

YANG for IEC/IEEE 60802

Overview of YANG Modules

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1 Overview

1.1 Scope of this Document

This document describes YANG modules which are required for devices according the industrial profile, defined in IEC/IEEE 60802.

It is intented as information for contributors and reviewers to decide, which leaves out of the vast amount of available leaves in the YANG modules shall be used for the industrial profile without the requirement to scan through all relevant IEEE, IETF and other documents and YANG modules by each individual.

For detailed information please see the referenced documents.

Also a very good information platform for YANG modules and their content is the [YANG catalog](#). It provides a tree view in the [YANG module detail viewer](#) with information about all leaves in a YANG module.

This document provides the background information collected from the YANG modules. The textual contribution to IEC/IEEE 60802 regarding Conformance requirements for configuration is derived from this information.

1.2 List of used YANG Modules

The usage of following YANG modules is described in this document:

YANG Module	60802	Description	Reference
ietf-system	M	A YANG Data Model for System Management	https://datatracker.ietf.org/doc/rfc7317/
ietf-hardware	M	A YANG Data Model for Hardware Management	https://datatracker.ietf.org/doc/rfc8348/
ietf-interface	M	A YANG Data Model for Interface Management	https://datatracker.ietf.org/doc/rfc8343/
ieee802-dot1q-bridge	M	Bridges and Bridged Networks - Amendment: YANG Data Model	IEEE P802.1Qcp/D2.2 Clause 48
ieee802-dot1q-bridge	M	Bridges and Bridged Networks - Amendment: YANG Data Models for Scheduled Traffic, Frame Preemption, and Per-Stream Filtering and Policing ¹	IEEE P802.1Qcw/D1.2 Clause 48
ieee802-dot1ab-lldp	M	Station and Media Access Control Connectivity Discovery Amendment: YANG Data Model	IEEE P802.1ABcu/D1.6 Clause 12
ieee802-ethernet-interface	M	IEEE Standard for Ethernet – YANG Data Model Definitions	IEEE Std802.3.2-2019 Clause 5

¹ IEEE P802.1Qcw comprises some corrections of the YANG model described in IEEE P802.1Qcp

ietf-keystore	M	A YANG Data Model for a Keystore	draft-ietf-netconf-keystore-22
ietf-truststore	M	A YANG Data Model for a Truststore	draft-ietf-netconf-trust-anchors-10
ieee1588-ptp	M	YANG Data Model for the configuration and status of IEEE 1588 clocks	IEEE P1588e-D0-1
ieee802-dot1q-sched	M	YANG Data Model for scheduled traffic	IEEE P802.1Qcw/D1.2 Clause 48
ieee802-dot1q-preemption	M	YANG Data Model for Preemption	IEEE P802.1Qcw/D1.2 Clause 48
ietf-yang-push	M	Subscription to YANG Notifications for Datastore Updates	https://datatracker.ietf.org/doc/rfc8641/
ietf-subscribed-notifications	M	Subscription to YANG Notifications	https://datatracker.ietf.org/doc/rfc8639/ see also: https://datatracker.ietf.org/doc/rfc8640/
ieee802-dot1q-lldp-basic-tlv	M	Basic set of IEEE 802.1 Organizationally Specific TLVs	IEEE P802.1Qcz/D2.0
ietf-system-capabilities	M	Capabilities for NETCONF or RESTCONF server or notification publisher	https://datatracker.ietf.org/doc/html/draft-ietf-netconf-notification-capabilities
ietf-notification-capabilities	M	Capabilities for NETCONF or RESTCONF server or notification publisher	https://datatracker.ietf.org/doc/html/draft-ietf-netconf-notification-capabilities
ietf-netconf-acm	M	Network Configuration Access Control Model	https://datatracker.ietf.org/doc/rfc8341/
ietf-datastores ietf-origin	M	Network Management Datastore Architecture (NMDA)	https://datatracker.ietf.org/doc/rfc8342/
ietf-netconf-monitoring	M	YANG Module for NETCONF Monitoring	https://datatracker.ietf.org/doc/rfc6022/
ietf-yang-library	M	YANG Library	https://datatracker.ietf.org/doc/rfc8525/
ietf-netconf-notifications	M	NETCONF Base Notifications	https://datatracker.ietf.org/doc/rfc6470/

1.3 YANG Tree Diagram conventions

This is an excerpt with the node representation, used in YANG tree diagrams. The syntax of YANG Tree Diagrams is described in detail in [RFC8791](#).

Each node in a YANG module is printed as:

`<status>--<flags> <name><opts> <type> <if-features>`

`<status>` is one of:

+ for current
x for deprecated
o for obsolete

`<flags>` is one of:

rw for configuration data nodes and choice nodes
ro for non-configuration data nodes and choice nodes, output parameters to rpcs and actions, and notification parameters
-w for input parameters to rpcs and actions
-u for uses of a grouping
-x for rpcs and actions
-n for notifications
mp for nodes containing a "mount-point" extension statement

Case nodes do not have any `<flags>`.

`<name>` is the name of the node

`(<name>)` means that the node is a choice node

`:(<name>)` means that the node is a case node

If the node is augmented into the tree from another module, its name is printed as `<prefix>:<name>`, where `<prefix>` is the prefix defined in the module where the node is defined.

If the node is a case node, there is no space before the `<name>`.

`<opts>` is one of:

? for an optional leaf, choice, anydata, or anyxml
! for a presence container
* for a leaf-list or list

`[<keys>]` for a list's keys

/ for a top-level data node in a mounted module

@ for a top-level data node of a module identified in a mount point parent reference

`<type>` is the name of the type for leaves and leaf-lists

If the type is a leafref, the type is printed as either
(1) "-> TARGET", where TARGET is the leafref path, with prefixes removed if possible or
(2) "leafref".

<if-features> is the list of features this node depends on, printed within curly brackets and a question mark "{...}?"

1.4 YANG „Features“

The basic YANG models define mandatory and optional leaves in the YANG tree. Mandatory leaves shall exist in the YANG tree of a device, whereas optional leaves may exist depending of the implementation of the device.

In addition to that, YANG allows the modeler to define sections of the model to be conditional. The server controls whether these conditional portions of the model are supported or valid for that particular server.

YANG supports this conditional mechanism using a construct called "feature". Features give the modeler a mechanism for making portions of the module conditional in a manner that is controlled by the server. The model can express constructs that are not universally present in all servers. These features are included in the model definition, allowing a consistent view and allowing applications to learn which features are supported and tailor their behavior to the server.

A module may declare any number of features, identified by simple strings, and may make portions of the module optional based on those features. If the server supports a feature, then the corresponding portions of the module are valid for that server. If the server doesn't support the feature, those parts of the module are not valid, and applications should behave accordingly.

A list of features that are defined in a specific YANG module and a proposal how to use them in IEC/IEEE 60802 is included in this document for each module that defines features.

1.5 GAP-List

This is an (incomplete) list of identified gaps up to now.

1.5.1 Activate Preemption

There is only a read-only leaf for preemption.

A configurable leaf to activate / deactivate preemption is missing.

1.5.2 aLldpXdot3LocAddFragSize attribute

802.3 specifies aLldpXdot3LocAddFragSize in “802.3-2018 Table 30–8—LLDP capabilities (additional packages)” also for SET-operations. However the description of aLldpXdot3LocAddFragSize defines no restrictions of the value range besides the size (2 bits).

Assuming that a devices doesn't have to support every possible value, there is the possibility that a configuration is written to the device, which is not supported by the device. Maybe there is a more detailed specification required in 802.3 or in the IEC/IEEE 60802 profile.

Anyway this parameter is missing in ieee802-dot1q-preemption.

1.5.3 RSTP/MSTP YANG Data Model

RSTP/MSTP YANG data model is missing.

1.5.4 MAU Types

MAU Types are missing in YANG data models. -> in LLDP-EXT-DOT3-MIB?

1.5.5 MEF 10.3 Configuration

How do the following parameters match the flow meter definition?

- Committed Information rate
- Committed burst size
- Rank
- Coupling flag
- Envelope
- Excess information rate

- Excess burst size
- Color
- ...

1.5.6 UNI YANG Module of CNC

-> Qdj

1.5.7 Device Capabilities and Quantities YANG

-> 60802

1.5.8 On-/ Offline Configuration of devices

How to create an offline version of YANG modules for devices?

1.5.9 Netconf Datastore Architecture for “Namespaces”

Separate Datastores required for e.b. security, device settings, UNI, application settings.

1.5.10 Date-Time format in YANG

60802 devices don't have calendar information!

1.5.11 String handling (UTF8)

Application information is not necessarily UTF8.

