   |   |   +--rw name                string
27     |   |   |   +--rw description?         string
28     |   |   |   +--rw static-routes
29     |   +--rw ribs
30     |   |   +--rw rib* [name]
31     |   |   |   +--rw name                string
32     |   |   |   +--rw address-family       identityref
33     |   |   |   +--ro default-rib?         boolean {multiple-ribs}?
34     |   |   |   +--ro routes
35     |   |   |   |   +--ro route* []
36     |   |   |   |   |   +--ro route-preference?   route-preference
37     |   |   |   |   |   +--ro next-hop
38     |   |   |   |   |   |   +--ro (next-hop-options)
39     |   |   |   |   |   |   |   +--:(simple-next-hop)
40     |   |   |   |   |   |   |   |   +--ro outgoing-interface?   if:interface-ref
41     |   |   |   |   |   |   |   |   +--:(special-next-hop)
42     |   |   |   |   |   |   |   |   |   +--ro special-next-hop?   enumeration
43     |   |   |   |   |   |   |   |   |   +--:(next-hop-list)
44     |   |   |   |   |   |   |   |   |   |   +--ro next-hop-list
45     |   |   |   |   |   |   |   |   |   |   |   +--ro next-hop* []
46     |   |   |   |   |   |   |   |   |   |   |   +--ro outgoing-interface?   if:interface-
47     |   |   |   |   |   |   |   |   |   |   |   ref
48     |   |   |   |   |   |   |   |   |   |   |   +--ro source-protocol       identityref
49     |   |   |   |   |   |   |   |   |   |   |   +--ro active?                empty
50     |   |   |   |   |   |   |   |   |   |   |   +--ro last-updated?          yang:date-and-time
51     |   |   |   |   |   |   |   |   |   |   |   +---x active-route
52     |   |   |   |   |   |   |   |   |   |   |   |   +--ro output
53     |   |   |   |   |   |   |   |   |   |   |   |   |   +--ro route
54     |   |   |   |   |   |   |   |   |   |   |   |   |   |   +--ro next-hop
55     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   +--ro (next-hop-options)
56     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   +--:(simple-next-hop)
57     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   +--ro outgoing-interface?   if:interface-ref
58
59
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```

```

1      |      |      |      +---:(special-next-hop)
2      |      |      |      | +---ro special-next-hop?      enumeration
3      |      |      |      +---:(next-hop-list)
4      |      |      |      +---ro next-hop-list
5      |      |      |      +---ro next-hop* []
6      |      |      |      +---ro outgoing-interface?      if:inter-
7      |      |      |
8      face-ref
9
10     |      |      +---ro source-protocol      identityref
11     |      |      +---ro active?              empty
12     |      |      +---ro last-updated?        yang:date-and-time
13     |      +---rw description?      string
14     o--ro routing-state
15         +---ro router-id?              yang:dotted-quad
16         o--ro interfaces
17             | o--ro interface*      if:interface-state-ref
18         o--ro control-plane-protocols
19             | o--ro control-plane-protocol* [type name]
20             |     o--ro type      identityref
21             |     o--ro name      string
22         o--ro ribs
23             o--ro rib* [name]
24                 o--ro name      string
25                 +---ro address-family      identityref
26                 o--ro default-rib?      boolean {multiple-ribs}?
27                 o--ro routes
28                     | o--ro route* []
29                     |     o--ro route-preference?      route-preference
30                     |     o--ro next-hop
31                     |         | +---ro (next-hop-options)
32                     |         | +---:(simple-next-hop)
33                     |         | | +---ro outgoing-interface?      if:interface-ref
34                     |         | | +---:(special-next-hop)
35                     |         | | +---ro special-next-hop?      enumeration
36                     |         | | +---:(next-hop-list)
37                     |         | | +---ro next-hop-list
38                     |         | | +---ro next-hop* []
39                     |         | +---ro outgoing-interface?      if:interface-
40                     |         |
41                     |         +---ro source-protocol      identityref
42                     |         +---ro active?              empty
43                     |         +---ro last-updated?        yang:date-and-time
44                     o---x active-route
45                         +---ro output
46                         o--ro route
47                             o--ro next-hop
48                                 | +---ro (next-hop-options)
49                                 | +---:(simple-next-hop)
50                                 | | +---ro outgoing-interface?      if:interface-ref
51                                 | | +---:(special-next-hop)
52                                 | | +---ro special-next-hop?      enumeration
53                                 | | +---:(next-hop-list)
54                                 | | +---ro next-hop-list
55                                 | | +---ro next-hop* []

```

```
1          |          +--ro outgoing-interface?  if:inter-
2  face-ref
3
4          +--ro source-protocol  identityref
5          +--ro active?          empty
6          +--ro last-updated?    yang:date-and-time
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
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```


5.3.2 YANG module

In the following YANG module definitions, should any discrepancy between the text of the description for individual YANG nodes and the corresponding definition in 5.2 through 5.3 of this clause occur, the definitions and mappings in 5.3 shall take precedence.

An ASCII text version of the Ethernet YANG module can be found at the following URL:^k
<https://github.com/YangModels/yang/tree/master/standard/ieee/published/802.3>.

5.3.2.1 Ethernet interface module

```
module ieee802-ethernet-interface {  
  yang-version 1.1;  
  
  namespace  
    "urn:ieee:std:802.3:yang:ieee802-ethernet-interface";  
  
  prefix ieee802-eth-if;  
  
  revision 2019-06-21 {  
    description "Initial revision.";  
  }  
  
  import ietf-yang-types {  
    prefix yang;  
    reference "IETF RFC 6991";  
  }  
  
  import ietf-interfaces {  
    prefix if;  
    reference "IETF RFC 8343";  
  }  
  
  import iana-if-type {  
    prefix ianaift;  
    reference "http://www.iana.org/assignments/yang-parameters/  
      iana-if-type@2018-07-03.yang";  
  }  
  
  organization  
    "IEEE Std 802.3 Ethernet Working Group  
    Web URL: http://www.ieee802.org/3/";  
  
  contact  
    "Web URL: http://www.ieee802.org/3/";  
  
  description  
    "This module contains YANG definitions for configuring IEEE Std  
    802.3 Ethernet Interfaces.  
    In this YANG module, 'Ethernet interface' can be interpreted  
    as referring to 'IEEE Std 802.3 compliant Ethernet
```

^kCopyright release for YANG modules: Users of this standard may freely reproduce the YANG module contained in this subclause so that it can be used for its intended purpose.

```
1     interfaces'.";
2
3     reference "IEEE Std 802.3-2018, unless dated explicitly";
4
5     typedef eth-if-speed-type {
6         type decimal64 {
7             fraction-digits 3;
8         }
9         units "Gb/s";
10        description
11            "Used to represent the configured, negotiated, or actual speed
12             of an Ethernet interface in Gigabits per second (Gb/s),
13             accurate to 3 decimal places (i.e., accurate to 1 Mb/s).";
14    }
15
16    typedef duplex-type {
17        type enumeration {
18            enum full {
19                description
20                    "Full duplex.";
21            }
22            enum half {
23                description
24                    "Half duplex.";
25            }
26            enum unknown {
27                description
28                    "Link is currently disconnected or initializing.";
29            }
30        }
31        default full;
32        description
33            "Used to represent the configured, negotiated, or actual
34             duplex mode of an Ethernet interface.";
35        reference "IEEE Std 802.3, 30.3.1.1.32, aDuplexStatus";
36    }
37
38    typedef pause-fc-direction-type {
39        type enumeration {
40            enum "disabled" {
41                description
42                    "Flow-control disabled in both ingress and egress
43                     directions, i.e., PAUSE frames are not transmitted and
44                     PAUSE frames received in the ingress direction are
45                     discarded without processing.";
46            }
47            enum "ingress-only" {
48                description
49                    "PAUSE frame based flow control is enabled in the ingress
50                     direction only, i.e., PAUSE frames may be transmitted to
51                     reduce the ingress traffic flow, but PAUSE frames received
52                     in the ingress direction are discarded without reducing
53                     the egress traffic rate.";
54            }
55        }
56    }
57
58    }
```

```
1      enum "egress-only" {
2          description
3              "PAUSE frame based flow control is enabled in the egress
4              direction only, i.e., PAUSE frames are not transmitted,
5              but PAUSE frames received in the ingress direction are
6              processed to reduce the egress traffic rate.";
7          }
8      }
9      enum "bi-directional" {
10         description
11             "PAUSE frame based flow control is enabled in both ingress
12             and egress directions, i.e., PAUSE frames may be
13             transmitted to reduce the ingress traffic flow, and
14             PAUSE frames received on ingress are processed to reduce
15             the egress traffic rate.";
16         }
17     }
18     enum "undefined" {
19         description
20             "Link is currently disconnected or initializing.";
21     }
22 }
23
24 description
25     "Used to represent the configured, negotiated, or actual
26     PAUSE frame-based flow control setting.";
27
28 reference
29     "IEEE Std 802.3.1, dot3PauseAdminMode and dot3PauseOperMode";
30
31 }
32
33
34 feature ethernet-pfc {
35     description
36         "This device supports Ethernet priority flow-control.";
37 }
38
39
40 feature ethernet-pause {
41     description
42         "This device supports Ethernet PAUSE.";
43 }
44
45
46 augment "/if:interfaces/if:interface" {
47     when "derived-from-or-self(if:type, 'ianaift:ethernetCsmacd')" {
48         description
49             "Applies to all P2P Ethernet interfaces.";
50     }
51 }
52
53 description
54     "Augment interface model with Ethernet interface
55     specific configuration nodes.";
56
57 container ethernet {
58     description
59         "Contains all Ethernet interface related configuration.";
60
61     container auto-negotiation {
62         presence
63             "The presence of this container indicates that
```

```
1         auto-negotiation is supported on this Ethernet
2         interface.";
3     description
4         "Contains auto-negotiation transmission parameters
5
6         This container contains a data node that allows the
7         advertised duplex value in the negotiation to be
8         restricted.
9
10        If not specified then the default behavior for the duplex
11        data node is to negotiate all available values for the
12        particular type of Ethernet PHY associated with the
13        interface.
14
15        If auto-negotiation is enabled, and PAUSE frame based flow
16        control has not been explicitly configured, then the
17        default PAUSE frame based flow control capabilities that
18        are negotiated allow for bi-directional or egress-only
19        PAUSE frame based flow control.
20
21        If auto-negotiation is enabled, and PAUSE frame based flow
22        control has been explicitly configured, then the
23        configuration settings restrict the values that may be
24        negotiated. However, it should be noted that the protocol
25        does not allow only egress PAUSE frame based flow control
26        to be negotiated without also allowing bi-directional
27        PAUSE frame based flow control.";
28     reference
29         "IEEE Std 802.3, Clause 28 and Annexes 28A-D";
30
31     leaf enable {
32         type boolean;
33         default true;
34
35         description
36             "Controls whether auto-negotiation is enabled or
37             disabled.
38             For interface types that support auto-negotiation then
39             it defaults to being enabled.
40
41             For interface types that do not support auto-negotiation,
42             the related configuration data is ignored.";
43     }
44     leaf negotiation-status {
45         when "../enable = 'true'";
46         type enumeration {
47             enum in-progress {
48                 description
49                     "The auto-negotiation protocol is running and
50                     negotiation is currently in-progress.";
51             }
52             enum complete {
53                 description
54                     "The auto-negotiation protocol has completed
```

```
1         successfully."";
2     }
3     enum failed {
4         description
5             "The auto-negotiation protocol has failed.";
6     }
7     enum unknown {
8         description
9             "The auto-negotiation status is not currently known,
10            this could be because it is still negotiating or the
11            protocol cannot run (e.g., if no medium is present).";
12     }
13     enum no-negotiation {
14         description
15             "No auto-negotiation is executed.
16            The auto-negotiation function is either not supported
17            on this interface or has not been enabled.";
18     }
19 }
20 config false;
21 description
22     "The status of the auto-negotiation protocol.";
23 reference
24     "IEEE 802.3, 30.6.1.1.4, aAutoNegAutoConfig";
25 }
26 }
27
28 leaf duplex {
29     type duplex-type;
30     description
31         "Operational duplex mode of the Ethernet interface.";
32     reference
33         "IEEE Std 802.3, 30.3.1.1.32 aDuplexStatus";
34 }
35
36 leaf speed {
37     type eth-if-speed-type;
38     units "Gb/s";
39     description
40         "Operational speed (data rate) of the Ethernet interface.
41         The default value is implementation-dependent.";
42 }
43
44 container flow-control {
45     description
46         "Holds the different types of Ethernet PAUSE frame based
47         flow control that can be enabled.";
48     container pause {
49         if-feature "ethernet-pause";
50         description
51             "IEEE Std 802.3 PAUSE frame based PAUSE frame based flow
52             control.";
53         reference
54             "IEEE Std 802.3, 30.3.1.1.32 aFlowControl";
55     }
56 }
```

```
1         "IEEE Std 802.3, Annex 31B";
2     leaf direction {
3         type pause-fc-direction-type;
4         description
5             "Indicates which direction PAUSE frame based flow
6              control is enabled in, or whether it is disabled.
7              The default flow-control settings are vendor specific.
8              If auto-negotiation is enabled, then PAUSE based
9              flow-control is negotiated by default.
10             The default value is implementation-dependent.";
11     }
12
13     container statistics {
14         config false;
15         description
16             "Contains the number of PAUSE frames received or
17              transmitted.";
18         leaf in-frames-pause {
19             type yang:counter64;
20             units frames;
21             description
22                 "A count of PAUSE MAC Control frames transmitted on
23                  this Ethernet interface.
24
25                 Discontinuities in the values of counters in
26                 this container can occur at re-initialization of the
27                 management system, and at other times as indicated
28                 by the value of the 'discontinuity-time' leaf
29                 defined in the ietf-interfaces YANG module
30                 (IETF RFC 8343).";
31             reference
32                 "IEEE Std 802.3, 30.3.4.3 aPAUSEMACCtrlFramesReceived";
33         }
34         leaf out-frames-pause {
35             type yang:counter64;
36             units frames;
37             description
38                 "A count of PAUSE MAC Control frames transmitted on
39                  this Ethernet interface.
40
41                 Discontinuities in the values of counters in
42                 this container can occur at re-initialization of the
43                 management system, and at other times as indicated
44                 by the value of the 'discontinuity-time' leaf
45                 defined in the ietf-interfaces YANG module
46                 (IETF RFC 8343).";
47             reference
48                 "IEEE Std 802.3, 30.3.4.2
49                  aPAUSEMACCtrlFramesTransmitted";
50         }
51     }
52 }
53
54 container pfc {
55
```

```
1         if-feature "ethernet-pfc";
2     description
3         "IEEE Std 802.3 Priority-based flow control.";
4     reference
5         "IEEE Std 802.3, Annex 31D";
6
7
8     leaf enable {
9         type boolean;
10
11         description
12             "True indicates that IEEE Std 802.3 priority-based
13              flow control is enabled, false indicates that
14              IEEE Std 802.3 priority-based flow control is disabled.
15              For interfaces that have auto-negotiation,
16              the priority-based flow control is enabled by default.";
17     }
18
19
20
21     container statistics {
22         config false;
23         description
24             "This container collects all statistics for
25              Ethernet interfaces.";
26
27
28         leaf in-frames-pfc {
29             type yang:counter64;
30             units frames;
31             description
32                 "A count of PFC MAC Control frames received on this
33                  Ethernet interface.
34
35                  Discontinuities in the values of counters in
36                  this container can occur at re-initialization of the
37                  management system, and at other times as indicated
38                  by the value of the 'discontinuity-time' leaf
39                  defined in the ietf-interfaces YANG module
40                  (IETF RFC 8343).";
41             reference
42                 "IEEE Std 802.3.1, dot3HCInPFCFrames";
43         }
44
45         leaf out-frames-pfc {
46             type yang:counter64;
47             units frames;
48             description
49                 "A count of PFC MAC Control frames transmitted on
50                  this interface.
51
52                  Discontinuities in the values of counters in
53                  this container can occur at re-initialization of the
54                  management system, and at other times as indicated
55                  by the value of the 'discontinuity-time' leaf
56                  defined in the ietf-interfaces YANG module
57                  (IETF RFC 8343).";
58             reference
```

```
1         "IEEE Std 802.3.1, dot3HCInPFCFrames";
2     }
3 }
4 }
5 }
6
7 leaf force-flow-control {
8     type boolean;
9     default false;
10    description
11        "Explicitly forces the local PAUSE frame based flow control
12         settings regardless of what has been negotiated.
13
14         Since the auto-negotiation of flow-control settings
15         does not allow all sane combinations to be negotiated
16         (e.g., consider a device that is only capable of sending
17         PAUSE frames connected to a peer device that is only
18         capable of receiving and acting on PAUSE frames) and
19         failing to agree on the flow-control settings does not
20         cause the auto-negotiation to fail completely, then it is
21         sometimes useful to be able to explicitly enable
22         particular PAUSE frame based flow control settings on
23         the local device regardless of what is being advertised
24         or negotiated.";
25    reference
26        "IEEE Std 802.3, Table 28B-3";
27 }
28 }
29
30 leaf max-frame-length {
31     type uint16;
32     units octets;
33     config false;
34     description
35         "This indicates the MAC frame length (including FCS bytes)
36          at which frames are dropped for being too long.";
37    reference
38        "IEEE Std 802.3, 30.3.1.1.37 aMaxFrameLength";
39 }
40
41 leaf mac-control-extension-control {
42     type boolean;
43     config false;
44     description
45         "A value that identifies the current EXTENSION MAC Control
46          function, as specified in IEEE Std 802.3, Annex 31C.";
47    reference
48        "IEEE Std 802.3, 30.3.8.3 aEXTENSIONMACCtrlStatus
49         IEEE Std 802.3.1, dot3ExtensionMacCtrlStatus ";
50 }
51
52 leaf frame-limit-slow-protocol {
53     type uint64;
54     units f/s;
55     default 10;
```



```
1      config false;
2      description
3          "The maximum number of Slow Protocol frames of a given
4          subtype that can be transmitted in a one second interval.
5          The default value is 10.";
6      reference
7          "IEEE Std 802.3, 30.3.1.1.38 aSlowProtocolFrameLimit";
8  }
9
10
11  container capabilities {
12      config false;
13      description
14          "Container all Ethernet interface specific capabilities.";
15
16      leaf auto-negotiation {
17          type boolean;
18          description
19              "Indicates whether auto-negotiation may be configured on
20              this interface.";
21      }
22  }
23
24
25
26
27
28  container statistics {
29      config false;
30      description
31          "Contains statistics specific to Ethernet interfaces.
32
33          Discontinuities in the values of counters in the
34          container can occur at re-initialization of the management
35          system, and at other times as indicated by the value of
36          the 'discontinuity-time' leaf defined in the
37          ietf-interfaces YANG module (IETF RFC 8343).";
38
39
40
41
42  container frame {
43      description
44          "Contains frame statistics specific to Ethernet
45          interfaces.
46
47          All octet frame lengths include the 4 byte FCS.
48
49          Error counters are only reported once ... The count
50          represented by an instance of this object is incremented
51          when the frameCheckError status is returned by the MAC
52          service to the LLC (or other MAC user). Received frames
53          for which multiple error conditions pertain are,
54          according to the conventions of IEEE Std 802.3 Layer
55          Management, counted exclusively according to the error
56          status presented to the LLC.
57
58          A frame that is counted by an instance of this object is
59          also counted by the corresponding instance of 'in-errors'
60          leaf defined in the ietf-interfaces YANG module
61          (IETF RFC 8343).
62
63
64
65
```

```
1
2       Discontinuities in the values of counters in the
3       container can occur at re-initialization of the
4       management system, and at other times as indicated by
5       the value of the 'discontinuity-time' leaf defined in
6       the ietf-interfaces YANG module (IETF RFC 8343).";
7
8
9
10      leaf in-total-frames {
11          type yang:counter64;
12          units frames;
13          description
14              "The total number of frames (including bad frames)
15              received on the Ethernet interface.
16
17              This counter is calculated by summing the following
18              IEEE Std 802.3, Clause 30 counters:
19              aFramesReceivedOK +
20              aFrameCheckSequenceErrors +
21              aAlignmentErrors +
22              aFrameTooLongErrors +
23              aFramesLostDueToIntMACRcvError
24
25              Also see the 'description' statement associated with
26              the parent 'statistics' container for additional
27              common semantics related to this counter.";
28
29          reference
30              "IEEE Std 802.3, Clause 30 counters, as specified
31              in the description above.";
32      }
33
34      leaf in-total-octets {
35          type yang:counter64;
36          units octets;
37          description
38              "The total number of octets of data (including those in
39              bad frames) received on the Ethernet interface.
40
41              Includes the 4-octet FCS.
42
43              Also see the 'description' statement associated with
44              the parent 'statistics' container for additional
45              common semantics related to this counter.";
46
47          reference
48              "IETF RFC 2819, etherStatsOctets";
49      }
50
51      leaf in-frames {
52          type yang:counter64;
53          units frames;
54          description
55              "A count of frames (including unicast, multicast and
56              broadcast) that have been successfully received on the
57
58
59
60
61
62
63
64
65
```

Ethernet interface.

This count does not include frames received with
frame-too-long, FCS, length or alignment errors, or
frames lost due to internal MAC sublayer error.

Also see the 'description' statement associated with
the parent 'statistics' container for additional
common semantics related to this counter.";

reference

"IEEE Std 802.3, 30.3.1.1.5 aFramesReceivedOK";

}

leaf in-multicast-frames {

type yang:counter64;

units frames;

description

"A count of multicast frames that have been
successfully received on the Ethernet interface.

This counter represents a subset of the frames counted
by in-frames.

This count does not include frames received with
frame-too-long, FCS, length or alignment errors, or
frames lost due to internal MAC sublayer error.

Also see the 'description' statement associated with
the parent 'statistics' container for additional
common semantics related to this counter.";

reference

"IEEE Std 802.3, 30.3.1.1.21 aMulticastFramesReceivedOK";

}

leaf in-broadcast-frames {

type yang:counter64;

units frames;

description

"A count of broadcast frames that have been
successfully received on the Ethernet interface.

This counter represents a subset of the frames counted
by in-frames.

This count does not include frames received with
frame-too-long, FCS, length or alignment errors, or
frames lost due to internal MAC sublayer error.

Also see the 'description' statement associated with
the parent 'statistics' container for additional
common semantics related to this counter.";

```
1         reference
2         "IEEE Std 802.3, 30.3.1.1.22 aBroadcastFramesReceivedOK";
3     }
4
5     leaf in-error-fcs-frames {
6         type yang:counter64;
7         units frames;
8         description
9             "A count of receive frames that are of valid length,
10             but do not pass the FCS check, regardless of whether
11             or not the frames are an integral number of octets in
12             length.
13
14             This count effectively comprises
15             aFrameCheckSequenceErrors and aAlignmentErrors added
16             together.
17
18             Also see the 'description' statement associated with
19             the parent 'statistics' container for additional
20             common semantics related to this counter.";
21
22         reference
23         "IEEE Std 802.3, 30.3.1.1.6 aFrameCheckSequenceErrors;
24         IEEE Std 802.3, 30.3.1.1.7 aAlignmentErrors";
25     }
26
27     leaf in-error-undersize-frames {
28         type yang:counter64;
29         units frames;
30         description
31             "A count of frames received on a particular Ethernet
32             interface that are less than 64 bytes in length, and
33             are discarded.
34
35             This counter is incremented regardless of whether the
36             frame passes the FCS check.
37
38             Also see the 'description' statement associated with
39             the parent 'statistics' container for additional
40             common semantics related to this counter.";
41
42         reference
43         "IETF RFC 2819, etherStatsUndersizePkts and
44         etherStatsFragments";
45     }
46
47     leaf in-error-oversize-frames {
48         type yang:counter64;
49         units frames;
50         description
51             "A count of frames received on a particular Ethernet
52             interface that exceed the maximum permitted frame
53             size, that is specified in max-frame-length, and are
54             discarded.
```

```
1
2       This counter is incremented regardless of whether the
3       frame passes the FCS check.
4
5       Also see the 'description' statement associated with
6       the parent 'statistics' container for additional
7       common semantics related to this counter.";
8
9
10      reference "IEEE Std 802.3, 30.3.1.1.25 aFrameTooLongErrors";
11    }
12
13
14  leaf in-error-mac-internal-frames {
15    type yang:counter64;
16    units frames;
17    description
18      "A count of frames for which reception on a particular
19      Ethernet interface fails due to an internal MAC
20      sublayer receive error.
21
22      A frame is only counted by an instance of this object
23      if it is not counted by the corresponding instance of
24      either the in-error-fcs-frames, in-error-undersize-frames,
25      or in-error-oversize-frames. The precise meaning of the
26      count represented by an instance of this object is
27      implementation-specific.
28
29      In particular, an instance of this object may
30      represent a count of receive errors on a particular
31      Ethernet interface that are not otherwise counted.
32
33      Also see the 'description' statement associated with
34      the parent 'statistics' container for additional
35      common semantics related to this counter.";
36
37    reference
38      "IEEE Std 802.3, 30.3.1.1.15
39      aFramesLostDueToIntMACRcvError";
40  }
41
42
43  leaf out-frames {
44    type yang:counter64;
45    units frames;
46    description
47      "A count of frames (including unicast, multicast and
48      broadcast) that have been successfully transmitted on
49      the Ethernet interface.
50
51      Also see the 'description' statement associated with
52      the parent 'statistics' container for additional
53      common semantics related to this counter.";
54
55    reference
56      "IEEE Std 802.3, 30.3.1.1.2 aFramesTransmittedOK";
57  }
58
59
60
61
62
63
64
65
```

```
1
2     leaf out-multicast-frames {
3         type yang:counter64;
4         units frames;
5         description
6             "A count of multicast frames that have been
7             successfully transmitted on the Ethernet interface.
8
9             This counter represents a subset of the frames counted
10            by out-frames.
11
12            Also see the 'description' statement associated with
13            the parent 'statistics' container for additional
14            common semantics related to this counter.";
15
16            reference
17                "IEEE Std 802.3, 30.3.1.1.18 aMulticastFramesXmittedOK";
18        }
19
20     leaf out-broadcast-frames {
21         type yang:counter64;
22         units frames;
23         description
24             "A count of broadcast frames that have been
25             successfully transmitted on the Ethernet interface.
26
27            This counter represents a subset of the frames counted
28            by out-frames.
29
30            Also see the 'description' statement associated with
31            the parent 'statistics' container for additional
32            common semantics related to this counter.";
33
34            reference
35                "IEEE Std 802.3, 30.3.1.1.19 aBroadcastFramesXmittedOK";
36        }
37
38     leaf out-error-mac-internal-frames {
39         type yang:counter64;
40         units frames;
41         description
42             "A count of frames for which transmission on a
43             particular Ethernet interface fails due to an internal
44             MAC sublayer transmit error.
45
46            The precise meaning of the count represented by an
47            instance of this object is implementation-specific. In
48            particular, an instance of this object may represent a
49            count of transmission errors on a particular Ethernet
50            interface that are not otherwise counted.
51
52            Also see the 'description' statement associated with
53            the parent 'statistics' container for additional
54            common semantics related to this counter.";
```

```
1
2         reference
3         "IEEE Std 802.3, 30.3.1.1.12
4         aFramesLostDueToIntMACXmitError";
5     }
6 }
7
8
9
10 container phy {
11     description
12         "Ethernet statistics related to the PHY layer.
13
14         Discontinuities in the values of counters in the
15         container can occur at re-initialization of the
16         management system, and at other times as indicated by
17         the value of the 'discontinuity-time' leaf defined in
18         the ietf-interfaces YANG module (IETF RFC 8343).";
19
20     leaf in-error-symbol {
21         type yang:counter64;
22         units errors;
23         description
24             "A count of the number of symbol errors that have
25             occurred.
26
27             For the precise definition of when the symbol error
28             counter is incremented, please see the 'description'
29             text associated with aSymbolErrorDuringCarrier,
30             specified in IEEE Std 802.3, 30.3.2.1.5.
31
32             Also see the 'description' statement associated with
33             the parent 'phy-statistics' container for additional
34             common semantics related to this counter.";
35         reference
36             "IEEE Std 802.3, 30.3.2.1.5 aSymbolErrorDuringCarrier";
37     }
38
39     container lpi {
40         description
41             "Physical Ethernet statistics for the energy efficiency
42             related low power idle indications.";
43
44         leaf in-lpi-transitions {
45             type yang:counter64;
46             units transitions;
47             description
48                 "A count of occurrences of the transition from
49                 DEASSERT to ASSERT of the LPI_INDICATE
50                 parameter. The indication reflects the state of the
51                 PHY according to the requirements of the RS (see
52                 IEEE Std 802.3, 22.7, 35.4, and 46.4).
53
54                 Also see the 'description' statement associated with
55                 the parent 'phy-statistics' container for additional
56                 common semantics related to this counter.";
```

```
1
2         reference
3         "IEEE Std 802.3, 30.3.2.1.11 aReceiveLPITransitions";
4     }
5
6
7     leaf in-lpi-time {
8         type decimal64 {
9             fraction-digits 6;
10        }
11        units seconds;
12        description
13        "A count reflecting the total amount of time (in
14         seconds) that the LPI_REQUEST parameter has the
15         value ASSERT. The request is indicated to the PHY
16         according to the requirements of the RS (see IEEE Std
17         802.3, 22.7, 35.4, and 46.4).
18
19         Also see the 'description' statement associated with
20         the parent 'phy-statistics' container for additional
21         common semantics related to this counter.";
22
23        reference
24        "IEEE Std 802.3, 30.3.2.1.9 aReceiveLPIMicroseconds";
25    }
26
27    leaf out-lpi-transitions {
28        type yang:counter64;
29        units transitions;
30        description
31        "A count of occurrences of the transition from state
32         LPI_DEASSERTED to state LPI_ASSERTED in the LPI
33         transmit state diagram of the RS. The state
34         transition corresponds to the assertion of the
35         LPI_REQUEST parameter. The request is indicated to
36         the PHY according to the requirements of the RS (see
37         IEEE Std 802.3, 22.7, 35.4, 46.4.)
38
39         Also see the 'description' statement associated with
40         the parent 'phy-statistics' container for additional
41         common semantics related to this counter.";
42
43        reference
44        "IEEE Std 802.3, 30.3.2.1.10 aTransmitLPITransitions";
45    }
46
47    leaf out-lpi-time {
48        type decimal64 {
49            fraction-digits 6;
50        }
51        units seconds;
52        description
53        "A count reflecting the total amount of time (in
54         seconds) that the LPI_INDICATION parameter has the
55         value ASSERT. The request is indicated to the PHY
```



```
1         according to the requirements of the RS (see IEEE
2         802.3, 22.7, 35.4, and 46.4).
3
4         Also see the 'description' statement associated with
5         the parent 'phy-statistics' container for additional
6         common semantics related to this counter.";
7
8
9         reference
10        "IEEE Std 802.3, 30.3.2.1.8 aTransmitLPIMicroseconds";
11    }
12  }
13  }
14  }
15
16  container mac-control {
17    description
18      "A group of statistics specific to MAC Control operation
19      of selected Ethernet interfaces.
20
21      Discontinuities in the values of counters in the
22      container can occur at re-initialization of the
23      management system, and at other times as indicated by
24      the value of the 'discontinuity-time' leaf defined in
25      the ietf-interfaces YANG module (IETF RFC 8343).";
26
27    reference
28      "IEEE Std 802.3.1, dot3ExtensionTable";
29
30    leaf in-frames-mac-control-unknown {
31      type yang:counter64;
32      units frames;
33      description
34        "A count of MAC Control frames with an unsupported
35        opcode received on this Ethernet interface.
36
37        Frames counted against this counter are also counted
38        against in-discards defined in the ietf-interfaces
39        YANG module (IETF RFC 8343).
40
41        Also see the 'description' statement associated with
42        the parent 'mac-control-statistics' container for
43        additional semantics.";
44      reference
45        "IEEE Std 802.3, 30.3.3.5 aUnsupportedOpcodesReceived";
46    }
47
48    leaf in-frames-mac-control-extension {
49      type yang:counter64;
50      units frames;
51      description
52        "The count of Extension MAC Control frames received on
53        this Ethernet interface.
54
55        Also see the 'description' statement associated with
56        the parent 'mac-control-statistics' container for
```

```
1         additional semantics.";
2     reference
3         "IEEE Std 802.3, 30.3.8.2
4         aEXTENSIONMACCtrlFramesReceived";
5     }
6
7
8     leaf out-frames-mac-control-extension {
9         type yang:counter64;
10        units frames;
11        description
12            "The count of Extension MAC Control frames transmitted
13            on this Ethernet interface.
14
15            Also see the 'description' statement associated with
16            the parent 'mac-control-statistics' container for
17            additional semantics.";
18        reference
19            "IEEE Std 802.3, 30.3.8.1
20            aEXTENSIONMACCtrlFramesTransmitted";
21    }
22
23    }
24
25    }
26
27    }
28
29    }
30 }
```

5.3.2.2 Ethernet interface module (half-duplex)

```
32
33
34 module ieee802-ethernet-interface-half-duplex {
35
36     yang-version 1.1;
37
38     namespace
39         "urn:ieee:std:802.3:yang:ieee802-ethernet-interface-half-duplex";
40
41     prefix ieee802-eth-half-duplex;
42
43     revision 2019-06-21 {
44         description "Initial revision.";
45     }
46
47     import ietf-yang-types {
48         prefix yang;
49         reference "IETF RFC 6991";
50     }
51
52     import ietf-interfaces {
53         prefix if;
54         reference "IETF RFC 8343";
55     }
56
57     import iana-if-type {
58         prefix ianaift;
59         reference "http://www.iana.org/assignments/yang-parameters/";
60     }
61
62     import iana-if-type {
63         prefix ianaift;
64         reference "http://www.iana.org/assignments/yang-parameters/";
65     }
```

```
1      iana-if-type@2018-07-03.yang";
2  }
3
4  import ieee802-ethernet-interface {
5    prefix ieee802-eth-if;
6  }
7
8
9  organization
10     "IEEE Std 802.3 Ethernet Working Group
11     Web URL: http://www.ieee802.org/3/";
12
13
14  contact
15     "Web URL: http://www.ieee802.org/3/";
16
17  description
18     "This module contains YANG definitions for configuring Ethernet
19     interfaces that are deprecated, and are no longer
20     widely used in the industry. The definitions are maintained for
21     backwards compatibility purposes, but the general expectation is
22     that this module is not anticipated to be widely implemented.";
23  reference
24     "IEEE Std 802.3-2018, unless dated explicitly";
25
26  feature dynamic-rate-control {
27    description
28       "This feature indicates that the device supports Ethernet
29       interfaces lowering the average data rate of the MAC sublayer,
30       with frame granularity, by using Rate Control to dynamically
31       increase the inter-packet gap for some types of Ethernet
32       interface.
33       Only valid for Ethernet interfaces operating at speeds (data
34       rates)
35       above 1000 Mb/s.";
36    reference "IEEE Std 802.3, 30.3.1.1.33 aRateControlAbility";
37  }
38
39  feature csma-cd {
40    description
41       "This feature indicates that the device supports Ethernet
42       interfaces running at half-duplex using CSMA/CD.";
43  }
44
45  typedef dynamic-rate-control-type {
46    type enumeration {
47      enum disabled {
48        description
49           "Dynamic rate control is disabled";
50      }
51
52      enum "sonet-oc192" {
53        value 2;
54        description
55           "Dynamic rate control is enabled for a 10 Gb/s Ethernet
56           interface to SONET/SDH OC192/STM64.";
```

```
1      }
2    }
3    default disabled;
4    description
5      "Allowed values for dynamic-rate-control.";
6    reference
7      "IEEE Std 802.3, 4.4.2 ipgStretchRatio and 30.3.1.1.34
8      aRateControlStatus";
9  }
10
11  augment "/if:interfaces/if:interface/ieee802-eth-if:ethernet" {
12  when "derived-from-or-self(..if:type, 'ianaift:ethernetCsmacd')
13    and ieee802-eth-if:duplex = 'half'" {
14    description
15      "Applies to half-duplex Ethernet interfaces.";
16  }
17
18  description
19    "Augment with Ethernet interface configuration parameters
20    for half-duplex operation.";
21
22  leaf dynamic-rate-control {
23    if-feature "dynamic-rate-control";
24    type dynamic-rate-control-type;
25    description
26      "Enables dynamic rate control and specifies what speed (data
27      rate)
28      the dynamic rate control is operating at. The value of this
29      attribute
30      is constrained by the MAC data rate and hardware support.
31      The default value is implementation-dependent.";
32    reference
33      "IEEE Std 802.3, 30.3.1.1.34 aRateControlStatus";
34  }
35  }
36
37  augment "/if:interfaces/if:interface/ieee802-eth-if:ethernet/" +
38    "ieee802-eth-if:capabilities"{
39    when "derived-from-or-self(..if:type,
40      'ianaift:ethernetCsmacd') and ../ieee802-eth-if:duplex = 'half'" {
41      description "Applies to half-duplex Ethernet interfaces";
42    }
43  }
44
45  description
46    "Augment with configuration capabilities for half-duplex
47    Ethernet interface.";
48
49  leaf dynamic-rate-control-supported {
50    if-feature "dynamic-rate-control";
51    type boolean;
52    default false;
53    description
54      "Indicates whether the Ethernet interface supports lowering
55      the average data rate of the MAC sublayer, with frame
```