1.5.12 Missing MIB Data Objects in ietf-system model

This Chapter contains objects which are available in MIB2 objects without a corresponding leave in any existing YANG model.

mib-2 Name	mib-2 Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
sysDescr	string	ro	???	mandatory		-	
sysObjectID	OBJECT IDENTIFYER	ro	???	mandatory			

sysUpTime	TimeTicks	ro	???	mandatory			
sysServices	integer	ro	???	mandatory			

1.5.13 Missing Data Objects in ietf-interfaces model

This Chapter contains objects which are available in MIB2 objects without a corresponding leave in any existing YANG model.

mib-2 Name	mib-2 Type	Access	Usage (YANG)	Usage (60802)	Note	Reference	
ifMtu	Integer32	ro	???	mandatory			

2 System Configuration (ietf-system)

2.1 Overview

The module ietf-system is defined in RFC 7317.

This module contains a collection of YANG definitions for the configuration and identification of some common system properties within a device containing a NETCONF server. This includes data node definitions for system identification, time-of-day management, user management, DNS resolver configuration, and some protocol operations for system management.

2.1.1 Main Features

The module ietf-system comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

2.1.1.1 Feature *radius*

This feature indicates that the device can be configured as a RADIUS client according to RFC 2865: Remote Authentication Dial In User Service (RADIUS).

This feature is **not required** in 60802.

2.1.1.2 Feature *authentication*

This feature indicates that the device supports configuration of user authentication.

This feature is **not required** in 60802.

2.1.1.3 Feature *NTP*

This feature indicates that the device can be configured to use one or more NTP servers to set the system date and time.

This feature is **not required** in 60802.

2.2 Tree Diagram

```
module: ietf-system
  +--rw system
  |   +--rw contact?          string
  |   +--rw hostname?        inet:domain-name
  |   +--rw location?         string
  |   +--rw clock
  |   |   +--rw (timezone)?
  |   |   |   +--:(timezone-name) {timezone-name}?
  |   |   |   |   +--rw timezone-name?          timezone-name
  |   |   |   +--:(timezone-utc-offset)
  |   |   |   |   +--rw timezone-utc-offset?    int16
  |   +--rw ntp! {ntp}?
  |   |   +--rw enabled?     boolean
  |   |   +--rw server* [name]
  |   |   |   +--rw name          string
  |   |   |   +--rw (transport)
  |   |   |   |   +--:(udp)
  |   |   |   |   |   +--rw udp
  |   |   |   |   |   |   +--rw address    inet:host
  |   |   |   |   |   |   |   +--rw port?  inet:port-number {ntp-udp-port}?
  |   |   |   |   +--rw association-type? enumeration
  |   |   |   +--rw iburst?      boolean
  |   |   |   +--rw prefer?      boolean
  |   +--rw dns-resolver
  |   |   +--rw search*    inet:domain-name
  |   |   +--rw server* [name]
  |   |   |   +--rw name          string
  |   |   |   +--rw (transport)
```

```

| | |      +---:(udp-and-tcp)
| | |      +---rw udp-and-tcp
| | |      +---rw address      inet:ip-address
| | |      +---rw port?       inet:port-number {dns-udp-tcp-port}?
| | +---rw options
| |   +---rw timeout?      uint8
| |   +---rw attempts?    uint8
| +---rw radius {radius}?
| | +---rw server* [name]
| | | +---rw name          string
| | | +---rw (transport)
| | | | +---:(udp)
| | | | +---rw udp
| | | |   +---rw address      inet:host
| | | |   +---rw authentication-port?  inet:port-number
| | | |   +---rw shared-secret  string
| | | +---rw authentication-type?  identityref
| | +---rw options
| |   +---rw timeout?      uint8
| |   +---rw attempts?    uint8
| +---rw authentication {authentication}?
|   +---rw user-authentication-order*  identityref
|   +---rw user* [name] {local-users}?
|     +---rw name          string
|     +---rw password?     ianach:crypt-hash
|     +---rw authorized-key* [name]
|       +---rw name        string
|       +---rw algorithm   string
|       +---rw key-data    binary
+---ro system-state
+---ro platform
| +---ro os-name?      string
| +---ro os-release?   string
| +---ro os-version?  string
| +---ro machine?     string
+---ro clock
+---ro current-datetime?  yang:date-and-time
+---ro boot-datetime?     yang:date-and-time

```

rpcs:

```

+---x set-current-datetime
| +---w input
|   +---w current-datetime   yang:date-and-time
+---x system-restart
+---x system-shutdown

```

2.3 Usage of YANG Data Objects

2.3.1 Container system

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
contact	string	rw	optional	mandatory	The administrator contact information for the system. A server implementation MAY map this leaf to the sysContact MIB object. Such an implementation needs to use some mechanism to handle the differences in size and characters allowed between this leaf and sysContact.	RFC 3418: MIB for SNMP SNMPv2-MIB.sysContact	
hostname	domain-name	rw	optional	mandatory	The name of the host. This name can be a single domain label or the fully qualified domain name of the host.	Equivalent to SNMPv2-MIB.sysName	
location	string	rw	optional	mandatory	The system location. A server implementation MAY map this leaf to the sysLocation MIB object. Such an implementation needs to use some mechanism to handle the differences in size and characters allowed between this leaf and sysLocation.	RFC 3418: MIB for SNMP SNMPv2-MIB.sysLocation	
clock	container	rw	optional	optional	Configuration of the system date and time properties		
ntp	container	rw	optional	optional	Configuration of the NTP client		

dns-resolver	container	rw	optional	optional	Configuration of the DNS resolver		
radius	container	rw	optional	optional	Configuration of the RADIUS client		
authentication	container	rw	optional	optional	The authentication configuration subtree		

2.3.2 Container system-state/platform (Operational State)

This container holds the vendor-specific information for identifying the system platform and operating system.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
os-name	string	ro	optional	optional	The name of the operating system in use - for example, 'Linux'	IEEE Std 1003.1-2008 - utsname.sysname	
os-release	string	ro	optional	optional	The current release level of the operating system in use. This string MAY indicate the OS source code revision	IEEE Std 1003.1-2008 - utsname.release	
os-version	string	ro	optional	optional	The current version level of the operating system in use. This string MAY indicate the specific OS build date and target variant information	IEEE Std 1003.1-2008 - utsname.version	
machine	string	ro	optional	optional	A vendor-specific identifier string representing the hardware in use	IEEE Std 1003.1-2008 - utsname.machine	

2.3.3 Container system-state/clock (Operational State)

Monitoring of the system date and time properties.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
current-datetime	yang:date-and-time	ro	optional	optional	The current system date and time	-	

2.4 Remote Procedure Calls

The RPCs which are specified in ietf-system are not required for 60802.

If they are not implemented in any 60802 device, they should be deviated as “not-supported” for the specific devices, so that they are marked as inaccessible.

2.4.1 set-current-datetime(current-datetime)

Set the /system-state/clock/current-datetime leaf to the specified value.

If the system is using NTP (i.e., /system/ntp/enabled is set to 'true'), then this operation will fail with error-tag 'operation-failed' and error-app-tag value of 'ntp-active'.

2.4.2 system-restart()

Request that the entire system be restarted immediately.

A server SHOULD send an rpc reply to the client before restarting the system

2.4.3 system-shutdown()

Request that the entire system be shut down immediately.

A server SHOULD send an rpc reply to the client before shutting down the system.

3 Hardware Configuration (ietf-hardware)

3.1 Overview

The module ietf-hardware is defined in RFC 8348.

This module defines a YANG data model for the management of hardware on a single server. The data model includes configuration and system state (status information and counters for the collection of statistics).

3.1.1 Main Features

3.1.1.1 Feature entity-mib

This feature indicates that the device implements the ENTITY-MIB.

3.1.1.2 Feature hardware-state

Indicates that ENTITY-STATE-MIB objects are supported.

3.1.1.3 Feature hardware-sensor

Indicates that ENTITY-SENSOR-MIB objects are supported.

3.2 Tree Diagram

```
module: ietf-hardware
  +--rw hardware
    +--ro last-change?   yang:date-and-time
    +--rw component* [name]
      +--rw name          string
      +--rw class         identityref
      +--ro physical-index? int32 {entity-mib}?
      +--ro description?  string
      +--rw parent?      -> ../../component/name
      +--rw parent-rel-pos? int32
      +--ro contains-child* -> ../../component/name
      +--ro hardware-rev? string
      +--ro firmware-rev? string
      +--ro software-rev? string
      +--ro serial-num?  string
      +--ro mfg-name?    string
      +--ro model-name?  string
      +--rw alias?       string
      +--rw asset-id?    string
      +--ro is-fru?      boolean
      +--ro mfg-date?    yang:date-and-time
      +--rw uri*         inet:uri
      +--ro uuid?       yang:uuid
      +--rw state {hardware-state}?
      | +--ro state-last-changed? yang:date-and-time
      | +--rw admin-state?        admin-state
      | +--ro oper-state?         oper-state
      | +--ro usage-state?        usage-state
      | +--ro alarm-state?        alarm-state
      | +--ro standby-state?      standby-state
      +--ro sensor-data {hardware-sensor}?
```

```

+--ro value?          sensor-value
+--ro value-type?     sensor-value-type
+--ro value-scale?    sensor-value-scale
+--ro value-precision? sensor-value-precision
+--ro oper-status?    sensor-status
+--ro units-display?  string
+--ro value-timestamp? yang:date-and-time
+--ro value-update-rate? uint32

```

notifications:

```

+---n hardware-state-change
+---n hardware-state-oper-enabled {hardware-state}?
| +--ro name?          -> /hardware/component/name
| +--ro admin-state?   -> /hardware/component/state/admin-state
| +--ro alarm-state?   -> /hardware/component/state/alarm-state
+---n hardware-state-oper-disabled {hardware-state}?
+--ro name?            -> /hardware/component/name
+--ro admin-state?     -> /hardware/component/state/admin-state
+--ro alarm-state?     -> /hardware/component/state/alarm-state

```

3.3 Usage of YANG Data Objects

3.3.1.1 Container /ietf-hardware/hardware

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
last-change	yang:date-and-time	ro	optional	optional			
component	list	rw	optional	mandatory			

3.3.1.2 List /ietf-hardware/hardware/component

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
name	string	rw	mandatory	mandatory	The name assigned to this component.	-	

class	identityref	rw	mandatory	mandatory	An indication of the general hardware type of the component.	RFC 6933: Entity MIB (Version 4) - entPhysicalClass	
physical-index²	int32	ro	optional	optional	The entPhysicalIndex for the entPhysicalEntry represented by this list entry.	RFC 6933: Entity MIB (Version 4) - entPhysicalIndex	
description	string	ro	optional	mandatory	A textual description of the component. This node should contain a string that identifies the manufacturer's name for the component and should be set to a distinct value for each version or model of the component.	RFC 6933: Entity MIB (Version 4) - entPhysicalDescr	
parent	leafref	rw	optional	optional	The name of the component that physically contains this component.	RFC 6933: Entity MIB (Version 4) - entPhysicalContainedIn	
parent-rel-pos	int32	rw	optional	optional	An indication of the relative position of this child component among all its sibling components.	RFC 6933: Entity MIB (Version 4) - entPhysicalParentRelPos	
contains-child	leaf-list	ro	optional	optional	The name of the contained component.	RFC 6933: Entity MIB (Version 4) - entPhysicalChildIndex	
hardware-rev	string	ro	optional	mandatory	The vendor-specific hardware revision string for the component.	RFC 6933: Entity MIB (Version 4) - entPhysicalHardwareRev	
firmware-rev	string	ro	optional	mandatory	The vendor-specific firmware revision string for the component.	RFC 6933: Entity MIB (Version 4) - entPhysicalFirmwareRev	
software-rev	string	ro	optional	mandatory	The vendor-specific software revision string for the component.	RFC 6933: Entity MIB (Version 4) - entPhysicalSoftwareRev	
serial-num	string	ro	optional	mandatory	The vendor-specific serial number string for the component.	RFC 6933: Entity MIB (Version 4) - entPhysicalSerialNum	
mfg-name	string	ro	optional	mandatory	The name of the manufacturer of this physical component.	RFC 6933: Entity MIB (Version 4) - entPhysicalMfgName	

² if-feature "entity-mib"

model-name	string	ro	optional	mandatory	The vendor-specific model name identifier string associated with this physical component.	RFC 6933: Entity MIB (Version 4) - entPhysicalModelName	
alias	string	rw	optional	mandatory	An 'alias' name for the component, as specified by a network manager, that provides a non-volatile 'handle' for the component.	RFC 6933: Entity MIB (Version 4) - entPhysicalAlias	
asset-id	string	rw	optional	mandatory	This node is a user-assigned asset tracking identifier for the component.	RFC 6933: Entity MIB (Version 4) - entPhysicalAssetID	
is-fru	boolean	ro	optional	optional	This node indicates whether or not this component is considered a 'field-replaceable unit' by the vendor.	RFC 6933: Entity MIB (Version 4) - entPhysicalIsFRU	
mfg-date	yang:date-and-time	ro	optional	optional	The date of manufacturing of the managed component.	RFC 6933: Entity MIB (Version 4) - entPhysicalMfgDate	
uri	list	rw	optional	optional	This node contains identification information about the component.	RFC 6933: Entity MIB (Version 4) - entPhysicalUris	
uuid	yang:uuid	ro	optional	optional	A Universally Unique Identifier of the component.	RFC 6933: Entity MIB (Version 4) - entPhysicalUUID	
state ³	container	rw	optional	optional	State-related nodes	RFC 4268: Entity State MIB	
sensor-data ⁴	container	ro	optional	optional	Sensor-related nodes.	RFC 3433: Entity Sensor Management Information Base	

3.4 Notifications

3.4.1 hardware-state-change

A hardware-state-change notification is generated when the value of /hardware/last-change changes in the operational state.

³ if-feature "hardware-state"

⁴ if-feature "hardware-sensor"

3.4.2 hardware-state-oper-enabled

A hardware-state-oper-enabled notification signifies that a component has transitioned into the 'enabled' state.

3.4.3 hardware-state-oper-disabled

A hardware-state-oper-disabled notification signifies that a component has transitioned into the 'disabled' state.

4 Interface Management (ietf-interface)

4.1 Overview

The module ietf-interfaces is defined in RFC 8343.

The ietf-interfaces YANG model is the central model for managing network interfaces. It is augmented by several other YANG modules in other standards.

Note: The deprecated container “interfaces-states” is not used in 60802.

4.1.1 Main Features

The module ietf-interfaces comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

4.1.1.1 Feature *arbitrary-names*

This feature indicates that the device allows user-controlled interfaces to be named arbitrarily.

This feature is **not required** in 60802.

4.1.1.2 Feature *pre-provisioning*

This feature indicates that the device supports pre-provisioning of interface configuration, i.e., it is possible to configure an interface whose physical interface hardware is not present on the device.

This feature is **not required** in 60802.

4.1.1.3 Feature *if-mib*

This feature indicates that the device implements the IF-MIB.

This feature is **not required** in 60802.

4.2 Tree Diagram

```
module: ietf-interfaces
  +--rw interfaces
  |   +--rw interface* [name]
  |   |   +--rw name                string
  |   |   +--rw description?       string
  |   |   +--rw type                identityref
  |   |   +--rw enabled?           boolean
  |   |   +--rw link-up-down-trap-enable? enumeration {if-mib}?
  |   |   +--ro admin-status       enumeration {if-mib}?
  |   |   +--ro oper-status        enumeration
  |   |   +--ro last-change?       yang:date-and-time
  |   |   +--ro if-index           int32 {if-mib}?
  |   |   +--ro phys-address?      yang:phys-address
  |   |   +--ro higher-layer-if*   interface-ref
  |   |   +--ro lower-layer-if*   interface-ref
  |   |   +--ro speed?             yang:gauge64
  |   |   +--ro statistics
  |   |   |   +--ro discontinuity-time yang:date-and-time
  |   |   |   +--ro in-octets?        yang:counter64
  |   |   |   +--ro in-unicast-pkts?  yang:counter64
  |   |   |   +--ro in-broadcast-pkts? yang:counter64
  |   |   |   +--ro in-multicast-pkts? yang:counter64
  |   |   |   +--ro in-discards?     yang:counter32
  |   |   |   +--ro in-errors?       yang:counter32
  |   |   |   +--ro in-unknown-protos? yang:counter32
  |   |   |   +--ro out-octets?       yang:counter64
  |   |   |   +--ro out-unicast-pkts? yang:counter64
  |   |   |   +--ro out-broadcast-pkts? yang:counter64
  |   |   |   +--ro out-multicast-pkts? yang:counter64
  |   |   |   +--ro out-discards?    yang:counter32
  |   |   |   +--ro out-errors?     yang:counter32
  |   +--ro interfaces-state
  |   |   x--ro interface* [name]
  |   |   |   x--ro name            string
  |   |   |   x--ro type            identityref
  |   |   |   x--ro admin-status    enumeration {if-mib}?
  |   |   |   x--ro oper-status     enumeration
  |   |   |   x--ro last-change?    yang:date-and-time
```



```

x--ro if-index          int32 {if-mib}?
x--ro phys-address?    yang:phys-address
x--ro higher-layer-if* interface-state-ref
x--ro lower-layer-if*  interface-state-ref
x--ro speed?           yang:gauge64
x--ro statistics
  x--ro discontinuity-time yang:date-and-time
  x--ro in-octets?         yang:counter64
  x--ro in-unicast-pkts?  yang:counter64
  x--ro in-broadcast-pkts? yang:counter64
  x--ro in-multicast-pkts? yang:counter64
  x--ro in-discards?     yang:counter32
  x--ro in-errors?       yang:counter32
  x--ro in-unknown-protos? yang:counter32
  x--ro out-octets?      yang:counter64
  x--ro out-unicast-pkts? yang:counter64
  x--ro out-broadcast-pkts? yang:counter64
  x--ro out-multicast-pkts? yang:counter64
  x--ro out-discards?    yang:counter32
  x--ro out-errors?     yang:counter32

```

4.3 Usage of YANG Data Objects

4.3.1 Container `ietf-interfaces/interfaces`

The data model for interfaces presented in RFC8343 uses a flat list of interfaces ("`/interfaces/interface`"). Each interface in the list is identified by its name. Furthermore, each interface has a mandatory "type" leaf.