```

1      granularity, by using Rate Control to dynamically increase
2      the inter-packet gap.
3      Only valid for Ethernet interfaces operating at speeds (data
4      rates)
5      above 1000 Mb/s.";
6      reference
7      "IEEE Std 802.3, 30.3.1.1.33 aRateControlAbility";
8  }
9  }
10
11  augment "/if:interfaces/if:interface/ieee802-eth-if:ethernet/" +
12  "ieee802-eth-if:statistics/ieee802-eth-if:frame" {
13    when "derived-from-or-self(..../if:type,
14      'ianaift:ethernetCsmacd') and ..../ieee802-eth-if:duplex = 'half'"
15  {
16    description
17      "Applies to half-duplex Ethernet interfaces.";
18  }
19  description
20    "Augment with statistics for half-duplex Ethernet interface.";
21
22  container "csma-cd" {
23    if-feature "csma-cd";
24    description
25      "Holds counters that are specific to CDMA/CD half-duplex
26      operation of Ethernet interfaces.
27      Discontinuities in the values of the counters in this
28      container can occur at re-initialization of the management
29      system, and at other times as indicated by the value of the
30      'discontinuity-time' leaf defined in the ietf-interfaces
31      YANG module (IETF RFC 8343).";
32
33    leaf in-errors-sqe-test {
34      type yang:counter64;
35      units errors;
36      description
37        "A count of times that the SQE TEST ERROR is received on a
38        particular interface. The SQE TEST ERROR is set in
39        accordance with the rules for verification of the SQE
40        detection mechanism in the PLS Carrier Sense Function as
41        described in IEEE Std 802.3, 7.2.4.6.
42        This counter does not increment on Ethernet interfaces
43        operating at speeds (data rates) greater than 10 Mb/s, or on
44        Ethernet interfaces operating in full-duplex mode.
45        Discontinuities in the value of this counter can occur at
46        re-initialization of the management system, and at other
47        times as indicated by the value of the
48        'discontinuity-time' leaf defined in the ietf-interfaces
49        YANG module (IETF RFC 8343).";
50      reference
51        "IEEE Std 802.3, 7.2.4.6, and 30.3.2.1.4 aSQETestErrors";
52    }
53
54    leaf out-frames-collision-single {

```

```
1      type yang:counter64;
2      units frames;
3      description
4          "A count of frames that are involved in a single collision,
5           and are subsequently transmitted successfully. A frame
6           that is counted by an instance of this object is also
7           counted by the corresponding instance of either
8           'out-unicast-frames', 'out-broadcast-frames', or
9           'out-multicast-frames', and is not counted by the
10          corresponding instance of the
11          'out-frames-collision-multiple'."
12
13          This counter does not increment when the Ethernet
14          interface is operating in full-duplex mode.
15          Discontinuities in the value of this counter can occur at
16          re-initialization of the management system, and at other
17          times as indicated by the value of the
18          'discontinuity-time' leaf defined in the ietf-interfaces
19          YANG module (IETF RFC 8343).";
20      reference
21          "IEEE Std 802.3, 30.3.1.1.3 aSingleCollisionFrames";
22  }
23
24  leaf out-frames-collision-multiple {
25      type yang:counter64;
26      units frames;
27      description
28          "A count of frames that are involved in multiple
29           collisions, and are subsequently transmitted
30           successfully. A frame that is counted by an instance of
31           this object is also counted by the corresponding instance
32           of either 'out-unicast-frames', 'out-broadcast-frames', or
33           'out-multicast-frames', and is not counted by the
34           corresponding instance of the 'out-frames-collision-single'.
35           This counter does not increment when the Ethernet
36           interface is operating in full-duplex mode.
37           Discontinuities in the value of this counter can occur at
38           re-initialization of the management system, and at other
39           times as indicated by the value of the
40           'discontinuity-time' leaf defined in the ietf-interfaces
41           YANG module (IETF RFC 8343).";
42      reference
43          "IEEE Std 802.3, 30.3.1.1.4 aMultipleCollisionFrames";
44  }
45
46  leaf out-frames-deferred {
47      type yang:counter64;
48      units frames;
49      description
50          "A count of frames for which the first transmission attempt
51           on a particular Ethernet interface is delayed because the
52           medium is busy.
53           A deferred frame that is not subject to any number of
54           collisions is not counted by an instance of
```

```
1         'out-frames-collision-single' or
2         'out-frames-collision-multiple' objects.
3         This counter does not increment when the Ethernet
4         interface is operating in full-duplex mode.
5         Discontinuities in the value of this counter can occur at
6         re-initialization of the management system, and at other
7         times as indicated by the value of the
8         'discontinuity-time' leaf defined in the ietf-interfaces
9         YANG module (IETF RFC 8343).";
10        reference
11        "IEEE Std 802.3, 30.3.1.1.9 aFramesWithDeferredXmissions";
12    }
13
14    leaf out-frames-collisions-excessive {
15        type yang:counter64;
16        units frames;
17        description
18            "A count of frames for which transmission on a particular
19            Ethernet interface fails due to excessive collisions.
20
21            This counter does not increment when the Ethernet
22            interface is operating in full-duplex mode.
23            Discontinuities in the value of this counter can occur at
24            re-initialization of the management system, and at other
25            times as indicated by the value of the
26            'discontinuity-time' leaf defined in the ietf-interfaces
27            YANG module (IETF RFC 8343).";
28        reference
29        "IEEE Std 802.3, 30.3.1.1.11 aFramesAbortedDueToXSColls";
30    }
31
32    leaf out-collisions-late {
33        type yang:counter64;
34        units collisions;
35        description
36            "The number of times that a collision is detected on a
37            particular Ethernet interface later than one slotTime into
38            the transmission of a packet.
39            A (late) collision included in a count represented by an
40            instance of this object is also considered as a (generic)
41            collision for purposes of other collision-related
42            statistics.
43            This counter does not increment when the Ethernet
44            interface is operating in full-duplex mode.
45            Discontinuities in the value of this counter can occur at
46            re-initialization of the management system, and at other
47            times as indicated by the value of the
48            'discontinuity-time' leaf defined in the ietf-interfaces
49            YANG module (IETF RFC 8343).";
50        reference
51        "IEEE Std 802.3, 30.3.1.1.10 aLateCollisions";
52    }
53
54    leaf out-errors-carrier-sense {
```

```
1      type yang:counter64;
2      units errors;
3      description
4          "The number of times that the carrier sense condition was
5           lost or never asserted when attempting to transmit a frame
6           on a particular Ethernet interface.
7           The count represented by an instance of this object is
8           incremented at most once per transmission attempt, even if
9           the carrier sense condition fluctuates during a
10          transmission attempt.
11          This counter does not increment when the Ethernet
12          interface is operating in full-duplex mode.
13          Discontinuities in the value of this counter can occur at
14          re-initialization of the management system, and at other
15          times as indicated by the value of the
16          'discontinuity-time' leaf defined in the ietf-interfaces
17          YANG module (IETF RFC 8343).";
18      reference
19          "IEEE Std 802.3, 30.3.1.1.13 aCarrierSenseErrors";
20  }
21
22  list collision-histogram {
23      key collision-count;
24      description
25          "A collection of collision histograms for a particular
26           interface.";
27      reference
28          "IEEE Std 802.3, 30.3.1.1.30 aCollisionFrames";
29      leaf collision-count {
30          type yang:counter64;
31          units collisions;
32          description
33              "The number of per-frame media collisions for which a
34               particular collision histogram cell represents the
35               frequency on a particular interface.";
36      }
37      leaf collision-count-frames {
38          type yang:counter64;
39          units frames;
40          description
41              "A count of individual MAC frames for which the
42               transmission (successful or otherwise) on a particular
43               interface occurs after the frame has experienced exactly
44               the number of collisions in the associated dot3CollCount
45               object.
46               For example, a frame which is transmitted on an
47               interface after experiencing exactly 4 collisions would
48               be indicated by incrementing only collision-count-frames
49               object associated with the collision-count value of
50               4. No other instance of collision-count-frames would be
51               incremented in this example.
52               This counter does not increment when the interface is
53               operating in full-duplex mode.
54               Discontinuities in the value of this counter can occur
```



```
1         at re-initialization of the management system, and at
2         other times as indicated by the value of the
3         'discontinuity-time' leaf defined in the ietf-interfaces
4         YANG module (IETF RFC 8343).";
```

```
5     }
6 }
7 }
8 }
9 }
10 }
11 }
```

5.3.2.3 Ethernet MAC merge module

```
16 module ieee802-ethernet-mac-merge {
17     yang-version "1.1";
18     namespace "urn:ieee:std:802.3:yang:ieee802-ethernet-mac-merge";
19     prefix "mac-merge";
20
21     import ietf-yang-types {
22         prefix yang;
23         reference "IETF RFC 6991";
24     }
25
26     import ietf-interfaces {
27         prefix if;
28         reference "IETF RFC 8343";
29     }
30
31     import ieee802-ethernet-interface {
32         prefix ieee802-eth-if;
33         reference "IEEE Std 802.3.2-2019";
34     }
35
36     organization
37         "IEEE Std 802.3 Ethernet Working Group
38         Web URL: http://www.ieee802.org/3/";
39
40     contact
41         "Web URL: http://www.ieee802.org/3/";
42
43     description
44         "The Yang model for managing devices that support the MAC merge sub-
45         layer as defined in Clause 99.
46         Unless otherwise indicated, the references in this model module are
47         to IEEE Std 802.3-2018.";
48
49     revision 2023-04-29 {
50         description
51             "Initial version.";
52         reference
53             "IEEE Std 802.3-2018";
54     }
55
56     feature mac-merge {
```

```

1      description
2      "Each Port supports the MAC merge sublayer.";
3      reference
4      "IEEE Std 802.3-2018";
5  }
6
7
8  augment "/if:interfaces/if:interface/ieee802-eth-if:ethernet" {
9      if-feature mac-merge;
10     container mac-merge {
11         container admin-control {
12             leaf merge-enable-tx {
13                 type enumeration {
14                     enum "Disabled" {
15                         description
16                             "Transmit preemption is disabled";
17                     }
18                     enum "Enabled" {
19                         description
20                             "Transmit preemption is enabled";
21                     }
22                 }
23             default "Disabled";
24             description
25                 "This attribute indicates (when accessed via a GET
26 operation) the status of the MAC
27 Merge sublayer on the given device in the transmit direction. The status
28 of the
29 MAC Merge sublayer may be modified to the indicated value via a SET
30 operation.
31 This attribute maps to the variable pEnable (see 99.4.7.3).";
32             reference
33                 "30.14.1.3";
34         }
35         leaf verify-disable-tx {
36             type enumeration {
37                 enum "Disabled" {
38                     description
39                         "Verify is disabled";
40                 }
41                 enum "Enabled" {
42                     description
43                         "Verify is enabled";
44                 }
45             }
46             default "Disabled";
47             description
48                 "This attribute indicates (when accessed via a
49 GET operation) the status of the
50 Verify function of MAC Merge sublayer on the given device in the trans-
51 mit direction. The status of the Verify function may be modified to the
52 indicated value via a SET operation. This attribute maps to the variable
53 disableVerify (see 99.4.7.3).";
54             reference
55                 "30.14.1.4";
56         }
57     }
58 }

```

```

1
2         }
3     leaf verify-time {
4         type uint16 {
5             range "1..128";
6         }
7         units "milliseconds";
8         default "10";
9         description
10            "The value of this attribute defines the nominal
11 wait time between verification
12 attempts in milliseconds. Valid range is 1 to 128 inclusive. The default
13 value is 10. This attribute maps to the variable verifyTime (see
14 99.4.7.3).";
15
16         reference
17            "30.14.1.6";
18     }
19     leaf frag-size {
20         type uint8 {
21             range "0..3";
22         }
23         default "0";
24         description
25            "A 2-bit integer value used to indicate the value
26 of addFragSize variable used by
27 the Transmit Processing State Diagram (see Figure 99?).";
28         reference
29            "30.14.1.7";
30     }
31 }
32
33 container admin-status {
34     config false;
35     leaf merge-support {
36         type enumeration {
37             enum "Supported" {
38                 description
39                    "MAC Merge sublayer is supported on
40 the device";
41             }
42             enum "Not Supported" {
43                 description
44                    "MAC Merge sublayer is not supported
45 on the device";
46             }
47         }
48     }
49     description
50        "This attribute indicates (when accessed via a
51 GET operation) whether the given
52 device supports a MAC Merge sublayer. The SET operation shall have no
53 effect on a
54 device.";
55
56     reference
57        "30.14.1.1";
58
59
60
61
62
63
64
65

```

```

1          }
2      leaf verify-status {
3          type enumeration {
4              enum "unknown" {
5                  description
6                      "Verification status is unknown";
7              }
8              enum "initial" {
9                  description
10                     "The Verify State diagram (Figure 99?)
11 is in the state
12                     INIT_VERIFICATION";
13             }
14             enum "verifying" {
15                 description
16                     "The Verify State diagram is in the state
17 VERIFICATION_IDLE,
18                     SEND_VERIFY or WAIT_FOR_RESPONSE";
19             }
20             enum "succeeded" {
21                 description
22                     "Indicates that the Verify State diagram
23 is in the state VERIFIED";
24             }
25             enum "failed" {
26                 description
27                     "The Verify State diagram is in the state
28 VERIFY_FAIL";
29             }
30             enum "disabled" {
31                 description "Verification of preemption oper-
32 ation is disabled";
33             }
34         }
35         description
36             "This attribute indicates (when accessed via a
37 GET operation) the status of the
38 MAC Merge sublayer verification on the given device. The SET operation
39 shall have
40 no effect on a device.";
41         reference
42             "30.14.1.2";
43     }
44     leaf status-tx {
45         type enumeration {
46             enum "unknown" {
47                 description
48                     "transmit preemption status is unknown";
49             }
50             enum "inactive" {
51                 description
52                     "transmit preemption is inactive";
53             }
54             enum "active" {

```

```

1          description
2              "transmit preemption is active";
3          }
4      }
5  }
6      description
7          "This attribute indicates (when accessed via a
8  GET operation) the status of the
9  MAC Merge sublayer on the given device in the transmit direction. The
10 SET
11 operation shall have no effect on a device. This attribute maps to the
12 variable
13 preempt (see 99.4.7.3).";
14      reference
15          "30.14.1.5";
16  }
17  }
18  }
19  }
20  }
21  }
22  container statistics {
23      config false;
24      leaf assembly-error-count {
25          type yang:counter64;
26          description
27              "A count of MAC frames with reassembly errors.
28  The counter is incremented by one
29  every time the ASSEMBLY_ERROR state in the Receive Processing
30  State Diagram is
31  entered";
32      reference
33          "30.14.1.8";
34  }
35  leaf smd-error-count {
36      type yang:counter64;
37      description
38          "A count of received MAC frames / MAC frame frag-
39  ments rejected due to unknown SMD
40  value or arriving with an SMD-C when no frame is in progress. The
41  counter is
42  incremented by one every time the BAD_FRAG state in the Receive Pro-
43  cessing State
44  Diagram is entered and every time the WAIT_FOR_DV_FALSE state is
45  entered due to
46  the invocation of the SMD_DECODE function returning the value ERR";
47      reference
48          "30.14.1.9";
49  }
50  leaf assembly-ok-count {
51      type yang:counter64;
52      description
53          "count of MAC frames that were successfully reas-
54  sembled and delivered to MAC. The
55  counter is incremented by one every time the FRAME_COMPLETE state in
56  the Receive
57  Processing state diagram (see Figure 99-6) is entered if the state
58  CHECK_FOR_RESUME was previously entered while processing the packet";
59  }
60  }
61  }
62  }
63  }
64  }
65  }

```

```

1         reference
2             "30.14.1.10";
3     }
4     leaf fragment-count-rx {
5         type yang:counter64;
6         description
7             "A count of the number of additional mPackets
8 received due to preemption. The
9 counter is incremented by one every time the state CHECK_FRAG_CNT in
10 the Receive
11 Processing State Diagram (see Figure 99-6) is entered";
12         reference
13             "30.14.1.11";
14     }
15     leaf fragment-count-tx {
16         type yang:counter64;
17         description
18             "A count of the number of additional mPackets
19 transmitted due to preemption. This
20 counter is incremented by one every time the SEND_SMD_C state in the
21 Transmit
22 Processing State Diagram (see Figure 99-5) is entered.";
23         reference
24             "30.14.1.12";
25     }
26     leaf hold-count {
27         type yang:counter64;
28         description
29             "A count of the number of times the variable hold
30 (see 99.4.7.3) transitions from
31 FALSE to TRUE.";
32         reference
33             "30.14.1.13";
34     }
35 }
36 }
37 }
38 }
39 }
40 }
41 }
42 }
43 }
44 }
45 }
46 }
47 }
48 }

```

5.3.2.4 Ethernet LLDP module

```

49
50
51 module ieee802-ethernet-lldp {
52     yang-version 1.1;
53     namespace "urn:ieee:std:802.3:yang:ieee802-ethernet-lldp";
54     prefix ieee802-eth-lldp;
55
56     import ieee802-dot1ab-lldp {
57         prefix lldp;
58         reference
59             "IEEE Std 802.1ABcu-2021";
60     }
61
62     organization
63         "IEEE Std 802.3 Ethernet Working Group
64
65

```

```
1      Web URL: http://www.ieee802.org/3/";
2  contact
3      "Web URL: http://www.ieee802.org/3/";
4  description
5      "This module contains YANG definitions for configuring LLDP for
6      802.3 Ethernet Interfaces.
7      In this YANG module, 'Ethernet interface' can be interpreted
8      as referring to 'IEEE Std 802.3 compliant Ethernet
9      interfaces'.";
10
11
12  revision 2023-10-17 {
13      description
14          "Initial revision.";
15      reference
16          "IEEE Std 802.3.2a, unless dated explicitly";
17  }
18
19  typedef port-class-type {
20      type enumeration {
21          enum p-class-pse {
22              value 0;
23              description
24                  "Power Sourcing Equipment";
25          }
26          enum p-class-pd {
27              value 1;
28              description
29                  "Powered Device";
30          }
31      }
32  }
33
34  description
35      "Enumeration for the power port class";
36  reference
37      "30.12.2.1.5 of IEEE Std IEEE Std 802.3-2022";
38  }
39
40  typedef pse-pinout-type {
41      type enumeration {
42          enum signal {
43              value 0;
44              description
45                  "PSE Pinout Alternative A";
46          }
47          enum spare {
48              value 1;
49              description
50                  "PSE Pinout Alternative B";
51          }
52      }
53  }
54
55  description
56      "Enumeration for the pinout alternatives used for PD detection and power ";
57  reference
58      "30.12.2.1.9 of IEEE Std IEEE Std 802.3-2022";
59  }
60
61  typedef pse-power-class-type {
62      type enumeration {
63          enum class0 {
64              value 0;
```

```
1      description
2      "Class 0 PD";
3  }
4  enum class1 {
5      value 1;
6      description
7      "Class 1 PD";
8  }
9
10 enum class2 {
11     value 2;
12     description
13     "Class 2 PD";
14 }
15 enum class3 {
16     value 3;
17     description
18     "Class 3 PD";
19 }
20 enum class4 {
21     value 4;
22     description
23     "Class 4 PD";
24 }
25 }
26 }
27 description
28 "Enumeration for the PD class";
29 reference
30 "30.12.2.1.10 of IEEE Std IEEE Std 802.3-2022";
31 }
32
33 typedef power-class-ext-AB-type {
34     type enumeration {
35         enum singlesig {
36             value 0;
37             description
38             "Single-signature PD or 2-pair only PSE";
39         }
40         enum class1 {
41             value 1;
42             description
43             "Class 1";
44         }
45         enum class2 {
46             value 2;
47             description
48             "Class 2";
49         }
50         enum class3 {
51             value 3;
52             description
53             "Class 3";
54         }
55         enum class4 {
56             value 4;
57             description
58             "Class 4";
59         }
60         enum class5 {
61             value 5;
62             description
```



```
1         "Class 5";
2     }
3 }
4 description
5     "Enumeration for the assigned power class ";
6 reference
7     "30.12.3.1.26 of IEEE Std IEEE Std 802.3-2022";
8 }
9
10 typedef power-class-ext-type {
11     type enumeration {
12         enum dualsig {
13             value 0;
14             description
15                 "Dual-signature PD";
16         }
17         enum class1 {
18             value 1;
19             description
20                 "Class 1";
21         }
22         enum class2 {
23             value 2;
24             description
25                 "Class 2";
26         }
27         enum class3 {
28             value 3;
29             description
30                 "Class 3";
31         }
32         enum class4 {
33             value 4;
34             description
35                 "Class 4";
36         }
37         enum class5 {
38             value 5;
39             description
40                 "Class 5";
41         }
42         enum class6 {
43             value 6;
44             description
45                 "Class 6";
46         }
47         enum class7 {
48             value 7;
49             description
50                 "Class 7";
51         }
52         enum class8 {
53             value 8;
54             description
55                 "Class 8";
56         }
57     }
58 }
59 description
60     "Enumeration for the assigned power class ";
61 reference
```

```
1      "30.12.3.1.28 of IEEE Std IEEE Std 802.3-2022";
2  }
3  typedef power-type {
4      type enumeration {
5          enum type4dualsigPD {
6              value 0;
7              description
8                  "Type 4 dual-signature PD";
9          }
10         enum type4singlesigPD {
11             value 1;
12             description
13                 "Type 4 single-signature PD";
14         }
15         enum type3dualsigPD {
16             value 2;
17             description
18                 "Type 3 dual-signature PD";
19         }
20         enum type3singlesigPD {
21             value 3;
22             description
23                 "Type 3 single-signature PD";
24         }
25         enum type4PSE {
26             value 4;
27             description
28                 "Type 4 PSE";
29         }
30         enum type3PSE {
31             value 5;
32             description
33                 "Type 3 PSE";
34         }
35     }
36     description
37         "Enumeration for the PD class";
38     reference
39         "30.12.2.1.29 of IEEE Std IEEE Std 802.3-2022";
40 }
41 typedef power-priority-type {
42     type enumeration {
43         enum low {
44             value 0;
45             description
46                 "low priority PD";
47         }
48         enum high {
49             value 1;
50             description
51                 "high priority PD";
52         }
53         enum critical {
54             value 2;
55             description
56                 "critical priority PD";
57         }
58         enum unknown {
59             value 3;
60         }
61     }
62 }
```

```

1      description
2          "priority unknown";
3      }
4  }
5  description
6      "Enumeration for possible priorities of a PD system";
7  reference
8      "30.12.2.1.16 of IEEE Std IEEE Std 802.3-2022";
9  }
10 }
11
12 typedef power-source-type {
13     type enumeration {
14         enum pse-primary {
15             value 0;
16             description
17                 "PSE powered by a primary power source";
18         }
19         enum pse-backup {
20             value 1;
21             description
22                 "PSE powered by a backup power source";
23         }
24         enum pse-unknown {
25             value 2;
26             description
27                 "PSE powered by an unknown power source";
28         }
29         enum pd-pse-and-local {
30             value 3;
31             description
32                 "PD powered by a PSE and locally";
33         }
34         enum pd-local-only {
35             value 4;
36             description
37                 "PD powered only locally";
38         }
39         enum pd-pse-only {
40             value 5;
41             description
42                 "PD powered by PD only";
43         }
44         enum pd-unknown {
45             value 6;
46             description
47                 "PD powered by an unknown source";
48         }
49     }
50 }
51 description
52     "Enumeration for the power sources of the
53     remote system. When the remote system is a PSE, it indicates
54     whether it is being powered by a primary power source; a backup
55     power source; or unknown. When the remote system is a PD, it
56     indicates whether it is being powered by a PSE and locally;
57     locally only; by a PSE only; or unknown.";
58 reference
59     "30.12.2.1.15 of IEEE Std IEEE Std 802.3-2022";
60 }
61 typedef powering-status-type {

```

```
1      type enumeration {
2          enum 4PdualsigPD {
3              value 0;
4              description
5                  "4-pair powering a dual-signature PD";
6          }
7          enum 4PsinglesigPD {
8              value 1;
9              description
10                 "4-pair powering a single-signature PD";
11          }
12          enum 2P {
13              value 2;
14              description
15                 "2-pair powering";
16          }
17      }
18      description
19      "Enumeration for the power status of the PSE";
20      reference
21      "30.12.2.1.23 of IEEE Std IEEE Std 802.3-2022";
22  }
23  typedef powered-status-type {
24      type enumeration {
25          enum 4PdualsigPD {
26              value 0;
27              description
28                 "4-pair powered dual-signature PD";
29          }
30          enum 2PdualsigPD {
31              value 1;
32              description
33                 "2-pair powered dual-signature PD";
34          }
35          enum singlesigPD {
36              value 2;
37              description
38                 "powered single-signature PD";
39          }
40      }
41      description
42      "Enumeration for the power status of the PSE";
43      reference
44      "30.12.2.1.24 of IEEE Std IEEE Std 802.3-2022";
45  }
46  typedef power-pairs-type {
47      type enumeration {
48          enum altA {
49              value 0;
50              description
51                 "Alternative A";
52          }
53          enum altB {
54              value 1;
55              description
56                 "Alternative B";
57          }
58          enum both {
59              value 2;
60          }
61      }
62  }
```

```
1      description
2      "both";
3    }
4  }
5  description
6  "Enumeration for the PSE Pinout Alternative";
7  reference
8  "30.12.2.1.25 of IEEE Std IEEE Std 802.3-2022";
9  }
10 }
11 augment "/lldp:lldp/lldp:port" {
12   description
13   "Augments port with 802.3 port config tlvs";
14   leaf tlvs-port-config-enable {
15     type bits {
16       bit mac-phy-config-status {
17         position 0;
18         description
19         "30.12.1.1.1 of IEEE Std 802.3-2022";
20       }
21       bit power-via-mdi {
22         position 1;
23         description
24         "30.12.1.1.1 of IEEE Std 802.3-2022";
25       }
26       bit unused {
27         position 2;
28         description
29         "30.12.1.1.1 of IEEE Std 802.3-2022";
30       }
31       bit max-frame-size {
32         position 3;
33         description
34         "30.12.1.1.1 of IEEE Std 802.3-2022";
35       }
36       bit eee-tlv {
37         position 4;
38         description
39         "30.12.1.1.1 of IEEE Std 802.3-2022";
40       }
41       bit eee-fast-wake-tlv {
42         position 5;
43         description
44         "30.12.1.1.1 of IEEE Std 802.3-2022";
45       }
46       bit additional-ethernet-capabilities-tlv {
47         position 6;
48         description
49         "30.12.1.1.1 of IEEE Std 802.3-2022";
50       }
51     }
52   }
53   description
54   "Bitmap that corresponds to an IEEE 802.3 subtype associated
55   with a specific IEEE 802.3 port config TLV";
56   reference
57   "30.12.1.1.1 of IEEE Std 802.3-2022";
58 }
59 leaf auto-negotiation-supported {
60   type boolean;
61   config false;
62 }
```

```
1      description
2          "True if the port supports Auto-negotiation";
3      reference
4          "30.12.2.1.1 of IEEE Std IEEE Std 802.3-2022";
5  }
6  leaf auto-negotiation-enabled {
7      type boolean;
8      config false;
9      description
10         "True if Auto-negotiation is enabled";
11     reference
12         "30.12.2.1.2 of IEEE Std IEEE Std 802.3-2022";
13 }
14 leaf auto-negotiation-cap {
15     type binary {
16         length "2";
17     }
18     config false;
19     description
20         "A read-only 2-octet value that contains the value (bitmap) of the ifMau-
21 AutoNegCapAdvertisedBits object (defined in IETF RFC 4836)
22         which is associated with the given port on the local system.";
23     reference
24         "30.12.2.1.3 of IEEE Std IEEE Std 802.3-2022";
25 }
26 leaf operational-mau-type {
27     type int32;
28     config false;
29     description
30         "32-bit integer value that indicates the operational MAU type of the given
31 port";
32     reference
33         "30.12.2.1.4 of IEEE Std IEEE Std 802.3-2022";
34 }
35 leaf power-port-class {
36     type port-class-type;
37     config false;
38     description
39         "A read-only value that identifies the port Class of the given port";
40     reference
41         "30.12.2.1.5 of IEEE Std IEEE Std 802.3-2022";
42 }
43 leaf mdi-power-supported {
44     type boolean;
45     config false;
46     description
47         "True if MDI power is supported";
48     reference
49         "30.12.2.1.6 of IEEE Std IEEE Std 802.3-2022";
50 }
51 leaf mdi-power-enabled {
52     type boolean;
53     config false;
54     description
55         "True if MDI power is enabled";
56     reference
57         "30.12.2.1.7 of IEEE Std IEEE Std 802.3-2022";
58 }
59 leaf power-pair-controlable {
```

```
1      type boolean;
2      config false;
3      description
4          "True if the pair selection can be controlled";
5      reference
6          "30.12.2.1.8 of IEEE Std IEEE Std 802.3-2022";
7  }
8
9  leaf power-pairs {
10     type pse-pinout-type;
11     config false;
12     description
13         "Indicates which pinout alternative is used for PD detection and power";
14     reference
15         "30.12.2.1.9 of IEEE Std IEEE Std 802.3-2022";
16 }
17 leaf local-power-class {
18     type pse-power-class-type;
19     config false;
20     description
21         "PD Power Class";
22     reference
23         "30.12.2.1.10 of IEEE Std IEEE Std 802.3-2022";
24 }
25
26 leaf link-aggregation-status {
27     type bits {
28         bit aggregation-capability {
29             position 0;
30             description
31                 "79.3.3.1 of IEEE Std 802.3-2022";
32         }
33         bit aggregation-status {
34             position 1;
35             description
36                 "79.3.3.1 of IEEE Std 802.3-2022";
37         }
38     }
39 }
40 config false;
41 description
42     "The bitmap value which contains the link aggregation capabilities and
43 the current aggregation
44     status of the link";
45 reference
46     "30.12.2.1.11 of IEEE Std 802.3-2022";
47 }
48
49 leaf aggregation-port-id {
50     type int32;
51     config false;
52     description
53         "The unique identifier allocated to this Aggregation Port by the local
54 System.";
55 reference
56     "30.12.2.1.12 of IEEE Std IEEE Std 802.3-2022";
57 }
58
59 leaf local-max-frame-size {
60     type int32;
61     config false;
62     description
63         "An integer value indicating the maximum supported frame size in octets
64 on the given port of the local system.";
65 }
```

```
1      reference
2      "30.12.2.1.13 of IEEE Std IEEE Std 802.3-2022";
3  }
4  leaf power-type {
5      type bits {
6          bit typel-or-greater {
7              position 0;
8              description
9                  "0-typel, 1-greater than typel";
10             }
11         }
12         bit pse-or-pd {
13             position 1;
14             description
15                 "0-pse, 1-pd";
16         }
17     }
18     config false;
19     description
20         "A GET attribute that returns a bit string indicating whether the local
21 system is a PSE or a PD and
22 whether it is Type 1 or greater than Type 1. The first bit indicates
23 Type 1 or greater than Type 1.
24 The second bit indicates PSE or PD. A PSE sets this bit to indicate
25 a PSE. A PD sets this bit to
26 indicate a PD. See also aLldpXdot3LocPowerTypeExt..";
27     reference
28         "30.12.2.1.14 of IEEE Std 802.3-2022";
29 }
30 leaf power-source {
31     type power-source-type;
32     config false;
33     description
34         "Indicates the power sources of the local system. A PSE indicates whether
35 it is being powered by a primary power source; a backup power source; or unknown.
36 A PD indicates whether it is being powered by a PSE and locally; by a PSE only;
37 or
38 unknown.";
39     reference
40         "30.12.2.1.15 of IEEE Std 802.3-2022";
41 }
42 leaf local-power-priority {
43     type power-priority-type;
44     description
45         "Priority of a PD system. For a PSE, this is the priority that the PSE
46 assigns to the PD.
47 For a PD, this is the priority that the PD requests from the PSE";
48     reference
49         "30.12.2.1.16 of IEEE Std IEEE Std 802.3-2022";
50 }
51 leaf pd-requested-power-value {
52     type int32;
53     config false;
54     description
55         "PD requested power value. For a PD, it is the power value that the PD has
56 currently requested from the remote system.
57 For a PSE, it is the power value that the PSE mirrors back to the
58 remote system";
59     reference
60         "30.12.2.1.17 of IEEE Std IEEE Std 802.3-2022";
61 }
```



```
1      }
2      leaf pd-requested-power-value-a {
3          type int32;
4          config false;
5          description
6              "A GET attribute that returns the PD requested power value for the Mode A
7              pairset in units of 0.1 W.
8              For a PD, it is the power value that the PD has currently requested
9              from the remote system
10             for the Mode A pairset. For a PSE, it is the power value for the
11             Alternative A pairset that the PSE
12             echoes back to the remote system";
13             reference
14                 "30.12.2.1.18 of IEEE Std IEEE Std 802.3-2022";
15         }
16         leaf pd-requested-power-value-b {
17             type int32;
18             config false;
19             description
20                 "A GET attribute that returns the PD requested power value for the Mode B
21                 pairset in units of 0.1 W.
22                 For a PD, it is the power value that the PD has currently requested
23                 from the remote system
24                 for the Mode B pairset. For a PSE, it is the power value for the
25                 Alternative B pairset that the PSE
26                 echoes back to the remote system";
27                 reference
28                     "30.12.2.1.19 of IEEE Std IEEE Std 802.3-2022";
29         }
30         leaf pse-allocated-power-value {
31             type int32;
32             config false;
33             description
34                 "PSE allocated power value. For a PSE, it is the power value that the PSE
35                 has currently allocated to the remote system.
36                 For a PD, it is the power value that the PD mirrors back to the
37                 remote system";
38             reference
39                 "30.12.2.1.20 of IEEE Std IEEE Std 802.3-2022";
40         }
41         leaf pse-allocated-power-value-a {
42             type int32;
43             config false;
44             description
45                 " PSE allocated power value for the Alternative A pairset in units of 0.1
46                 W.
47                 For a PSE, it is the power value for the Alternative A pairset that
48                 the PSE has currently
49                 allocated to the remote system. For a PD, it is the power value for
50                 the Mode A pairset that the PD
51                 echoes back to the remote system.";
52             reference
53                 "30.12.2.1.21 of IEEE Std IEEE Std 802.3-2022";
54         }
55         leaf pse-allocated-power-value-b {
56             type int32;
57             config false;
58             description
```

```
1      " PSE allocated power value for the Alternative B pairset in units of 0.1
2  W.
3          For a PSE, it is the power value for the Alternative B pairset that
4  the PSE has currently
5          allocated to the remote system. For a PD, it is the power value for
6  the Mode B pairset that the PD
7          echoes back to the remote system.";
8  reference
9      "30.12.2.1.22 of IEEE Std IEEE Std 802.3-2022";
10 }
11     leaf pse-powering-status {
12     type powering-status-type;
13     config false;
14     description
15         " A read only value that indicates the powering status of the PSE. For a
16     PD, the contents of this
17         attribute are undefined.";
18     reference
19         "30.12.2.1.23 of IEEE Std IEEE Std 802.3-2022";
20 }
21     leaf pd-powered-status {
22     type powered-status-type;
23     config false;
24     description
25         " A read only value that indicates the powering status of the PD. For a
26     PSE, the contents of this attribute are undefined";
27     reference
28         "30.12.2.1.24 of IEEE Std IEEE Std 802.3-2022";
29 }
30     leaf power-pairs-ext {
31     type power-pairs-type;
32     config false;
33     description
34         " A read-only value that identifies the supported PSE Pinout Alternative
35     specified in 145.2.4. For a
36     PSE, this attribute contains the value of the aPSEPowerPairs attri-
37     bute (see 30.9.1.1.4). For a PD,
38         the contents of this attribute are undefined";
39     reference
40         "30.12.2.1.25 of IEEE Std IEEE Std 802.3-2022";
41 }
42     leaf power-class-ext-A {
43     type power-class-ext-AB-type;
44     config false;
45     description
46         "For a dual-signature PD, a read-only value that indicates the requested
47     Class for Mode A during
48     Physical Layer Classification (see 145.3.6). For a single-signature
49     PD, a read-only value set to
50         'singlesig'. For a PSE connected to a dual-signature PD, a read-only
51     value that indicates the currently assigned
52     Class for Mode A (see 145.2.8). For a PSE connected to a single-
53     signature PD or a PSE that
54     operates only in 2-pair mode, a read-only value set to 'sin-
55     glesig'";
56     reference
57         "30.12.2.1.26 of IEEE Std IEEE Std 802.3-2022";
58 }
59     leaf power-class-ext-B {
```

```
1      type power-class-ext-AB-type;
2      config false;
3      description
4          "For a dual-signature PD, a read-only value that indicates the requested
5      Class for Mode B during
6          Physical Layer Classification (see 145.3.6). For a single-signature
7      PD, a read-only value set to
8          'singlesig'. For a PSE connected to a dual-signature PD, a read-only
9      value that indicates the currently assigned
10         Class for Mode B (see 145.2.8). For a PSE connected to a single-
11         signature PD or a PSE that
12         operates only in 2-pair mode, a read-only value set to 'sin-
13         glesig'";
14     reference
15         "30.12.2.1.27 of IEEE Std IEEE Std 802.3-2022";
16 }
17
18     leaf power-class-ext {
19         type power-class-ext-type;
20         config false;
21         description
22             "For a single-signature PD, a read-only value that indicates the
23             requested Class during Physical
24             Layer Classification (see 145.3.6). For a dual-signature PD, a
25             read-only value set to 'dualsig'.?
26             For a PSE connected to a single-signature PD or a PSE that operates
27             only in 2-pair mode, a read-
28             only value that indicates the currently assigned Class (see
29             145.2.8). For a PSE connected to a dual-
30             signature PD, a read-only value set to 'dualsig'.'";
31         reference
32             "30.12.2.1.28 of IEEE Std IEEE Std 802.3-2022";
33     }
34
35     leaf power-type-ext {
36         type power-type;
37         config false;
38         description
39             "A read-only attribute that returns a value to indicate if the local sys-
40             tem is a Type 3 or Type 4 PSE
41             or PD and, in the case of a Type 3 or Type 4 PD, if it is a single-
42             signature PD or a dual-signature
43             PD";
44         reference
45             "30.12.2.1.29 of IEEE Std IEEE Std 802.3-2022";
46     }
47
48     leaf pd-load {
49         type boolean;
50         config false;
51         description
52             "For a dual-signature PD, a GET attribute that returns whether the load
53             of a dual-signature PD is
54             electrically isolated, as defined in 79.3.2.10.2. For a single-sig-
55             nature PD or a PSE, the value of this
56             attribute is FALSE";
57         reference
58             "30.12.2.1.30 of IEEE Std IEEE Std 802.3-2022";
59     }
60
61     leaf pd-4pid {
62         type boolean;
63         config false;
```