4.3.2 List `ietf-interfaces/interfaces/interface`

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
name	string	rw	mandatory	mandatory	The name of the interface. 60802 automation value: for management port interfaces (see 5.2.3) the NameOfStation SHALL be applied; for physical port interfaces the identifier	RFC 2863: The Interfaces Group MIB - ifName	

					portion of the interface descriptor ifDescr SHALL be given.		
description	string	rw	optional	mandatory	<p>A textual description of the interface.</p> <p>A server implementation MAY map this leaf to the ifAlias MIB object. Such an implementation needs to use some mechanism to handle the differences in size and characters allowed between this leaf and ifAlias. The definition of such a mechanism is outside the scope of this document.</p> <p>Since ifAlias is defined to be stored in non-volatile storage, the MIB implementation MUST map ifAlias to the value of 'description' in the persistently stored configuration.</p>	<p>Original Reference in YANG model:RFC 2863: The Interfaces Group MIB – ifAlias</p> <p>DI Usage reference: RFC-2863: The Interfaces Group MIB - ifDescr</p>	
type	identityref	rw	mandatory	mandatory	The type of the interface.	RFC 2863: The Interfaces Group MIB - ifType	
enabled	boolean	rw	optional	mandatory	<p>This leaf contains the configured, desired state of the interface.</p> <p>Systems that implement the IF-MIB use the value of this leaf in the intended configuration to set IF-MIB.ifAdminStatus to 'up' or 'down' after an ifEntry has been initialized, as described in RFC 2863.</p> <p>Changes in this leaf in the intended configuration are reflected in ifAdminStatus.</p>	RFC 2863: The Interfaces Group MIB - ifAdminStatus	
link-up-down-trap-enable	enumeration	rw	optional	Optional	<p>Controls whether linkUp/linkDown SNMP notifications should be generated for this interface.</p> <p>If this node is not configured, the value 'enabled' is operationally used by the</p>	RFC 2863: The Interfaces Group MIB - ifLinkUpDownTrapEnable	

					server for interfaces that do not operate on top of any other interface (i.e., there are no 'lower-layer-if' entries), and 'disabled' otherwise.		
admin-status	enumeration	ro	mandatory	mandatory	The desired state of the interface. This leaf has the same read semantics as ifAdminStatus.	RFC 2863: The Interfaces Group MIB - ifAdminStatus	
oper-status	enumeration	ro	mandatory	mandatory	The current operational state of the interface. This leaf has the same semantics as ifOperStatus.	RFC 2863: The Interfaces Group MIB - ifOperStatus	
last-change	yang:date-and-time	ro	optional	Optional	The time the interface entered its current operational state. If the current state was entered prior to the last re-initialization of the local network management subsystem, then this node is not present.	RFC 2863: The Interfaces Group MIB - ifLastChange	
if-index	int32	ro	mandatory	mandatory	The ifIndex value for the ifEntry represented by this interface.	RFC 2863: The Interfaces Group MIB - ifIndex	
phys-address	yang:phys-address	ro	optional	mandatory	The interface's address at its protocol sub-layer. For example, for an 802.x interface, this object normally contains a Media Access Control (MAC) address. The interface's media-specific modules must define the bit and byte ordering and the format of the value of this object. For interfaces that do not have such an address (e.g., a serial line), this node is not present.	RFC 2863: The Interfaces Group MIB - ifPhysAddress	
higher-layer-if	list of interface-ref	ro	optional	mandatory	A list of references to interfaces layered on top of this interface.	RFC 2863: The Interfaces Group MIB - ifStackTable	
lower-layer-if	list of interface-ref	ro	optional	mandatory	A list of references to interfaces layered underneath this interface.	RFC 2863: The Interfaces Group MIB - ifStackTable	

speed	yang:gauge64	ro	optional	mandatory	<p>An estimate of the interface's current bandwidth in bits per second.</p> <p>For interfaces that do not vary in bandwidth or for those where no accurate estimation can be made, this node should contain the nominal bandwidth.</p> <p>For interfaces that have no concept of bandwidth, this node is not present.</p>	RFC 2863: The Interfaces Group MIB - ifSpeed, ifHighSpeed	
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4.3.3 Container Statistics

Each entry in the interface list comprises the container statistics

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
discontinuity-time	yang:date-and-time	ro	mandatory	Mandatory	The time on the most recent occasion at which any one or more of this interface's counters suffered a discontinuity. If no such discontinuities have occurred since the last re-initialization of the local management subsystem, then this node contains the time the local management subsystem re-initialized itself.		
in-octets	yang:counter64	ro	optional	mandatory	<p>The total number of octets received on the interface, including framing characters.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.</p>	RFC 2863: The Interfaces Group MIB - ifHCInOctets	
in-unicast-pkts	yang:counter64	ro	optional	Optional	The number of packets, delivered by this sub-layer to a higher (sub-)layer, that were not addressed to a multicast or broadcast address at this sub-layer.	RFC 2863: The Interfaces Group MIB - ifHCInUcastPkts	

					Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.		
in-broadcast-pkts	yang:counter64	ro	optional	Optional	<p>The number of packets, delivered by this sub-layer to a higher (sub-)layer, that were addressed to a broadcast address at this sub-layer.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.</p>	RFC 2863: The Interfaces Group MIB - ifHCInBroadcastPkts	
in-multicast-pkts	yang:counter64	ro	optional	Optional	<p>The number of packets, delivered by this sub-layer to a higher (sub-)layer, that were addressed to a multicast address at this sub-layer. For a MAC-layer protocol, this includes both Group and Functional addresses.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.</p>	RFC 2863: The Interfaces Group MIB - ifHCInMulticastPkts	
in-discards	yang:counter32	ro	optional	mandatory	<p>The number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as</p>	RFC 2863: The Interfaces Group MIB - ifInDiscards	

					indicated by the value of 'discontinuity-time'.		
in-errors	yang:counter32	ro	optional	mandatory	<p>For packet-oriented interfaces, the number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol. For character-oriented or fixed-length interfaces, the number of inbound transmission units that contained errors preventing them from being deliverable to a higher-layer protocol.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.</p>	RFC 2863: The Interfaces Group MIB - ifInErrors	
in-unknown-protos	yang:counter32	ro	optional	Optional	<p>For packet-oriented interfaces, the number of packets received via the interface that were discarded because of an unknown or unsupported protocol. For character-oriented or fixed-length interfaces that support protocol multiplexing, the number of transmission units received via the interface that were discarded because of an unknown or unsupported protocol. For any interface that does not support protocol multiplexing, this counter is not present.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.</p>	RFC 2863: The Interfaces Group MIB - ifInUnknownProtos	
out-octets	yang:counter64	ro	optional	mandatory	The total number of octets transmitted out of the interface, including framing characters.	RFC 2863: The Interfaces Group MIB - ifHCOutOctets	

					Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.		
out-unicast-pkts	yang:counter64	ro	optional	Optional	<p>The total number of packets that higher-level protocols requested be transmitted and that were not addressed to a multicast or broadcast address at this sub-layer, including those that were discarded or not sent.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.</p>	RFC 2863: The Interfaces Group MIB - ifHCOUcastPkts	
out-broadcast-pkts	yang:counter64	ro	optional	Optional	<p>The total number of packets that higher-level protocols requested be transmitted and that were addressed to a broadcast address at this sub-layer, including those that were discarded or not sent.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.</p>	RFC 2863: The Interfaces Group MIB - ifHCOBroadcastPkts	
out-multicast-pkts	yang:counter64	ro	optional	Optional	<p>The total number of packets that higher-level protocols requested be transmitted and that were addressed to a multicast address at this sub-layer, including those that were discarded or not sent. For a MAC-layer protocol, this includes both Group and Functional addresses.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the</p>	RFC 2863: The Interfaces Group MIB - ifHCOMulticastPkts	

					management system and at other times as indicated by the value of 'discontinuity-time'.		
out-discards	yang:counter32	ro	optional	mandatory	<p>The number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free up buffer space.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.</p>	RFC 2863: The Interfaces Group MIB - ifOutDiscards	
out-errors	yang:counter32	ro	optional	mandatory	<p>For packet-oriented interfaces, the number of outbound packets that could not be transmitted because of errors. For character-oriented or fixed-length interfaces, the number of outbound transmission units that could not be transmitted because of errors.</p> <p>Discontinuities in the value of this counter can occur at re-initialization of the management system and at other times as indicated by the value of 'discontinuity-time'.</p>	RFC 2863: The Interfaces Group MIB - ifOutErrors	

4.4 Augmentation by Module ieee802-dot1q-bridge (IEEE 802.1Qcp/D2-2 and IEEE 802.1Qcw/D1-2)

4.4.1 Additional Container ietf-interfaces/interface/bridge-port

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
------	------	--------	--------------	---------------	-------------	-----------	--

bridge-name	leafref (-> /bridges/bridge/name)	rw	optional	mandatory	Used to reference configured Bridge node.		
component-name	leafref	rw	optional	mandatory	Used to reference configured Component node.		
port-type	identityref	rw	optional	mandatory	The port type. Indicates the capabilities of this port.	12.4.2.1 of IEEE Std 802.1Q-2018	
pvid	dot1qtypes:vlan-index-type	rw	optional	mandatory	The primary (default) VID assigned to a specific Bridge Port.	12.10.1 of IEEE Std 802.1Q-2018 5.4, item m) of IEEE Std 802.1Q-2018	
default-priority	dot1qtypes:priority-type	rw	optional	mandatory	The default priority assigned to a specific Bridge Port.	12.6.2 of IEEE Std 802.1Q-2018	
priority-regeneration	container, uses dot1qtypes:priority-regeneration-table-grouping	rw	optional	optional	The Priority Regeneration Table parameters associated with a specific Bridge Port. A list of Regenerated User Priorities for each received priority on each port of a Bridge. The regenerated priority value may be used to index the Traffic Class Table for each input port. This only has effect on media that support native priority. The default values for Regenerated User Priorities are the same as the User Priorities	12.6.2 of IEEE Std 802.1Q-2018 6.9.4 of IEEE Std 802.1Q-2018	
pcp-selection	dot1qtypes:pcp-selection-type	rw	optional	optional	The Priority Code Point selection assigned to a specific Bridge Port. This object identifies the rows in the PCP encoding and decoding tables that are used to remark frames on this port if this remarking is enabled Default: "8POD"	12.6.2 of IEEE Std 802.1Q-2018 6.9.3 of IEEE Std 802.1Q-2018	
pcp-decoding-table	container, uses dot1qtypes:pcp-decoding-table-grouping	rw	optional	optional	The Priority Code Point Decoding Table parameters associated with a specific Bridge Port.		

pcp-encoding-table	container, uses dot1qtypes:pcp-encoding-table-grouping	rw	optional	optional	The Priority Code Point Encoding Table parameters associated with a specific Bridge Port.		
use-dei	boolean	rw	optional	optional	The Drop Eligible Indicator. If it is set to True, then the drop_eligible parameter is encoded in the DEI of transmitted frames, and the drop_eligible parameter shall be true(1) for a received frame if the DEI is set in the VLAN tag or the Priority Code Point Decoding Table indicates drop_eligible True for the received PCP value. If this parameter is False, the DEI shall be transmitted as zero and ignored on receipt. Default: false	12.6.2 of IEEE Std 802.1Q-2018 6.9.3 of IEEE Std 802.1Q-2018	
drop-encoding	boolean	rw	optional	optional	The Drop Encoding parameter. If a Bridge supports encoding or decoding of drop_eligible from the PCP field of a VLAN tag (6.7.3) on any of its Ports, then it shall implement a Boolean parameter Require Drop Encoding on each of its Ports with default value False. If Require Drop Encoding is True and the Bridge Port cannot encode particular priorities with drop_eligible, then frames queued with those priorities and drop_eligible True shall be discarded and not transmitted. Default: false	12.6.2 of IEEE Std 802.1Q-2018 8.6.6 of IEEE Std 802.1Q-2018	
service-access-priority-selection	boolean	rw	optional	optional	The Service Access Priority selection. Indication of whether the Service Access Priority Selection function is supported on the Customer Bridge Port to request priority handling of the	12.6.2 of IEEE Std 802.1Q-2018 6.13 of IEEE Std 802.1Q-2018	

					frame from a Port-based service interface. Default: false		
service-access-priority	container, uses dot1qtypes:service-access-priority-table-grouping	rw	optional	optional	The Service Access Priority table parameters. A table that contains information about the Service Access Priority Selection function for a Provider Bridge. The use of this table enables a mechanism for a Customer Bridge attached to a Provider Bridged Network to request priority handling of frames.	12.6.2 of IEEE Std 802.1Q-2018 6.13.1 of IEEE Std 802.1Q-2018	
traffic-class	container	rw	obsolete!	-	The Traffic Class table parameters. A table mapping evaluated priority to Traffic Class, for forwarding by the Bridge. <u>This container modeled the Traffic Class Table incorrectly, and therefore its status is obsolete. It is replaced by traffic-class-v2</u>		
traffic-class-v2	container, uses dot1qtypes:traffic-class-table-grouping-v2	rw	optional	mandatory	The Traffic Class Table models the operations that can be performed on, or inquire about, the current contents of the Traffic Class Table for a given Port. The default values for the table are specified in IEEE Std 802.1Q-2018 8.6.6 or 34.5.	12.6.3 of IEEE Std 802.1Q-2018	
acceptable-frame	enumeration	rw	optional	optional	To configure the Acceptable Frame Types parameter associated with one or more Ports Default: admit-all-frames	12.10.1.3 of IEEE Std 802.1Q-2018 6.9 of IEEE Std 802.1Q-2018	
enable-ingress-filtering	boolean	rw	optional	optional	To enable the Ingress Filtering feature associated with one or more Ports. Default: false	12.10.1.4 of IEEE Std 802.1Q-2018 8.6.2 of IEEE Std 802.1Q-2018	

enable-restricted-vlan-registration	boolean	rw	optional	optional	To enable the Restricted VLAN Registration associated with one or more Ports. Default: false	11.2.3.2.3 of IEEE Std 802.1Q-2018 12.10.1.6 of IEEE Std 802.1Q-2018	
enable-vid-translation-table	boolean	rw	optional	optional	To enable VID Translation table associated with a Bridge Port. This is not applicable to Bridge Ports that do not support a VID Translation Table. Default: false	12.10.1.8 of IEEE Std 802.1Q-2018 6.9 of IEEE Std 802.1Q-2018	
enable-egress-vid-translation-table	boolean	rw	optional	optional	To enable Egress VID Translation table associated with a Bridge Port. This is not applicable to Ports that do not support an Egress VID Translation table. Default: false	12.10.1.9 of IEEE Std 802.1Q-2018 6.9 of IEEE Std 802.1Q-2018	
protocol-group-vid-set⁵	list			optional	The list of VID values associated with the Protocol Group Identifier for this port.	12.10.1.1.3 of IEEE Std 802.1Q-2018	
admin-point-to-point	enumeration	rw	optional	optional	For a port running spanning tree, this object represents the administrative point-to-point status of the LAN segment attached to this port, using the enumeration values of IEEE Std 802.1AC. A value of forceTrue(1) indicates that this port should always be treated as if it is connected to a point-to-point link. A value of forceFalse(2) indicates that this port should be treated as having a shared media connection. A value of auto(3) indicates that this port is considered to have a point-to-point link if it is an	12.4.2 of IEEE Std 802.1Q-2018 6.8.2 of IEEE Std 802.1Q-2018	

⁵ if-feature "port-and-protocol-based-vlan"

					Aggregator and all of its members are aggregatable, or if the MAC entity is configured for full duplex operation, either through auto-negotiation or by management means. Manipulating this object changes the underlying adminPointToPointMAC.		
protocol-based-vlan-classification	boolean	ro	optional	optional	A boolean indication indicating if Port-and-Protocol-based VLAN classification is supported on a given Port.	5.4.1.2 of IEEE Std 802.1Q-2018	
max-vid-set-entries	uint16	ro	optional	optional	The maximum number of entries supported in the VID set on a given Port.	12.10.1.1.3 of IEEE Std 802.1Q-2018	
port-number	dot1qtypes:port-number-type	ro	optional	optional	An integer that uniquely identifies a Bridge Port.	12.3, item i) of IEEE Std 802.1Q-2018 17.3.2.2 of IEEE Std 802.1Q-2018	
address	ieee:mac-address	ro	optional	optional	The specific MAC address of the individual MAC Entity associated with the Port.	12.4.2 of IEEE Std 802.1Q-2018 12.4.2.1.1.3, item a) of IEEE Std 802.1Q-2018	
capabilities	bits	ro	optional	optional	The feature capabilities associated with port. Indicates the parts of IEEE 802.1Q that are optional on a per-port basis, that are implemented by this device, and that are manageable.	12.10.1.1.3, item c) of IEEE Std 802.1Q-2018 12.4.2 of IEEE Std 802.1Q-2018	
type-capabilities	bits	ro	optional	optional	The type of feature capabilities supported with port. Indicates the capabilities of this port.	12.4.2 of IEEE Std 802.1Q-2018	
external	boolean	ro	optional	optional	A boolean indicating whether the port is external. A value of True means the port is external. A value of False means the port is internal.	12.4.2 of IEEE Std 802.1Q-2018	

oper-point-to-point	boolean	ro	optional	optional	<p>For a port running spanning tree, this object represents the operational point-to-point status of the LAN segment attached to this port. It indicates whether a port is considered to have a point-to-point connection.</p> <p>If admin-point-to-point is set to auto(2), then the value of oper-point-to-point is determined in accordance with the specific procedures defined for the MAC entity concerned, as defined in IEEE Std 802.1AC.</p> <p>The value is determined dynamically; that is, it is re-evaluated whenever the value of admin-point-to-point changes, and whenever the specific procedures defined for the MAC entity evaluate a change in its point-to-point status.</p>	IEEE Std 802.1AC 12.4.2 of IEEE Std 802.1Q-2018	
statistics	container	ro	optional	mandatory	Container of operational state node information associated with the bridge port.	-	

4.5 Augmentation by Module `ieee802-dot1cb-stream-identification` (IEEE 802.1CBcv)

4.5.1 Additional Container `ietf-interfaces/interface/statistics/stream-id`

This container contains the per-port as well as the per-port-per-stream counters for stream identification.