```
1      description
2          "A read-only Boolean attribute indicating whether the local PD system
3 supports powering of both
4          PD Modes.";
5      reference
6          "30.12.2.1.31 of IEEE Std IEEE Std 802.3-2022";
7  }
8      leaf pse-max-avail-power {
9          type int32;
10         config false;
11         description
12             "A GET attribute that returns the local PSE maximum available power value
13 in units of 0.1 W";
14         reference
15             "30.12.2.1.32 of IEEE Std IEEE Std 802.3-2022";
16     }
17     leaf pse-autoclass-support {
18         type boolean;
19         config false;
20         description
21             "Indicates whether the local PSE system supports Autoclass.";
22         reference
23             "30.12.2.1.33 of IEEE Std IEEE Std 802.3-2022";
24     }
25     leaf autoclass-completed {
26         type boolean;
27         config false;
28         description
29             "Indicates whether the local PSE system has completed the Autoclass mea-
30 surement.";
31         reference
32             "30.12.2.1.34 of IEEE Std IEEE Std 802.3-2022";
33     }
34     leaf autoclass-request {
35         type boolean;
36         config false;
37         description
38             "A read-only Boolean attribute indicating whether the local PD system is
39 requesting an Autoclass measurement.";
40         reference
41             "30.12.2.1.35 of IEEE Std IEEE Std 802.3-2022";
42     }
43     leaf power-down-request {
44         type int32;
45         description
46             "A SET attribute that indicates the local PD system is requesting a power
47 down when the value is 0x1D.";
48         reference
49             "30.12.2.1.36 of IEEE Std IEEE Std 802.3-2022";
50     }
51     leaf power-down-time {
52         type int32;
53         description
54             "A SET attribute that indicates the number of seconds the PD requests to
55 stay powered off. A value of zero indicates an indefinite amount of time.";
56         reference
57             "30.12.2.1.37 of IEEE Std IEEE Std 802.3-2022";
58     }
59     leaf meas-voltage-support {
```

```
1         type boolean;
2         config false;
3         description
4             "A GET attribute that indicates the local device is capable of providing
5 a voltage measurement.;";
6         reference
7             "30.12.2.1.38 of IEEE Std IEEE Std 802.3-2022";
8     }
9
10    leaf meas-current-support {
11        type boolean;
12        config false;
13        description
14            "A GET attribute that indicates the local device is capable of providing
15 a current measurement.;";
16        reference
17            "30.12.2.1.39 of IEEE Std IEEE Std 802.3-2022";
18    }
19    leaf meas-power-support {
20        type boolean;
21        config false;
22        description
23            "A GET attribute that indicates the local device is capable of providing
24 a power measurement.;";
25        reference
26            "30.12.2.1.40 of IEEE Std IEEE Std 802.3-2022";
27    }
28    leaf meas-energy-support {
29        type boolean;
30        config false;
31        description
32            "A GET attribute that indicates the local device is capable of providing
33 a energy measurement.;";
34        reference
35            "30.12.2.1.41 of IEEE Std IEEE Std 802.3-2022";
36    }
37    leaf measurement-source {
38        type bits {
39            bit bit1 {
40                position 0;
41                description
42                    "-";
43            }
44            bit bit2 {
45                position 1;
46                description
47                    "-";
48            }
49        }
50        description
51            "A SET attribute value that indicates to local device on which Alternative
52 or Mode the measurement
53 is to be taken";
54        reference
55            "30.12.2.1.42 of IEEE Std 802.3-2022";
56    }
57    leaf meas-voltage-request {
58        type boolean;
59        config false;
60        description
```

```
1         "A GET attribute that indicates the local device is requesting a voltage
2 measurement from the remote device.";
3         reference
4             "30.12.2.1.43 of IEEE Std IEEE Std 802.3-2022";
5     }
6     leaf meas-current-request {
7         type boolean;
8         config false;
9         description
10            "A GET attribute that indicates the local device is requesting a current
11 measurement from the remote device.";
12        reference
13            "30.12.2.1.44 of IEEE Std IEEE Std 802.3-2022";
14    }
15    leaf meas-power-request {
16        type boolean;
17        config false;
18        description
19            "A GET attribute that indicates the local device is requesting a power
20 measurement from the remote device.";
21        reference
22            "30.12.2.1.45 of IEEE Std IEEE Std 802.3-2022";
23    }
24    leaf meas-energy-request {
25        type boolean;
26        config false;
27        description
28            "A GET attribute that indicates the local device is requesting an energy
29 measurement from the remote device.";
30        reference
31            "30.12.2.1.46 of IEEE Std IEEE Std 802.3-2022";
32    }
33    leaf meas-voltage-valid {
34        type boolean;
35        config false;
36        description
37            "A GET attribute that indicates the local device's voltage measurement is
38 valid.";
39        reference
40            "30.12.2.1.47 of IEEE Std IEEE Std 802.3-2022";
41    }
42    leaf meas-current-valid {
43        type boolean;
44        config false;
45        description
46            "A GET attribute that indicates the local device's current measurement is
47 valid.";
48        reference
49            "30.12.2.1.48 of IEEE Std IEEE Std 802.3-2022";
50    }
51    leaf meas-power-valid {
52        type boolean;
53        config false;
54        description
55            "A GET attribute that indicates the local device's power measurement is
56 valid.";
57        reference
58            "30.12.2.1.49 of IEEE Std IEEE Std 802.3-2022";
59    }
60 }
```

```
1      leaf meas-energy-valid {
2      type boolean;
3      config false;
4      description
5      "A GET attribute that indicates the local device's energy measurement is
6      valid.";
7      reference
8      "30.12.2.1.50 of IEEE Std IEEE Std 802.3-2022";
9      }
10     leaf meas-voltage-uncertainty {
11     type int32;
12     config false;
13     description
14     "A GET attribute that indicates the expanded uncertainty (coverage factor
15     k = 2) for the device's voltage measurement.";
16     reference
17     "30.12.2.1.51 of IEEE Std IEEE Std 802.3-2022";
18     }
19     leaf meas-current-uncertainty {
20     type int32;
21     config false;
22     description
23     "A GET attribute that indicates the expanded uncertainty (coverage factor
24     k = 2) for the device's current measurement.";
25     reference
26     "30.12.2.1.52 of IEEE Std IEEE Std 802.3-2022";
27     }
28     leaf meas-power-uncertainty {
29     type int32;
30     config false;
31     description
32     "A GET attribute that indicates the expanded uncertainty (coverage factor
33     k = 2) for the device's power measurement.";
34     reference
35     "30.12.2.1.53 of IEEE Std IEEE Std 802.3-2022";
36     }
37     leaf meas-energy-uncertainty {
38     type int32;
39     config false;
40     description
41     "A GET attribute that indicates the expanded uncertainty (coverage factor
42     k = 2) for the device's energy measurement.";
43     reference
44     "30.12.2.1.54 of IEEE Std IEEE Std 802.3-2022";
45     }
46     leaf voltage-measurement {
47     type int32;
48     config false;
49     description
50     "A GET attribute that returns the measured device voltage.";
51     reference
52     "30.12.2.1.55 of IEEE Std IEEE Std 802.3-2022";
53     }
54     leaf current-measurement {
55     type int32;
56     config false;
57     description
58     "A GET attribute that returns the measured device current.";
59     reference
```

```
1      "30.12.2.1.56 of IEEE Std IEEE Std 802.3-2022";
2  }
3      leaf power-measurement {
4      type int32;
5      config false;
6      description
7      "A GET attribute that returns the measured device power.";
8      reference
9      "30.12.2.1.57 of IEEE Std IEEE Std 802.3-2022";
10     }
11     leaf energy-measurement {
12     type int32;
13     config false;
14     description
15     "A GET attribute that returns the measured device energy.";
16     reference
17     "30.12.2.1.58 of IEEE Std IEEE Std 802.3-2022";
18     }
19     leaf pse-power-price-index {
20     type int32;
21     config false;
22     description
23     "A GET attribute that returns an index of the price of power being sourced
24     by the PSE. For a PD, this value is undefined";
25     reference
26     "30.12.2.1.59 of IEEE Std IEEE Std 802.3-2022";
27     }
28     leaf local-response {
29     type int32;
30     config false;
31     description
32     "The maximum time required to update pse-allocated-power-value";
33     reference
34     "30.12.2.1.60 of IEEE Std IEEE Std 802.3-2022";
35     }
36     leaf local-system-ready {
37     type boolean;
38     config false;
39     description
40     "Initialization status of the Data Link Layer classification engine on
41     the local system";
42     reference
43     "30.12.2.1.61 of IEEE Std IEEE Std 802.3-2022";
44     }
45     leaf tx-system-value {
46     type int32;
47     config false;
48     description
49     "Returns the value of Tw_sys_tx that the local system can support in the
50     transmit direction.";
51     reference
52     "30.12.2.1.62 of IEEE Std IEEE Std 802.3-2022";
53     }
54     leaf tx-system-value-echo {
55     type int32;
56     config false;
57     description
```



```
1      "Returns the value of Tw_sys_tx that the remote system is advertising that
2      it can support in the transmit direction and is echoed by the local system under
3      the control of the EEE DLL receiver state diagram.";
4      reference
5          "30.12.2.1.63 of IEEE Std IEEE Std 802.3-2022";
6  }
7  leaf rx-system-value {
8      type int32;
9      config false;
10     description
11         "Returns the value of Tw_sys_tx that the local system is requesting in the
12         receive direction.";
13     reference
14         "30.12.2.1.64 of IEEE Std IEEE Std 802.3-2022";
15 }
16 leaf rx-system-value-echo {
17     type int32;
18     config false;
19     description
20         "Returns the value of Tw_sys_tx that the remote system is advertising that
21         it is requesting in the receive direction and is echoed by the local system under
22         the control of the EEE DLL transmitter state diagram.";
23     reference
24         "30.12.2.1.65 of IEEE Std IEEE Std 802.3-2022";
25 }
26 leaf fallback-system-value {
27     type int32;
28     config false;
29     description
30         "Returns the value of the fallback Tw_sys_tx that the local system is
31         advertising to the remote system.";
32     reference
33         "30.12.2.1.66 of IEEE Std IEEE Std 802.3-2022";
34 }
35 leaf tx-dll-ready {
36     type boolean;
37     config false;
38     description
39         "Returns the initialization status of the EEE transmit Data Link Layer
40         management function on the local system.";
41     reference
42         "30.12.2.1.67 of IEEE Std IEEE Std 802.3-2022";
43 }
44 leaf rx-dll-ready {
45     type boolean;
46     config false;
47     description
48         "Returns the initialization status of the EEE receive Data Link Layer man-
49         agement function on the local system.";
50     reference
51         "30.12.2.1.68 of IEEE Std IEEE Std 802.3-2022";
52 }
53 leaf dll-enabled {
54     type boolean;
55     config false;
56     description
57         "Returns the status of the EEE capability negotiation on the local sys-
58         tem.";
59     reference
```

```
1         "30.12.2.1.69 of IEEE Std IEEE Std 802.3-2022";
2     }
3     leaf tx-system-fw {
4         type boolean;
5         config false;
6         description
7             "Returns the value of LPI_FW that the local system can support in the
8 transmit direction.";
9         reference
10            "30.12.2.1.70 of IEEE Std IEEE Std 802.3-2022";
11    }
12    leaf tx-system-fw-echo {
13        type boolean;
14        config false;
15        description
16            "Returns the value of LPI_FW that the remote system is advertising that
17 it can support in the transmit direction and is echoed by the local system under
18 the control of the EEE DLL receiver state diagram.";
19        reference
20            "30.12.2.1.71 of IEEE Std IEEE Std 802.3-2022";
21    }
22    leaf rx-system-fw {
23        type boolean;
24        config false;
25        description
26            "Returns the value of LPI_FW that the local system is requesting in the
27 receive direction.";
28        reference
29            "30.12.2.1.72 of IEEE Std IEEE Std 802.3-2022";
30    }
31    leaf rx-system-fw-echo {
32        type boolean;
33        config false;
34        description
35            "Returns the value of LPI_FW that the remote system is advertising that
36 it is requesting in the receive direction and is echoed by the local system under
37 the control of the EEE DLL transmitter state diagram.";
38        reference
39            "30.12.2.1.73 of IEEE Std IEEE Std 802.3-2022";
40    }
41    leaf preemption-supported {
42        type boolean;
43        config false;
44        description
45            "Indicates whether the given port (associated with the local System) sup-
46 ports the preemption capability.";
47        reference
48            "30.12.2.1.74 of IEEE Std IEEE Std 802.3-2022";
49    }
50    leaf preemption-enabled {
51        type boolean;
52        config false;
53        description
54            "Indicates whether the preemption capability is enabled on the given port
55 associated with the local System.";
56        reference
57            "30.12.2.1.75 of IEEE Std IEEE Std 802.3-2022";
58    }
59    leaf preemption-active {
```

```
1         type boolean;
2         config false;
3         description
4             "Indicates whether the preemption capability is active on the given port
5 associated with the local System.";
6         reference
7             "30.12.2.1.76 of IEEE Std IEEE Std 802.3-2022";
8     }
9
10    leaf additional-fragment-size {
11        type int32;
12        config false;
13        description
14            "Indicate the minimum size of non-final fragments supported by the
15 receiver on the given port associated with the local System. This value is
16 expressed in units of 64 octets of additional fragment length.";
17        reference
18            "30.12.2.1.77 of IEEE Std IEEE Std 802.3-2022";
19    }
20 }
21
22
23 augment "/lldp:lldp/lldp:port/lldp:remote-systems-data" {
24     description "Augments port with 802.3 port config tlvs";
25     leaf auto-negotiation-supported {
26         type boolean;
27         config false;
28         description
29             "True if the port supports Auto-negotiation";
30         reference
31             "30.12.3.1.1 of IEEE Std IEEE Std 802.3-2022";
32     }
33     leaf auto-negotiation-enabled {
34         type boolean;
35         config false;
36         description
37             "True if Auto-negotiation is enabled";
38         reference
39             "30.12.3.1.2 of IEEE Std IEEE Std 802.3-2022";
40     }
41     leaf auto-negotiation-cap {
42         type binary {
43             length "2";
44         }
45         config false;
46         description
47             "A read-only 2-octet value that contains the value (bitmap) of the ifMau-
48 AutoNegCapAdvertisedBits object (defined in IETF RFC 4836)
49 which is associated with the given port on the local system.";
50         reference
51             "30.12.3.1.3 of IEEE Std IEEE Std 802.3-2022";
52     }
53     leaf operational-mau-type {
54         type int32;
55         config false;
56         description
57             "32-bit integer value that indicates the operational MAU type of the given
58 port";
59         reference
60             "30.12.3.1.4 of IEEE Std IEEE Std 802.3-2022";
61     }
62 }
```

```
1     leaf power-port-class {
2         type port-class-type;
3         config false;
4         description
5             "A read-only value that identifies the port Class of the given port";
6         reference
7             "30.12.3.1.5 of IEEE Std IEEE Std 802.3-2022";
8     }
9
10    leaf mdi-power-supported {
11        type boolean;
12        config false;
13        description
14            "True if MDI power is supported";
15        reference
16            "30.12.3.1.6 of IEEE Std IEEE Std 802.3-2022";
17    }
18
19    leaf mdi-power-enabled {
20        type boolean;
21        config false;
22        description
23            "True if MDI power is enabled";
24        reference
25            "30.12.3.1.7 of IEEE Std IEEE Std 802.3-2022";
26    }
27
28    leaf power-pair-controlable {
29        type boolean;
30        config false;
31        description
32            "True if the pair selection can be controlled";
33        reference
34            "30.12.3.1.8 of IEEE Std IEEE Std 802.3-2022";
35    }
36
37    leaf power-pairs {
38        type pse-pinout-type;
39        config false;
40        description
41            "Indicates which pinout alternative is used for PD detection and power";
42        reference
43            "30.12.3.1.9 of IEEE Std IEEE Std 802.3-2022";
44    }
45
46    leaf power-class {
47        type pse-power-class-type;
48        config false;
49        description
50            "PD Power Class";
51        reference
52            "30.12.3.1.10 of IEEE Std IEEE Std 802.3-2022";
53    }
54
55    leaf link-aggregation-status {
56        type bits {
57            bit aggregation-capability {
58                position 0;
59                description
60                    "79.3.3.1 of IEEE Std 802.3-2022";
61            }
62            bit aggregation-status {
63                position 1;
64                description
65                    "79.3.3.1 of IEEE Std 802.3-2022";
```

```
1      }
2      bit bit2-reserved {
3          position 2;
4          description
5              "79.3.3.1 of IEEE Std 802.3-2022";
6      }
7      bit bit3-reserved {
8          position 3;
9          description
10             "79.3.3.1 of IEEE Std 802.3-2022";
11     }
12     bit bit4-reserved {
13         position 4;
14         description
15             "79.3.3.1 of IEEE Std 802.3-2022";
16     }
17     bit bit5-reserved {
18         position 5;
19         description
20             "79.3.3.1 of IEEE Std 802.3-2022";
21     }
22     bit bit6-reserved {
23         position 6;
24         description
25             "79.3.3.1 of IEEE Std 802.3-2022";
26     }
27     bit bit7-reserved {
28         position 7;
29         description
30             "79.3.3.1 of IEEE Std 802.3-2022";
31     }
32     }
33     config false;
34     description
35         "The bitmap value which contains the link aggregation capabilities and
36         the current aggregation
37         status of the link";
38     reference
39         "30.12.3.1.11 of IEEE Std 802.3-2022";
40 }
41 leaf aggregation-port-id {
42     type int32;
43     config false;
44     description
45         "The unique identifier allocated to this Aggregation Port by the local
46         System.";
47     reference
48         "30.12.3.1.12 of IEEE Std IEEE Std 802.3-2022";
49 }
50 leaf local-max-frame-size {
51     type int32;
52     config false;
53     description
54         "An integer value indicating the maximum supported frame size in octets
55         on the given port of the local system.";
56     reference
57         "30.12.3.1.13 of IEEE Std IEEE Std 802.3-2022";
58 }
59 leaf power-type {
```

```
1      type bits {
2          bit type1-or-greater {
3              position 0;
4              description
5                  "0-type1, 1-greater than type1";
6          }
7          bit pse-or-pd {
8              position 1;
9              description
10                 "0-pse, 1-pd";
11          }
12      }
13  }
14  config false;
15  description
16      "A GET attribute that returns a bit string indicating whether the local
17  system is a PSE or a PD and
18  whether it is Type 1 or greater than Type 1. The first bit indicates
19  Type 1 or greater than Type 1.
20  The second bit indicates PSE or PD. A PSE sets this bit to indicate
21  a PSE. A PD sets this bit to
22  indicate a PD. See also aLldpXdot3LocPowerTypeExt..";
23  reference
24      "30.12.3.1.14 of IEEE Std 802.3-2022";
25  }
26  leaf power-source {
27      type power-source-type;
28      config false;
29      description
30          "Indicates the power sources of the remote system. A PSE indicates whether
31  it is being powered by a primary power source; a backup power source; or unknown.
32  A PD indicates whether it is being powered by a PSE and locally; by a PSE only;
33  or
34          unknown.";
35      reference
36          "30.12.3.1.15 of IEEE Std 802.3-2022";
37  }
38  leaf power-priority {
39      type power-priority-type;
40      description
41          "the priority of the PD system received from the remote system";
42      reference
43          "30.12.3.1.16 of IEEE Std IEEE Std 802.3-2022";
44  }
45  leaf pd-requested-power-value {
46      type int32;
47      config false;
48      description
49          "PD requested power value that was used by the remote system to compute
50  the power value that is has currently allocated to the PD.";
51      reference
52          "30.12.3.1.17 of IEEE Std IEEE Std 802.3-2022";
53  }
54  leaf pd-requested-power-value-a {
55      type int32;
56      config false;
57      description
58          "A GET attribute that returns the PD requested power value for the Mode A
59  pairset that was used
```

```
1         by the remote system to compute the power value that it has cur-
2 rently allocated to the PD. For a
3         PSE, it is the PD requested power value for the Alternative A pair-
4 set received from the remote
5         system. For a PD, it is the PD requested power value for the Alter-
6 native A pairset that the PSE
7         echoes back to the remote system. The definition and encoding of PD
8 requested power value for
9         the Mode A pairset is the same as described in aLldpXdot3LocPDRe-
10 requestedPowerValueA";
11     reference
12         "30.12.3.1.18 of IEEE Std IEEE Std 802.3-2022";
13 }
14     leaf pd-requested-power-value-b {
15         type int32;
16         config false;
17         description
18             "A GET attribute that returns the PD requested power value for the Mode B
19 pairset that was used
20         by the remote system to compute the power value that it has cur-
21 rently allocated to the PD. For a
22         PSE, it is the PD requested power value for the Alternative B pair-
23 set received from the remote
24         system. For a PD, it is the PD requested power value for the Alter-
25 native B pairset that the PSE
26         echoes back to the remote system. The definition and encoding of PD
27 requested power value for
28         the Mode B pairset is the same as described in aLldpXdot3LocPDRe-
29 requestedPowerValueB ";
30     reference
31         "30.12.3.1.19 of IEEE Std IEEE Std 802.3-2022";
32 }
33     leaf pse-allocated-power-value {
34         type int32;
35         config false;
36         description
37             "PSE allocated power value. For a PSE, it is the power value that the PSE
38 has currently allocated to the remote system.
39         For a PD, it is the power value that the PD mirrors back to the
40 remote syste";
41     reference
42         "30.12.3.1.20 of IEEE Std IEEE Std 802.3-2022";
43 }
44     leaf pse-allocated-power-value-a {
45         type int32;
46         config false;
47         description
48             "A GET attribute that returns the PSE allocated power value for the Alter-
49 native A pairset received
50         from the remote system. For a PSE, it is the PSE allocated power
51 value for the Alternative A pairset
52         that was echoed back by the remote PD. For a PD, it is the PSE allo-
53 cated power value for the
54         Mode A pairset received from the remote system. The definition and
55 encoding of PSE allocated
56         power value for the Alternative A pairset is the same as described
57 in
58         aLldpXdot3LocPSEAllocatedPowerValueA";
59     reference
```

```
1      "30.12.3.1.21 of IEEE Std IEEE Std 802.3-2022";
2  }
3  leaf pse-allocated-power-value-b {
4    type int32;
5    config false;
6    description
7      "A GET attribute that returns the PSE allocated power value for the Alter-
8 native B pairset received
9      from the remote system. For a PSE, it is the PSE allocated power
10 value for the Alternative B pairset
11 that was echoed back by the remote PD. For a PD, it is the PSE allo-
12 cated power value for the
13 Mode B pairset received from the remote system. The definition and
14 encoding of PSE allocated
15 power value for the Alternative B pairset is the same as described
16 in
17 aLldpXdot3LocPSEAllocatedPowerValueB";
18 reference
19   "30.12.3.1.22 of IEEE Std IEEE Std 802.3-2022";
20 }
21 leaf pse-powering-status {
22   type powering-status-type;
23   config false;
24   description
25     " A read only value that indicates the powering status of the remote PSE.
26 For a PD, the contents of this
27 attribute are undefined.";
28 reference
29   "30.12.3.1.23 of IEEE Std IEEE Std 802.3-2022";
30 }
31 leaf pd-powered-status {
32   type powered-status-type;
33   config false;
34   description
35     " A read only value that indicates the powering status of the PD. For a
36 PSE, the contents of this attribute are undefined";
37 reference
38   "30.12.3.1.24 of IEEE Std IEEE Std 802.3-2022";
39 }
40 leaf power-pairs-ext {
41   type power-pairs-type;
42   config false;
43   description
44     " A read-only value that identifies the supported PSE Pinout Alternative
45 specified in 145.2.4. For a
46 PD, this attribute contains the value of the aPSEPowerPairs attri-
47 bute (see 30.9.1.1.4). For a PSE,
48 the contents of this attribute are undefined";
49 reference
50   "30.12.3.1.25 of IEEE Std IEEE Std 802.3-2022";
51 }
52 leaf power-class-ext-A {
53   type power-class-ext-AB-type;
54   config false;
55   description
56     "For a dual-signature PD, a read-only value that indicates the currently
57 assigned Class for Mode A
58 by the remote 4-pair PSE. For a single-signature PD or a dual-sig-
59 nature PD connected to a 2-pair
```



```
1           only PSE, a read-only value set to 'singlesig' by the remote PSE.
2 For a PSE connected to a dual-
3           signature PD, a read-only value that indicates the requested Class
4 for Mode A during Physical
5           Layer classification (see 145.2.8) by the remote PD. For a PSE con-
6 nected to a single-signature PD,
7           a read-only value set to 'singlesig' by the remote PD";
8
9     reference
10      "30.12.3.1.26 of IEEE Std IEEE Std 802.3-2022";
11   }
12   leaf power-class-ext-B {
13     type power-class-ext-AB-type;
14     config false;
15     description
16       "For a dual-signature PD, a read-only value that indicates the currently
17 assigned Class for Mode B
18       by the remote 4-pair PSE. For a single-signature PD or a dual-sig-
19 nature PD connected to a 2-pair
20       only PSE, a read-only value set to 'singlesig' by the remote PSE.
21 For a PSE connected to a dual-
22       signature PD, a read-only value that indicates the requested Class
23 for Mode B during Physical
24       Layer classification (see 145.2.8) by the remote PD. For a PSE con-
25 nected to a single-signature PD,
26       a read-only value set to 'singlesig' by the remote PD";
27
28     reference
29      "30.12.3.1.27 of IEEE Std IEEE Std 802.3-2022";
30   }
31   leaf power-class-ext {
32     type power-class-ext-type;
33     config false;
34     description
35       "For a single-signature PD or a dual-signature PD connected to a 2-pair
36 only PSE, a read-only value
37       that indicates the currently assigned Class by the remote PSE. For
38 a dual-signature PD connected
39       to a 4-pair capable PSE, a read-only value set to 'dualsig' by the
40 remote PSE. For a PSE connected
41       to a single-signature PD, a read-only value that indicates the
42 requested Class during Physical Layer
43       classification (see 145.2.8) by the remote PD. For a PSE connected
44 to a dual-signature PD, a read-
45       only value set to 'dualsig' by the remote PD.";
46
47     reference
48      "30.12.3.1.28 of IEEE Std IEEE Std 802.3-2022";
49   }
50   leaf power-type-ext {
51     type power-type;
52     config false;
53     description
54       "A read-only attribute that returns a value to indicate if the remote sys-
55 tem is a Type 3 or Type 4 PSE
56       or PD and, in the case of a Type 3 or Type 4 PD, if it is a single-
57 signature PD or dual-signature PD.";
58
59     reference
60      "30.12.3.1.29 of IEEE Std IEEE Std 802.3-2022";
61   }
62   leaf pd-load {
63     type boolean;
```

```
1      config false;
2      description
3          "For a PSE, a GET attribute that returns whether the load of the remote
4      dual-signature PD is
5          electrically isolated, as defined in 79.3.2.10.2. For a PD, this
6      attribute is set to FALSE.";
7      reference
8          "30.12.3.1.30 of IEEE Std IEEE Std 802.3-2022";
9  }
10     leaf pd-4pid {
11         type boolean;
12         config false;
13         description
14             "A read-only Boolean attribute indicating whether the remote PD system
15 supports powering of both
16             PD Modes.";
17         reference
18             "30.12.3.1.31 of IEEE Std IEEE Std 802.3-2022";
19     }
20     leaf pse-max-avail-power {
21         type int32;
22         config false;
23         description
24             "A GET attribute that returns the remote PSE maximum available power value
25 in units of 0.1 W";
26         reference
27             "30.12.3.1.32 of IEEE Std IEEE Std 802.3-2022";
28     }
29     leaf pse-autoclass-support {
30         type boolean;
31         config false;
32         description
33             "Indicates whether the remote PSE system supports Autoclass.";
34         reference
35             "30.12.3.1.33 of IEEE Std IEEE Std 802.3-2022";
36     }
37     leaf autoclass-completed {
38         type boolean;
39         config false;
40         description
41             "Indicates whether the remote PSE system has completed the Autoclass mea-
42 surement.";
43         reference
44             "30.12.3.1.34 of IEEE Std IEEE Std 802.3-2022";
45     }
46     leaf autoclass-request {
47         type boolean;
48         config false;
49         description
50             "A read-only Boolean attribute indicating whether the remote PD system is
51 requesting an Autoclass measurement.";
52         reference
53             "30.12.3.1.35 of IEEE Std IEEE Std 802.3-2022";
54     }
55     leaf power-down-request {
56         type int32;
57         description
58             "A SET attribute that indicates the remote PD system is requesting a power
59 down when the value is 0x1D.";
60     }
```

```
1         reference
2         "30.12.3.1.36 of IEEE Std IEEE Std 802.3-2022";
3     }
4     leaf power-down-time {
5         type int32;
6         description
7             "A GET attribute that indicates the number of seconds the remote PD
8 requests to stay powered off.
9             A value of zero indicates an indefinite amount of time";
10        reference
11        "30.12.3.1.37 of IEEE Std IEEE Std 802.3-2022";
12    }
13    leaf meas-voltage-support {
14        type boolean;
15        config false;
16        description
17            "A GET attribute that indicates the remote device is capable of providing
18 a voltage measurement.;";
19        reference
20        "30.12.3.1.38 of IEEE Std IEEE Std 802.3-2022";
21    }
22    leaf meas-current-support {
23        type boolean;
24        config false;
25        description
26            "A GET attribute that indicates the remote device is capable of providing
27 a current measurement.;";
28        reference
29        "30.12.3.1.39 of IEEE Std IEEE Std 802.3-2022";
30    }
31    leaf meas-power-support {
32        type boolean;
33        config false;
34        description
35            "A GET attribute that indicates the remote device is capable of providing
36 a power measurement.;";
37        reference
38        "30.12.3.1.40 of IEEE Std IEEE Std 802.3-2022";
39    }
40    leaf meas-energy-support {
41        type boolean;
42        config false;
43        description
44            "A GET attribute that indicates the remote device is capable of providing
45 a energy measurement.;";
46        reference
47        "30.12.3.1.41 of IEEE Std IEEE Std 802.3-2022";
48    }
49    leaf measurement-source {
50        type bits {
51            bit bit1 {
52                position 0;
53                description
54                    "-";
55            }
56            bit bit2 {
57                position 1;
58                description
59                    "-";
60            }
61        }
62    }
63    }
64    }
65    }
66    }
67    }
68    }
69    }
70    }
71    }
72    }
73    }
74    }
75    }
76    }
77    }
78    }
79    }
80    }
81    }
82    }
83    }
84    }
85    }
86    }
87    }
88    }
89    }
90    }
91    }
92    }
93    }
94    }
95    }
96    }
97    }
98    }
99    }
100   }
```

```
1      }
2    }
3    description
4      "A SET attribute value that indicates on which Alternative or Mode the
5 measurement was taken by the remote device.";
6    reference
7      "30.12.3.1.42 of IEEE Std 802.3-2022";
8    }
9
10   leaf meas-voltage-request {
11     type boolean;
12     config false;
13     description
14       "A GET attribute that indicates the remote device is requesting a voltage
15 measurement from the local device.";
16     reference
17       "30.12.3.1.43 of IEEE Std IEEE Std 802.3-2022";
18   }
19   leaf meas-current-request {
20     type boolean;
21     config false;
22     description
23       "A GET attribute that indicates the remote device is requesting a current
24 measurement from the local device.";
25     reference
26       "30.12.3.1.44 of IEEE Std IEEE Std 802.3-2022";
27   }
28   leaf meas-power-request {
29     type boolean;
30     config false;
31     description
32       "A GET attribute that indicates the remote device is requesting a power
33 measurement from the local device.";
34     reference
35       "30.12.3.1.45 of IEEE Std IEEE Std 802.3-2022";
36   }
37   leaf meas-energy-request {
38     type boolean;
39     config false;
40     description
41       "A GET attribute that indicates the remote device is requesting an energy
42 measurement from the local device.";
43     reference
44       "30.12.3.1.46 of IEEE Std IEEE Std 802.3-2022";
45   }
46   leaf meas-voltage-valid {
47     type boolean;
48     config false;
49     description
50       "A GET attribute that indicates the remote device's voltage measurement
51 is valid.";
52     reference
53       "30.12.3.1.47 of IEEE Std IEEE Std 802.3-2022";
54   }
55   leaf meas-current-valid {
56     type boolean;
57     config false;
58     description
59       "A GET attribute that indicates the remote device's current measurement
60 is valid.";
```

```
1      reference
2      "30.12.3.1.48 of IEEE Std IEEE Std 802.3-2022";
3  }
4  leaf meas-power-valid {
5  type boolean;
6  config false;
7  description
8  "A GET attribute that indicates the remote device's power measurement is
9  valid.";
10 reference
11 "30.12.3.1.49 of IEEE Std IEEE Std 802.3-2022";
12 }
13 leaf meas-energy-valid {
14 type boolean;
15 config false;
16 description
17 "A GET attribute that indicates the remote device's energy measurement is
18 valid.";
19 reference
20 "30.12.3.1.50 of IEEE Std IEEE Std 802.3-2022";
21 }
22 leaf meas-voltage-uncertainty {
23 type int32;
24 config false;
25 description
26 "A GET attribute that indicates the expanded uncertainty (coverage factor
27 k = 2) for the remote device's voltage measurement.";
28 reference
29 "30.12.3.1.51 of IEEE Std IEEE Std 802.3-2022";
30 }
31 leaf meas-current-uncertainty {
32 type int32;
33 config false;
34 description
35 "A GET attribute that indicates the expanded uncertainty (coverage factor
36 k = 2) for the remote device's current measurement.";
37 reference
38 "30.12.3.1.52 of IEEE Std IEEE Std 802.3-2022";
39 }
40 leaf meas-power-uncertainty {
41 type int32;
42 config false;
43 description
44 "A GET attribute that indicates the expanded uncertainty (coverage factor
45 k = 2) for the remote device's power measurement.";
46 reference
47 "30.12.3.1.53 of IEEE Std IEEE Std 802.3-2022";
48 }
49 leaf meas-energy-uncertainty {
50 type int32;
51 config false;
52 description
53 "A GET attribute that indicates the expanded uncertainty (coverage factor
54 k = 2) for the remote device's energy measurement.";
55 reference
56 "30.12.3.1.54 of IEEE Std IEEE Std 802.3-2022";
57 }
58 leaf voltage-measurement {
59 type int32;
```

```
1         config false;
2     description
3         "A GET attribute that returns the measured remote device voltage.";
4     reference
5         "30.12.3.1.55 of IEEE Std IEEE Std 802.3-2022";
6 }
7     leaf current-measurement {
8         type int32;
9         config false;
10        description
11            "A GET attribute that returns the measured remote device current.";
12        reference
13            "30.12.3.1.56 of IEEE Std IEEE Std 802.3-2022";
14    }
15        leaf power-measurement {
16            type int32;
17            config false;
18            description
19                "A GET attribute that returns the measured remote device power.";
20            reference
21                "30.12.3.1.57 of IEEE Std IEEE Std 802.3-2022";
22        }
23            leaf energy-measurement {
24                type int32;
25                config false;
26                description
27                    "A GET attribute that returns the measured remote device energy.";
28                reference
29                    "30.12.3.1.58 of IEEE Std IEEE Std 802.3-2022";
30            }
31                leaf pse-power-price-index {
32                    type int32;
33                    config false;
34                    description
35                        "A GET attribute that returns an index of the price of power being sourced
36                        by the remote PSE. For a PSE, this value is undefined.";
37                    reference
38                        "30.12.3.1.59 of IEEE Std IEEE Std 802.3-2022";
39                }
40                    leaf tx-system-value {
41                        type int32;
42                        config false;
43                        description
44                            "Returns the value of Tw_sys_tx that the remote system can support in the
45                            transmit direction.";
46                        reference
47                            "30.12.3.1.60 of IEEE Std IEEE Std 802.3-2022";
48                    }
49                        leaf tx-system-value-echo {
50                            type int32;
51                            config false;
52                            description
53                                "Returns the value of Tw_sys_tx that the local system is advertising that
54                                it can support in the transmit direction and is echoed by the local system under
55                                the control of the IEEE DLL receiver state diagram.";
56                            reference
57                                "30.12.3.1.61 of IEEE Std IEEE Std 802.3-2022";
58                        }
59                            leaf rx-system-value {
```

```
1      type int32;
2      config false;
3      description
4          "Returns the value of Tw_sys_tx that the remote system is requesting in
5 the receive direction.";
6      reference
7          "30.12.3.1.62 of IEEE Std IEEE Std 802.3-2022";
8  }
9
10     leaf rx-system-value-echo {
11         type int32;
12         config false;
13         description
14             "Returns the value of Tw_sys_tx that the local system is advertising that
15 it is requesting in the receive direction and is echoed by the local system under
16 the control of the EEE DLL transmitter state diagram.";
17         reference
18             "30.12.3.1.63 of IEEE Std IEEE Std 802.3-2022";
19     }
20
21     leaf fallback-system-value {
22         type int32;
23         config false;
24         description
25             "Returns the value of the fallback Tw_sys_tx that the remote system is
26 advertising to the remote system.";
27         reference
28             "30.12.3.1.64 of IEEE Std IEEE Std 802.3-2022";
29     }
30
31     leaf tx-system-fw {
32         type boolean;
33         config false;
34         description
35             "Returns the value of LPI_FW that the remote system can support in the
36 transmit direction.";
37         reference
38             "30.12.3.1.65 of IEEE Std IEEE Std 802.3-2022";
39     }
40
41     leaf tx-system-fw-echo {
42         type boolean;
43         config false;
44         description
45             "Returns the value of LPI_FW that the local system is advertising that it
46 can support in the transmit direction and is echoed by the local system under the
47 control of the EEE DLL receiver state diagram.";
48         reference
49             "30.12.3.1.66 of IEEE Std IEEE Std 802.3-2022";
50     }
51
52     leaf rx-system-fw {
53         type boolean;
54         config false;
55         description
56             "Returns the value of LPI_FW that the remote system is requesting in the
57 receive direction.";
58         reference
59             "30.12.3.1.67 of IEEE Std IEEE Std 802.3-2022";
60     }
61
62     leaf rx-system-fw-echo {
63         type boolean;
64         config false;
65         description
```

```
1         "Returns the value of LPI_FW that the local system is advertising that it
2 is requesting in the receive direction and is echoed by the local system under
3 the control of the IEEE DLL transmitter state diagram.";
4         reference
5             "30.12.3.1.68 of IEEE Std IEEE Std 802.3-2022";
6     }
7     leaf preemption-supported {
8         type boolean;
9         config false;
10        description
11            "Indicates whether the given port (associated with the remote System)
12 supports the preemption capability.";
13        reference
14            "30.12.3.1.69 of IEEE Std IEEE Std 802.3-2022";
15    }
16    leaf preemption-enabled {
17        type boolean;
18        config false;
19        description
20            "Indicates whether the preemption capability is enabled on the given port
21 associated with the remote System.";
22        reference
23            "30.12.3.1.70 of IEEE Std IEEE Std 802.3-2022";
24    }
25    leaf preemption-active {
26        type boolean;
27        config false;
28        description
29            "Indicates whether the preemption capability is active on the given port
30 associated with the remote System.";
31        reference
32            "30.12.3.1.72 of IEEE Std IEEE Std 802.3-2022";
33    }
34    leaf additional-fragment-size {
35        type int32;
36        config false;
37        description
38            "Indicate the minimum size of non-final fragments supported by the
39 receiver on the given port associated with the remote System. This value is
40 expressed in units of 64 octets of additional fragment length.";
41        reference
42            "30.12.3.1.72 of IEEE Std IEEE Std 802.3-2022";
43    }
44 }
45 }
46 }
47 }
48 }
49 }
50 }
51 }
52 }
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```


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6. YANG module for Ethernet data terminal equipment (DTE) power via medium dependent interface (MDI) and Power over Data Lines (PoDL)

6.1 Introduction

This clause defines a YANG module to manage power via MDI Power Sourcing Equipment (PSE) and Power over Data Line (PoDL) PSE.

IEEE Std 802.3 defines the hardware registers that allow management interfaces to be built for a DTE Power via MDI and Power over Data Line device. The YANG module defined in this clause extends the Ethernet-interface YANG data modules defined in Clause 5 with the management objects required for the management of PoE and PoDL devices and ports.

6.2 YANG module structure

The *ieee802-ethernet-pse* YANG module of this clause is focused on the configuration and monitoring of the Power over Ethernet (PoE) function defined in IEEE Std 802.3, including power via MDI, as well as Power over Data Line which can also be considered as the single pair PoE. The module augments the *ieee802-ethernet-interface* YANG module with attributes for the PoE function. The module is partitioned into two major containers.

The PoE PSE container describes a multi-pair PSE, while the PoDL PSE describes a single-pair PSE.

6.3 Security considerations for Ethernet data terminal equipment (DTE) power via medium dependent interface (MDI) and Power over Data Line Module

There are a number of data nodes defined in this YANG module that are configurable as read-write. Such data nodes may be considered sensitive or vulnerable in some network environments. The support for configuration operations in a non-secure environment without proper protection can have a negative effect on network operations.

Setting the following data nodes to incorrect values can result in improper operation of the PSE, including the possibility that the Powered Device (PD) does not receive power from the PSE port:

- `pse-enable`
- `powering-pairs`

Some of the readable operational states in this module may be considered sensitive or vulnerable in some network environments. These are as follows:

- `pairs-control-ability`
- `classifications`
- `pd-power-class`
- `pse-type`
- `detected-pd-type`

It is thus important to control GET access to these data nodes and to possibly encrypt their values when sending them over the network.

6.4 Mapping of IEEE Std 802.3, Clause 30 managed objects

This subclause contains the mapping between YANG data nodes included in *ieee802-ethernet-pse* (see Table 6-1) YANG module, managed objects, and attributes defined in IEEE Std 802.3, Clause 30.

Table 6–1—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-ethernet-pse* YANG data nodes

IEEE Std 802.3, Clause 30		Reference	Corresponding <i>ieee802-ethernet-pse</i> YANG data nodes		
Managed object(s)	Attribute(s)		Container(s)	Data node(s)	R/W
N/A	N/A		interfaces/interface/ethernet/pse	supported-pse-type	R
oPSE	aPSEAdminState	30.9.1	interfaces/interface/ethernet/pse/multi-pair	pse-enable	R
	aPSEPowerPairs			powering-pairs	R/W
	aPSEPowerPairsControlAbility			pairs-control-ability	R
	aPSEPowerDetectionStatus			detection-status	R
	aPSEPowerClassification			classifications	R
	aPSEActualPower			actual-power	R
	aPSEPowerAccuracy			power-accuracy	R
	aPSEInvalidSignatureCounter		interfaces/interface/ethernet/pse/multi-pair/statistics	invalid-signature	R
	aPSEPowerDeniedCounter			power-denied	R
	aPSEOverLoadCounter			overload	R
	aPSEShortCounter			short	R
	aPSEMPSAbsentCounter			mps-absent	R
	aPSECumulativeEnergy			cumulative-energy	R

Table 6–1—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-ethernet-pse* YANG data nodes (continued)

IEEE Std 802.3, Clause 30		Reference	Corresponding <i>ieee802-ethernet-pse</i> YANG data nodes		
Managed object(s)	Attribute(s)		Container(s)	Data node(s)	R/W
oPoDLPSE	aPoDLPSEAdminState	30.15	interfaces/interface/ethernet/pse/single-pair	pse-enable	R
	aPoDLPSEPowerDetectionStatus			detection-status	R
	aPoDLPSEType			podl-type	R
	aPoDLPSEDetectedPDType			detected-pd-type	R
	aPoDLPSEDetectedPDPowerClass			pd-power-class	R
	aPoDLPSEActualPower			actual-power	R
	aPoDLPSEPowerAccuracy			power-accuracy	R
	aPoDLPSEInvalidSignatureCounter		interfaces/interface/ethernet/pse/single-pair/statistics	invalid-signature	R
	aPoDLPSEInvalidClassCounter			invalid-class	R
	aPoDLPSEPowerDeniedCounter			power-denied	R
	aPoDLPSEOverLoadCounter			overload	R
	aPoDLPSEMaintainFullVoltageSignatureAbsentCounter			fvs-absent	R
	aPoDLPSECumulativeEnergy			cumulative-energy	R

6.5 YANG module definition¹

The YANG module tree hierarchy uses terms defined in IETF RFC 8407.

6.5.1 Tree hierarchy

```

module: ieee802-ethernet-pse
  augment /if:interfaces/if:interface/ieee802-eth-if:ethernet:
    +--rw pse
      +--ro supported-pse-type?    identityref
      +--rw multi-pair!
        | +--rw pse-enable?        boolean
        | +--rw powering-pairs?    identityref
        | +--ro pairs-control-ability? boolean
        | +--ro detection-status?   multi-pair-detection-state
        | +--ro classifications?    power-class
        | +--ro statistics
        | | +--ro power-denied?     yang:counter64
        | | +--ro invalid-signature? yang:counter64
        | | +--ro mps-absent?       yang:counter64
        | | +--ro overload?         yang:counter64
        | | +--ro short?            yang:counter64
        | | +--ro cumulative-energy?  yang:counter64
        | +--ro actual-power?       decimal64
        | +--ro power-accuracy?     int64
      +--rw single-pair!
        +--rw pse-enable?          boolean
        +--ro detection-status?     single-pair-detection-state
        +--ro podl-type?            enumeration
        +--ro detected-pd-type?     enumeration
        +--ro pd-power-class?       power-class
        +--ro statistics
        | +--ro power-denied?       yang:counter64
        | +--ro invalid-signature?   yang:counter64
        | +--ro invalid-class?       yang:counter64
        | +--ro overload?            yang:counter64
        | +--ro fvs-absence?         yang:counter64
        | +--ro cumulative-energy?    yang:counter64
        +--ro actual-power?          decimal64
        +--ro power-accuracy?        int64

```

¹Copyright release for YANG modules: Users of this standard may freely reproduce the YANG module contained in this subclause so that it can be used for its intended purpose.

6.5.2 YANG module

In the following YANG module definition, should any discrepancy between the text of the description for individual YANG nodes and the corresponding definition in 6.2 through 6.5 of this clause occur, the definitions and mappings in 6.5 shall take precedence.

An ASCII text version of the YANG module can be found at the following URL:^m <https://github.com/YangModels/yang/tree/master/standard/ieee/published/802.3>.

```
module ieee802-ethernet-pse{
  yang-version 1.1;
  namespace "urn:ieee:std:802.3:yang:ieee802-ethernet-pse";
  prefix ieee802-pse;

  revision 2019-06-21 {
    description "Initial revision.";
  }

  import ietf-interfaces {
    prefix "if";
    reference "IETF RFC 8343";
  }

  import ietf-yang-types {
    prefix yang;
    reference "IETF RFC 6991";
  }

  import ieee802-ethernet-interface {
    prefix ieee802-eth-if;
  }

  organization
    "IEEE 802.3 Ethernet Working Group
    Web URL: http://www.ieee802.org/3/";

  contact
    "Web URL: http://www.ieee802.org/3/";

  description
    "This module contains YANG definitions for configuring and
    managing ports with Power Over Ethernet feature defined by
    IEEE 802.3. It provides functionality roughly equivalent to
    that of the POWER-ETHERNET-MIB defined in IETF RFC 3621.";

  reference
    "IEEE Std 802.3-2018, unless dated explicitly";

  typedef multi-pair-detection-state {
    type enumeration {
      enum disabled {
        value 1;
      }
    }
  }
```

^mCopyright release for YANG modules: Users of this standard may freely reproduce the YANG module contained in this subclause so that it can be used for its intended purpose.

```
1         description "PSE disabled.";
2     }
3     enum searching {
4         value 2;
5         description "PSE is searching.";
6     }
7     enum deliveringPower {
8         value 3;
9         description "PSE is delivering power.";
10    }
11    enum fault {
12        value 4;
13        description "PSE fault detected.";
14    }
15    enum test {
16        value 5;
17        description "PSE test mode.";
18    }
19    enum otherFault {
20        value 6;
21        description "PSE implementation specific fault detected.";
22    }
23    }
24    description
25    "Detection state of a multi-pair PSE.";
26    reference
27    "IEEE Std 802.3, 30.9.1.1.5";
28 }
29
30 typedef single-pair-detection-state{
31     type enumeration {
32         enum unknown {
33             value 1;
34             description "True detection state unknown.";
35         }
36         enum disabled {
37             value 2;
38             description "PoDL PSE is disabled.";
39         }
40         enum searching {
41             value 3;
42             description "PoDL PSE is searching.";
43         }
44         enum deliveringPower {
45             value 4;
46             description "PoDL PSE is delivering power.";
47         }
48         enum sleep {
49             value 5;
50             description "PoDL PSE is in sleep state.";
51         }
52         enum idle {
53             value 6;
54             description "PoDL PSE is idle.";
55         }
56     }
57 }
```

```
1      }
2      enum error {
3          value 7;
4          description "PoDL PSE error.";
5      }
6  }
7
8
9  description
10     "Detection state of a PoDL PSE.";
11
12  reference
13     "IEEE Std 802.3, 30.15.1.1.3";
14 }
15
16 typedef power-class {
17     type enumeration {
18         enum class0 {
19             value 1;
20             description "Class 0";
21         }
22         enum class1 {
23             value 2;
24             description "Class 1";
25         }
26         enum class2 {
27             value 3;
28             description "Class 2";
29         }
30         enum class3 {
31             value 4;
32             description "Class 3";
33         }
34         enum class4 {
35             value 5;
36             description "Class 4";
37         }
38         enum class5 {
39             value 6;
40             description "Class 5 (for PoDL-only)";
41         }
42         enum class6 {
43             value 7;
44             description "Class 6 (for PoDL-only)";
45         }
46         enum class7 {
47             value 8;
48             description "Class 7 (for PoDL-only)";
49         }
50         enum class8 {
51             value 9;
52             description "Class 8 (for PoDL-only)";
53         }
54         enum class9 {
55             value 10;
56             description "Class 9 (for PoDL-only)";
57         }
58     }
59 }
```



```
1      }
2      enum unknown {
3          value 11;
4          description
5              "Initializing, true Power Class not yet known
6              (only for PoDL PSE).";
7      }
8  }
9  }
10 }
11 description
12     "Power class.";
13 reference
14     "IEEE Std 802.3, 30.9.1.1.6 aPSEPowerClassification and
15     IEEE Std 802.3, 30.15.1.1.6 aPoDLPSEDetectedPDPowerClass.";
16 }
17
18
19 identity pse-type {
20     description "Base type for PSE.";
21 }
22
23
24 identity multi-pair {
25     base pse-type;
26     description "PSE supports IEEE Std 802.3, Clause 33.";
27 }
28
29
30 identity single-pair {
31     base pse-type;
32     description "PSE support IEEE Std 802.3, Clause 104.";
33 }
34
35
36 identity powering-pairs {
37     description "Base type for powering pairs.";
38 }
39
40 identity signal {
41     base powering-pairs;
42     description "The signal pair is in use.";
43 }
44
45 identity spare {
46     base powering-pairs;
47     description "The spare pair is in use.";
48 }
49
50 augment "/if:interfaces/if:interface/ieee802-eth-if:ethernet" {
51     description
52         "Augments ethernet interface configuration model with
53         nodes specific to DTE Power via MDI devices and ports";
54
55     container pse {
56         description
57             "DTE Power via MDI port configuration";
58         reference
59             "IEEE Std 802.3, 30.9.1 PoE PSE & IEEE Std 802.3, 30.15.1 PoDL
60             PSE";
61
62         leaf supported-pse-type {
63
64
65
```

```
1      type identityref {
2          base ieee802-pse:pse-type ;
3      }
4      config false;
5      description
6          "PSE may support IEEE Std 802.3, Clause 33 or
7           IEEE Std 802.3, Clause 104.";
8      }
9
10
11
12  container multi-pair {
13      presence "PSE port supports IEEE Std 802.3, Clause 33.";
14
15      description
16          "PSE port configuration in IEEE Std 802.3, 30.9.1.";
17
18      leaf pse-enable {
19          type boolean;
20          default false;
21          description
22              "When true enables the PSE function on the interface,
23               when false disables the PSE function on the interface.";
24          reference
25              "IEEE Std 802.3, 30.9.1.1.2 aPSEAdminState";
26      }
27
28      leaf powering-pairs {
29          type identityref {
30              base powering-pairs;
31          }
32          description
33              "Describes or controls the PSE pairs in use. If the value of
34               pairs-control-ability is true, this object is
35               writeable.";
36          reference
37              "IEEE Std 802.3, 30.9.1.1.4 aPSEPowerPairs";
38      }
39
40      leaf pairs-control-ability {
41          type boolean;
42          default true;
43          config false;
44          description
45              "Describes the ability to control switching the
46               power sourcing pins of the PSE.";
47          reference
48              "IEEE Std 802.3, 30.9.1.1.3 aPSEPowerPairsControlAbility";
49      }
50
51      leaf detection-status {
52          type multi-pair-detection-state;
53          config false;
54          description
55              "Describes the operational status of the port
```

```
1         PD detection.";
2     reference
3         "IEEE Std 802.3, 30.9.1.1.5 aPSEPowerDetectionStatus";
4     }
5
6
7     leaf classifications {
8         when "../detection-status = 'deliveringPower'" {
9             description
10                "This node only applies when the detection status is
11                delivering power.";
12            }
13        }
14        type power-class;
15        config false;
16        description
17            "The power class of the PSE port.";
18        reference
19            "IEEE Std 802.3, 30.9.1.1.6 aPSEPowerClassification";
20    }
21
22
23    container statistics {
24        config false;
25        description
26            "statistics information of the multi-pair port.";
27
28
29        leaf power-denied {
30            type yang:counter64;
31            description
32                "This counter is incremented when the PSE state diagram
33                enters the POWER_DENIED state, per IEEE Std 802.3,
34                Figure 33-9.";
35            reference
36                "IEEE Std 802.3, 30.9.1.1.8 aPSEPowerDeniedCounter";
37        }
38
39
40        leaf invalid-signature {
41            type yang:counter64;
42            description
43                "This counter is incremented when the PSE state diagram
44                enters the SIGNATURE_INVALID state per IEEE Std 802.3,
45                Figure 33-9.";
46            reference
47                "IEEE Std 802.3, 30.9.1.1.7 aPSEInvalidSignatureCounter";
48        }
49
50
51        leaf mps-absent {
52            type yang:counter64;
53            description
54                "This counter is incremented when the PSE
55                transitions directly from the POWER_ON state to the
56                IDLE state due to tmpdo_timer_done being asserted,
57                per IEEE Std 802.3, Figure 33-9.";
58            reference
59                "IEEE Std 802.3, 30.9.1.1.11 aPSEMPSAbsentCounter";
60        }
61    }
62
63
64
65
```

```
1
2     leaf overload {
3         type yang:counter64;
4         description
5             "This counter is incremented when the PSE state diagram
6             enters the ERROR_DELAY state due to the ovld_detected
7             variable being TRUE, per IEEE Std 802.3, Figure 33-9.";
8         reference
9             "IEEE Std 802.3, 30.9.1.1.9 aPSEOverLoadCounter";
10    }
11
12    leaf short {
13        type yang:counter64;
14        description
15            "This counter is incremented when the PSE state diagram
16            enters the ERROR_DELAY state due to the short_detected
17            variable being TRUE, per IEEE Std 802.3, Figure 33-9.";
18        reference
19            "IEEE Std 802.3, 30.9.1.1.10 aPSEShortCounter";
20    }
21
22    leaf cumulative-energy {
23        type yang:counter64;
24        units millijoules;
25        description
26            "The cumulative energy supplied by the PSE as measured at
27            the MDI in millijoules.";
28        reference
29            "IEEE Std 802.3, 30.9.1.1.14 aPSECumulativeEnergy";
30    }
31
32    }
33
34    leaf actual-power {
35        type decimal64 {
36            fraction-digits 4;
37        }
38        units milliwatts;
39        config false;
40        description
41            "The actual power drawn by a PD over the port.";
42        reference
43            "IEEE Std 802.3, 30.9.1.1.12 aPSEActualPower";
44    }
45
46    leaf power-accuracy {
47        type int64;
48        units milliwatts;
49        config false;
50        description
51            "An integer value indicating the accuracy
52            associated with power-accuracy in +/- milliwatts.";
```

```
1         reference
2             "IEEE Std 802.3, 30.9.1.1.13 aPSEPowerAccuracy";
3     }
4
5
6 }
7
8 container single-pair {
9     presence "PSE port working in PoDL.";
10
11
12     description
13         "PoDL PSE configuration as defined in
14         IEEE Std 802.3, 30.15.1.";
15
16     leaf pse-enable {
17         type boolean;
18         default false;
19         description
20             "When true enables the PSE function on the interface,
21             when false disables the PSE function on the interface.";
22         reference
23             "IEEE Std 802.3, 30.15.1.1.2 aPoDLPSEAdminState";
24     }
25
26     leaf detection-status {
27         type single-pair-detection-state;
28         config false;
29         description
30             "Indicates the current status of the PoDL PSE.";
31         reference
32             "IEEE Std 802.3, 30.15.1.1.3 aPoDLPSEPowerDetectionStatus";
33     }
34
35     leaf podl-type {
36         type enumeration {
37             enum unknown {
38                 description "Unknown PSE type.";
39             }
40             enum typeA {
41                 description "TypeA";
42             }
43             enum typeB {
44                 description "TypeB";
45             }
46             enum typeC {
47                 description "TypeC";
48             }
49             enum typeD {
50                 description "TypeD";
51             }
52         }
53         config false;
54         description "PSE type specified in IEEE Std 802.3, 104.4.1.";
55     }
56 }
57
58
59
60
61
62
63
64
65
```

```
1      leaf detected-pd-type {
2          when "../detection-status = 'deliveringPower'" {
3              description
4                  "This node only applies when the detection status is
5                  delivering power.";
6          }
7      }
8
9      type enumeration {
10         enum unknown {
11             description "Unknown";
12         }
13         enum typeA {
14             description "TypeA";
15         }
16         enum typeB {
17             description "TypeB";
18         }
19         enum typeC {
20             description "TypeC";
21         }
22         enum typeD {
23             description "TypeD";
24         }
25     }
26     config false;
27     description
28         "Indicates the Type of the detected PoDL PD as specified in
29         IEEE Std 802.3, 104.5.1.";
30
31     reference
32         "IEEE Std 802.3, 30.15.1.1.5 aPoDLPSEDetectedPDType";
33 }
34
35 leaf pd-power-class {
36
37     when "../detection-status = 'deliveringPower'" {
38         description
39             "This node only applies when the detection status is
40             delivering power.";
41     }
42
43     type power-class;
44     config false;
45     description
46         "Power class of the PD detected on the PSE port.";
47     reference
48         "IEEE Std 802.3, 30.15.1.1.6 aPoDLPSEDetectedPDPowerClass";
49 }
50
51 container statistics {
52     config false;
53     description "Statistics information of the single-pair PSE";
54
55     leaf power-denied {
```

```
1         type yang:counter64;
2     description
3         "This counter is incremented when the PoDL PSE state
4         diagram variable power_available transitions from true
5         to false (see IEEE Std 802.3, 104.4.3.3).";
6     reference
7         "IEEE Std 802.3, 30.15.1.1.9 aPoDLPSEPowerDeniedCounter";
8 }
9
10
11 leaf invalid-signature {
12     type yang:counter64;
13     description
14         "This counter is incremented when the PSE state diagram
15         enters the SIGNATURE_INVALID state per
16         IEEE Std 802.3, Figure 33-9.";
17     reference
18         "IEEE Std 802.3, 30.15.1.1.7
19         aPoDLPSEInvalidSignatureCounter";
20 }
21
22
23 leaf invalid-class {
24     type yang:counter64;
25     description
26         "This counter is incremented when the PoDL PSE state
27         diagram variable tclass_timer_done transitions from false
28         to true or when the valid_class variable transitions from
29         true to false (see IEEE Std 802.3, 104.4.3.3).";
30     reference
31         "IEEE Std 802.3, 30.15.1.1.8 aPoDLPSEInvalidClassCounter";
32 }
33
34
35 leaf overload {
36     type yang:counter64;
37     description
38         "This counter is incremented when the PSE state diagram
39         variable overload_held transitions from false to true
40         (see IEEE Std 802.3, 104.4.3.3).";
41     reference
42         "IEEE Std 802.3, 30.15.1.1.10 aPoDLPSEOverLoadCounter";
43 }
44
45
46 leaf fvs-absence {
47     type yang:counter64;
48     description
49         "Maintain Full Voltage Signature absent counter.
50         This counter is incremented when the PoDL PSE state
51         diagram variable mfvs_timeout transitions from false to
52         true (see IEEE Std 802.3, 104.4.3.3).";
53     reference
54         "IEEE Std 802.3, 30.15.1.1.11
55         aPoDLPSEMaintainFullVoltageSignatureAbsentCounter";
56 }
57
58
59
60
61
62
63
64
65
```

```
1
2
3     leaf cumulative-energy {
4         type yang:counter64;
5         units millijoules;
6         description
7             "A count of the cumulative energy supplied by the PoDL
8             PSE, measured at the MDI, and expressed in units of
9             millijoules.";
10        reference
11            "IEEE Std 802.3, 30.15.1.1.14 aPoDLPSECumulativeEnergy";
12    }
13
14
15
16
17
18
19
20
21    leaf actual-power {
22        type decimal64 {
23            fraction-digits 4;
24        }
25
26
27
28        units milliwatts;
29        config false;
30        description
31            "An integer value indicating present (actual) power being
32            supplied by the PoDL PSE as measured at the MDI in
33            milliwatts.";
34        reference
35            "IEEE Std 802.3, 30.15.1.1.12 aPoDLPSEActualPower";
36    }
37
38
39
40
41
42
43
44    leaf power-accuracy {
45        type int64;
46        units milliwatts;
47        config false;
48        description
49            "A signed integer value indicating the accuracy associated
50            with power-accuracy in milliwatts.";
51        reference
52            "IEEE Std 802.3, 30.15.1.1.13 aPoDLPSEPowerAccuracy";
53    }
54
55
56
57
58
59
60
61
62
63
64
65
```


7. YANG module for Ethernet Passive Optical Network (EPON)

7.1 Introduction

This clause defines a YANG module to manage Ethernet Passive Optical Network (EPON).

7.2 YANG module structure

The *ieee802-ethernet-pon* YANG module of this clause is focused on the configuration and monitoring of EPON.

7.2.1 Introduction

EPON is defined in IEEE Std 802.3, covering Physical Layers and Media Access Control sublayers. The Passive Optical Network (PON) is comprised of sections of single-mode fiber connected with passive optical splitter/coupler devices, forming a passive optical tree, as shown in Figure 7–1. Individual branches of the PON are terminated with the Optical Line Terminal (OLT) in the Central Office or at remote optical nodes, and Optical Network Units (ONUs) near the subscribers. ONUs can be located either in some remote location (e.g., basement in a multi-dwelling unit) or directly at the subscriber premises. Various types of Customer Premises Equipment (CPE) can be connected to ONUs or even integrated with such devices. Figure 7–1 presents an example PON topology.

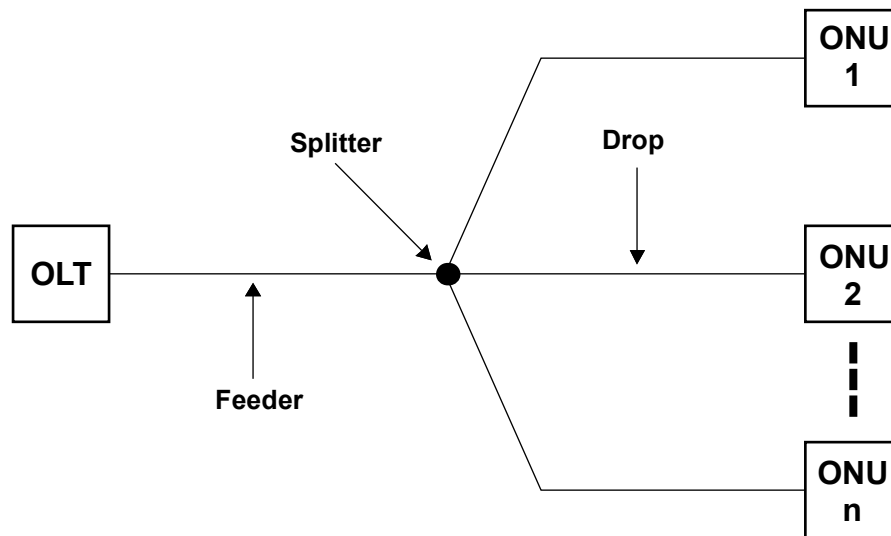


Figure 7–1—PON topology example

The following clauses in IEEE Std 802.3 define 1G-EPON:

- Clause 60: Physical Medium Dependent (PMD) sublayer for 1G-EPON
- Clause 64: MPCP (Multipoint Control Protocol) for 1G-EPON
- Clause 65: Reconciliation Sublayer (RS), Physical Coding Sublayer (PCS), and Physical Media Attachment (PMA) sublayers for 1G-EPON

The following clauses in IEEE Std 802.3 define 10G-EPON:

- Clause 75: PMD sublayer for 10G-EPON
- Clause 76: RS, PCS, and PMA sublayers for 10G-EPON

— Clause 77: MPCP for 10G-EPON

Additionally, IEEE Std 802.3, Clause 30 and Clause 45 are also applicable to EPON.

7.2.2 Principles of operation

The EPON specification extended the specification of Gigabit Ethernet (in case of 1G-EPON) or 10 Gigabit Ethernet (in case of 10G-EPON) as described in IEEE Std 802.3. The Ethernet MAC operates at the data rate of 1 Gb/s (in 1G-EPON) or 10 Gb/s (in 10G-EPON) and it is connected to a media dependent interface through the GMII (in 1G-EPON) or XGMII (in 10G-EPON) interface. The EPON PCS layer extended the Ethernet PCS, adding burst-mode operation capabilities and EPON-specific forward error correction (FEC). The following new, EPON-specific layers were added:

- MPCP is placed in the MAC control layer, providing EPON media access, station discovery, and registration protocol.
- Functionality of the reconciliation sublayer (RS) was extended, creating logical links over shared passive optical medium, providing private transmission channels to each of the connected ONU.
- FEC functionality (optional in 1G-EPON, mandatory in 10G-EPON) located in the PCS was added, extending the Ethernet PCS layer, enhancing reach and split performance of the EPON optical link.

Figure 7–2 presents the EPON layering model.

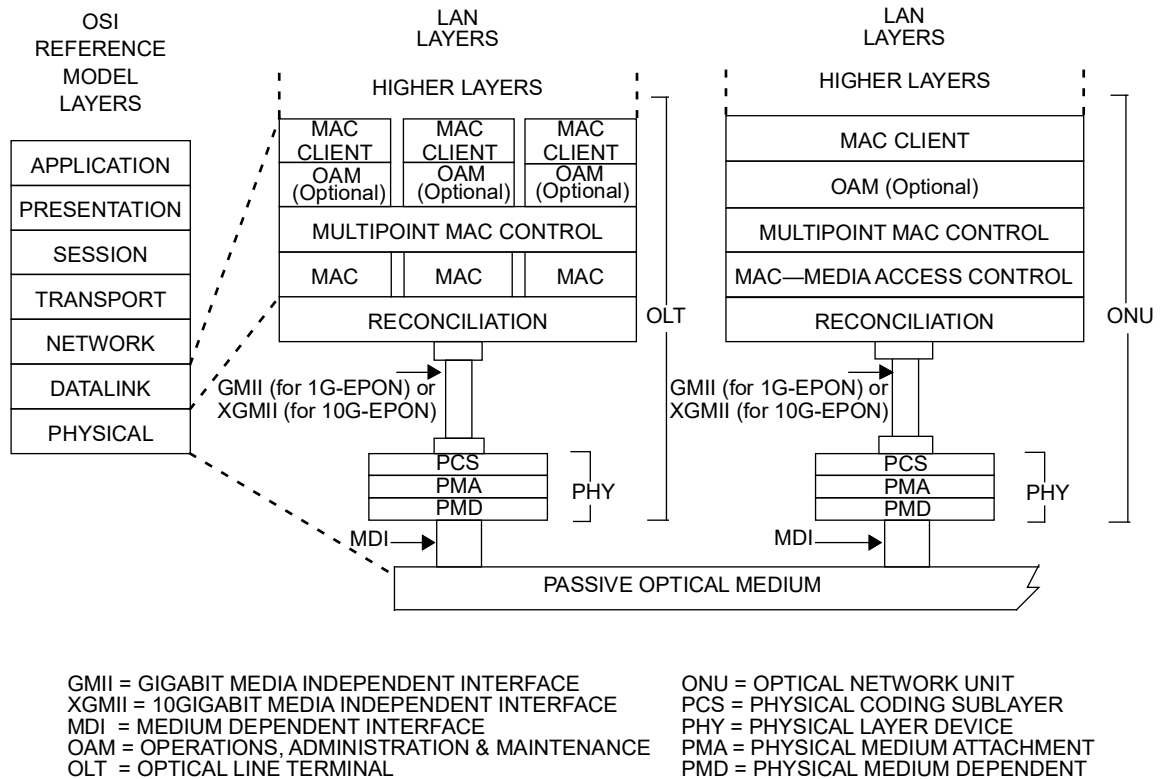


Figure 7–2—Relationship of Multipoint MAC Control and the OSI protocol stack

7.2.3 Physical media

The physical link in EPON comprises single-mode fiber. The OLT and ONUs are connected through a passive optical network comprising sections of single-mode fiber interconnected with passive splitter/coupler devices.

The term *downstream* denotes transmission from the OLT to all connected ONUs, while the term *upstream* denotes transmission from the connected ONUs (one at the time) to the OLT. Upstream and downstream transmissions are wavelength division multiplexed (WDM) into a single strand of single-mode fiber, sharing the same physical link.

The downstream transmission channel is continuously available to the OLT, thus Time Division Multiplexing (TDM) is used. Transmissions from the OLT arrive at all of the connected ONUs and the individual ONUs filter data from the OLT's transmission based on the logical link identifiers (LLID) assigned to them during the registration and discovery process.

The upstream transmission channel is shared among a number of connected and registered ONUs using time-division multiple access (TDMA). Access to the upstream channel is controlled via the Multipoint Control Protocol (MPCP), where the OLT plays the role of the master and ONUs play the role of slave devices. An ONU upon registration remains silent until registered and once registered, it transmits data towards OLT only when granted a transmission opportunity (slot).

7.2.4 PMD specifications

The EPON PMD specifications are based on a wavelength plan defined in IEEE Std 802.3, Clause 60 (1G-EPON) and Clause 75 (10G-EPON). The OLT and ONU optical parameters were derived in part from applicable Ethernet PMD specifications, with the addition of WDM capabilities, and burst mode operation for ONU transmitters and the OLT receiver.

The upstream burst mode operation capability corresponds directly to the TDMA operation in the upstream direction, where queued data is burst from individual ONUs at full data rate for the duration of the allocated transmission period. Once completed, the ONU goes silent and another ONU starts transmitting its data.

7.2.5 Principles of the MPCP

The EPON standard comprises a mechanism for media access control, referred to as Multipoint Control Protocol (MPCP). An access network architecture is different from a typical LAN environment, primarily in terms of network provisioning. An access network is an administrated environment, with an operator providing services and subscribers consuming it depending on service provisioning contracts. The operator controls the network, manages traffic and medium access, and enforces the service level agreements. For instance, the available bandwidth is controlled and subscribers may be billed for services. In this sense, the access network (and EPON specifically) requires a media access control protocol that provides a mechanism for station discovery and registration as well as bandwidth provisioning capabilities.

In the MPCP, the OLT is considered to be the master, controlling a series of connected ONUs (slave devices). The OLT manages the network and controls access to network resources from individual slave devices. The MPCP is also used for provisioning upstream channel access to individual slave devices via a MPCPDU pair i.e., GATE and REPORT. The MPCP is part of the MAC control layer and MPCPDUs are considered MAC control messages, carrying a specific Ethertype of 0x8808. These messages are not forwarded outside of the EPON domain and are used to manage the EPON link only.

A concept of time exists in the MPCP in order to schedule the upstream transmission. A timestamp, which is transmitted in the MPCPDUs downstream by the OLT and received by the connected ONUs, is used to synchronize slave devices to the master device clock. This coordinates upstream transmissions from individual

ONUs so that the transmissions arrive at the OLT at the precisely anticipated time, and thus data from different ONUs do not overlap.

The MPCP plane is also used to measure the round-trip time (RTT) for each connected ONU. Each MPCPDU carries a generalized timestamp field, which is filled in by the transmitting station with the current value of its MPCP clock at the time when the given MPCPDU is transmitted. The RTT is measured first during the discovery and registration process and then updated regularly upon each exchange of MPCPDUs between the OLT and one of the ONUs. RTT is used by the OLT bandwidth scheduler to schedule upstream transmission slots for individual ONUs in a non-overlapping manner. The IEEE 802.3 EPON standard provides support for the network diameter (distance between the OLT and the farthest ONU) of nominally up to 20 km, which corresponds to the RTT of approximately 200 μ s. However, nothing in the standard precludes support for larger network diameters.

The TDMA control is performed using a pair of MPDPUs, namely GATE generated by the OLT to indicate a future transmission opportunity to an ONU and REPORT generated by the ONU with information on the current queue status (bandwidth demand). Internal structure and possible encoding of GATE and REPORT MPCPDUs are defined in IEEE Std 802.3, Clause 64 (for 1G-EPON) and Clause 77 (for 10G-EPON).

A scheduling algorithm at the OLT, which is not defined in IEEE Std 802.3, is responsible for dividing the bandwidth and controlling the transmission delay of each ONU according to its service level agreement. The MPCP defines a closed loop operation in order for this algorithm to be efficient. The MPCP allows the ONUs to report on the amount of bandwidth they require for transmission using a special REPORT message. This allows allocating bandwidth to an ONU only when requested, relying on the statistical burst property of the traffic, and allowing different peak bandwidths for different ONUs at different times; hence, allowing oversubscription of the bandwidth. The REPORT message reports the amount of data waiting in the ONU queues.