4.5.1.1 Container `ietf-interfaces/interface/statistics/stream-id/per-port-counters`

Contains the per-port counters for stream identification. The following counters are instantiated for each port on which the Stream identification function is configured. The counters are indexed by port number.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
------	------	--------	--------------	---------------	-------------	-----------	--

input-pkts	uint64	ro	optional	optional	The tsnCpSidInputPackets counter is incremented once for each packet identified by any Stream identification function on this port. Its value equals the sum (modulo the size of the counters) of all of the tsnCpsSidInputPackets counters on this same port.	9.3.1 of IEEE Std 802.1CB-2017	
output-pkts	uint64	ro	optional	optional	The tsnCpSidOutputPackets counter is incremented once for each packet passed down the stack by any Stream identification function on this port. Its value equals the sum (modulo the size of the counters) of all of the tsnCpsSidOutputPackets counters on this same port.	9.3.2 of IEEE Std 802.1CB-2017	

4.5.1.2 List ietf-interfaces/interface/statistics/stream-id/per-port-per-stream-counters

Contains the per-port-per-stream counters for stream identification. The following counters are instantiated for each port on which the Stream identification function is configured. The counters are indexed by port number, facing (in-facing or out-facing), and stream_handle value (tsnStreamIdHandle).

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
direction-out-facing	dot1cb-sid-types:direction	ro	optional	optional	An object indicating whether the counters apply to out-facing (True) or in-facing (False).	-	
handle	leafref -> /stream-identity/handle	ro	optional	optional	The according tsnStreamIdHandle for these counters.	-	
input-pkts	uint64	ro	optional	optional	The tsnCpsSidInputPackets counter is incremented once for each packet identified by the Stream identification function.	9.2.1 of IEEE Std 802.1CB-2017	
output-pkts	uint64	ro	optional	optional	The tsnCpsSidOutputPackets counter is incremented once for each packet	9.2.2 of IEEE Std 802.1CB-2017	

					passed down the stack by the Stream identification function.		
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4.6 Augmentation by Module `ieee802-dot1cb-frer` (IEEE 802.1CBcv)

4.6.1 Additional Container `ietf-interfaces/interface/statistics/frer`

This container contains the per-port as well as the per-port-per-stream counters for frame replication and elimination for reliability.

4.6.1.1 Container `ietf-interfaces/interface/statistics/frer/per-port-counters`

Contains the per-port counters for frame replication and elimination for reliability. The following counters are instantiated for each port on which any of the Stream identification function, Sequencing function, or Sequence encode/decode function is configured. The counters are indexed by port number.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
<code>rx-passed-pkts</code>	uint64	ro	optional	optional	The <code>frerCpSeqRcvyPassedPackets</code> counter is incremented once for each packet passed up the stack by the <code>VectorRecoveryAlgorithm</code> or <code>MatchRecoveryAlgorithm</code> . Its value equals the sum (modulo the size of the counters) of all of the <code>frerCpsSeqRcvyPassedPackets</code> counters on this same port.	10.9.1 of IEEE Std 802.1CB-2017	
<code>rx-discarded-pkts</code>	uint64	ro	optional	optional	The <code>frerCpSeqRcvyDiscardPackets</code> counter is incremented once for each packet discarded due to a duplicate sequence number or for being a rogue packet by any <code>VectorRecoveryAlgorithm</code> or <code>MatchRecoveryAlgorithm</code> on this port. Its value equals the sum (modulo the size of the counters) of all of the <code>frerCpsSeqRcvyRoguePackets</code> and	10.9.2 of IEEE Std 802.1CB-2017	

					frerCpsSeqRcvyDiscardedPackets counters on this same port.		
encode-errored-pkts	uint64	ro	optional	optional	The frerCpSeqEncErroredPackets counter is incremented once each time the Sequence encode/decode function receives a packet that it is unable to decode successfully. Its value equals the sum (modulo the size of the counters) of all of the frerCpsSeqEncErroredPackets counters on this same port.	10.9.2 of IEEE Std 802.1CB-2017	

4.6.1.2 List ietf-interfaces/interface/statistics/frer/per-port-per-stream-counters

Contains the per-port-per-stream counters for frame replication and elimination for reliability. The following counters are instantiated for each port on which any of the Stream identification function, Sequencing function, or Sequence encode/decode function is configured. The counters are indexed by port number, facing (in-facing or out-facing), and stream_handle value.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
direction-out-facing	dot1cb-sid-types:direction	ro	optional	optional	An object indicating whether the counters apply to out-facing (True) or in-facing (False).		
handle	leafref -> /dot1cb-sid:stream-identity/dot1cb-sid:handle	ro	optional	optional	The according tsnStreamIdHandle for the counters.		
generation-reset	uint64	ro	optional	optional	The frerCpsSeqGenResets counter is incremented each time the SequenceGenerationReset function is called.	10.8.2 of IEEE Std 802.1CB-2017	
rx-out-of-order-pkts	uint64	ro	optional	optional	The frerCpsSeqRcvyOutOfOrderPackets counter is incremented once for each	10.8.3 of IEEE Std 802.1CB-2017	

					packet accepted out-of-order by the VectorRecoveryAlgorithm or MatchRecoveryAlgorithm. Out-of-order means that the packet's sequence number is not one more than the previous packet received.		
rx-rogue-pkts	uint64	ro	optional	optional	The frerCpsSeqRcvyRoguePackets counter is incremented once for each packet discarded by the VectorRecoveryAlgorithm because its sequence_number subparameter is more than frerSeqRcvyHistoryLength from RecovSeqNum.	10.8.4 of IEEE Std 802.1CB-2017	
rx-passed-pkts	uint64	ro	optional	optional	The frerCpsSeqRcvyPassedPackets counter is incremented once for each packet passed up the stack by the VectorRecoveryAlgorithm or MatchRecoveryAlgorithm.	10.8.5 of IEEE Std 802.1CB-2017	
rx-discarded-pkts	uint64	ro	optional	optional	The frerCpsSeqRcvyDiscardedPackets counter is incremented once for each packet discarded due to a duplicate sequence number by the VectorRecoveryAlgorithm or MatchRecoveryAlgorithm.	10.8.6 of IEEE Std 802.1CB-2017	
rx-lost-pkts	uint64	ro	optional	optional	The frerCpsSeqRcvyLostPackets counter is incremented once for each packet lost by the VectorRecoveryAlgorithm. A packet is counted as lost if its sequence number is not received on any ingress port. NOTE—If per-source sequence numbering is used, frerCpsSeqRcvyLostPackets can count, as lost, packets that were sent to another destination, but not lost.	10.8.7 of IEEE Std 802.1CB-2017	

rx-tagless-pkts	uint64	ro	optional	optional	The frerCpsSeqRcvyTaglessPackets counter is incremented once for each packet received by the VectorRecoveryAlgorithm that has no sequence_number subparameter.	10.8.8 of IEEE Std 802.1CB-2017	
rx-resets	uint64	ro	optional	optional	The frerCpsSeqRcvyResets counter is incremented once each time the SequenceRecoveryReset function is called.	10.8.9 of IEEE Std 802.1CB-2017	
rx-latent-error-resets	uint64	ro	optional	optional	The frerCpsSeqRcvyLatentErrorResets counter is incremented once each time the LatentErrorReset function is called.	10.8.10 of IEEE Std 802.1CB-2017	
encode-errored-pkts	uint64	ro	optional	optional	The frerCpsSeqEncErroredPackets counter is incremented once each time the Sequence encode/decode function receives a packet that it is unable to decode successfully.	10.8.11 of IEEE Std 802.1CB-2017	