In addition, the MPCP defines a protocol of auto-discovery and registration of ONUs.

The MPCP registration process is presented in Figure 7–3, while details are described in IEEE Std 802.3, Clause 64 (for 1G-EPON) and Clause 77 (for 10G-EPON). Note that MPCP for 10G-EPON supports the coexistence mode, i.e., simultaneous operation of 1G-EPON and 10G-EPON devices on the same fiber plant, through time sharing the upstream transmission channel.

A new ONU requests to register during a special upstream window (called Discovery Window), sending the REGISTER_REQ MPCPDU. More than one ONU may attempt registration during that window, which means that their REGISTER_REQ MPCPDUs can potentially collide at the OLT receiver, since the ONU-specific RTT is not yet known and transmissions from individual ONUs cannot be scheduled in a non-overlapping manner. A random backoff mechanism was therefore developed and is used to increase the registration success probability.

When the OLT receives a REGISTER_REQ MPCPDU from an ONU, a decision a non-overlapping on registration is taken and an LLID is assigned to that ONU. Next, the OLT sends a REGISTER MPCPDU to that ONU, informing the given slave device whether it is admitted to network or not. The registration process is completed with the ONU sending REGISTER_ACK MPCPDU to the OLT, confirming assigned parameters and registration in the network. From that point onward, the OLT can schedule transmissions from that ONU using its LLID and the measured RTT so that its transmissions do not collide with other ONUs.

Additional higher layer protocols may be employed to authenticate the ONU and allow it to participate in the network; however, their specification is outside the scope of IEEE Std 802.3.

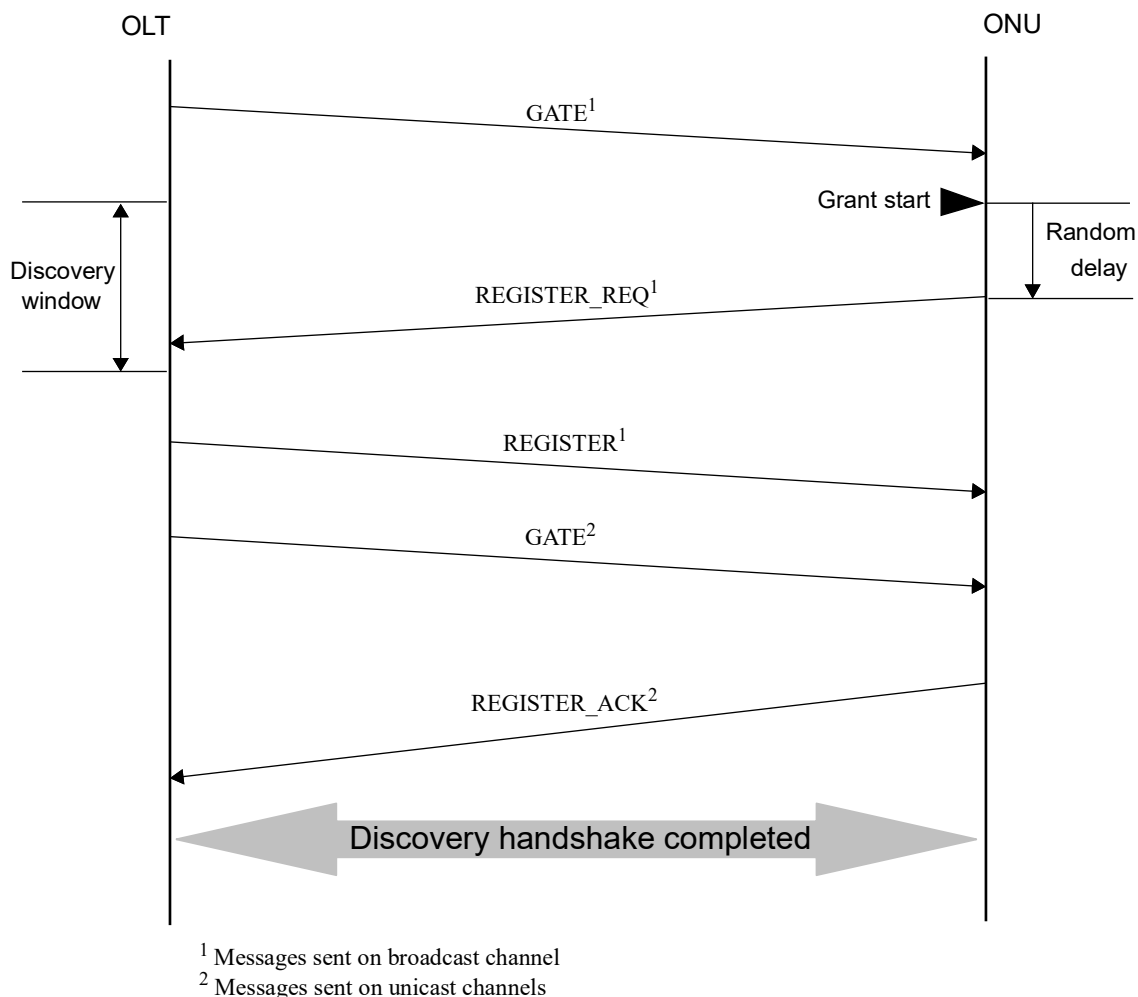


Figure 7-3—Discovery handshake message exchange

7.2.6 Forward error correction (FEC)

The FEC mechanism is optional for 1G-EPON and is defined to enhance the 1G-EPON link budget. All the passive components of the fiber plant attenuate the optical signal, thus the target distance (network diameter) and the number of supported splits is limited by the available link budget. The optional FEC mechanism increases the available link budget by improving the link BER from 10^{-4} to 10^{-12} (the target BER at the MAC), effectively increasing the target network diameter and/or split ratio. The target use of the increased power budget remains at the sole discretion of the network architects and is out of the scope of IEEE Std 802.3.

The optional FEC used in 1G-EPON is frame-based, meaning that parity information is added at the end of each Ethernet packet. Extra space between individual Ethernet packets is provided by the MAC rate adaptation function, while extra idle symbols were replaced within the FEC function.

The start and end of packet codewords also define the FEC boundaries, and they are outside the FEC protection. They are replaced by a series of symbols to reduce their vulnerability to link errors.

Figure 7–4 presents the structure of an FEC-protected 1G-EPON frame.

The optional FEC function is added to the extended Gigabit Ethernet PCS per 65.2 in IEEE Std 802.3. The added, optional FEC function introduces a fixed delay in receive path and transmit path.



Figure 7–4—1G-EPON FEC-protected frame

The FEC mechanism is mandatory for 10G-EPON, and similarly to 1G-EPON – defined to enhance the EPON link budget. The mandatory FEC mechanism increases the available link budget by improving the link BER from 2×10^{-3} to 10^{-12} (the target BER at the MAC), effectively increasing the target network diameter and/or split ratio. The target use of the increased power budget remains at the sole discretion of the network architects and is out of the scope of IEEE Std 802.3. The mandatory FEC used in 10G-EPON is stream-based, meaning that 32 parity symbols are inserted into the bit stream at regular intervals (every 223 information symbols). Details of the FEC encoding process in 10G-EPON are described in IEEE Std 802.3, 76.3.2.4, including the structure of the resulting frame and the resulting bit ordering shown in IEEE Std 802.3, Figure 76-12.

7.2.7 Management architecture

All of the EPON layers are accompanied by a management interface that is controlled through mechanisms defined in Clause 30 of IEEE Std 802.3. Since IEEE Std 802.3 specifications may be used for different applications (and hence are extensible), and some of the clauses may be used separately, the management clause allocates a separate package for each independent layer. The structure of the modules follows this separation.

Figure 7–5 presents the relation of the module groups to the individual IEEE Std 802.3 layers.

The association is straightforward for the ONU interface. There is one logical and one physical interface, and a single copy of each layer can be remotely queried by the OLT.

The OLT has a single physical interface and N logical interfaces, one for each logical link connected to an ONU. There is also one logical interface for the single copy broadcast link. Per layering diagram in Figure 7–5, the MAC sublayer is virtually replicated. Therefore, in this clause it was elected that management of logical interfaces is performed in the manner identical to management of any physical interfaces—an interface index is allocated for each one of the logical links, and an additional interface index is allocated for the OLT.

Each row in the tables is indexed according to the ifIndex; specifically, there is a row for each logical link. There are some control objects that are shared and are the same for the logical interfaces (and they should have the same value for each ifIndex), but most of the objects have different values for N+1 logical interfaces at the OLT. This is done for each YANG group. It is different from the EPON layering diagram, which presents the P2MP layer as a single layer, while duplicating the MAC and MAC client layers (please see Figure 7–5). However, from a management perspective, it is more convenient to partition the management of the layers for the logical links, as the atomic managed entity is the logical link. It is also convenient to use the interface index of the logical link for that purpose, as it is already used to index the rows of the logical links at the Interface, MAU, and Ethernet-like interface YANG module.

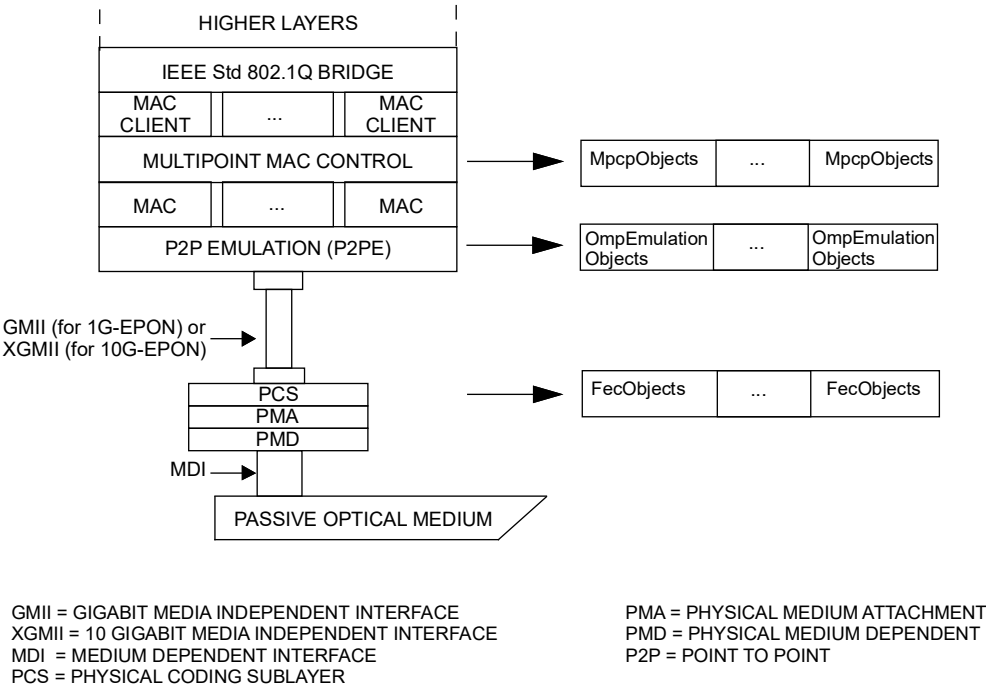


Figure 7–5—Relationship of the YANG module to the EPON sublayers

7.3 Mapping of IEEE Std 802.3, Clause 30 managed objects

This sub-clause contains the mapping between YANG data nodes included in *ieee802-ethernet-pon* (see Table 7–1) YANG module, managed objects, and attributes defined in IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB.

Table 7–1—Mapping between IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB managed objects and *ieee802-ethernet-pon* YANG data nodes

IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB		Corresponding <i>ieee802-ethernet-pon</i> YANG data nodes		
Managed object(s)	Attribute(s)	Container(s)	Data node(s)	R/W
dot3EponFecTable	dot3EponFecMode		fec-mode	R/W
	dot3EponFecPCSCodingViolation	statistics-pon-fec	fec-code-group-violations	R
	dot3EponFecAbility		fec-capability	R
	dot3EponFecCorrectedBlocks	statistics-pon-fec	fec-code-word-corrected-errors	R
	dot3EponFecUncorrectableBlocks	statistics-pon-fec	fec-code-word-uncorrected-errors	R
	dot3EponFecBufferHeadCodingViolation	statistics-pon-fec	fec-buffer-head-coding-violation	R
dot3MpcpControl Table	dot3MpcpAdminState		mpcp-admin-state	R/W
	dot3MpcpMode		mpcp-mode	R
	dot3MpcpLinkID		mpcp-logical-link-id	R
	dot3MpcpRemoteMACAddress		mpcp-remote-mac-address	R
	dot3MpcpRegistrationState		mpcp-logical-link-state	R
	dot3MpcpSyncTime		mpcp-sync-time	R
	dot3MpcpTransmitElapsed		mpcp-elapsed-time-out	R
	dot3MpcpReceiveElapsed		mpcp-elapsed-time-in	R
	dot3MpcpRoundTripTime		mpcp-round-trip-time	R
	dot3MpcpMaximumPendingGrants		mpcp-maximum-grant-count	R

Table 7–1—Mapping between IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB managed objects and *ieee802-ethernet-pon* YANG data nodes (continued)

IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB		Corresponding <i>ieee802-ethernet-pon</i> YANG data nodes		
Managed object(s)	Attribute(s)	Container(s)	Data node(s)	R/W
dot3ExtPkgQueueSets Table	dot3QueueSetIndex	mpcp-queue-thresholds	mpcp-queue-set-index	R/W
	dot3ExtPkgObjectReportThreshold		mpcp-queue-set-threshold	R/W
	dot3QueueIndex	mpcp-queues	mpcp-queue-index	R/W
	dot3ExtPkgObjectReportNumThreshold		mpcp-queue-threshold-count	R/W
	dot3ExtPkgObjectReportMaximumNumThreshold		mpcp-queue-threshold-count-max	R
	dot3ExtPkgStatTxFramesQueue		in-mpcp-queue-frames	R
	dot3ExtPkgStatRxFramesQueue		out-mpcp-queue-frames	R
	dot3ExtPkgStatDroppedFramesQueue		mpcp-queue-frames-drop	R
dot3ExtPkgControl Table	dot3ExtPkgObjectReset dot3MpcpOperStatus		mpcp-logical-link-admin-state	R/W
	dot3ExtPkgObjectNumberOfLLIDs		mpcp-logical-link-count	R
	dot3ExtPkgObjectReportMaximumNumQueues		mpcp-maximum-queue-count-per-report	R
dot3RecognizedMulticast-IDs Table	dot3RecognizedMulticastID	multicast-IDs	multicast-ID	R/W

Table 7–1—Mapping between IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB managed objects and *ieee802-ethernet-pon* YANG data nodes (continued)

IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB		Corresponding <i>ieee802-ethernet-pon</i> YANG data nodes		
Managed object(s)	Attribute(s)	Container(s)	Data node(s)	R/W
dot3OmpEmulation Table	dot3OmpEmulationType	statistics-ompe	ompe-mode	R
	dot3OmpEmulationSLDErrors		in-ompe-frames-errored-sld	R
	dot3OmpEmulationCRC8Errors		in-ompe-frames-errored-crc8	R
	dot3OmpEmulationBadLLID		in-ompe-frames-with-bad-llid	R
	dot3OmpEmulationGoodLLID		in-ompe-frames-with-good-llid	R
	dot3OmpEmulationBroadcastBitNotOnuLlid		in-ompe-frames-not-match-onu-llid-broadcast	R
	dot3OmpEmulationOnuLLIDNotBroadcast		in-ompe-frames-match-onu-llid-not-broadcast	R
	dot3OmpEmulationBroadcastBitPlusOnuLlid		in-ompe-frames-match-onu-llid-broadcast	R
	dot3OmpEmulationNotBroadcastBitNotOnuLlid		in-ompe-frames-not-match-onu-llid-not-broadcast	R
			in-ompe-frames	R
			ompe-onu-frames-with-good-llid-good-crc8	
			ompe-olt-frames-with-good-llid-good-crc8	

Table 7–1—Mapping between IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB managed objects and *ieee802-ethernet-pon* YANG data nodes (continued)

IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB		Corresponding <i>ieee802-ethernet-pon</i> YANG data nodes		
Managed object(s)	Attribute(s)	Container(s)	Data node(s)	R/W
dot3MpcpStat Table	dot3MpcpMACCtrlFramesTransmitted	statistics-mpcp	out-mpcp-mac-ctrl-frames	R
	dot3MpcpMACCtrlFramesReceived		in-mpcp-mac-ctrl-frames	R
	dot3MpcpDiscoveryWindowsSent		mpcp-discovery-window-count	R
	dot3MpcpDiscoveryTimeout		mpcp-discovery-timeout-count	R
	dot3MpcpTxRegRequest		out-mpcp-register-req	R
	dot3MpcpRxRegRequest		in-mpcp-register-req	R
	dot3MpcpTxRegAck		out-mpcp-register-ack	R
	dot3MpcpRxRegAck		in-mpcp-register-ack	R
	dot3MpcpTxReport		out-mpcp-report	R
	dot3MpcpRxReport		in-mpcp-report	R
	dot3MpcpTxGate		out-mpcp-gate	R
	dot3MpcpRxGate		in-mpcp-gate	R
	dot3MpcpTxRegister		out-mpcp-register	R
	dot3MpcpRxRegister		in-mpcp-register	R

Table 7–1—Mapping between IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB managed objects and *ieee802-ethernet-pon* YANG data nodes (continued)

IEEE Std 802.3.1, IEEE8023-DOT3-EPON-MIB		Corresponding <i>ieee802-ethernet-pon</i> YANG data nodes		
Managed object(s)	Attribute(s)	Container(s)	Data node(s)	R/W
dot3ExtPkgOptIf Table	dot3ExtPkgOptIfLowerInputPowerThreshold	thresholds-trx	in-trx-power-low-threshold	R/W
	dot3ExtPkgOptIfUpperInputPowerThreshold		in-trx-power-high-threshold	R/W
	dot3ExtPkgOptIfLowerOutputPowerThreshold		out-trx-power-low-threshold	R/W
	dot3ExtPkgOptIfUpperOutputPowerThreshold		out-trx-power-high-threshold	R/W
	dot3ExtPkgOptIfSignalDetect		in-trx-power-signal-detect	R
	dot3ExtPkgOptIfInputPower		in-trx-power	R
	dot3ExtPkgOptIfLowInputPower		in-trx-power-low-15-minutes-bin	R
	dot3ExtPkgOptIfHighInputPower		in-trx-power-high-15-minutes-bin	R
	dot3ExtPkgOptIfTransmitEnable		out-trx-power-signal-detect	R/W
	dot3ExtPkgOptIfOutputPower		out-trx-power	R
	dot3ExtPkgOptIfLowOutputPower		out-trx-power-low-15-minutes-bin	R
	dot3ExtPkgOptIfHighOutputPower		out-trx-power-high-15-minutes-bin	R
	dot3ExtPkgOptIfSuspectedFlag		trx-data-reliable	R

7.4 YANG module definitionⁿ

The YANG module tree hierarchy uses terms defined in IETF RFC 8407.

7.4.1 Tree hierarchy

```
module: ieee802-ethernet-pon
  augment /if:interfaces/if:interface/ieee802-eth-if:ethernet:
    +--rw fec-mode?                               fec-mode {fec-supported}?
    +--rw mpcp-admin-state?                         mpcp-admin-state
    +--ro mpcp-logical-link-admin-state?            mpcp-logical-link-admin-state
    +--rw trx-transmit-admin-state?                 trx-admin-state {trx-power-level-reporting-supported}?
    +--ro capabilities
      | +--ro mpcp-supported?    mpcp-supported
    +--ro statistics-mpcp
      | +--ro out-mpcp-mac-ctrl-frames?    yang:counter64
      | +--ro in-mpcp-mac-ctrl-frames?     yang:counter64
      | +--ro mpcp-discovery-window-count? yang:counter64
      | +--ro mpcp-discovery-timeout-count? yang:counter64
      | +--ro out-mpcp-register-req?       yang:counter64
      | +--ro in-mpcp-register-req?        yang:counter64
      | +--ro out-mpcp-register-ack?       yang:counter64
      | +--ro in-mpcp-register-ack?        yang:counter64
      | +--ro out-mpcp-report?             yang:counter64
      | +--ro in-mpcp-report?              yang:counter64
      | +--ro out-mpcp-gate?               yang:counter64
      | +--ro in-mpcp-gate?                yang:counter64
      | +--ro out-mpcp-register?           yang:counter64
      | +--ro in-mpcp-register?            yang:counter64
    +--rw statistics-ompe
      | +--ro in-ompe-frames-errored-sld?    yang:counter64
      | +--ro in-ompe-frames-errored-crc8?   yang:counter64
      | +--ro ompe-onu-frames-with-good-llid-good-crc8? yang:counter64
```

ⁿCopyright release for YANG modules: Users of this standard may freely reproduce the YANG module contained in this subclause so that it can be used for its intended purpose.

```

1      |      +--ro      ompe-olt-frames-with-good-llid-good-crc8?
2  yang:counter64
3      |      +--ro      in-ompe-frames-with-bad-llid?
4  yang:counter64
5      |      +--ro      in-ompe-frames-with-good-llid?
6  yang:counter64
7      |  +--ro in-ompe-frames?                                yang:count-
8  er64
9
10     |      +--ro      in-ompe-frames-not-match-onu-llid-broadcast?
11  yang:counter64
12     |      +--ro      in-ompe-frames-match-onu-llid-not-broadcast?
13  yang:counter64
14     |      +--ro      in-ompe-frames-match-onu-llid-broadcast?
15  yang:counter64
16     |      +--ro      in-ompe-frames-not-match-onu-llid-not-broadcast?
17  yang:counter64
18
19  +--rw thresholds-trx {trx-power-level-reporting-supported}?
20     |  +--rw in-trx-power-low-threshold?          int32 {trx-power-level-
21  reporting-supported}?
22     |  +--rw in-trx-power-high-threshold?         int32 {trx-power-level-
23  reporting-supported}?
24     |  +--rw out-trx-power-low-threshold?         int32 {trx-power-level-
25  reporting-supported}?
26     |  +--rw out-trx-power-high-threshold?        int32 {trx-power-level-
27  reporting-supported}?
28     |  +--rw out-trx-power-high-threshold?        int32 {trx-power-level-
29  reporting-supported}?
30
31  +--rw statistics-trx {trx-power-level-reporting-supported}?
32     |  +--ro in-trx-power-signal-detect?          boolean
33     |  +--ro in-trx-power?                         int32
34     |  +--ro in-trx-power-low-15-minutes-bin?      int32
35     |  +--ro in-trx-power-high-15-minutes-bin?     int32
36     |  +--ro out-trx-power-signal-detect?          boolean
37     |  +--ro out-trx-power?                       int32
38     |  +--ro out-trx-power-low-15-minutes-bin?     int32
39     |  +--ro out-trx-power-high-15-minutes-bin?    int32
40     |  +--ro out-trx-power-high-15-minutes-bin?    int32
41     |  +--ro trx-data-reliable?                   boolean {trx-power-
42  level-reporting-supported}?
43
44  +--ro statistics-pon-fec {fec-supported}?
45     |  +--ro fec-code-group-violations?            yang:counter64
46     |  +--ro fec-buffer-head-coding-violations?    yang:counter64
47     |  +--ro fec-code-word-corrected-errors?       yang:counter64
48     |  +--ro fec-code-word-uncorrected-errors?     yang:counter64
49
50  +--rw mpcp-logical-link-admin-actions
51     |  +---x state-change-action-type
52     |  |  +---w input
53     |  |  +---w state-change-action-type?  identityref
54     |  +---x reset-action-type
55     |  |  +---w input
56     |  |  +---w reset-action-type?  identityref
57     |  +---x register-type
58     |  |  +---w input
59     |  |  +---w register-type?  identityref
60
61  +--rw mpcp-queues* [mpcp-queue-index]
62     |  +--rw mpcp-queue-index                    uint8
63     |  +--rw mpcp-queue-threshold-count?         uint8
64
65

```

```

1      |  +--ro mpcp-queue-threshold-count-max?   uint8
2      |  +--rw mpcp-queue-thresholds* [mpcp-queue-set-index]
3      |    |  +--rw mpcp-queue-set-index        uint8
4      |    |  +--rw mpcp-queue-set-threshold?   uint64
5      |  +--ro in-mpcp-queue-frames?            yang:counter64
6      |  +--ro out-mpcp-queue-frames?           yang:counter64
7      |  +--ro mpcp-queue-frames-drop?         yang:counter64
8      +--rw multicast-IDs* [multicast-ID]
9      |  +--rw multicast-ID                     uint32
10     +--ro fec-capability?                     fec-capability
11     +--ro mpcp-mode?                          mpcp-mode
12     +--ro mpcp-sync-time?                     uint64
13     +--ro mpcp-logical-link-id?              mpcp-supported
14
15
16
17
18
19
20
21
22
23
24     +--ro mpcp-remote-mac-address?            ieee:mac-address
25     +--ro mpcp-logical-link-state?           mpcp-logical-link-state
26     +--ro mpcp-elapsed-time-out?             uint64
27     +--ro mpcp-elapsed-time-in?              uint64
28     +--ro mpcp-round-trip-time?              uint16
29     +--ro mpcp-maximum-grant-count?          uint8
30     +--ro mpcp-logical-link-count?           mpcp-llid-count
31     +--ro mpcp-maximum-queue-count-per-report? mpcp-maximum-queue-
32 count-per-report
33     +--ro ompe-mode?                         ompe-mode
34
35
36
37
38
39
40
41
42
43
44
45
46
47
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65

```

Editor's Note (to be removed prior to publication):

Leaf mpcp-remote-mac-address was modified per Maintenance Request 1380 (see https://www.ieee802.org/3/maint/requests/maint_1380.pdf)

7.4.2 YANG module

In the following YANG module definition, should any discrepancy between the text of the description for individual YANG nodes and the corresponding definition in 7.2 through 7.4 of this clause occur, the definitions and mappings in 7.4 shall take precedence.

An ASCII text version of the YANG module can be found at the following URL:^o <https://github.com/YangModels/yang/tree/master/standard/ieee/published/802.3>.

```
module ieee802-ethernet-pon {  
  yang-version 1.1;  
  
  namespace "urn:ieee:std:802.3:yang:ieee802-ethernet-pon";  
  
  prefix "ieee802-eth-pon";  
  
  revision 2019-06-21 {  
    description "Initial revision.";  
  }  
}
```

Editor's Note (to be removed prior to publication):

New 'ieee' prefix import was added per Maintenance Request 1380 (see https://www.ieee802.org/3/maint/requests/maint_1380.pdf)

```
import ieee802-types {  
  prefix "ieee";  
  reference "IEEE 802 types";  
}  
  
import ietf-yang-types {  
  prefix "yang";  
  reference "IETF RFC 6991";  
}  
  
import ietf-interfaces {  
  prefix "if";  
  reference "IETF RFC 8343";  
}  
  
import ieee802-ethernet-interface {  
  prefix "ieee802-eth-if";  
}  
  
organization  
  "IEEE 802.3 Ethernet Working Group  
  Web URL: http://www.ieee802.org/3/";  
  
contact  
  "Web URL: http://www.ieee802.org/3/";  
  
description  
  "This module contains a collection of YANG definitions for
```

^oCopyright release for YANG modules: Users of this standard may freely reproduce the YANG module contained in this subclause so that it can be used for its intended purpose.


```
1      managing the Multi Point Control Protocol for Ethernet PON (EPON),
2      as defined in IEEE Std 802.3, Clause 64 and Clause 77.
3
4      This YANG module augments the 'ethernet' module.";
5
6  reference
7      "IEEE Std 802.3-2018, Clause 64 and Clause 77, unless dated explicitly
8      IEEE Std 802.3.1-2013, Clause 9, unless dated explicitly";
9
10
11  typedef mpcp-supported {
12      type boolean;
13
14      description
15          "This object indicates that the given interface supports MPCP,
16          i.e., it is an Ethernet PON (EPON) interface.";
17  }
18
19  typedef mpcp-llid {
20      type uint64 {
21          range "0 .. 32767";
22      }
23
24      description
25          "Logical Link Identifiers (LLIDs) are used to identify a single
26          MAC from a number of MACs which may be present in the
27          EPON OLT or ONU. LLIDs between the value of 0x07FFE
28          and 0x7FFF are assigned for ONU discovery and registration.
29          Other LLIDs are dynamically assigned by the OLT during the
30          registration process. For a complete description of how the
31          LLID is used in an EPON device, see IEEE Std 802.3, Clause 65
32          for 1G-EPON and Clause 76 for 10G-EPON.";
33
34      reference
35          "IEEE Std 802.3, 65.1.3.3 for 1G-EPON and 76.2.6.1.3 for 10G-EPON";
36  }
37
38  typedef mpcp-maximum-queue-count-per-report {
39      type uint8 {
40          range "0..7";
41      }
42
43      default "0";
44
45      description
46          "Defines the maximum number of queues (0-7) in the REPORT
47          MPCPDU as defined in IEEE Std 802.3, Clause 64 and Clause 77.";
48  }
49
50  typedef mpcp-llid-count {
51      type uint64 {
52          range "0 .. 32767";
53      }
54
55      description
56          "Indicates the number of registered LLIDs. The initialization
57          value is 0. This is applicable for an OLT with the same value
58          for all logical interfaces and for an ONU.";
59
60      reference
```

```
1      "IEEE Std 802.3, 65.1.3.3 for 1G-EPON and 76.2.6.1.3 for 10G-EPON";
2
3  }
4
5  typedef mpcp-admin-state {
6      type enumeration {
7
8          enum enabled {
9              description
10                 "When selecting the value of 'enabled', the MultiPoint
11                 Control Protocol sublayer on the OLT / ONU is enabled.";
12             }
13
14             enum disabled {
15                 description
16                     "When selecting the value of 'disabled', the MultiPoint
17                     Control Protocol sublayer on the OLT / ONU is disabled.";
18             }
19         }
20     }
21
22     description
23         "Enumeration of valid administrative states for a MultiPoint MAC
24         Control sublayer on the OLT or ONU.";
25
26     reference
27         "IEEE Std 802.3, 30.3.5.2.1";
28 }
29
30 typedef mpcp-mode {
31     type enumeration {
32         enum olt {
33             description
34                 "MPCP mode: olt";
35         }
36
37         enum onu {
38             description
39                 "MPCP mode: onu";
40         }
41     }
42
43     description
44         "Enumeration of valid MPCP modes for EPON interfaces.";
45
46     reference
47         "IEEE Std 802.3, 30.3.5.1.3";
48 }
49
50 typedef mpcp-logical-link-state {
51     type enumeration {
52         enum unregistered {
53             description
54                 "MPCP registration state: logical link is NOT registered.";
55         }
56
57         enum registering {
58             description
59                 "MPCP registration state: logical link is currently in the
60                 process of registering.";
61         }
62     }
63 }
```

```
1      }
2
3      enum registered {
4          description
5              "MPCP registration state: logical link is currently
6              registered.";
7      }
8  }
9
10
11  description
12      "Enumeration of valid MPCP registration states for EPON
13      interfaces.";
14
15  reference
16      "IEEE Std 802.3, 30.3.5.1.6";
17  }
18
19  typedef mpcp-logical-link-admin-state {
20      type enumeration {
21          enum reset {
22              description
23                  "When read, the value of 'reset' indicates that the given
24                  logical link on the OLT / ONU has been reset.";
25          }
26          enum operate {
27              description
28                  "When read, the value of 'operate' indicates that the
29                  given logical link on the OLT / ONU has moved into
30                  operating mode.";
31          }
32          enum unknown {
33              description
34                  "When read, the value of 'unknown' indicates that the
35                  status of the given logical link on the OLT / ONU is
36                  currently not known.";
37          }
38          enum registered {
39              description
40                  "When read, the value of 'registered' indicates that the
41                  given logical link on the OLT / ONU has been registered.";
42          }
43          enum deregistered {
44              description
45                  "When read, the value of 'deregistered' indicates that the
46                  given logical link on the OLT / ONU has been deregistered.";
47          }
48          enum reregistered {
49              description
50                  "When read, the value of 'reregistered' indicates that the
51                  given logical link on the OLT / ONU has been reregistered.";
52          }
53      }
54      description
55          "Enumeration of valid administrative states for a logical link
56          on the OLT or ONU.";
57  }
58
59  typedef ompe-mode {
60      type enumeration {
```

```
1      enum unknown {
2          description
3              "omp-emulation mode: unknown = system is initializing";
4      }
5
6      enum olt {
7          description
8              "omp-emulation mode: olt";
9      }
10
11     enum onu {
12         description
13             "omp-emulation mode: onu";
14     }
15 }
16
17 description
18     "Enumeration of valid OMP-Emulation modes for EPON
19     interfaces.";
20
21 reference
22     "IEEE Std 802.3, 30.3.7.1.2";
23 }
24
25 typedef fec-capability {
26     type enumeration {
27         enum unknown {
28             description
29                 "FEC capability: unknown = system is initializing.";
30         }
31
32         enum supported {
33             description
34                 "FEC capability: supported.";
35         }
36
37         enum "not supported" {
38             description
39                 "FEC capability: not supported.";
40         }
41     }
42 }
43
44 description
45     "Enumeration of valid FEC capability values for EPON
46     interfaces with enabled MPCP.";
47
48 reference
49     "IEEE Std 802.3, 30.5.1.1.15";
50 }
51
52 typedef fec-mode {
53     type enumeration {
54         enum unknown {
55             description
56                 "FEC mode: unknown = system is initializing.";
57         }
58
59         enum disabled {
60             description
```

```
1         "FEC mode: disabled = FEC is disabled for the given
2         logical link (both Tx and Rx directions).";
3     }
4
5     enum enabled-Tx-Rx {
6         description
7         "FEC mode: enabled-Tx-Rx = FEC is enabled for the given
8         logical link in both Tx and Rx directions.";
9     }
10
11     enum enabled-Tx-only {
12         description
13         "FEC mode: enabled-Tx-only = FEC is enabled for
14         the given logical link but only in Tx direction.";
15     }
16
17     enum enabled-Rx-only {
18         description
19         "FEC mode: enabled-Rx-only = FEC is enabled for
20         the given logical link but only in Rx direction.";
21     }
22 }
23
24 description
25     "Enumeration of valid FEC modes for EPON interfaces.";
26
27 reference
28     "IEEE Std 802.3, 30.5.1.1.16";
29
30 }
31
32 typedef trx-admin-state {
33     type enumeration {
34         enum enabled {
35             description
36             "When read as 'enabled', the transmitter is enabled and
37             operating under the control of the logical control protocol.
38             When set to 'enabled', the transmitter is enabled to
39             operate under the control of the logical control protocol.";
40         }
41
42         enum disabled {
43             description
44             "When read as 'disabled', the transmitter is currently
45             disabled (not transmitting). When set to 'disabled', the
46             transmitter is expected to be disabled (to stop transmitting).";
47         }
48     }
49
50     description
51         "Enumeration of valid administrative states for an optical
52         transceiver.";
53
54     reference
55         "IEEE Std 802.3.1, dot3ExtPkgOptIfTransmitEnable";
56 }
57
58 feature trx-power-level-reporting-supported {
59     description
```

```
1      "This object indicates the support for optical transceiver power
2      level monitoring and reporting capability. When 'true', the
3      given interface supports the optical power level monitoring
4      and reporting function. Otherwise, the value is 'false.'";
5  }
6
7  feature
8  fec-supported {
9      description
10         "This object indicates the support of operation of the optional
11         FEC sublayer of the 1G-EPON PHY specified in IEEE Std 802.3,
12         65.2. The value of 'unknown' is reported in the initialization,
13         for non FEC support state or type not yet known. The value of
14         'not supported' is reported when the sublayer is not supported.
15         The value of 'supported' is reported when the sublayer is
16         supported. This object is applicable for an OLT, with the
17         same value for all logical links, and for an ONU.";
18
19         reference
20             "IEEE Std 802.3, 30.5.1.1.15";
21     }
22
23     identity state-change-action-type {
24         description
25             "Type of interface state change requested.";
26     }
27
28     identity power-down {
29         base state-change-action-type;
30         description
31             "Power down the EPON logical interface.
32             Power-down actions are applicable for the OLT and ONU. A
33             power down of a specific logical interface affects only
34             the logical interface (and not the physical interface).
35             the logical interface will be unavailable while the
36             power-down occurs and data may be lost. Other logical
37             interface are unaffected by power-down.
38
39             This action is relevant when the admin state is active.";
40     }
41
42     identity power-up {
43         base state-change-action-type;
44         description
45             "Exit EPON logical interface power-down state.";
46     }
47
48     identity reset-action-type {
49         description
50             "Type of reset action requested.";
51     }
52
53     identity reset-interface {
54         base reset-action-type;
55         description
56             "Reset the EPON logical interface. Resetting an interface
57             can lead an interruption of service for the users connected
58             to the respective EPON interface.
59
60             This object is applicable for an OLT and an ONU. At the
61             OLT, it has a distinct value for each logical interface.
```

```
1      A reset for a specific logical interface resets only
2      this logical interface and not the physical interface.
3
4      Thus, a logical link that is malfunctioning can be
5      reset without affecting the operation of other logical
6      interfaces.
7
8      The reset can cause Discontinuities in the values of the
9      counters of the interface, similar to re-initialization
10     of the management system.";
11
12 }
13 identity register-type {
14     description
15         "Type of registration requested.";
16 }
17 identity register {
18     base register-type;
19     description
20         "Register indicates a request to register an LLID.
21         This action applies to an OLT or ONU logical interface.";
22 }
23 identity reregister {
24     base register-type;
25     description
26         "Re-register indicates an request to re-register an LLID.
27         This action applies to an OLT or ONU logical interface.";
28 }
29 identity deregister {
30     base register-type;
31     description
32         "De-register indicates an request to de-register an LLID.
33         This action applies to an OLT or ONU logical interface.
34         Deregister may result in an interruption of service to
35         users connected to the respective EPON interface.";
36 }
37
38 augment "/if:interfaces/if:interface/ieee802-eth-if:ethernet" {
39     description
40         "Augments the definition of Ethernet interface (/if:interfaces/
41         if:interface/ieee802-eth-if:ethernet) module with nodes
42         specific to Ethernet PON (EPON).";
43
44     leaf fec-mode {
45         if-feature "fec-supported";
46
47         type fec-mode;
48
49         description
50             "This object reflects the current administrative state of the
51             FEC function for the given logical link on an ONU or OLT.
52
53             When reading the value of 'disabled', the FEC function on the
54             given logical link is disabled.
55
56             When reading the value of 'enabled-Tx-Rx', the FEC function on
57             the given logical link is enabled in both Tx and Rx directions.
58
59             When reading the value of 'enabled-Tx-only', the FEC function
```

```
1         on the given logical link is enabled in Tx direction only.
2
3         When reading the value of 'enabled-Rx-only', the FEC function
4         on the given logical link is enabled in Rx direction only.
5
6         When reading the value of 'unknown', the state of the FEC
7         function on the given logical link is unknown or the FEC
8         function is currently initializing.
9
10        This object is applicable for an OLT and an ONU. This object has
11        the same value for each logical link.";
12
13
14        reference
15            "IEEE Std 802.3, 30.5.1.1.16";
16    }
17
18    leaf mpcp-admin-state {
19        type mpcp-admin-state;
20
21
22        description
23            "This object reflects the current administrative state of the
24            MultiPoint MAC Control sublayer, as defined in IEEE Std 802.3,
25            Clause 64 and Clause 77, for the OLT / ONU.
26
27            When reading the value of 'enabled', the MultiPoint Control
28            Protocol on the OLT / ONU is enabled.
29
30            When reading the value of 'disabled', the MultiPoint Control
31            Protocol on the OLT / ONU is disabled.
32
33            This object is applicable for an OLT and an ONU. It has the
34            same value for all logical links.";
35
36
37        reference
38            "IEEE Std 802.3, 30.3.5.1.2";
39    }
40
41    leaf mpcp-logical-link-admin-state {
42        type mpcp-logical-link-admin-state;
43        config false;
44        description
45            "This object reflects the current administrative state of a
46            logical link on an ONU or OLT.
47
48            When reading the value of 'reset', the given logical link is
49            undergoing a reset.
50
51            When reading the value of 'unknown', the current status of the
52            given logical link is unknown and the link might be undergoing
53            initialization.
54
55            When reading the value of 'operate', the given logical link is
56            operating normally.
57
58            When reading the value of 'registered', the given logical link
59            was requested to perform registration.
60
61            When reading the value of 'deregistered', the given logical
62            link was requested to perform deregistration.
```



```
1
2     When reading the value of 'reregistered', the given logical
3     link was requested to perform reregistration.
4
5     This object is applicable for an OLT and an ONU. It has a
6     distinct value for each logical link.";
7
8     reference
9         "IEEE Std 802.3.1, dot3ExtPkgObjectRegisterAction";
10 }
11
12
13 leaf trx-transmit-admin-state {
14     when
15         "../../../ieee802-eth-if:ethernet/
16             ieee802-eth-pon:mpcp-admin-state = 'enabled'";
17
18     if-feature "trx-power-level-reporting-supported";
19
20     type trx-admin-state;
21
22     description
23         "This object reflects the current status of the transmitter in
24         the optical transceiver.
25
26         When read as 'enabled', the optical transmitter is enabled and
27         operating under the control of the logical control protocol.
28
29         When read as 'disabled', the optical transmitter is disabled.
30
31         This object is applicable for an OLT and an ONU. At the OLT, this
32         object has a distinct value for each logical link.
33
34         The value of this object is only reliable when
35         /if:interfaces-state/if:interface/ieee802-eth-if:ethernet/
36         'mpcp-admin-state' is equal to 'enabled'.";
37
38     reference
39         "IEEE Std 802.3.1, dot3ExtPkgOptIfTransmitEnable";
40 }
41
42
43 container capabilities {
44
45     config false;
46     description
47         "This container includes all EPON interface-specific capabilities.";
48
49     leaf mpcp-supported {
50         type mpcp-supported;
51
52         default
53             "true";
54         description
55             "This object indicates that the given interface supports MPCP,
56             i.e., it is an Ethernet PON (EPON) interface.";
57     }
58 }
59
60
61 container statistics-mpcp {
62     config false;
```

```
1      description
2          "This container defines a set of MPCP-related statistics
3            counters of an EPON interface, as defined in
4            IEEE Std 802.3, Clause 64 and Clause 77.";
5
6      leaf out-mpcp-mac-ctrl-frames {
7          type yang:counter64;
8
9
10         units frames;
11
12         config false;
13
14         description
15             "A count of MPCP frames passed to the MAC sublayer for
16               transmission.
17
18               This counter is incremented when a MA_CONTROL.request
19               service primitive is generated within the MAC control
20               sublayer with an opcode indicating an MPCP frame.
21
22               This object is applicable for an OLT and an ONU. It has a
23               distinct value for each logical link.
24
25               Discontinuities of this counter can occur at
26               re-initialization of the management system, and at other
27               times, as indicated by the value of the 'discontinuity-time'
28               leaf defined in the ietf-interfaces YANG module (IETF RFC 8343).";
29
30         reference
31             "IEEE Std 802.3, 30.3.5.1.7";
32     }
33
34     leaf in-mpcp-mac-ctrl-frames {
35         type yang:counter64;
36
37
38         units frames;
39
40         config false;
41
42         description
43             "A count of MPCP frames passed by the MAC sublayer to the
44               MAC Control sublayer.
45
46               This counter is incremented when a frame is received at the
47               interface which is an MPCP frame or has a Length/Type Ethernet
48               header field value equal to the Type assigned for
49               802.3_MAC_Control as specified in IEEE Std 802.3, 31.4.1.3.
50
51               This object is applicable for an OLT and an ONU. It has a
52               distinct value for each logical link.
53
54               Discontinuities in the value of this counter can occur at
55               re-initialization of the management system, and at other times
56               as indicated by the value of the 'discontinuity-time' leaf
57               defined in the ietf-interfaces YANG module (IETF RFC 8343).";
58
59         reference
60             "IEEE Std 802.3, 30.3.5.1.8";
61     }
62
63
64
65 }
```

```
1
2     leaf mpcp-discovery-window-count {
3         when "../ompe-mode = 'olt'";
4         type yang:counter64;
5
6         units "discovery windows";
7
8         config false;
9
10        description
11            "A count of discovery windows generated by the OLT.
12
13            The counter is incremented by one for each generated
14            discovery window.
15
16            This object is applicable for an OLT and has the same value
17            for each logical link.
18
19            Discontinuities in the value of this counter can occur at
20            re-initialization of the management system, and at other times
21            as indicated by the value of the 'discontinuity-time' leaf
22            defined in the ietf-interfaces YANG module (IETF RFC 8343).";
23
24        reference
25            "IEEE Std 802.3, 30.3.5.1.22";
26    }
27
28    leaf mpcp-discovery-timeout-count {
29        when "../ompe-mode = 'olt'";
30        type yang:counter64;
31
32        units "discovery timeouts";
33
34        config false;
35
36        description
37            "A count of the number of times a discovery timeout occurs.
38
39            This counter is incremented by one for each discovery
40            processing state-machine reset resulting from timeout
41            waiting for message arrival.
42
43            This object is applicable for an OLT and has the same value
44            for each logical link.
45
46            Discontinuities in the value of this counter can occur at
47            re-initialization of the management system, and at other times
48            as indicated by the value of the 'discontinuity-time' leaf
49            defined in the ietf-interfaces YANG module (IETF RFC 8343).";
50
51        reference
52            "IEEE Std 802.3, 30.3.5.1.23";
53    }
54
55    leaf out-mpcp-register-req {
56        when "../ompe-mode = 'onu'";
57        type yang:counter64;
58
59        units frames;
```

```
1      config false;
2
3
4      description
5          "A count of the number of times a REGISTER_REQ MPCP frame
6            transmission occurs.
7
8            This counter is incremented by one for each REGISTER_REQ MPCP
9            frame transmitted as defined in IEEE Std 802.3,
10           Clause 64 and Clause 77.
11
12           This object is applicable for an ONU and has the same value
13           for each logical link.
14
15           Discontinuities in the value of this counter can occur at
16           re-initialization of the management system, and at other times
17           as indicated by the value of the 'discontinuity-time' leaf
18           defined in the ietf-interfaces YANG module (IETF RFC 8343).";
19
20
21
22      reference
23          "IEEE Std 802.3, 30.3.5.1.12";
24  }
25
26  leaf in-mpcp-register-req {
27      when "../ompe-mode = 'olt'";
28      type yang:counter64;
29
30      units frames;
31
32      config false;
33
34
35      description
36          "A count of the number of times a REGISTER_REQ MPCP frame
37            reception occurs.
38
39            This counter is incremented by one for each REGISTER_REQ MPCP
40            frame received as defined in IEEE Std 802.3,
41            Clause 64 and Clause 77.
42
43            This object is applicable for an OLT and has the same value
44            for each logical link.
45
46            Discontinuities in the value of this counter can occur at
47            re-initialization of the management system, and at other times
48            as indicated by the value of the 'discontinuity-time' leaf
49            defined in the ietf-interfaces YANG module (IETF RFC 8343).";
50
51
52
53      reference
54          "IEEE Std 802.3, 30.3.5.1.17";
55  }
56
57  leaf out-mpcp-register-ack {
58      when "../ompe-mode = 'onu'";
59      type yang:counter64;
60
61      units frames;
62
63      config false;
64
65
```

```
1      description
2        "A count of the number of times a REGISTER_ACK MPCP frame
3        transmission occurs.
4
5        This counter is incremented by one for each REGISTER_ACK MPCP
6        frame transmitted as defined in IEEE Std 802.3,
7        Clause 64 and Clause 77.
8
9        This object is applicable for an ONU and has a distinct value
10       for each logical link.
11
12       Discontinuities in the value of this counter can occur at
13       re-initialization of the management system, and at other times
14       as indicated by the value of the 'discontinuity-time' leaf
15       defined in the ietf-interfaces YANG module (IETF RFC 8343).";
16
17     reference
18       "IEEE Std 802.3, 30.3.5.1.10";
19   }
20
21   leaf in-mpcp-register-ack {
22     when "../ompe-mode = 'olt'";
23     type yang:counter64;
24
25     units frames;
26
27     config false;
28
29     description
30       "A count of the number of times a REGISTER_ACK MPCP frame
31       reception occurs.
32
33       This counter is incremented by one for each REGISTER_ACK MPCP
34       frame received as defined in IEEE Std 802.3,
35       Clause 64 and Clause 77.
36
37       This object is applicable for an OLT and has a distinct
38       value for each logical link.
39
40       Discontinuities of this counter can occur at
41       re-initialization of the management system and at other
42       times, as indicated by the value of the 'discontinuity-time'
43       leaf defined in the ietf-interfaces YANG module (IETF RFC 8343).";
44
45     reference
46       "IEEE Std 802.3, 30.3.5.1.15";
47   }
48
49   leaf out-mpcp-report {
50     when "../ompe-mode = 'onu'";
51     type yang:counter64;
52
53     units frames;
54
55     config false;
56
57     description
58       "A count of the number of times a REPORT MPCP frame
59       transmission occurs.
```

```
1
2      This counter is incremented by one for each REPORT MPCP frame
3      transmitted as defined in IEEE Std 802.3,
4      Clause 64 and Clause 77.
5
6      This object is applicable for an ONU and has a distinct value for
7      each logical link.
8
9
10     Discontinuities of this counter can occur at
11     re-initialization of the management system and at other
12     times, as indicated by the value of the 'discontinuity-time'
13     leaf defined in the ietf-interfaces YANG module (IETF RFC 8343).";
14
15     reference
16       "IEEE Std 802.3, 30.3.5.1.13";
17   }
18
19   leaf in-mpcp-report {
20     when "../ompe-mode = 'olt'";
21     type yang:counter64;
22
23     units frames;
24
25     config false;
26
27     description
28       "A count of the number of times a REPORT MPCP frame
29       reception occurs.
30
31       This counter is incremented by one for each REPORT MPCP frame
32       received as defined in IEEE Std 802.3,
33       Clause 64 and Clause 77.
34
35       This object is applicable for an OLT and has a distinct
36       value for each logical link.
37
38       Discontinuities in the value of this counter can occur at
39       re-initialization of the management system, and at other times
40       as indicated by the value of the 'discontinuity-time' leaf
41       defined in the ietf-interfaces YANG module (IETF RFC 8343).";
42
43     reference
44       "IEEE Std 802.3, 30.3.5.1.18";
45   }
46
47   leaf out-mpcp-gate {
48     when "../ompe-mode = 'olt'";
49     type yang:counter64;
50
51     units frames;
52
53     config false;
54
55     description
56       "A count of the number of times a GATE MPCP frame
57       transmission occurs.
58
59       This counter is incremented by one for each GATE MPCP frame
60       transmitted as defined in IEEE Std 802.3,
```

```
1      Clause 64 and Clause 77.
2
3      This object is applicable for an OLT and has a distinct
4      value for each logical link.
5
6      Discontinuities of this counter can occur at
7      re-initialization of the management system and at other
8      times, as indicated by the value of the 'discontinuity-time'
9      leaf defined in the ietf-interfaces YANG module (IETF RFC 8343).";
10
11
12      reference
13      "IEEE Std 802.3, 30.3.5.1.9";
14  }
15
16  leaf in-mpcp-gate {
17      when "../ompe-mode = 'onu'";
18      type yang:counter64;
19
20      units frames;
21
22      config false;
23
24      description
25      "A count of the number of times a GATE MPCP frame reception
26      occurs.
27
28      This counter is incremented by one for each GATE MPCP frame
29      received as defined in IEEE Std 802.3,
30      Clause 64 and Clause 77.
31
32      This object is applicable for an ONU and has a distinct value
33      for each logical link.
34
35      Discontinuities of this counter can occur at
36      re-initialization of the management system and at other
37      times, as indicated by the value of the 'discontinuity-time'
38      leaf defined in the ietf-interfaces YANG module (IETF RFC 8343).";
39
40      reference
41      "IEEE Std 802.3, 30.3.5.1.14";
42  }
43
44  leaf out-mpcp-register {
45      when "../ompe-mode = 'olt'";
46      type yang:counter64;
47
48      units frames;
49
50      config false;
51
52      description
53      "A count of the number of times a REGISTER MPCP frame
54      transmission occurs.
55
56      This counter is incremented by one for each REGISTER MPCP
57      frame transmitted as defined in IEEE Std 802.3,
58      Clause 64 and Clause 77.
59
60      This object is applicable for an OLT and has a distinct
```

```
1         value for each logical link.
2
3         Discontinuities of this counter can occur at
4         re-initialization of the management system and at other
5         times, as indicated by the value of the 'discontinuity-time'
6         leaf defined in the ietf-interfaces YANG module (IETF RFC 8343).";
7
8     reference
9         "IEEE Std 802.3, 30.3.5.1.11";
10 }
11
12 leaf in-mpcp-register {
13     when "../..//ompe-mode = 'onu'";
14     type yang:counter64;
15
16     units frames;
17
18     config false;
19
20     description
21         "A count of the number of times a REGISTER MPCP frame
22         reception occurs.
23
24         This counter is incremented by one for each REGISTER MPCP
25         frame received as defined in IEEE Std 802.3,
26         Clause 64 and Clause 77.
27
28         This object is applicable for an ONU and has a distinct value
29         for each logical link.
30
31         Discontinuities of this counter can occur at
32         re-initialization of the management system and at other
33         times, as indicated by the value of the 'discontinuity-time'
34         leaf defined in the ietf-interfaces YANG module (IETF RFC 8343).";
35
36     reference
37         "IEEE Std 802.3, 30.3.5.1.16";
38 }
39
40 }
41
42 container statistics-ompe {
43     description
44         "This container defines a set of OMP-Emulation-related
45         statistics counters of an EPON interface, as defined in
46         IEEE Std 802.3, Clause 65 and Clause 76.";
47
48     reference
49         "IEEE Std 802.3.1, dot3OmpEmulationStatEntry";
50
51     leaf in-ompe-frames-errored-sld {
52         type yang:counter64;
53
54         units frames;
55
56         config false;
57
58         description
59             "A count of frames received that do not contain a valid SLD
60             field as defined in IEEE Std 802.3, 65.1.3.3.1 or
```



```
1         76.2.6.1.3.1, as appropriate.
2
3         This object is applicable for an OLT and an ONU. It has a
4         distinct value for each logical link.
5
6         Discontinuities in the value of this counter can occur at
7         re-initialization of the management system, and at other times
8         as indicated by the value of the 'discontinuity-time' leaf
9         defined in the ietf-interfaces YANG module (IETF RFC 8343).";
10
11     reference
12         "IEEE Std 802.3, 30.3.7.1.3";
13 }
14
15 leaf in-ompe-frames-errored-crc8 {
16     type yang:counter64;
17
18     units frames;
19
20     config false;
21
22     description
23         "A count of frames received that contain a valid SLD field,
24         as defined in IEEE Std 802.3, 65.1.3.3.1 or 76.2.6.1.3.1 as
25         appropriate, but do not pass the CRC-8 check as defined in
26         IEEE Std 802.3, 65.1.3.3.3 or 76.2.6.1.3.3 as appropriate.
27
28         This object is applicable for an OLT and an ONU. It has a
29         distinct value for each logical link.
30
31         Discontinuities of this counter can occur at
32         re-initialization of the management system and at other
33         times, as indicated by the value of the 'discontinuity-time'
34         leaf defined in the ietf-interfaces YANG module (IETF RFC 8343).";
35
36     reference
37         "IEEE Std 802.3, 30.3.7.1.4";
38 }
39
40 leaf ompe-onu-frames-with-good-llid-good-crc8 {
41     when "../ompe-mode = 'onu'";
42     type yang:counter64;
43     units frames;
44     config false;
45     description
46         "A count of frames received that 1) contain a valid SLD field
47         in an ONU, 2) meet the rule for frame acceptance, and
48         3) pass the CRC-8 check.
49
50         The SLD is defined in IEEE Std 802.3, 65.1.3.3.1 or
51         76.2.6.1.3.1, as appropriate.
52
53         The rules for LLID acceptance are defined in IEEE Std 802.3,
54         65.1.3.3.2 or 76.2.6.1.3.2, as appropriate.
55
56         The CRC-8 check is defined in IEEE Std 802.3,
57         65.1.3.3.3 or 76.2.6.1.3.3, as appropriate.
58
59         This object is applicable for an ONU and has a distinct value
```

```
1         for each logical link.
2
3         Discontinuities in the value of this counter can occur at
4         re-initialization of the management system, and at other
5         times as indicated by the value of the
6         'discontinuity-time' leaf defined in the ietf-interfaces
7         YANG module (IETF RFC 8343).";
8     reference
9         "IEEE Std 802.3, 30.3.7.1.6";
10 }
11
12
13 leaf ompe-olt-frames-with-good-llid-good-crc8 {
14     when "../ompe-mode = 'olt'";
15     type yang:counter64;
16     units frames;
17     config false;
18     description
19         "A count of frames received that 1) contain a valid SLD field
20         in an OLT, and 2) pass the CRC-8 check.
21
22         The SLD is defined in IEEE Std 802.3, 65.1.3.3.1 or
23         76.2.6.1.3.1, as appropriate.
24
25         The frame acceptance are defined in IEEE Std 802.3,
26         65.1.3.3.2 or 76.2.6.1.3.2, as appropriate.
27
28         The CRC-8 check is defined in IEEE Std 802.3,
29         65.1.3.3.3 or 76.2.6.1.3.3, as appropriate.
30
31         This object is applicable for an OLT and has a distinct
32         value for each logical link.
33
34         Discontinuities in the value of this counter can occur at
35         re-initialization of the management system, and at other
36         times as indicated by the value of the
37         'discontinuity-time' leaf defined in the ietf-interfaces
38         YANG module (IETF RFC 8343).";
39     reference
40         "IEEE Std 802.3, 30.3.7.1.6";
41 }
42
43 leaf in-ompe-frames-with-bad-llid {
44     when "../ompe-mode = 'olt'";
45     type yang:counter64;
46
47     units frames;
48
49     config false;
50
51     description
52         "A count of frames received that contain a valid SLD field, as
53         defined in IEEE Std 802.3, 65.1.3.3.1 or 76.2.6.1.3.1, as
54         appropriate, and pass the CRC-8 check as defined in IEEE Std
55         802.3, 65.1.3.3.3 or 76.2.6.1.3.3, as appropriate, but are
56         discarded due to the LLID check.
57
58         This object is applicable for an OLT and has a distinct value
59         for each logical link.
```

```
1
2     Discontinuities in the value of this counter can occur at
3     re-initialization of the management system, and at other times
4     as indicated by the value of the 'discontinuity-time' leaf
5     defined in the ietf-interfaces YANG module (IETF RFC 8343).";
6
7     reference
8         "IEEE Std 802.3, 30.3.7.1.8";
9
10 }
11
12 leaf in-ompe-frames-with-good-llid {
13     type yang:counter64;
14
15     units frames;
16
17     config false;
18
19     description
20         "A count of frames received that contain a valid SLD field,
21         as defined in IEEE Std 802.3, 65.1.3.3.1 or 76.2.6.1.3.1 as
22         appropriate, but do not pass the CRC-8 check as defined in
23         IEEE Std 802.3, 65.1.3.3.3 or 76.2.6.1.3.3 as appropriate.
24
25         This object is applicable for an OLT and an ONU. It has a
26         distinct value for each logical link.
27
28         Discontinuities in the value of this counter can occur at
29         re-initialization of the management system, and at other times
30         as indicated by the value of the 'discontinuity-time' leaf
31         defined in the ietf-interfaces YANG module (IETF RFC 8343).";
32
33     reference
34         "IEEE Std 802.3, 30.3.7.1.4";
35 }
36
37 leaf in-ompe-frames {
38     type yang:counter64;
39
40     units frames;
41
42     config false;
43
44     description
45         "A count of frames received that contain a valid SLD field,
46         as defined in IEEE Std 802.3, 65.1.3.3.1 or 76.2.6.1.3.1, as
47         appropriate, and pass the CRC-8 check as defined in
48         IEEE Std 802.3, 65.1.3.3.3 or 76.2.6.1.3.3, as appropriate.
49
50         This object is applicable for an OLT and an ONU. It has a
51         distinct value for each logical link.
52
53         Discontinuities in the value of this counter can occur at
54         re-initialization of the management system, and at other times
55         as indicated by the value of the 'discontinuity-time' leaf
56         defined in the ietf-interfaces YANG module (IETF RFC 8343).";
57
58     reference
59         "IEEE Std 802.3, 30.3.7.1.6 (ONU) and 30.3.7.1.7 (OLT)";
60 }
61
62 }
```

```
1
2     leaf in-ompe-frames-not-match-onu-llid-broadcast {
3         when "../ompe-mode = 'onu'";
4
5         type yang:counter64;
6
7         units frames;
8
9         config false;
10
11        description
12            "A count of frames received that contain a valid SLD field,
13             as defined in IEEE Std 802.3, 65.1.3.3.1 or 76.2.6.1.3.1, as
14             appropriate, pass the CRC-8 check, as defined in
15             IEEE Std 802.3, 65.1.3.3.3 or 76.2.6.1.3.3, as appropriate,
16             and contain the broadcast bit in the LLID and not the ONU's
17             LLID (frame accepted) as defined in IEEE Std 802.3,
18             Clause 65 and Clause 76, as appropriate.
19
20             This object is applicable for an ONU only.
21
22             Discontinuities in the value of this counter can occur at
23             re-initialization of the management system, and at other times
24             as indicated by the value of the 'discontinuity-time' leaf
25             defined in the ietf-interfaces YANG module (IETF RFC 8343).";
26
27        reference
28            "IEEE Std 802.3.1, dot3OmpEmulationBroadcastBitNotOnuLlid";
29    }
30
31    leaf in-ompe-frames-match-onu-llid-not-broadcast {
32        when "../ompe-mode = 'onu'";
33
34        type yang:counter64;
35
36        units frames;
37
38        config false;
39
40        description
41            "A count of frames received that contain a valid SLD field,
42             as defined in IEEE Std 802.3, 65.1.3.3.1 or 76.2.6.1.3.1, as
43             appropriate, pass the CRC-8 check, as defined in
44             IEEE Std 802.3, 65.1.3.3.3 or 76.2.6.1.3.3, as appropriate,
45             and contain the ONU's LLID (frame accepted) as defined in
46             IEEE Std 802.3, Clause 65 and Clause 76, as appropriate.
47
48             This object is applicable for an ONU only.
49
50             Discontinuities in the value of this counter can occur at
51             re-initialization of the management system, and at other times
52             as indicated by the value of the 'discontinuity-time' leaf
53             defined in the ietf-interfaces YANG module (IETF RFC 8343).";
54
55        reference
56            "IEEE Std 802.3.1, dot3OmpEmulationOnuLLIDNotBroadcast";
57    }
58
59    leaf in-ompe-frames-match-onu-llid-broadcast {
```

```
1      when "../..//ompe-mode = 'onu'";
2
3      type yang:counter64;
4
5      units frames;
6
7      config false;
8
9
10     description
11       "A count of frames received that contain a valid SLD field,
12        as defined in IEEE Std 802.3, 65.1.3.3.1 or 76.2.6.1.3.1, as
13        appropriate, pass the CRC-8 check, as defined in
14        IEEE Std 802.3, 65.1.3.3.3 or 76.2.6.1.3.3, as appropriate,
15        and contain the broadcast bit in the LLID and the ONU's LLID
16        (frame accepted) as defined in IEEE Std 802.3, Clause 65 and
17        Clause 76, as appropriate.
18
19        This object is applicable for an ONU only.
20
21        Discontinuities in the value of this counter can occur at
22        re-initialization of the management system, and at other times
23        as indicated by the value of the 'discontinuity-time' leaf
24        defined in the ietf-interfaces YANG module (IETF RFC 8343).";
25
26
27     reference
28       "IEEE Std 802.3.1, dot3OmpEmulationBroadcastBitPlusOnuLlid";
29   }
30
31   leaf in-ompe-frames-not-match-onu-llid-not-broadcast {
32     when "../..//ompe-mode = 'onu'";
33
34
35     type yang:counter64;
36
37     units frames;
38
39     config false;
40
41
42     description
43       "A count of frames received that contain a valid SLD field,
44        as defined in IEEE Std 802.3, 65.1.3.3.1 or 76.2.6.1.3.1, as
45        appropriate, pass the CRC-8 check, as defined in
46        IEEE Std 802.3, 65.1.3.3.3 or 76.2.6.1.3.3, as appropriate,
47        do not contain the broadcast bit in the LLID and do not
48        contain the ONU's LLID (frame is NOT accepted) as defined in
49        IEEE Std 802.3, Clause 65 and Clause 76, as appropriate.
50
51        This object is applicable for an ONU only.
52
53        Discontinuities in the value of this counter can occur at
54        re-initialization of the management system, and at other times
55        as indicated by the value of the 'discontinuity-time' leaf
56        defined in the ietf-interfaces YANG module (IETF RFC 8343).";
57
58
59     reference
60       "IEEE Std 802.3.1, dot3OmpEmulationNotBroadcastBitNotOnuLlid";
61   }
62 }
63
64 container thresholds-trx {
65   if-feature "trx-power-level-reporting-supported";
```

```
1
2     description
3         "This container defines a set of optical transceiver
4         thresholds of an EPON interface as defined in
5         IEEE Std 802.3, Clause 60 and Clause 75.";
6
7     reference
8         "IEEE Std 802.3.1, dot3ExtPkgOptIfEntry";
9
10
11     leaf in-trx-power-low-threshold {
12         if-feature "trx-power-level-reporting-supported";
13
14         type int32;
15
16         units "0.1 dBm";
17
18         description
19             "This object reflects the current setting of low alarm
20             threshold for the input power into the optical receiver.
21             If the value reported in 'in-trx-power' object drops below
22             the value set in 'in-trx-power-low-threshold', a
23             'in-trx-power-low-threshold-crossing' event is generated.
24
25             This object is applicable for an OLT and an ONU. It has a
26             distinct value for each logical link.";
27
28         reference
29             "IEEE Std 802.3.1, dot3ExtPkgOptIfLowerInputPowerThreshold";
30     }
31
32
33     leaf in-trx-power-high-threshold {
34         if-feature "trx-power-level-reporting-supported";
35
36         type int32;
37
38         units "0.1 dBm";
39
40         description
41             "This object reflects the current setting of high alarm
42             threshold for the input power into the optical receiver. If
43             the value reported in 'in-trx-power' object exceeds the
44             value set in 'in-trx-power-high-threshold', a
45             'in-trx-power-high-threshold-crossing' event is generated.
46
47             This object is applicable for an OLT and an ONU. It has a
48             distinct value for each logical link.";
49
50         reference
51             "IEEE Std 802.3.1, dot3ExtPkgOptIfUpperInputPowerThreshold";
52     }
53
54
55     leaf out-trx-power-low-threshold {
56         if-feature "trx-power-level-reporting-supported";
57
58         type int32;
59
60         units "0.1 dBm";
61
62         description
```

```
1      "This object reflects the current setting of low alarm
2      threshold for the output power out of the optical
3      transmitter. If the value reported in 'out-trx-power' object
4      drops below the value set in 'out-trx-power-low-threshold',
5      a 'out-trx-power-low-threshold-crossing' event is generated.
6
7      This object is applicable for an OLT and an ONU. It has a
8      distinct value for each logical link.";
9
10
11     reference
12       "IEEE Std 802.3.1, dot3ExtPkgOptIfLowerOutputPowerThreshold";
13   }
14
15   leaf out-trx-power-high-threshold {
16     if-feature "trx-power-level-reporting-supported";
17
18     type int32;
19
20     units "0.1 dBm";
21
22     description
23       "This object reflects the current setting of high alarm
24       threshold for the output power out of the optical
25       transmitter. If the value reported in 'out-trx-power' object
26       exceeds the value set in 'out-trx-power-high-threshold', a
27       'out-trx-power-high-threshold-crossing' event is generated.
28
29       This object is applicable for an OLT and an ONU. It has a
30       distinct value for each logical link.";
31
32     reference
33       "IEEE Std 802.3.1, dot3ExtPkgOptIfUpperOutputPowerThreshold";
34   }
35 }
36
37 container statistics-trx {
38   if-feature "trx-power-level-reporting-supported";
39
40   description
41     "This container defines a set of optical transceiver
42     statistics counters of an EPON interface as defined in
43     IEEE Std 802.3, Clause 60 and Clause 75.";
44
45     reference
46       "IEEE Std 802.3.1, dot3ExtPkgOptIfEntry";
47
48     leaf in-trx-power-signal-detect {
49       type boolean;
50
51       config false;
52
53       description
54         "This object indicates whether a valid optical signal was
55         detected (when read as 'true') or not (when read as 'false')
56         at the input to the optical transceiver.
57
58         This object is applicable for an OLT and an ONU. It has a
59         distinct value for each logical link.";
60
61     reference
```

```
1      "IEEE Std 802.3.1, dot3ExtPkgOptIfSignalDetect";
2    }
3
4    leaf in-trx-power {
5      type int32;
6
7      units "0.1 dBm";
8
9      config false;
10
11     description
12       "This object reflects the value of the input power, as
13        measured at the optical transceiver, expressed in units of
14        0.1 dBm.
15
16        At the ONU, the measurement is performed in a continuous
17        manner.
18
19        At the OLT, the measurement is performed in a burst-mode
20        manner, for each incoming data burst.
21
22        This object is applicable for an OLT and an ONU. It has a
23        distinct value for each logical link.";
24
25     reference
26       "IEEE Std 802.3.1, dot3ExtPkgOptIfInputPower";
27   }
28
29   leaf in-trx-power-low-15-minutes-bin {
30     type int32;
31
32     units "0.1 dBm";
33
34     config false;
35
36     description
37       "This object reflects the lowest value of the input power
38        during the period of the last 15 minutes, as measured at the
39        optical transceiver, and expressed in units of 0.1 dBm.
40
41        At the ONU, the measurement is performed in a continuous
42        manner and stored in a rolling 15-minutes' long observation
43        bin.
44
45        At the OLT, the measurement is the average power for each
46        incoming data burst, and stored in a rolling 15-minutes'
47        long observation bin.
48
49        This object is applicable for an OLT and an ONU. It has a
50        distinct value for each logical link.";
51
52     reference
53       "IEEE Std 802.3.1, dot3ExtPkgOptIfLowInputPower";
54   }
55
56   leaf in-trx-power-high-15-minutes-bin {
57     type int32;
58
59     units "0.1 dBm";
```



```
1      config false;
2
3      description
4      "This object reflects the highest value of the input power
5      during the period of the last 15 minutes, as measured at the
6      optical transceiver, and expressed in units of 0.1 dBm.
7
8      At the ONU, the measurement is performed in a continuous
9      manner and stored in a rolling 15-minutes' long observation
10     bin.
11
12     At the OLT, the measurement is the average power for each
13     incoming data burst, and stored in a rolling 15-minutes'
14     long observation bin.
15
16     This object is applicable for an OLT and an ONU. It has a
17     distinct value for each logical link.";
18
19     reference
20     "IEEE Std 802.3.1, dot3ExtPkgOptIfHighInputPower";
21 }
22
23 leaf out-trx-power-signal-detect {
24     type boolean;
25
26     config false;
27
28     description
29     "This object indicates whether a valid optical signal was
30     detected (when read as 'true') or not (when read as 'false')
31     at the output from the optical transceiver.
32
33     This object is applicable for an OLT and an ONU. It has a
34     distinct value for each logical link.";
35
36     reference
37     "IEEE Std 802.3.1, dot3ExtPkgOptIfTransmitAlarm";
38 }
39
40 leaf out-trx-power {
41     type int32;
42
43     units "0.1 dBm";
44
45     config false;
46
47     description
48     "This object reflects the value of the output power, as
49     measured at the optical transceiver, expressed in units of
50     0.1 dBm.
51
52     At the ONU, the measurement is performed in a burst-mode
53     manner for each outgoing data burst.
54
55     At the OLT, the measurement is performed in a continuous
56     manner.
57
58     This object is applicable for an OLT and an ONU. It has a
```

```
1         distinct value for each logical link.";
2
3     reference
4         "IEEE Std 802.3.1, dot3ExtPkgOptIfOutputPower";
5 }
6
7 leaf out-trx-power-low-15-minutes-bin {
8     type int32;
9
10    units "0.1 dBm";
11
12
13    config false;
14
15    description
16        "This object reflects the lowest value of the output power
17         during the period of the last 15 minutes, as measured at the
18         optical transceiver, and expressed in units of 0.1 dBm.
19
20         At the ONU, the measurement is performed in a burst-mode
21         manner and stored in a rolling 15-minutes' long observation
22         bin.
23
24         At the OLT, the measurement is the average power for each
25         incoming data burst, and stored in a rolling 15-minutes'
26         long observation bin.
27
28         This object is applicable for an OLT and an ONU. It has a
29         distinct value for each logical link.";
30
31    reference
32        "IEEE Std 802.3.1, dot3ExtPkgOptIfLowOutputPower";
33 }
34
35 leaf out-trx-power-high-15-minutes-bin {
36     type int32;
37
38    units "0.1 dBm";
39
40
41    config false;
42
43    description
44        "This object reflects the highest value of the output power
45         during the period of the last 15 minutes, as measured at the
46         optical transceiver, and expressed in units of 0.1 dBm.
47
48         At the ONU, the measurement is performed in a burst-mode
49         manner and stored in a rolling 15-minutes' long observation
50         bin.
51
52         At the OLT, the measurement is the average power for each
53         incoming data burst, and stored in a rolling 15-minutes'
54         long observation bin.
55
56         This object is applicable for an OLT and an ONU. It has a
57         distinct value for each logical link.";
58
59    reference
60        "IEEE Std 802.3.1, dot3ExtPkgOptIfHighOutputPower";
61 }
62
63
64
65
```

```
1
2     leaf trx-data-reliable {
3         if-feature "trx-power-level-reporting-supported";
4
5         type boolean;
6
7         config false;
8
9         description
10            "This object indicates whether data contained in individual
11            counters in 'statistics-trx' container are reliable
12            (when read as 'true') or not (when read as 'false')."
13
14            This object is applicable for an OLT and an ONU. It has a
15            distinct value for each logical link.";
16
17            reference
18                "IEEE Std 802.3.1, dot3ExtPkgOptIfSuspectedFlag";
19        }
20    }
21
22
23
24
25    container statistics-pon-fec {
26        when
27            "(../fec-capability = 'supported') and
28            (../fec-mode = 'enabled-Tx-Rx')";
29
30        if-feature "fec-supported";
31
32        config false;
33
34        description
35            "This container defines a set of FEC-related statistics
36            counters of an EPON interface, as defined in
37            IEEE Std 802.3, Clause 65 and Clause 76.";
38
39        reference
40            "IEEE Std 802.3.1, dot3OmpEmulationStatEntry";
41
42        leaf fec-code-group-violations {
43            type yang:counter64;
44
45            units code-group;
46
47            config false;
48
49            description
50                "For 1G-EPON this is a count of the number of events that
51                cause the PHY to indicate 'Data reception error' or
52                'Carrier Extend Error' on the GMII (see IEEE Std 802.3,
53                Table 35-1). The contents of this counter is undefined when
54                FEC is operating. For 10G-EPON this object is not applicable.
55
56                This object is applicable for an OLT and an ONU. At the
57                OLT, it has a distinct value for each logical link.
58
59                Discontinuities in the value of this counter can occur at
60                re-initialization of the management system, and at other times
61                as indicated by the value of the 'discontinuity-time' leaf
62
63
64
65
```

```
1         defined in the ietf-interfaces YANG module (IETF RFC 8343).";
2
3     reference
4         "IEEE Std 802.3, 30.5.1.1.14";
5 }
6
7 leaf fec-buffer-head-coding-violations {
8     type yang:counter64;
9
10
11     units code-group;
12
13     config false;
14
15     description
16         "For 1G-EPON PHY, this object represents the count of the
17         number of invalid code-groups received directly from the
18         link when FEC is enabled. When FEC is disabled this
19         counter stops counting.
20
21         For 10G-EPON PHYs, this object is set to zero.
22
23         This object is applicable for an OLT and an ONU. It has a
24         distinct value for each logical link.
25
26         Discontinuities in the value of this counter can occur at
27         re-initialization of the management system, and at other times
28         as indicated by the value of the 'discontinuity-time' leaf
29         defined in the ietf-interfaces YANG module (IETF RFC 8343).";
30
31     reference
32         "IEEE Std 802.3.1, dot3EponFecBufferHeadCodingViolation";
33 }
34
35 leaf fec-code-word-corrected-errors {
36     type yang:counter64;
37
38     units code-group;
39
40     config false;
41
42     description
43         "For 1G-EPON or 10G-EPON PHYs, this object represents a count
44         of corrected FEC blocks.
45
46         This counter increments by one for each received FEC block
47         that contained detected errors and was corrected by the FEC
48         function in the PHY.
49
50         This object is applicable for an OLT and an ONU. It has a
51         distinct value for each logical link.
52
53         Discontinuities in the value of this counter can occur at
54         re-initialization of the management system, and at other times
55         as indicated by the value of the 'discontinuity-time' leaf
56         defined in the ietf-interfaces YANG module (IETF RFC 8343).";
57
58     reference
59         "IEEE Std 802.3, 30.5.1.1.17";
60 }
61
62
63
64
65
```

```
1
2     leaf fec-code-word-uncorrected-errors {
3         type yang:counter64;
4
5         units code-group;
6
7         config false;
8
9         description
10            "For 1G-EPON or 10G-EPON PHYs, this object represents a count of
11            uncorrectable FEC blocks.
12
13            This counter increments by one for each received FEC block
14            that contained detected errors and was not corrected by the
15            FEC function in the PHY.
16
17            This object is applicable for an OLT and an ONU. It has a
18            distinct value for each logical link.
19
20            Discontinuities in the value of this counter can occur at
21            re-initialization of the management system, and at other times
22            as indicated by the value of the 'discontinuity-time' leaf
23            defined in the ietf-interfaces YANG module (IETF RFC 8343).";
24
25            reference
26                "IEEE Std 802.3, 30.5.1.1.18";
27        }
28    }
29
30    container mpcp-logical-link-admin-actions {
31        description
32            "Container of actions.";
33        action state-change-action-type {
34            description
35                "Request a state change on the interface.";
36            input {
37                leaf state-change-action-type {
38                    type identityref {
39                        base state-change-action-type;
40                    }
41                    description
42                        "Type of interface state change requested.";
43                }
44            }
45        }
46        action reset-action-type {
47            description
48                "Request a reset-action of the interface.";
49            input {
50                leaf reset-action-type {
51                    type identityref {
52                        base reset-action-type;
53                    }
54                    description
55                        "Type of reset action requested of the interface.";
56                }
57            }
58        }
59        action register-type {
```

```

1      description
2          "Request a registration action.";
3      input {
4          leaf register-type {
5              type identityref {
6                  base register-type;
7              }
8          }
9          description
10             "Type of registration action requested of the interface.";
11        }
12    }
13 }
14 }
15
16 list mpcp-queues {
17     key mpcp-queue-index;
18
19     description
20         "An instance of this object for each value of
21         'mpcp-queue-index' is created when a new logical link is
22         registered and deleted when the logical link is deregistered.
23
24         All instances of this object in the ONU associated with the
25         given logical link are then mapped to a REPORT MPCPDU, when
26         generated.
27
28         +-----+
29         |          Destination Address          |
30         +-----+
31         |          Source Address              |
32         +-----+
33         |          Length/Type                 |
34         +-----+
35         |          OpCode                     |
36         +-----+
37         |          TimeStamp                   |
38         +-----+
39         |          Number of Queue Sets        |
40         +-----+
41         |          Report bitmap               |
42         +-----+
43         |          Queue 0 report              |
44         +-----+
45         |          Queue 1 report              |
46         +-----+
47         |          Queue 2 report              |
48         +-----+
49         |          Queue 3 report              |
50         +-----+
51         |          Queue 4 report              |
52         +-----+
53         |          Queue 5 report              |
54         +-----+
55         |          Queue 6 report              |
56         +-----+
57         |          Queue 7 report              |
58         +-----+
59         |          Pad/reserved                |
60         +-----+
61
62         -|
63         |
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1      |          FCS          |
2      +-----+

```

The 'Queue N report' field reports the current occupancy of each upstream transmission queue associated with the given logical link.