4.7 Augmentation by IEEE 802.3.2

4.7.1 Container ietf-interfaces/interface/ethernet

This container contains all Ethernet interface related configuration.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
auto-negotiation	presence container	rw	optional	mandatory	The presence of this container indicates that auto-negotiation is supported on this Ethernet interface. It contains auto-negotiation transmission parameters.	IEEE Std 802.3, Clause 28 and Annexes 28A-D	
duplex	duplex-type	rw	optional	mandatory	Operational duplex mode of the Ethernet interface.	IEEE Std 802.3, 30.3.1.1.32 aDuplexStatus	

speed	eth-if-speed-type	rw	optional	mandatory	Operational speed (data rate) of the Ethernet interface. The default value is implementation-dependent.	-	
flow-control	container	rw	optional	mandatory	Holds the different types of Ethernet PAUSE frame based flow control that can be enabled.	-	
max-frame-length	uint16	ro	optional	optional	This indicates the MAC frame length (including FCS bytes) at which frames are dropped for being too long.	IEEE Std 802.3, 30.3.1.1.37 aMaxFrameLength	
mac-control-extension-control	boolean	ro	optional	optional	A value that identifies the current EXTENSION MAC Control function, as specified in IEEE Std 802.3, Annex 31C.	IEEE Std 802.3, 30.3.8.3 aEXTENSIONMACCtrlStatus IEEE Std 802.3.1, dot3ExtensionMacCtrlStatus	
frame-limit-slow-protocol	uint64	ro	optional	optional	The maximum number of Slow Protocol frames of a given subtype that can be transmitted in a one second interval.	IEEE Std 802.3, 30.3.1.1.38 aSlowProtocolFrameLimit	
capabilities	container	ro	optional	optional	Container all Ethernet interface specific capabilities.	-	
statistics	container	ro	optional	optional	Contains statistics specific to Ethernet interfaces.	-	

4.8 Augmentation by Module ieee802-dot1q-sched

4.8.1 Container ietf-interfaces/interface/bridge-port/gate-parameter-table

This container augments bridge-port with Scheduled Traffic configuration..

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
queue-max-sdu-table	list	rw	optional	mandatory	A list containing a set of max SDU parameters, one for each traffic class.	12.29.1.1 of IEEE Std 802.1Q-2018	

						8.6.8.4 of IEEE Std 802.1Q-2018 8.6.9 of IEEE Std 802.1Q-2018	
gate-enabled	boolean	rw	optional	mandatory	The GateEnabled parameter determines whether traffic scheduling is active (true) or inactive (false).	12.29.1 of IEEE Std 802.1Q-2018 8.6.8.2 of IEEE Std 802.1Q-2018 8.6.9.4.14 of IEEE Std 802.1Q-2018	
admin-gate-states	uint8	rw	optional	mandatory	AdminGateStates is the administrative value of the initial gate states for the Port.	12.29.1 of IEEE Std 802.1Q-2018 8.6.9.4.5 of IEEE Std 802.1Q-2018	
oper-gate-states	uint8	ro	optional	mandatory	OperGateStates is the operational value of the current gate states for the Port	12.29.1 of IEEE Std 802.1Q-2018 8.6.9.4.22 of IEEE Std 802.1Q-2018	
admin-control-list	list	rw	optional	mandatory	AdminControlList is the administrative value of the gate control list for the Port.	12.29.1.2 of IEEE Std 802.1Q-2018 8.6.8.4 of IEEE Std 802.1Q-2018 8.6.9.4.2 of IEEE Std 802.1Q-2018	
oper-control-list	list	ro	optional	mandatory	OperControlList is the operational value of the gate control list for the Port.	12.29.1.2 of IEEE Std 802.1Q-2018 8.6.8.4 of IEEE Std 802.1Q-2018 8.6.9.4.19 of IEEE Std 802.1Q-2018	

admin-cycle-time	container	rw	optional	mandatory	AdminCycleTime specifies the administrative value of the gating cycle time for the Port.	12.29.1 of IEEE Std 802.1Q-2018 8.6.8.4 of IEEE Std 802.1Q-2018 8.6.9.4.3 of IEEE Std 802.1Q-2018	
oper-cycle-time	container	ro	optional	mandatory	OperCycleTime specifies the operational value of the gating cycle time for the Port.	12.29.1 of IEEE Std 802.1Q-2018 8.6.8.4 of IEEE Std 802.1Q-2018 8.6.9.4.20 of IEEE Std 802.1Q-2018	
admin-cycle-time-extension	uint32	rw	optional	mandatory	An unsigned integer number of nanoseconds, defining the maximum amount of time by which the gating cycle for the Port is permitted to be extended when a new cycle configuration is being installed. This is the administrative value.	12.29.1 of IEEE Std 802.1Q-2018 8.6.9.4.4 of IEEE Std 802.1Q-2018	
oper-cycle-time-extension	uint32	ro	optional	mandatory	An unsigned integer number of nanoseconds, defining the maximum amount of time by which the gating cycle for the Port is permitted to be extended when a new cycle configuration is being installed. This is the operational value.	12.29.1 of IEEE Std 802.1Q-2018 8.6.9.4.21 of IEEE Std 802.1Q-2018	
admin-base-time	container	rw	optional	mandatory	The administrative value of the base time at which gating cycles begin, expressed as an IEEE 1588 precision time protocol (PTP) timescale.	12.29.1 of IEEE Std 802.1Q-2018 8.6.9.4.1 of IEEE Std 802.1Q-2018	
oper-base-time	container	ro	optional	mandatory	The operational value of the base time at which gating cycles begin, expressed	12.29.1 of IEEE Std 802.1Q-2018	

					as an IEEE 1588 precision time protocol (PTP) timescale.	8.6.9.4.18 of IEEE Std 802.1Q-2018	
config-change	boolean	rw	optional	mandatory	The ConfigChange parameter signals the start of a configuration change when it is set to TRUE, indicating that the administrative parameters for the Port are ready to be copied into their corresponding operational parameters. This should only be done when the various administrative parameters are all set to appropriate values.	12.29.1 of IEEE Std 802.1Q-2018 8.6.9.4.7 of IEEE Std 802.1Q-2018	
config-change-time	container	ro	optional	mandatory	The time at which the next config change is scheduled to occur.	12.29.1 of IEEE Std 802.1Q-2018 8.6.9.4.9 of IEEE Std 802.1Q-2018	
tick-granularity	uint32	ro	optional	mandatory	The granularity of the cycle time clock, represented as an unsigned number of tenths of nanoseconds.	12.29.1 of IEEE Std 802.1Q-2018	
current-time	container	ro	optional	mandatory	The current time as maintained by the local system.	12.29.1 of IEEE Std 802.1Q-2018 8.6.9.4.10 of IEEE Std 802.1Q-2018	
config-pending	boolean	ro	optional	mandatory	The value of the ConfigPending state machine variable. The value is TRUE if a configuration change is in progress but has not yet completed.	12.29.1 of IEEE Std 802.1Q-2018 8.6.9.4.8 of IEEE Std 802.1Q-2018	
config-change-error	yang:counter64	ro	optional	mandatory	A counter of the number of times that a re-configuration of the traffic schedule has been requested with the old schedule still running and the requested base time was in the past.	12.29.1 of IEEE Std 802.1Q-2018 8.6.9.3.1 of IEEE Std 802.1Q-2018	
supported-list-max	uint32	rw	optional	mandatory	The maximum value supported by this Port for the AdminControlListLength	12.29.1.5 of IEEE Std 802.1Q-2018	

					and OperControlListLength parameters. It is available for use by schedule computation software to determine the port's control list capacity prior to computation. The object may optionally be read-only.	8.6.9.4.21 of IEEE Std 802.1Q-2018	
supported-cycle-max	container	rw	optional	mandatory	The maximum value supported by this Port of the AdminCycleTime and OperCycleTime parameters. The object may optionally be read-only.	12.29.1.6 of IEEE Std 802.1Qcw	
supported-interval-max	uint32	rw	optional	mandatory	The maximum value supported by this Port of the TimeIntervalValue parameter. The object may optionally be read-only.	12.29.1.7 of IEEE Std 802.1Qcw	

4.9 Augmentation by Module ieee802-dot1q-preemption

4.9.1 Container ietf-interfaces/interface/bridge-port/frame-preemption-parameters

This container augments bridge-port with Frame Preemption configuration..

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
frame-preemption-status-table	list	rw	optional	mandatory	The framePreemptionStatusTable consists of 8 framePreemptionAdminStatus values, one per priority	12.30.1.1 of IEEE Std 802.1Q-2018	
hold-advance	uint32	ro	optional	optional	The value of the holdAdvance parameter for the Port in nanoseconds. There is no default value; the holdAdvance is a property of the underlying MAC.	12.30.1.2 of IEEE Std 802.1Q-2018	
release-advance	uint32	ro	optional	optional	The value of the releaseAdvance parameter for the Port in nanoseconds.	12.30.1.3 of IEEE Std 802.1Q-2018	

					There is no default value; the releaseAdvance is a property of the underlying MAC.		
preemption-active	boolean	ro	optional	mandatory	TRUE if preemption is both supported by the MAC and currently active.	12.30.1.4 of IEEE Std 802.1Q-2018	
hold-request enumeration	enumeration	ro	optional	optional	The value of the holdRequest parameter for the Port.	12.30.1.5 of IEEE Std 802.1Q-2018	

5 Bridges and Bridged Networks (ieee802-dot1q-bridge)

5.1 Overview

The Bridges and Bridged Networks model is defined in IEEE P802.1Qcp/D2.2 Clause 48 and IEEE P802.1Qcw/D1.2 Clause 48.