The 'Number of Queue Sets' field defines the number of reported 'Queue N report' sets.

For each Queue Set, the 'Report bitmap' field defines which upstream transmission queues are present in the REPORT MPCPDU. Although the REPORT MPCPDU can report current occupation for up to 8 upstream transmission queues in a single REPORT MPCPDU, the actual number is flexible. The 'mpcp-queue-group' grouping has a variable size that is limited by value of 'mpcp-maximum-queue-count-per-report' object, allowing ONUs report the occupancy of fewer upstream transmission queues, as needed.

This object is applicable for an OLT and an ONU. At the OLT, this object has a distinct value for each logical link and every queue. At the ONU, it has a distinct value for every queue.";

reference

"IEEE Std 802.3.1, dot3ExtPkgQueueEntry";

leaf mpcp-queue-index {

type uint8 {

range "0 .. 7" {

description

"This object indicates the identity (index) of a queue in the ONU. It can have a value between 0 and 7, limited by the value stored in the 'mpcp-maximum-queue-count-per-report' object.";

reference

"See 'mpcp-maximum-queue-count-per-report' object";

}

}

description

"An object represents the index of an upstream transmission queue storing subscriber packets. The size (occupancy) of the upstream transmission queue identified by this object is then reported within REPORT MPCPDU, defined in IEEE Std 802.3, Clause 64 and Clause 77.

This object indicates the identity (index) of a queue in the ONU. It can have a value between 0 and 7, limited by the value stored in the 'mpcp-maximum-queue-count-per-report' object.

This object is applicable for an OLT and an ONU. It has a distinct value for each logical link and each queue. At the ONU, it has a distinct value for each queue.";

reference

"IEEE Std 802.3.1, dot3QueueIndex";

```
1      }
2
3      leaf mpcp-queue-threshold-count {
4          type uint8 {
5              range "0 .. 7" {
6                  description
7                      "This object indicates the identity (index) of a queue in
8                       the ONU. It can have a value between 0 and 7, limited by
9                       the value stored in the
10                      'mpcp-maximum-queue-count-per-report' object.";
11
12                  reference
13                      "See 'mpcp-queue-threshold-count-max' object";
14              }
15          }
16      }
17
18      description
19          "This object reflects the number of reporting thresholds for
20           the specific upstream transmission queue, reflected in the
21           REPORT MPCPDU, as defined in IEEE Std 802.3,
22           Clause 64 and Clause 77.
23
24           Each 'Queue set' provides information for the specific
25           upstream transmission queue occupancy of frames below the
26           matching reporting threshold.
27
28           A read of this object reflects the number of reporting
29           thresholds for the specific upstream transmission queue.
30
31           This object is applicable for an OLT and an ONU. It has a
32           distinct value for each logical link and each queue.
33           At the ONU, it has a distinct value for each queue.";
34
35      reference
36          "IEEE Std 802.3.1, dot3ExtPkgObjectReportNumThreshold";
37  }
38
39  leaf mpcp-queue-threshold-count-max {
40      type uint8 {
41          range "0 .. 7" {
42              description
43                  "This object can have a value between 0 and 7.";
44          }
45      }
46      config false;
47      description
48          "This object reflects the maximum number of reporting
49           thresholds for the specific upstream transmission queue,
50           reflected in the REPORT MPCPDU, as defined in
51           IEEE Std 802.3, Clause 64 and Clause 77.
52
53           A read of this object reflects the maximum number of
54           reporting thresholds for the specific upstream transmission
55           queue.
56
57           This object is applicable for an OLT and an ONU. It has a
58           distinct value for each logical link and each queue.
59           At the ONU, it has a distinct value for each queue.";
```



```

1      reference
2      "IEEE Std 802.3.1, dot3ExtPkgObjectReportMaximumNumThreshold";
3  }
4
5  list mpcp-queue-thresholds {
6      when "../mpcp-queue-threshold-count > 0";
7
8      key mpcp-queue-set-index;
9
10     max-elements 7;
11
12     description
13         "An instance of this object for each value of
14         'mpcp-queue-index' is created when a new logical link is
15         registered and deleted when the logical link is
16         deregistered.
17
18         All instances of this object in the ONU associated with the
19         given logical link are then mapped to a REPORT MPCPDU,
20         when generated.
21
22         +-----+
23         |          Destination Address          |
24         +-----+
25         |          Source Address              |
26         +-----+
27         |          Length/Type                 |
28         +-----+
29         |          OpCode                     |
30         +-----+
31         |          TimeStamp                  |
32         +-----+
33         |          Number of Queue Sets        |
34         +-----+
35         |          Report bitmap               |
36         +-----+
37         |          Queue 0 report              |
38         +-----+
39         |          Queue 1 report              |
40         +-----+
41         |          Queue 2 report              |
42         +-----+
43         |          Queue 3 report              |
44         +-----+
45         |          Queue 4 report              |
46         +-----+
47         |          Queue 5 report              |
48         +-----+
49         |          Queue 6 report              |
50         +-----+
51         |          Queue 7 report              |
52         +-----+
53         |          Pad/reserved                |
54         +-----+
55         |          FCS                        |
56         +-----+
57
58         The 'Queue N report' field reports the current occupancy of
59         each upstream transmission queue associated with the given
60
61
62
63
64
65

```

logical link.

The 'Number of Queue Sets' field defines the number of reported 'Queue N report' sets.

For each Queue Set, the 'Report bitmap' field defines which upstream transmission queues are present in the REPORT MPCPDU. Although the REPORT MPCPDU can report current occupation for up to 8 upstream transmission queues in a single REPORT MPCPDU, the actual number is flexible.

The 'mpcp-queue-group' grouping has a variable size that is limited by value of 'mpcp-maximum-queue-count-per-report' object, allowing ONUs to report the occupancy of fewer upstream transmission queues, as needed.

This object is applicable for an OLT and an ONU. It has a distinct value for each logical link and every queue. At the ONU, it has a distinct value for every queue."

reference

"IEEE Std 802.3.1, dot3ExtPkgQueueSetsEntry";

leaf mpcp-queue-set-index {

type uint8 {

range "0 .. 7" {

description

"This object indicates the identity (index) of a queue in the ONU. It can have a value between 0 and 7, limited by the value stored in the 'mpcp-maximum-queue-count-per-report' object.";

reference

"See 'mpcp-maximum-queue-count-per-report' object";

}

}

description

"This object represents the index of the Queue Set for the 'mpcp-queue-set-group' grouping. The size (occupancy) of the upstream transmission queues belonging to the given Queue Set is then reported within REPORT MPCPDU, defined in IEEE Std 802.3, Clause 64 and Clause 77.

This object can have a value between 0 and 7, limited by the value stored in the 'mpcp-queue-threshold-count-max' object.";

reference

"IEEE Std 802.3.1, dot3QueueSetIndex";

}

leaf mpcp-queue-set-threshold {

type uint64;

units "TQ";

default "0";

```
1      description
2          "This object defines the value of a reporting threshold
3            for each Queue Set stored in REPORT MPCPDU defined in
4            IEEE Std 802.3, Clause 64 and Clause 77.
5
6            The number of Queue Sets for each upstream transmission
7            queue is defined in the 'mpcp-queue-threshold-count'
8            object.
9
10           Within REPORT MPCPDU, each Queue Set provides information
11            on the current upstream transmission queue occupancy for
12            frames below the matching threshold.
13
14           The value stored in this object is expressed in the units
15            of Time quanta (TQ), where 1 TQ = 16 ns.
16
17           A read of this object provides the current threshold value
18            for the specific upstream transmission queue.
19
20           This object is applicable for an OLT and an ONU. At the
21            OLT, it has a distinct value for each logical link, each
22            queue, and each Queue Set.
23
24           At the ONU, it has a distinct value for each queue and
25            each Queue Set.";
```

```
26      reference
27          "IEEE Std 802.3.1, dot3ExtPkgObjectReportThreshold";
28    }
29  }
30
31  leaf in-mpcp-queue-frames {
32      type yang:counter64;
33
34      config false;
35
36      description
37          "A count of the number of times a frame reception event
38            results in a frame being queued in (for ONUs) or received
39            from (for OLTs) the corresponding queue. This object is
40            incremented by one for each frame written to (in the case
41            of the ONU) or received for (in case of the OLT) the
42            associated queue.
43
44            The queue index matches the queue number in REPORT MPCPDU,
45            as defined in IEEE Std 802.3, Clause 64 and Clause 77.
46
47            This object is applicable for an OLT and an ONU. At the OLT,
48            it has a distinct value for each logical link and each queue.
49            At the ONU, it has a distinct value for each queue.
50
51            Discontinuities in the value of this counter can occur at
52            re-initialization of the management system, and at other times
53            as indicated by the value of the 'discontinuity-time' leaf
54            defined in the ietf-interfaces YANG module (IETF RFC 8343).";
55
56      reference
57          "IEEE Std 802.3.1, dot3ExtPkgStatRxFramesQueue";
58    }
```

```
1
2     leaf out-mpcp-queue-frames {
3         when "../../mpcp-mode = 'onu'";
4
5         type yang:counter64;
6
7         config false;
8
9         description
10            "This object reflects the number of frame transmission
11             events from the corresponding upstream transmission queue.
12             This object is incremented by one for each frame transmitted
13             , when it is output from the associated queue.
14
15             The queue index matches the queue number in REPORT MPCPDU,
16             as defined in IEEE Std 802.3, Clause 64 and Clause 77.
17
18             This object is applicable for an ONU only. At the ONU, it
19             has a distinct value for each queue.
20
21             Discontinuities in the value of this counter can occur at
22             re-initialization of the management system, and at other times
23             as indicated by the value of the 'discontinuity-time' leaf
24             defined in the ietf-interfaces YANG module (IETF RFC 8343).";
25
26         reference
27             "IEEE Std 802.3.1, dot3ExtPkgStatTxFramesQueue";
28     }
29
30     leaf mpcp-queue-frames-drop {
31         when "../../mpcp-mode = 'onu'";
32
33         type yang:counter64;
34
35         config false;
36
37         description
38            "This object reflects the number of frame drop events from
39             the corresponding upstream transmission queue. This object
40             is incremented by one for each frame dropped in the
41             associated queue.
42
43             The queue index matches the queue number in REPORT MPCPDU,
44             as defined in IEEE Std 802.3, Clause 64 and Clause 77.
45
46             This object is applicable for an ONU only. At the ONU, it
47             has a distinct value for each queue.
48
49             Discontinuities in the value of this counter can occur at
50             re-initialization of the management system, and at other times
51             as indicated by the value of the 'discontinuity-time' leaf
52             defined in the ietf-interfaces YANG module (IETF RFC 8343).";
53
54         reference
55             "IEEE Std 802.3.1, dot3ExtPkgStatDroppedFramesQueue";
56     }
57
58     list multicast-IDs {
```

```
1      key multicast-ID;
2      description
3          "Multicast-IDs list of multicast IDs
4           to be recognized by the device.";
5      leaf multicast-ID {
6          type uint32;
7          description
8              "Multicast-IDs to be recognized by the device.";
9      reference
10         "IEEE Std 802.3, 30.3.5.1.25";
11     }
12 }
13
14
15 leaf fec-capability {
16     type fec-capability;
17
18     config false;
19
20     description
21         "This object is used to identify whether the given interface
22          is capable of supporting FEC or not.";
23 }
24
25
26 leaf mpcp-mode {
27     type mpcp-mode;
28
29     config false;
30
31     description
32         "This object is used to identify the operational state of the
33          MultiPoint MAC Control sublayer as defined in
34          IEEE Std 802.3, Clause 64 and Clause 77.
35
36          Reading 'olt' for an OLT (controller) mode and 'onu' for an ONU
37          (client) mode.
38
39          This object is used to identify the operational mode for the
40          MPCP objects.
41
42          This object is applicable for an OLT, with the same value for
43          all logical links, and for an ONU.";
44
45     reference
46         "IEEE Std 802.3, 30.3.5.1.3";
47 }
48
49
50
51 leaf mpcp-sync-time {
52     type uint64;
53
54     units "TQ (16ns)";
55
56     config false;
57
58     description
59         "This object reports the 'sync lock time' of the OLT
60          receiver in units of Time Quanta (TQ; 1 TQ = 16 ns; see
61          IEEE Std 802.3, Clause 64 and Clause 77).
62
63          The value returned is equal to [sync lock time ns]/16,
```

```
1         rounded up to the nearest TQ. If this value exceeds
2         4,294,967,295 TQ, the value 4,294,967,295 TQ is returned.
3
4         This object is applicable for an OLT, with distinct values for
5         all logical links, and for an ONU.";
6
7     reference
8     "IEEE Std 802.3.1, dot3MpcpSyncTime";
9 }
10
11 leaf mpcp-logical-link-id {
12     type mpcp-supported;
13
14     config false;
15
16     description
17         "This object is used to identify the operational state of the
18         MultiPoint MAC Control sublayer as defined in
19         IEEE Std 802.3, Clause 64 and Clause 77.
20
21         Reading 'olt' for an OLT (controller) mode and 'onu' for an ONU
22         (client) mode.
23
24         This object is used to identify the operational mode for the
25         MPCP objects.
26
27         This object is applicable for an OLT, with the same value for
28         all logical links, and for an ONU.";
29
30     reference
31     "IEEE Std 802.3, 30.3.5.1.3";
32 }
```

Editor's Note (to be removed prior to publication):

Leaf mpcp-remote-mac-address was modified per Maintenance Request 1380
(see https://www.ieee802.org/3/maint/requests/maint_1380.pdf)

```
44 leaf mpcp-remote-mac-address {
45     type ieee:mac-address;
46
47     config false;
48
49     description
50         "This object identifies the source_address parameter of the
51         last MPCPDUs passed to the MAC Control. This value is updated
52         on reception of a valid frame with:
53
54         1) a destination Field equal to the multicast address assigned
55         for MAC Control as specified in IEEE Std 802.3, Annex 31A;
56
57         2) the lengthOrType field value equal to the Type assigned for
58         MAC Control as specified in IEEE Std 802.3, Annex 31A;
59
60         3) an MPCP Control opcode value equal to the subtype assigned
61         for MPCP as specified in IEEE Std 802.3, Annex 31A.
62
63
64
65
```

```
1      This object is applicable for an OLT and an ONU. It has a
2      distinct value for each logical link.
3
4      The value reflects the MAC address of the remote entity and
5      therefore the OLT holds a value for each LLID, which is
6      the MAC address of the ONU.
7
8      The ONU has a single value that is the OLT MAC address.";
9
10     reference
11       "IEEE Std 802.3, 30.3.5.1.5";
12   }
13
14   leaf mpcp-logical-link-state {
15     type mpcp-logical-link-state;
16
17     config false;
18
19     description
20       "This object identifies the registration state of the
21       MultiPoint MAC Control sublayer as defined in
22       IEEE Std 802.3, Clause 64 and Clause 77.
23
24       When this object has the enumeration 'unregistered', the
25       interface is unregistered and may be used for registering
26       a link partner.
27
28       When this object has the enumeration 'registering',
29       the interface is in the process of registering a link-partner.
30
31       When this object has the enumeration 'registered', the
32       interface has an established link-partner.
33
34       This object is applicable for an OLT and an ONU. It has a
35       distinct value for each logical link.";
36
37     reference
38       "IEEE Std 802.3, 30.3.5.1.6";
39   }
40
41   leaf mpcp-elapsed-time-out {
42     type uint64;
43
44     units "TQ (16ns)";
45
46     config false;
47
48     description
49       "This object reports the interval from the last MPCP frame
50       transmission in increments of Time Quanta (TQ; 1 TQ = 16 ns;
51       see IEEE Std 802.3, Clause 64 and Clause 77).
52
53       The value returned is equal to [interval from last MPCP
54       frame transmission on this EPON interface, expressed
55       in ns]/16. If this value exceeds 4,294,967,295 TQ, the value
56       4,294,967,295 TQ is returned.
57
58       This object is applicable for an OLT and an ONU. It has a
59       distinct value for each logical link.";
```

```
1
2     reference
3         "IEEE Std 802.3, 30.3.5.1.19";
4     }
5
6     leaf mpcp-elapsed-time-in {
7         type uint64;
8
9         units "TQ (16ns)";
10
11         config false;
12
13         description
14             "This object reports the interval from the last MPCP frame
15             reception in increments of Time Quanta (TQ; 1 TQ = 16 ns; see
16             IEEE Std 802.3, Clause 64 and Clause 77).
17
18             The value returned is equal to [interval from last MPCP
19             frame reception on this EPON interface, expressed in
20             ns]/16. If this value exceeds 4,294,967,295 TQ, the value
21             4,294,967,295 TQ is returned.
22
23             This object is applicable for an OLT and an ONU. It has a
24             distinct value for each logical link.";
25
26         reference
27             "IEEE Std 802.3, 30.3.5.1.20";
28     }
29
30     leaf mpcp-round-trip-time {
31         when "../ompe-mode = 'olt'";
32         type uint16;
33
34         units "TQ (16ns)";
35
36         config false;
37
38         description
39             "This object reports the MPCP round trip time in increments
40             of Time Quanta (TQ; 1 TQ = 16 ns; see IEEE Std 802.3,
41             Clause 64 and Clause 77).
42
43             The value returned is equal to [round trip time in ns]/16.
44             If this value exceeds 65,535 TQ, the value 65,535 TQ is
45             returned.
46
47             This object is applicable for an OLT. It has a distinct value
48             for each logical link.";
49
50         reference
51             "IEEE Std 802.3, 30.3.5.1.21";
52     }
53
54     leaf mpcp-maximum-grant-count {
55         when "../ompe-mode = 'onu'";
56         type uint8;
57
58         config false;
59
60         description
61             "This object reports the maximum grant count in increments
62             of Time Quanta (TQ; 1 TQ = 16 ns; see IEEE Std 802.3,
63             Clause 64 and Clause 77).
64             The value returned is equal to [maximum grant count in ns]/16.
65             If this value exceeds 65,535 TQ, the value 65,535 TQ is
66             returned.
67             This object is applicable for an ONU. It has a distinct value
68             for each logical link.";
```



```
1      description
2          "This object reports the maximum number of grants that an
3          ONU can store for handling. The maximum number of grants that
4          an ONU can store for handling has a range of 0 to 255.
5
6          This object is applicable for an ONU and has a distinct value
7          for each logical link.";
8
9
10     reference
11         "IEEE Std 802.3, 30.3.5.1.24";
12 }
13
14 leaf mpcp-logical-link-count {
15     type mpcp-llid-count;
16
17     units LLID;
18
19     config false;
20
21     description
22         "This object reflects the number of logical links registered
23         on the OLT / ONU. The LLID field, as defined in the
24         IEEE Std 802.3, Clause 65 and Clause 76, is a 2-byte register
25         (15-bit field and a broadcast bit) limiting the number of
26         logical links to 32,768.
27
28         This object is initialized to the value of 0 when the
29         OLT / ONU is powered up.
30
31         This object is applicable for an OLT and an ONU. It has the same
32         value for all logical links.";
33
34     reference
35         "IEEE Std 802.3.1, dot3ExtPkgObjectNumberOfLLIDs";
36 }
37
38 leaf mpcp-maximum-queue-count-per-report {
39     when "../ompe-mode = olt";
40     type mpcp-maximum-queue-count-per-report;
41
42     config false;
43
44     description
45         "This object reflects the maximum number of queues (0-7) that can
46         be accepted by the OLT in a single REPORT MPCPDU, as defined in
47         IEEE Std 802.3, Clause 64 and Clause 77.
48
49         This object is applicable for an OLT and has a distinct value
50         for each logical link.";
51
52     reference
53         "IEEE Std 802.3.1, dot3ExtPkgObjectReportMaximumNumQueues";
54 }
55
56 leaf ompe-mode {
57     type ompe-mode;
58
59     config false;
60
61     description
62         "This object reflects the maximum number of queues (0-7) that can
63         be accepted by the OLT in a single REPORT MPCPDU, as defined in
64         IEEE Std 802.3, Clause 64 and Clause 77.
65         This object is applicable for an OLT and has a distinct value
66         for each logical link.";
```

```
1      description
2          "This object indicates the mode of operation of the
3            Reconciliation Sublayer for Point-to-Point Emulation (see
4            IEEE Std 802.3, 65.1 or 76.2 as appropriate).
5
6            The value of 'unknown' is assigned in initialization; true
7            state or type is not yet known.
8
9            The value of 'olt' is assigned when the sublayer is operating
10           in OLT mode.
11
12           The value of 'onu' is assigned when the sublayer is operating
13           in ONU mode.
14
15           This object is applicable for an OLT and an ONU. It has the same
16           value for each logical link.";
17
18      reference
19          "IEEE Std 802.3, 30.3.7.1.2";
20  }
21  }
22  }
```

8. YANG module for Ethernet Link OAM (ELO)

8.1 Introduction

IEEE Std 802.3, Clause 57 includes management capabilities for Ethernet-like interfaces to provide some basic operations, administration and maintenance (OAM) functions. The defined functionality includes discovery, error signaling, loopback, and link monitoring. This clause defines a portion of the YANG module for use with NETCONF or RESTCONF to manage these Ethernet-like interface capabilities.

8.2 Overview

Ethernet OAM is composed of a core set of functions and a set of optional functional groups as described in Clause 57 of IEEE Std 802.3. The core functions include discovery operations (determining if the other end of the link is OAM capable and what OAM functions it supports), state machine implementation, and some critical event flows.

Ethernet OAM provides single-hop functionality in that it works only between two directly connected Ethernet stations. Ethernet OAM has three functional objectives, which are detailed in 8.2.1 through 8.2.3. The definition of a basic Ethernet OAM protocol data unit is given in 8.2.4.

8.2.1 Remote fault indication

Remote fault indication provides a mechanism for one end of an Ethernet link to signal the other end that the receive path is non-operational. Some Ethernet Physical Layers offer mechanisms to signal this condition at the Physical Layer. Ethernet OAM added a mechanism so that some Ethernet Physical Layers can operate in unidirectional mode, allowing frames to be transmitted in one direction even when the other direction is non-operational. Traditionally, Ethernet PHYs do not allow frame transmission in one direction if the other direction is not operational. Using this mode, Ethernet OAM allows frame-based signaling of remote fault conditions while still not allowing higher layer applications to be aware of the unidirectional capability. This clause includes mechanisms for capturing that fault information and reflecting such information in data nodes and notifications within the NETCONF management framework.

8.2.2 Link monitoring

Ethernet OAM includes event signaling capability so that one end of an Ethernet link can indicate the occurrence of certain important events to the other end of the link. This happens via layer 2 protocols. This clause defines methods for incorporating the occurrence of these events, at both the local end and the far end of the link, into the YANG-based management framework.

Ethernet OAM also includes mechanisms for one Ethernet station to query another directly connected Ethernet station about the status of its Ethernet interface variables and status. This clause does not include mechanisms for controlling how one Ethernet endpoint may use this functionality to query the status or statistics of a peer Ethernet entity.

8.2.3 Remote loopback

Remote loopback is a link state where the peer Ethernet entity echoes every received packet (without modifications) back onto the link. Remote loopback is intrusive in that the other end of the link is not forwarding traffic from higher layers out over the link. This clause defines data nodes controlling loopback operation and reading the status of the loopback state.

8.2.4 Ethernet OAM protocol data units

An Ethernet OAM protocol data unit (OAMPDU) is a valid Ethernet frame with a destination Media Access Control (MAC) address equal to the MAC address assigned for Slow Protocols (see IEEE Std 802.3, Annex 57A), a lengthOrType field equal to the Type assigned for Slow Protocols, and a Slow Protocols subtype equal to that of the subtype assigned for Ethernet OAM.

OAMPDU is used throughout this clause as an abbreviation for Ethernet OAM protocol data unit. OAMPDUs are the mechanism by which two directly connected Ethernet interfaces exchange OAM information.

8.3 Security considerations for Ethernet operations, administration, and maintenance (OAM) module

The readable data nodes in this module can provide information about network traffic, and therefore, they may be considered sensitive. In particular, OAM provides mechanisms for reading the Clause 30 IEEE 802.3 management attributes from a link partner via a layer 3 protocol. IEEE Std 802.3 OAM does not include encryption or authentication mechanisms. It should not be used in environments where this interface information is considered sensitive, and where the facility terminations are unprotected. By default, OAM is disabled on Ethernet-like interfaces and is therefore not a risk.

IEEE Std 802.3 OAM is designed to support deployment in access and enterprise networks. In access networks, one end of a link is the CO-side, and the other is the CPE-side, and the facilities are often protected in wiring cages or closets. In such deployments, it is often the case that the CO-side is protected from access from the CPE-side. Within IEEE Std 802.3 OAM, this protection from remote access is accomplished by configuring the CPE-side in passive mode using the mode leaf. This prevents the CPE from accessing functions and information at the CO-side of the connection. In enterprise networks, read-only interface information is often considered non-sensitive.

The frequency of OAM PDUs on an Ethernet interface does not adversely affect data traffic, as OAM is a slow protocol with very limited bandwidth potential, and it is not required for normal link operation. Although there are a number of objects in this module with read-write or read-create MAX-ACCESS, they have limited effects on user data.

The loopback capability of OAM can have potentially disruptive effects; when remote loopback is enabled, the remote station automatically transmits all received traffic back to the local station except for OAM traffic. This completely disrupts all higher layer protocols such as bridging, IP, and NETCONF/RESTCONF.

The administrative state and mode are also configuration nodes. Disabling OAM can interrupt management activities between peer devices, potentially causing serious problems. Setting the mode node to an undesired value can allow access to Ethernet monitoring, events, and functions that may not be acceptable in a particular deployment scenario. In addition to loopback functionality, Ethernet interface statistics and events can be accessed via the OAM protocol, which may not be desired in some circumstances.

OAM event configuration also contains configuration nodes. These nodes control whether events are sent, and at what thresholds. Note that the frequency of event communication is limited by the frequency limits of Slow Protocols on Ethernet interfaces. Also, the information available via OAM events is also available via OAM Variable Requests. Access to this information via either OAM events or Variable Requests is controlled by the admin and mode nodes. As mentioned previously, inadequate protection of these variables can result in access to link information and functions.

8.4 Mapping of IEEE 802.3 managed objects

This subclause contains the mapping between the YANG data nodes defined in this clause and the attributes defined in IEEE Std 802.3, Clause 30. Table 8–1 provides the mapping between the *ieee802-ethernet-link-oam* module data nodes and the OAM attributes of IEEE Std 802.3, Clause 30.

Table 8–1—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-ethernet-link-oam* YANG data nodes

IEEE Std 802.3, Clause 30		Reference	Corresponding <i>ieee802-ethernet-link-oam</i> YANG data nodes		
Managed object(s)	Attribute(s)		Container(s)	Data node(s)	R/W
oOAM	aOAMAdminState	30.3.6.1.2	interfaces/interface/ethernet/link-oam	admin	R/W
	dot3OamOperStatus aOAMDiscoveryState aOAMLocalFlagsField aOAMRemoteFlagsField	IEEE Std 802.3.1 30.3.6.1.4 30.3.6.1.10 30.3.6.1.11	interfaces/interface/ethernet/link-oam/ discovery-info/local	operational-status	R
	aOAMLocalState	30.3.6.1.14		loopback-mode	R
	aOAMMode	30.3.6.1.3		mode	RW
	aOAMLocalRevision	30.3.6.1.12		revision	R
	aOAMLocalPDUConfiguration	30.3.6.1.8		oammtu	R
	aOAMLocalConfiguration	30.3.6.1.6	interfaces/interface/ethernet/link-oam/ discovery-info/remote/functions-sup- ported	uni-directional-link-fault	R/W
				loopback	R/W
				mib-retrieval	R/W
		aOAMLocalCon- figuration	interfaces/interface/ethernet/link-oam/ discovery-info/local/functions-sup- ported/link-monitor	link-monitoring	R/W
	aOAMLocalErrSymPeriodConfig aOAMLocalErrFrameConfig aOAMLocalErrFramePeriodConfig aOAMLocalErrFrameSecsSummaryConfig aOAMLocalErrSymPeriodConfig	30.3.6.1.34 30.3.6.1.36 30.3.6.1.38 30.3.6.1.40 30.3.6.1.42	interfaces/interface/ethernet/link-oam/ link-monitor/event-type	threshold-type window threshold	R/W R/W R/W
	aOAMRemoteMACAddress	30.3.6.1.5	interfaces/interface/ethernet/link-oam/ discovery-info/remote	mac-address	R
	aOAMRemoteVendorOUI	30.3.6.1.16		vendor-oui	R
	aOAMRemoteVendorSpecificInfo	30.3.6.1.17		vendor-info	R

**Table 8–1—Mapping between IEEE Std 802.3, Clause 30 managed objects
and *ieee802-ethernet-link-oam* YANG data nodes (continued)**

IEEE Std 802.3, Clause 30		Reference	Corresponding <i>ieee802-ethernet-link-oam</i> YANG data nodes		
Managed object(s)	Attribute(s)		Container(s)	Data node(s)	R/W
OAM	aOAMLocalConfiguration	30.3.6.1.6	interfaces/interface/ethernet/link-oam/ discovery-info/local/functions-sup- ported	uni-directional-link-fault	R
				loopback	R
				link-monitoring	R
				mib-retrieval	R
	dot3OamEventLogEntry	IEEE Std 802.3.1	interfaces-state/ interface/ethernet/ link-oam/event-log/event-log-entry	index	R
				oui	R
				timestamp	R
				location	R
				event-type	R
				running-total	R
				event-total	R
	aOAMLocalErrSymPeriodEvent aOAMLocalErrFrameEvent aOAMLocalErrFramePeriodConfig aOAMLocalErrFrameSecsSummaryEvent aOAMRemoteErrSymPeriodEvent aOAMRemoteErrFrameEvent aOAMRemoteErrFramePeriodEvent aOAMRemoteErrFrameSecsSummaryEvent	30.3.6.1.35 30.3.6.1.37 30.3.6.1.38 30.3.6.1.41 30.3.6.1.42 30.3.6.1.43 30.3.6.1.44 30.3.6.1.45	interfaces/interface/ethernet/link-oam/ event-log/event-log-entry/threshold	threshold-event-type window threshold value	R R R R
	Dot3OamStatsEntry	RFC-4878	interfaces/interface/ethernet/link-oam/ statistics	out-information	R
	aOAMInformationTx	30.3.6.1.20		in-information	R
	aOAMInformationRx	30.3.6.1.21			

Table 8–1—Mapping between IEEE Std 802.3, Clause 30 managed objects and *ieee802-ethernet-link-oam* YANG data nodes (continued)

IEEE Std 802.3, Clause 30		Reference	Corresponding <i>ieee802-ethernet-link-oam</i> YANG data nodes		
Managed object(s)	Attribute(s)		Container(s)	Data node(s)	R/W
OAM	aOAMVariableRequestRx	30.3.6.1.29	interfaces/interface/ethernet/link-oam/statistics	variable-requeste-rx	R
	aOAMVariableResponseTx	30.3.6.1.30		out-variable-response	R
	aOAMVariableResponseRx	30.3.6.1.31		in-variable-response	R
	aOAMOrganizationSpecificTx	30.3.6.1.32		out-org-specific	R
	aOAMOrganizationSpecificRx	30.3.6.1.33		in-org-specific	R
	aOAMUnsupportedCodesTx	30.3.6.1.18		unsupported-condes-tx	R
	aOAMUnsupportedCodesRx	30.3.6.1.19		in-unsupported-codes	R
	aFramesLostDueToOAMError	30.3.6.1.46		frames-lost-due-to-oam	R
	aOAMLocalErrSymPeriodEvent, Errored Symbols	30.3.6.1.35		local-error-symbol-period-log-entries	R
	aOAMLocalErrFrameEvent, Errored Frames	30.3.6.1.37		local-error-frame-log-entries	R
	aOAMLocalErrFramePeriodEvent, Errored Frames	30.3.6.1.39		local-error-frame-period-log-entries	R
	aOAMLocalErrFrameSecsSummaryEvent, Errored Frame Seconds Summary	30.3.6.1.41		local-error-frame-second-log-entries	R
	aOAMRemoteErrSymPeriodEvent, Errored Symbols	30.3.6.1.42		remote-error-symbol-period-log-entries	R
	aOAMRemoteErrFrameEven, Errored Frames	30.3.6.1.43		remote-error-frame-log-entries	R
	aOAMRemoteErrFramePeriodEvent, Errored Frames	30.3.6.1.44		remote-error-frame-period-log-entries	R
	aOAMRemoteErrFrameSecsSummaryEvent, Errored Frame Seconds Summary	30.3.6.1.45		remote-error-frame-second-log-entries	R

8.5 YANG module definition^P

The YANG module tree hierarchy uses terms defined in IETF RFC 8407.

8.5.1 Tree hierarchy

```

module: ieee802-ethernet-link-oam
  augment /if:interfaces/if:interface:
    +--rw link-oam!
      +--rw admin?                  admin-state
      +--rw discovery-info
        | +--rw local
        | | +--ro operational-status    operational-state
        | | +--ro loopback-mode        loopback-status {remote-loopback-initiate or
remote-loopback-respond}?
        | | +--rw mode?                mode
        | | +--rw functions-supported
        | | | +--rw uni-directional-link-fault?  boolean {uni-directional-link-fault}?
        | | | +--rw loopback?              boolean {remote-loopback-initiate}?
        | | | +--rw link-monitor {link-monitoring-remote or
link-monitoring-local}?
        | | | | +--rw link-monitoring?  boolean
        | | | | +--rw event-type* [threshold-type] {link-monitoring-local}?
        | | | | +--rw threshold-type    threshold-event-enum
        | | | | +--rw window?           uint64
        | | | | +--rw threshold?        uint64
        | | | +--rw mib-retrieval?      boolean {remote-mib-retrieval-initiate or
remote-mib-retrieval-respond}?
        | | +--ro revision?             uint64
        | +--ro oammtu?                 uint16

```

^PCopyright release for YANG modules: Users of this standard may freely reproduce the YANG module contained in this subclause so that it can be used for its intended purpose.

| +--ro remote

Editor's Note (to be removed prior to publication):

Leaf mac-address was modified per Maintenance Request 1380 (see https://www.ieee802.org/3/maint/requests/maint_1380.pdf)

```

|   +--ro mac-address?           ieee:mac-address
|   +--ro vendor-oui?            vendor-oui
|   +--ro vendor-info?           uint64
|   +--ro loopback-mode          loopback-status
|   +--ro mode?                  mode
|   +--ro functions-supported
|   |   +--ro uni-directional-link-fault?  boolean
|   |   +--ro loopback?                  boolean
|   |   +--ro link-monitoring?            boolean
|   |   +--ro mib-retrieval?              boolean
|   +--ro revision?               uint64
|   +--ro oammtu?                 uint16
+--ro event-log
|   +--ro event-log-entry* [index]
|   |   +--ro index               uint64
|   |   +--ro oui                 vendor-oui
|   |   +--ro timestamp           uint64
|   |   +--ro location            event-location
|   |   +--ro event-type          identityref
|   |   +--ro running-total       yang:counter64
|   |   +--ro event-total        yang:counter64
|   |   +--ro threshold {link-monitoring-local or
link-monitoring-remote}?
|   |   |   +--ro threshold-event-type  threshold-event-enum
|   |   |   +--ro window                uint64
|   |   |   +--ro threshold             uint64
|   |   |   +--ro value                 uint64
+--ro statistics
|   +--ro out-information          yang:counter64

```

```

|   +---ro in-information                               yang:counter64
|   +---ro out-unique-event-notification              yang:counter64 {link-monitoring-local}?
|   +---ro in-unique-event-notification               yang:counter64 {link-monitoring-remote}?
|   +---ro out-duplicate-event-notification           yang:counter64 {link-monitoring-local}?
|   +---ro in-duplicate-event-notification            yang:counter64 {link-monitoring-remote}?
|   +---ro out-loopback-control                       yang:counter64 {remote-loopback-initiate}?
|   +---ro in-loopback-control                       yang:counter64 {remote-loopback-respond}?
|   +---ro out-variable-request                      yang:counter64 {remote-mib-retrieval-initiate}?
|   +---ro in-variable-request                      yang:counter64 {remote-mib-retrieval-respond}?
|   +---ro out-variable-response                     yang:counter64 {remote-mib-retrieval-respond}?
|   +---ro in-variable-response                     yang:counter64 {remote-mib-retrieval-initiate}?
|   +---ro out-org-specific                          yang:counter64
|   +---ro in-org-specific                          yang:counter64
|   +---ro out-unsupported-codes                     yang:counter64
|   +---ro in-unsupported-codes                     yang:counter64
|   +---ro frames-lost-due-to-oam                   yang:counter64
|   +---ro local-error-symbol-period-log-entries     yang:counter64
|   +---ro local-error-frame-log-entries            yang:counter64
|   +---ro local-error-frame-period-log-entries      yang:counter64
|   +---ro local-error-frame-second-log-entries      yang:counter64
|   +---ro remote-error-symbol-period-log-entries    yang:counter64 {link-monitoring-remote}?
|   +---ro remote-error-frame-log-entries            yang:counter64 {link-monitoring-remote}?
|   +---ro remote-error-frame-period-log-entries     yang:counter64 {link-monitoring-remote}?
|   +---ro remote-error-frame-second-log-entries     yang:counter64 {link-monitoring-remote}?
+---x remote-loopback {remote-loopback-initiate}?
|   +---w input
|   |   +---w enable      boolean
|   +---ro output
|   |   +---ro success      boolean
|   |   +---ro error-message? string
+---x reset-stats
|   +---ro output
|   |   +---ro success      boolean
|   |   +---ro error-message? string
+---n non-threshold-event
|   +---- oui              vendor-oui

```

```

| +---- timestamp          uint64
| +---- location           event-location
| +---- event-type         identityref
| +---- running-total      yang:counter64
| +---- event-total        yang:counter64
+---n threshold-event {link-monitoring-local or
link-monitoring-remote}?
    +---- oui              vendor-oui
    +---- timestamp        uint64
    +---- location         event-location
    +---- event-type       identityref
    +---- running-total    yang:counter64
    +---- event-total      yang:counter64
    +---- threshold {link-monitoring-local or
link-monitoring-remote}?
        +---- threshold-event-type    threshold-event-enum
        +---- window                  uint64
        +---- threshold                uint64
        +---- value                    uint64

```

8.5.2 YANG module

In the following YANG module definition, should any discrepancy between the text of the description for individual YANG nodes and the corresponding definition in 8.2 through 8.5 of this clause occur, the definitions in 8.2 through 8.5 shall take precedence.

An ASCII text version of the YANG module can be found at the following URL:⁹ <https://github.com/YangModels/yang/tree/master/standard/ieee/published/802.3>.

```
module ieee802-ethernet-link-oam {  
    yang-version 1.1;  
    namespace "urn:ieee:std:802.3:yang:ieee802-ethernet-link-oam";  
    prefix "ieee802-link-oam";  
    revision 2019-06-21 {  
        description "Initial revision.";  
    }
```

Editor's Note (to be removed prior to publication):

New 'ieee' prefix import was added per Maintenance Request 1380 (see https://www.ieee802.org/3/maint/requests/maint_1380.pdf)

```
import ietf-yang-types {  
    prefix yang;  
    reference "IETF RFC 6991";  
}  
  
import iana-if-type {  
    prefix ianaift;  
    reference "http://www.iana.org/assignments/yang-parameters/  
        iana-if-type@2018-07-03.yang";  
}  
  
import ietf-interfaces {  
    prefix if;  
    reference "IETF RFC 8343";  
}  
  
organization  
    "IEEE 802.3 Ethernet Working Group  
    Web URL: http://www.ieee802.org/3/";  
contact  
    "Web URL: http://www.ieee802.org/3/";  
  
description  
    "This module contains a collection of YANG definitions
```

⁹Copyright release for YANG modules: Users of this standard may freely reproduce the YANG module contained in this subclause so that it can be used for its intended purpose.

```
1      for managing the Ethernet Link OAM feature defined by IEEE
2      802.3. It provides functionality roughly equivalent to that of
3      the DOT3-OAM-MIB defined in IETF RFC 4878.";
4
5  reference
6      "IEEE Std 802.3-2018, unless dated explicitly";
7
8
9  feature uni-directional-link-fault {
10      description
11          "This feature means the device supports Uni Directional Link
12          Fault detection.";
13      reference
14          "IEEE Std 802.3, 57.1.2:a, 30.3.6.1.6 aOAMLocalConfiguration and
15          30.3.6.1.7 aOAMRemoteConfiguration";
16  }
17
18  feature remote-loopback-initiate {
19      description
20          "This feature means the device supports being the initiator
21          of remote loopback.";
22      reference
23          "IEEE Std 802.3, 57.1.2:b, 30.3.6.1.6 aOAMLocalConfiguration";
24  }
25
26  feature remote-loopback-respond {
27      description
28          "This feature means the device supports responding to remote
29          loopback control OAMPDUs received from the peer";
30      reference
31          "IEEE Std 802.3, 57.1.2:b, 30.3.6.1.7 aOAMRemoteConfiguration";
32  }
33
34  feature link-monitoring-local {
35      description
36          "This feature means the device monitors the link at the local
37          side and can generate Link Event OAMPDUs to the peer device.";
38      reference
39          "IEEE Std 802.3, 57.1.2:c:1, 30.3.6.1.6 aOAMLocalConfiguration,
40          and 30.3.6.1.7 aOAMRemoteConfiguration";
41  }
42
43  feature link-monitoring-remote {
44      description
45          "This feature means the device can process Link Event OAMPDUs
46          received from the peer device and report itself about this
47          event on its own management interface.";
48      reference
49          "IEEE Std 802.3, 57.1.2:c:1, 30.3.6.1.6 aOAMLocalConfiguration,
50          and 30.3.6.1.7 aOAMRemoteConfiguration";
51  }
52
53  feature remote-mib-retrieval-initiate {
54      description
55          "This feature means the device supports data retrieval from
56          the peer device. I.e. the device can send Variable Requests
57          OAMPDUs to the peer side and process the received Variable
58          Response OAMPDUs.";
59      reference
60          "IEEE Std 802.3, 57.1.2:c:2, 30.3.6.1.6 aOAMLocalConfiguration,
```

```
1         and 30.3.6.1.7 aOAMRemoteConfiguration";
2     }
3     feature remote-mib-retrieval-respond {
4         description
5             "This feature means the device allows the peer device to
6             retrieve data from the managed device. I.e. the device can
7             process received Variable Requests OAMPDUs and respond with
8             Variable Response OAMPDUs.";
9         reference
10            "IEEE Std 802.3, 57.1.2:c:2, 30.3.6.1.6 aOAMLocalConfiguration,
11            and 30.3.6.1.7 aOAMRemoteConfiguration";
12    }
13    typedef threshold-event-enum {
14        type enumeration {
15            enum symbol-period-event {
16                value 1;
17                description
18                    "Errored symbol period event.";
19            }
20            enum frame-period-event {
21                value 2;
22                description
23                    "Errored frame period event.";
24            }
25            enum frame-event {
26                value 3;
27                description
28                    "Errored frame event";
29            }
30            enum frame-seconds-event {
31                value 4;
32                description
33                    "Errored frame seconds event.";
34            }
35        }
36        description
37            "Enumeration of the valid threshold event types.";
38        reference
39            "IEEE Std 802.3, 57.5.3";
40    }
41
42    identity event-type {
43        description
44            "Base identity for all Link OAM event types.";
45    }
46
47    identity threshold-event-type {
48        base event-type;
49        description
50            "Event type for a Link Monitoring threshold event.";
51    }
52
53    identity link-fault-event {
54        base event-type;
55        if-feature "uni-directional-link-fault";
56        description
```

```
1      "Event type for a uni-directional link fault event.";
2      reference
3      "IEEE Std 802.3, 57.2.10.1";
4  }
5  identity dying-gasp-event {
6      base event-type;
7      description
8          "Event type for a dying gasp event.";
9      reference
10     "IEEE Std 802.3, 57.2.10.1";
11 }
12 identity critical-event {
13     base event-type;
14     description
15         "Event type for a critical event.";
16     reference
17         "IEEE Std 802.3, 57.2.10.1";
18 }
19 typedef mode {
20     type enumeration {
21         enum passive {
22             value 0;
23             description
24                 "Ethernet Link OAM Passive mode.";
25         }
26         enum active {
27             value 1;
28             description
29                 "Ethernet Link OAM Active mode.";
30         }
31     }
32     description
33         "Enumeration of the valid modes in which Link OAM may run.";
34     reference
35         "IEEE Std 802.3, 57.2.9 and 30.3.6.1.3.";
36 }
37 typedef event-location {
38     type enumeration {
39         enum event-location-local {
40             value 1;
41             description
42                 "A local event.";
43         }
44         enum event-location-remote {
45             value 2;
46             description
47                 "A remote event.";
48         }
49     }
50     description
51         "The location of the event that caused a log entry.";
52 }
```



```
1
2 typedef loopback-status{
3     type enumeration {
4         enum none {
5             value 1;
6             description
7                 "Loopback is not being performed.";
8         }
9         enum initiating {
10            value 2;
11            description
12                "Initiating master loopback.";
13        }
14        enum master-loopback {
15            value 3;
16            description
17                "In master loopback mode.";
18        }
19        enum terminating {
20            value 4;
21            description
22                "Terminating master loopback mode.";
23        }
24        enum local-loopback {
25            value 5;
26            description
27                "In slave loopback mode.";
28        }
29        enum unknown {
30            value 6;
31            description
32                "Parser and multiplexer combination unexpected.";
33        }
34    }
35    description
36        "The loopback mode of an OAM interface.";
37    reference
38        "IEEE Std 802.3, 57.2.11";
39 }
40
41 typedef operational-state {
42     type enumeration {
43         enum disabled {
44             value 1;
45             description
46                 "IEEE Std 802.3 OAM is disabled.";
47         }
48         enum link-fault {
49             value 2;
50             description
51                 "IEEE Std 802.3 OAM has encountered a link fault.";
52         }
53         enum passive-wait {
54             value 3;
55             description
```

```
1         "Passive OAM entity waiting to see if peer is
2         OAM capable.";
3     }
4     enum active-send-local {
5         value 4;
6         description
7             "Active OAM entity trying to determine if peer
8             is OAM capable.";
9     }
10    }
11    enum send-local-and-remote {
12        value 5;
13        description
14            "OAM discovered peer but still to accept or
15            reject peer configuration.";
16    }
17    }
18    enum send-local-and-remote-ok {
19        value 6;
20        description
21            "OAM peering is allowed by local device.";
22    }
23    }
24    enum peering-locally-rejected {
25        value 7;
26        description
27            "OAM peering rejected by local device.";
28    }
29    }
30    enum peering-remotely-rejected {
31        value 8;
32        description
33            "OAM peering rejected by remote device.";
34    }
35    }
36    enum operational {
37        value 9;
38        description
39            "IEEE Std 802.3 OAM is operational.";
40    }
41    }
42    enum operational-half-duplex {
43        value 10;
44        description
45            "IEEE Std 802.3 OAM is operating in half-duplex mode.";
46    }
47    }
48    }
49    }
50    description
51        "Operational state of an interface.";
52    reference
53        "IETF RFC 4878, dot3OamOperStatus; IEEE Std 802.3, 30.3.6.1.4,
54        30.3.6.1.10, and 30.3.6.1.11";
55    }
56    }
57    }
58    }
59    typedef vendor-oui {
60        type string {
61            length 6;
62        }
63    }
64    description
65        "24-bit Organizationally Unique Identifier.";
```

```
1      reference
2        "IEEE Std 802-2014, Clause 9";
3    }
4
5
6    typedef admin-state {
7      type enumeration {
8        enum enabled {
9          value 1;
10         description
11           "IEEE Std 802.3, Clause 57 OAM is in the
12            enabled admin state.";
13         }
14       enum disabled {
15         value 2;
16         description
17           "IEEE Std 802.3, Clause 57 OAM is in the
18            disabled admin state.";
19       }
20     }
21   }
22   description
23     "Admin state of the OAM function on an interface.";
24   reference
25     "IEEE Std 802.3, 30.3.6.1.2 and 30.3.6.2";
26 }
27
28
29
30
31 grouping event-details {
32   description
33     "Nodes describing an event, used in the event log and in
34     notifications.";
35   reference
36     "IETF RFC 4878, Dot3OamEventLogEntry";
37   leaf oui {
38     type vendor-oui;
39     mandatory true;
40     description
41       "Organizationally Unique Identifier for the device that
42       generated the event.";
43   }
44   leaf timestamp {
45     type uint64;
46     units "milliseconds";
47     mandatory true;
48     description
49       "Timestamp in milliseconds since Unix epoch for when the
50       event occurred.";
51   }
52   leaf location {
53     type event-location;
54     mandatory true;
55     description
56       "Where the event occurred (local or remote).";
57   }
58   leaf event-type {
59     type identityref {
60
```

```
1         base event-type;
2     }
3     mandatory true;
4     description
5         "Type of event that occurred.";
6     reference
7         "IEEE Std 802.3, 30.3.6.1.10 and 30.3.6.11";
8 }
9
10 leaf running-total {
11     type yang:counter64;
12     mandatory true;
13     description
14         "The running total number of errors seen since OAM was
15         enabled on the interface. For threshold events, this is the
16         total number of times that particular type of error (e.g.
17         symbol error) has occurred, which may be greater than the
18         number of threshold-crossing event notifications of that
19         type generated during that time (which is conveyed by the
20         event-total leaf).";
21 }
22
23 leaf event-total {
24     type yang:counter64;
25     mandatory true;
26     description
27         "Total number of times this event has occurred since OAM was
28         enabled on the interface. For threshold events this is the
29         number of events generated of this type (as opposed to the
30         total number of errors of that type, which may be greater,
31         and is conveyed by the running-total leaf.";
32 }
33 }
34
35 grouping threshold-event-details {
36     description
37         "Nodes describing a threshold event, used in the event
38         log and in notifications";
39     reference
40         "IETF RFC 4878, Dot3OamEventLogEntry";
41
42     container threshold {
43         when "../event-type = 'threshold-event-type'" {
44             description
45                 "These nodes only apply to threshold event types";
46         }
47         if-feature "link-monitoring-local or
48         link-monitoring-remote";
49         description
50             "Nodes specific to threshold (link monitoring) events";
51
52         leaf threshold-event-type {
53             type threshold-event-enum;
54             mandatory true;
55             description
56                 "The type of threshold event";
57         }
58     }
59 }
```

```
1         reference
2             "IEEE Std 802.3, 57.5.3";
3     }
4     leaf window {
5         type uint64;
6         mandatory true;
7         description
8             "Size of the window in which the event was generated.
9             Units are dependent on the threshold event type.";
10    }
11    leaf threshold {
12        type uint64;
13        mandatory true;
14        description
15            "Size of the threshold that was breached during the
16            window. Units are dependent on the threshold
17            event type.";
18    }
19    leaf value {
20        type uint64;
21        mandatory true;
22        description
23            "Breaching value. Units are dependent on the
24            threshold event type, and match that
25            of the threshold.";
26    }
27 }
28
29 }
30
31 }
32
33 }
34
35
36 grouping statistics-common {
37     description
38         "Collection of Link OAM event/packet counters.";
39     reference
40         "IETF RFC 4878, Dot3OamStatsEntry";
41
42     leaf out-information {
43         type yang:counter64;
44         mandatory true;
45         description
46             "Number of information OAMPDUs transmitted.";
47         reference
48             "IEEE Std 802.3, 30.3.6.1.20";
49     }
50     leaf in-information {
51         type yang:counter64;
52         mandatory true;
53         description
54             "Number of information OAMPDUs received.";
55         reference
56             "IEEE Std 802.3, 30.3.6.1.21";
57     }
58     leaf out-unique-event-notification {
59         if-feature "link-monitoring-local";
60         type yang:counter64;
```

```
1      mandatory true;
2      description
3          "Number of unique event notification OAMPDUs transmitted.";
4      reference
5          "IEEE Std 802.3, 30.3.6.1.22";
6  }
7
8  leaf in-unique-event-notification {
9      if-feature "link-monitoring-remote";
10     type yang:counter64;
11     mandatory true;
12     description
13         "Number of unique event notification OAMPDUs received.";
14     reference
15         "IEEE Std 802.3, 30.3.6.1.24";
16 }
17
18 leaf out-duplicate-event-notification {
19     if-feature "link-monitoring-local";
20     type yang:counter64;
21     mandatory true;
22     description
23         "Number of duplicate event notification OAMPDUs
24         transmitted.";
25     reference
26         "IEEE Std 802.3, 30.3.6.1.23";
27 }
28
29 leaf in-duplicate-event-notification {
30     if-feature "link-monitoring-remote";
31     type yang:counter64;
32     mandatory true;
33     description
34         "Number of duplicate event notification OAMPDUs
35         received.";
36     reference
37         "IEEE Std 802.3, 30.3.6.1.25";
38 }
39
40 leaf out-loopback-control {
41     if-feature "remote-loopback-initiate";
42     type yang:counter64;
43     mandatory true;
44     description
45         "Number of loopback control OAMPDUs transmitted.";
46     reference
47         "IEEE Std 802.3, 30.3.6.1.26";
48 }
49
50 leaf in-loopback-control {
51     if-feature "remote-loopback-respond";
52     type yang:counter64;
53     mandatory true;
54     description
55         "Number of loopback control OAMPDUs received.";
56     reference
57         "IEEE Std 802.3, 30.3.6.1.27";
58 }
59
60 leaf out-variable-request {
```

```
1      if-feature "remote-mib-retrieval-initiate";
2      type yang:counter64;
3      mandatory true;
4      description
5          "Number of variable request OAMPDUs transmitted.";
6      reference
7          "IEEE Std 802.3, 30.3.6.1.28";
8  }
9
10 leaf in-variable-request {
11     if-feature "remote-mib-retrieval-respond";
12     type yang:counter64;
13     mandatory true;
14     description
15         "Number of variable request OAMPDUs received.";
16     reference
17         "IEEE Std 802.3, 30.3.6.1.29";
18 }
19
20 leaf out-variable-response {
21     if-feature "remote-mib-retrieval-respond";
22     type yang:counter64;
23     mandatory true;
24     description
25         "Number of variable response OAMPDUs transmitted.";
26     reference
27         "IEEE Std 802.3, 30.3.6.1.30";
28 }
29
30 leaf in-variable-response {
31     if-feature "remote-mib-retrieval-initiate";
32     type yang:counter64;
33     mandatory true;
34     description
35         "Number of variable response OAMPDUs received.";
36     reference
37         "IEEE Std 802.3, 30.3.6.1.31";
38 }
39
40 leaf out-org-specific {
41     type yang:counter64;
42     mandatory true;
43     description
44         "Number of organization specific OAMPDUs transmitted.";
45     reference
46         "IEEE Std 802.3, 30.3.6.1.32";
47 }
48
49 leaf in-org-specific {
50     type yang:counter64;
51     mandatory true;
52     description
53         "Number of organization specific OAMPDUs received.";
54     reference
55         "IEEE Std 802.3, 30.3.6.1.33";
56 }
57
58 leaf out-unsupported-codes {
59     type yang:counter64;
60     mandatory true;
```

```
1      description
2        "Number of OAMPDUs with unsupported codes transmitted.";
3      reference
4        "IEEE Std 802.3, 30.3.6.1.18";
5    }
6  leaf in-unsupported-codes {
7    type yang:counter64;
8    mandatory true;
9    description
10     "Number of OAMPDUs with unsupported codes received.";
11    reference
12     "IEEE Std 802.3, 30.3.6.1.19";
13  }
14  leaf frames-lost-due-to-oam {
15    type yang:counter64;
16    mandatory true;
17    description
18     "A count of the number of frames that were dropped by the OAM
19     multiplexer. Since the OAM multiplexer has multiple inputs
20     and a single output, there may be cases where frames are
21     dropped due to transmit resource contention. This counter
22     is incremented whenever a frame is dropped by the OAM
23     layer.";
24    reference
25     "IEEE Std 802.3, 30.3.6.1.46";
26  }
27 }
28
29 grouping discovery-remote {
30   description
31     "Nodes describing the discovery process remote end of a link.";
32   leaf mode {
33     type mode;
34     description
35       "Mode (passive/active).";
36     reference
37       "IEEE Std 802.3, 30.3.6.1.3";
38   }
39   container functions-supported {
40     description
41       "The Link OAM functions supported by this interface.";
42     reference
43       "IEEE Std 802.3, 30.3.6.1.7";
44     leaf uni-directional-link-fault {
45       type boolean;
46       description
47         "Unidirectional link fault support.";
48     }
49     leaf loopback {
50       type boolean;
51       description
52         "Remote Loopback support.";
53     }
54     leaf link-monitoring {
```



```
1         type boolean;
2         description
3             "Link monitoring support.";
4     }
5     leaf mib-retrieval {
6         type boolean;
7         description
8             "MIB variable retrieval support.";
9     }
10 }
11 }
12 }
13 leaf revision {
14     type uint64;
15     config false;
16     description "Configuration revision.";
17     reference
18         "IEEE Std 802.3, 30.3.6.1.12 and 30.3.6.1.13";
19 }
20 }
21 leaf oammtu {
22     type uint16;
23     units octets;
24     config false;
25     description "The maximum OAMPDU size.";
26     reference
27         "IEEE Std 802.3, 30.3.6.1.8 and 30.3.6.1.9";
28 }
29 }
30 }
31 }
32 }
33 }
34 grouping discovery-local {
35     description
36         "Nodes describing the local end discovery process of a link.";
37     leaf mode {
38         type mode;
39         description
40             "Mode (passive/active)
41             The default value is implementation-dependent.";
42         reference
43             "IEEE Std 802.3, 30.3.6.1.3";
44     }
45 }
46 }
47 container functions-supported {
48     description
49         "The Link OAM functions supported by this interface.";
50     reference
51         "IEEE Std 802.3, 30.3.6.1.7";
52     leaf uni-directional-link-fault {
53         if-feature "uni-directional-link-fault";
54         type boolean;
55         description
56             "Unidirectional link fault support.
57             This affects the setting of the 'Unidirectional Support'
58             bit in the OAM configuration field put in the
59             Information OAMPDU.
60             This bit indicates to the peer device that it can send
61             OAM PDUs on links that are operating in unidirectional
62             mode (traffic flowing in one direction only).";
63     }
64 }
65 }
```

```
1      }
2      leaf loopback {
3          if-feature "remote-loopback-initiate";
4          type boolean;
5          default true;
6          description
7              "Remote Loopback support.";
8      }
9
10     container link-monitor {
11         if-feature "link-monitoring-remote or
12             link-monitoring-local";
13         description
14             "Configure link monitor parameters.";
15         reference
16             "IEEE Std 802.3, 57.1.2:c";
17
18         leaf link-monitoring {
19             type boolean;
20             default true;
21             description
22                 "Enable or disable monitoring.
23                 This affects the setting of the 'Link Events' bit in the
24                 OAM configuration field put in the Information OAMPDU.
25                 This bit indicates to the peer device that the OAM
26                 entity can send and receive Event Notification OAMPDUs.";
27         }
28
29         list event-type {
30             if-feature "link-monitoring-local";
31             key threshold-type;
32             description
33                 "A list containing at most one entry for each of the
34                 threshold event types. If there is no entry for a
35                 particular event type, the default values are used for
36                 both window size and threshold.";
37             leaf threshold-type {
38                 type threshold-event-enum;
39                 description
40                     "The type of threshold event for which this list entry
41                     is specifying the configuration.";
42                 reference
43                     "IEEE Std 802.3, 57.5.3";
44             }
45
46             leaf window {
47                 type uint64;
48                 description
49                     "The size of the window to use when monitoring for
50                     this threshold event. The units, default and upper
51                     and lower bounds depend on the threshold type as
52                     follows:
53
54                     Symbol Period:
55                     Units:    number of symbols
```

```
1           Default: number of symbols in one second for the
2               underlying physical layer
3           Min:    number of symbols in one second for the
4               underlying physical layer
5           Max:    number of symbols in one minute for the
6               underlying physical layer
7
8
9           Frame:
10              Units:    deciseconds
11              Default: 1 second
12              Min:      1 second
13              Max:      1 minute
14
15
16           Frame Period:
17              Units:    number of frames
18              Default: number of minFrameSize frames in one
19                  second for the underlying physical layer
20              Min:      number of minFrameSize frames in one
21                  second for the underlying physical layer
22              Max:      number of minFrameSize frames in one
23                  minute for the underlying physical layer
24
25
26           Frame Seconds:
27              Units:    deciseconds
28              Default: 60 seconds
29              Min:      10 seconds
30              Max:      900 seconds";
31
32           reference
33           "IEEE Std 802.3, 30.3.6.1.34, 30.3.6.1.36, 30.3.6.1.38,
34           and 30.3.6.1.40";
35
36       }
37
38
39       leaf threshold {
40           type uint64 {
41               range "1..max";
42           }
43           default 1;
44           description
45               "The threshold value to use when determining whether to
46               generate an event given the number of errors that
47               occurred in a given window. The units depend on the
48               threshold type as follows:
49
50               Symbol Period: number of errored symbols
51               Frame:          number of errored frames
52               Frame Period:   number of errored frames
53               Frame Seconds:  number of seconds containing at least
54                   1 frame error";
55           reference
56               "IEEE Std 802.3, 30.3.6.1.34, 30.3.6.1.36, 30.3.6.1.38,
57               and 30.3.6.1.40";
58
59       }
60
61   }
62
63 }
64
65 }
```

```
1
2     leaf mib-retrieval {
3         if-feature "remote-mib-retrieval-initiate or
4             remote-mib-retrieval-respond";
5         type boolean;
6         description
7             "MIB variable retrieval support.
8             This affects the setting of the 'Variable Retrieval' bit
9             in the OAM configuration field put in the Information
10            OAMPDU. This bit indicates to the peer device that the OAM
11            entity can send and receive Variable Request and Response
12            OAMPDU's.";
13        }
14    }
15
16    leaf revision {
17        type uint64;
18        config false;
19        description
20            "Configuration revision.";
21        reference
22            "IEEE Std 802.3, 30.3.6.1.12 and 30.3.6.1.13";
23    }
24
25    leaf oammtu {
26        type uint16;
27        units octets;
28        config false;
29        description
30            "The maximum OAMPDU size.";
31        reference
32            "IEEE Std 802.3, 30.3.6.1.8 and 30.3.6.1.9";
33    }
34
35    }
36
37    grouping discovery-info {
38        description
39            "Information relating to the discovery process.";
40
41        container local {
42            description
43                "Properties of the local device.";
44
45            leaf operational-status {
46                type operational-state;
47                config false;
48                mandatory true;
49                description
50                    "Operational status.";
51                reference
52                    "IETF RFC 4878, dot3OamOperStatus; IEEE Std 802.3,
53                    30.3.6.1.4, 30.3.6.1.10, and 30.3.6.1.11";
54            }
55
56            leaf loopback-mode {
57                if-feature "remote-loopback-initiate or
```

```
1         remote-loopback-respond";
2     type loopback-status;
3     config false;
4     mandatory true;
5     description
6         "The loopback mode the interface is in.";
7     reference
8         "IEEE Std 802.3, 30.3.6.1.14";
9 }
10
11 uses discovery-local;
12
13 }
```

```
14
15 container remote {
16     config false;
17     description
18         "Properties of the remote (peer) device.";
19 }
```

Editor's Note (to be removed prior to publication):

Type mac-address was modified per Maintenance Request 1380 (see https://www.ieee802.org/3/maint/requests/maint_1380.pdf)

```
27
28
29     leaf mac-address {
30         type ieee:mac-address;
31         description
32             "Remote MAC address.";
33         reference
34             "IEEE Std 802.3, 30.3.6.1.5";
35     }
36
37     leaf vendor-oui {
38         type vendor-oui;
39         description
40             "Remote vendor OUI.";
41         reference
42             "IEEE Std 802.3, 30.3.6.1.16";
43     }
44
45     leaf vendor-info {
46         type uint64;
47         description
48             "Remote vendor info. The semantics of this value are
49             proprietary and specific to the vendor.";
50         reference
51             "IEEE Std 802.3, 30.3.6.1.17";
52     }
53
54     leaf loopback-mode {
55         type loopback-status;
56         mandatory true;
57         description
58             "The loopback mode the interface is in.";
59         reference
60             "IEEE Std 802.3, 30.3.6.1.15";
61     }
62
63 }
```

```
1      uses discovery-remote;
2    }
3  }
4
5  augment '/if:interfaces/if:interface' {
6    when
7      "derived-from-or-self(if:type, 'ianaift:ethernetCsmacd') or
8      derived-from-or-self(if:type, 'ianaift:ptm') " {
9      description
10       "Augments the interface model with nodes
11       specific to Ethernet Link OAM.";
12    }
13    description
14     "Augments Ethernet interface model with nodes
15     specific to Ethernet Link OAM.";
16
17    container link-oam {
18      presence
19        "Implies Link OAM is configured on the interface.";
20      description
21        "Interface operational state for Ethernet Link OAM.";
22
23      leaf admin {
24        type admin-state;
25        default disabled;
26        description
27          "This object is used to provision the default
28          administrative OAM mode for this interface. This object
29          represents the desired state of OAM for this interface.
30          It starts in the disabled state until an explicit
31          management action or configuration information retained by
32          the system causes a transition to the enabled(1) state.
33          When enabled(1), Ethernet OAM will attempt to operate over
34          this interface. The default value is
35          implementation-dependent.";
36      }
37
38      container discovery-info {
39        description
40          "Information relating to the discovery process.";
41        uses discovery-info;
42      }
43
44      container event-log {
45        config false;
46        description
47          "List of Ethernet Link OAM event log entries on the
48          interface.";
49
50        list event-log-entry {
51          key "index";
52          description
53            "Ethernet Link OAM event log entry.";
54          leaf index {
```

```
1         type uint64;
2         description
3             "Index of this event in the event log.";
4     }
5     uses event-details;
6     uses threshold-event-details;
7 }
8
9 }
10
11
12 container statistics {
13     config false;
14     description
15         "Statistics for an 802.3 OAM interface.";
16
17     uses statistics-common;
18
19
20     leaf local-error-symbol-period-log-entries {
21         type yang:counter64;
22         mandatory true;
23         description
24             "Number of local error symbol period log entries.";
25     }
26
27     leaf local-error-frame-log-entries {
28         type yang:counter64;
29         mandatory true;
30         description
31             "Number of local error frame log entries.";
32     }
33
34     leaf local-error-frame-period-log-entries {
35         type yang:counter64;
36         mandatory true;
37         description
38             "Number of local error frame period log entries.";
39     }
40
41
42     leaf local-error-frame-second-log-entries {
43         type yang:counter64;
44         mandatory true;
45         description
46             "Number of local error frame second log entries.";
47     }
48
49     leaf remote-error-symbol-period-log-entries {
50         if-feature "link-monitoring-remote";
51         type yang:counter64;
52         mandatory true;
53         description
54             "Number of remote error symbol period log entries.";
55     }
56
57     leaf remote-error-frame-log-entries {
58         if-feature "link-monitoring-remote";
59         type yang:counter64;
60         mandatory true;
61         description
62             "Number of remote error frame log entries.";
63     }
64
65 }
```

```
1      leaf remote-error-frame-period-log-entries {
2          if-feature "link-monitoring-remote";
3          type yang:counter64;
4          mandatory true;
5          description
6              "Number of remote error frame period log entries.";
7      }
8
9      leaf remote-error-frame-second-log-entries {
10         if-feature "link-monitoring-remote";
11         type yang:counter64;
12         mandatory true;
13         description
14             "Number of remote error frame second log entries.";
15     }
16 }
17
18
19
20 action remote-loopback {
21     if-feature "remote-loopback-initiate";
22     description
23         "Start/stop remote loopback on the specified interface.";
24     reference
25         "IEEE Std 802.3, 57.1.2:b";
26     input {
27         leaf enable {
28             type boolean;
29             mandatory true;
30             description
31                 "Whether to enable or disable remote loopback.";
32         }
33     }
34 }
35
36
37 output {
38     leaf success {
39         type boolean;
40         mandatory true;
41         description
42             "True if the operation was successful,
43             false otherwise.";
44     }
45
46     leaf error-message {
47         type string;
48         description
49             "If the operation failed, optionally used to
50             provide extra details.";
51     }
52 }
53
54 }
55
56
57 action reset-stats {
58     description
59         "Reset Ethernet Link OAM statistics on this interface.";
60     output {
61         leaf success {
62             type boolean;
63             mandatory true;
64         }
65     }
```



```
1         description
2             "True if the operation was successful,
3             false otherwise.";
4     }
5     leaf error-message {
6         type string;
7         description
8             "If the operation failed, optionally used to provide
9             extra details.";
10    }
11 }
12 }
13 }
14 }
15 }
16
17 notification non-threshold-event {
18     description
19         "This notification is sent when a local or remote
20         non-threshold crossing event is detected.";
21     uses event-details {
22         refine event-type {
23             must ". != 'threshold-event-type'" {
24                 description
25                     "This leaf is not set to
26                     'threshold-event-type'.";
27             }
28         }
29     }
30 }
31 }
32 }
33 }
34
35 notification threshold-event {
36     if-feature "link-monitoring-local or
37     link-monitoring-remote";
38     description
39         "This notification is sent when a local or remote
40         threshold crossing event is detected.";
41     uses event-details {
42         refine event-type {
43             must ". = 'threshold-event-type'" {
44                 description
45                     "This leaf is set to 'threshold-event-type'.";
46             }
47         }
48     }
49 }
50 }
51 }
52     uses threshold-event-details;
53 }
54 }
55 }
56 }
57 }
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```

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