5.1.1 Main Features

The module ieee802-dot1q-bridge comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

5.1.1.1 Feature *ingress-filtering*

Each Port may support an Enable Ingress Filtering parameter. A frame received on a Port that is not in the member set (8.8.10) associated with the frames VID shall be discarded if this parameter is set. The default value for this parameter is reset, i.e., Disable Ingress Filtering, for all Ports. Any Port that supports setting this parameter shall also support resetting it. The parameter may be configured by the management operations defined in IEEE 802.1Q Clause 12.

Reference: 8.6.2 of IEEE Std 802.1Q-2018.

This feature is **optional** in 60802.

5.1.1.2 Feature *extended-filtering-services*

Extended Filtering Services support the filtering behavior required for regions of a network in which potential recipients of multicast frames exist, and where both the potential recipients of frames and the Bridges are able to support dynamic configuration of filtering information for group MAC addresses. In order to integrate this extended filtering behavior with the needs of regions of the network that support only Basic Filtering Services, Bridges that support Extended Filtering Services can be statically and dynamically configured to modify their filtering behavior on a per-group MAC address basis, and also on the basis of the overall filtering service provided by each outbound Port with regard to multicast frames. The latter capability permits configuration of the Ports default forwarding or filtering behavior with regard to group MAC addresses for which no specific static or dynamic filtering information has been configured.

Reference: 8.8.4 of IEEE Std 802.1Q-2018, Clause 10 of IEEE Std 802.1Q-2018

This feature is **optional** in 60802.

5.1.1.3 Feature *port-and-protocol-based-vlan*

A VLAN-aware bridge component implementation in conformance to the provisions of this standard for Port-and-Protocol-based VLAN classification (5.4.1) shall 1) Support one or more of the following Protocol Classifications and Protocol Template formats: Ethernet, RFC_1042, SNAP_8021H, SNAP_Other, or LLC_Other (6.12); and may 2) Support configuration of the contents of the Protocol Group Database.

Reference: 5.4.1.2 of IEEE Std 802.1Q-2018

This feature is **not required** in 60802.

5.1.1.4 Feature *flow-filtering*

Flow filtering support enables Bridges to distinguish frames belonging to different client flows and to use this information in the forwarding process. Information related to client flows may be used at the boundary of an SPT Domain to generate a flow hash value. The flow hash, carried in an F-TAG, serves to distinguish frames belonging to different flows and can be used in the forwarding process to distribute frames over equal cost paths. This provides for finer granularity load spreading while maintaining frame order for each client flow.

Reference: 44.2 of IEEE Std 802.1Q-2018

This feature is **not required** in 60802.

5.1.1.5 Feature *simple-bridge-port*

A simple bridge port allows underlying (MAC) layers to share the same Interface as the Bridge Port.

This feature is **not required** in 60802.

5.1.1.6 Feature *flexible-bridge-port*

A flexible bridge port supports an Interface that is a Bridge Port to be a separate Interface from the underlying (MAC) layer.

This feature is **not required** in 60802.

5.2 Tree Diagram

```
module: ieee802-dot1q-bridge
  +--rw bridges
    +--rw bridge* [name]
      +--rw name          dot1qtypes:name-type
      +--rw address       ieee:mac-address
      +--rw bridge-type   identityref
      +--ro ports?        uint16
      +--ro up-time?      yang:zero-based-counter32
      +--ro components?   uint32
      +--rw component* [name]
        +--rw name          string
        +--rw id?           uint32
        +--rw type          identityref
        +--rw address?      ieee:mac-address
        +--rw traffic-class-enabled? boolean
        +--ro ports?        uint16
        +--ro bridge-port*  if:interface-ref
```

```

+---ro capabilities
| +---ro extended-filtering?          boolean
| +---ro traffic-classes?            boolean
| +---ro static-entry-individual-port? boolean
| +---ro ivl-capable?                boolean
| +---ro svl-capable?                boolean
| +---ro hybrid-capable?             boolean
| +---ro configurable-pvid-tagging?   boolean
| +---ro local-vlan-capable?         boolean
+---rw filtering-database
| +---rw aging-time?                 uint32
| +---ro size?                       yang:gauge32
| +---ro static-entries?             yang:gauge32
| +---ro dynamic-entries?           yang:gauge32
| +---ro static-vlan-registration-entries? yang:gauge32
| +---ro dynamic-vlan-registration-entries? yang:gauge32
| +---ro mac-address-registration-entries? yang:gauge32 {extended-filtering-services}?
| +---rw filtering-entry* [database-id vids address]
| | +---rw database-id      uint32
| | +---rw address         ieee:mac-address
| | +---rw vids            dot1qtypes:vid-range-type
| | +---rw entry-type?     enumeration
| | +---rw port-map* [port-ref]
| | | +---rw port-ref                    port-number-type
| | | +---rw (map-type)?
| | |   +---:(static-filtering-entries)
| | |   | +---rw static-filtering-entries
| | |   |   +---rw control-element?     enumeration
| | |   |   +---rw connection-identifier? port-number-type
| | |   +---:(static-vlan-registration-entries)
| | |   | +---rw static-vlan-registration-entries
| | |   |   +---rw registrar-admin-control? enumeration
| | |   |   +---rw vlan-transmitted?     enumeration
| | |   +---:(mac-address-registration-entries)
| | |   | +---rw mac-address-registration-entries
| | |   |   +---rw control-element?     enumeration
| | |   +---:(dynamic-vlan-registration-entries)
| | |   | +---rw dynamic-vlan-registration-entries
| | |   |   +---rw control-element?     enumeration
| | |   +---:(dynamic-reservation-entries)

```

```

| | | | +---rw dynamic-reservation-entries
| | | | +---rw control-element? enumeration
| | | +---:(dynamic-filtering-entries)
| | | +---rw dynamic-filtering-entries
| | | +---rw control-element? enumeration
| | +---ro status? enumeration
| +---rw vlan-registration-entry* [database-id vids]
| +---rw database-id uint32
| +---rw vids dot1qtypes:vid-range-type
| +---rw entry-type? enumeration
| +---rw port-map* [port-ref]
| +---rw port-ref port-number-type
| +---rw (map-type)?
| +---:(static-filtering-entries)
| | +---rw static-filtering-entries
| | +---rw control-element? enumeration
| | +---rw connection-identifier? port-number-type
| +---:(static-vlan-registration-entries)
| | +---rw static-vlan-registration-entries
| | +---rw registrar-admin-control? enumeration
| | +---rw vlan-transmitted? enumeration
| +---:(mac-address-registration-entries)
| | +---rw mac-address-registration-entries
| | +---rw control-element? enumeration
| +---:(dynamic-vlan-registration-entries)
| | +---rw dynamic-vlan-registration-entries
| | +---rw control-element? enumeration
| +---:(dynamic-reservation-entries)
| | +---rw dynamic-reservation-entries
| | +---rw control-element? enumeration
| +---:(dynamic-filtering-entries)
| | +---rw dynamic-filtering-entries
| | +---rw control-element? enumeration
+---rw permanent-database
| +---ro size? yang:gauge32
| +---ro static-entries? yang:gauge32
| +---ro static-vlan-registration-entries? yang:gauge32
| +---rw filtering-entry* [database-id vids address]
| +---rw database-id uint32
| +---rw address ieee:mac-address

```

```

| +--rw vids          dot1qtypes:vid-range-type
| +--ro status?      enumeration
| +--rw port-map* [port-ref]
|   +--rw port-ref          port-number-type
|   +--rw (map-type)?
|     +--:(static-filtering-entries)
|       | +--rw static-filtering-entries
|       |   +--rw control-element?      enumeration
|       |   +--rw connection-identifier? port-number-type
|     +--:(static-vlan-registration-entries)
|       | +--rw static-vlan-registration-entries
|       |   +--rw registrar-admin-control? enumeration
|       |   +--rw vlan-transmitted?      enumeration
|     +--:(mac-address-registration-entries)
|       | +--rw mac-address-registration-entries
|       |   +--rw control-element?      enumeration
|     +--:(dynamic-vlan-registration-entries)
|       | +--rw dynamic-vlan-registration-entries
|       |   +--rw control-element?      enumeration
|     +--:(dynamic-reservation-entries)
|       | +--rw dynamic-reservation-entries
|       |   +--rw control-element?      enumeration
|     +--:(dynamic-filtering-entries)
|       | +--rw dynamic-filtering-entries
|       |   +--rw control-element?      enumeration
+--rw bridge-vlan
| +--ro version?          uint16
| +--ro max-vids?        uint16
| +--ro override-default-pvid? boolean
| +--ro protocol-template? dot1qtypes:protocol-frame-format-type {port-and-protocol-based-vlan}?
| +--ro max-msti?        uint16
| +--rw vlan* [vid]
| | +--rw vid          dot1qtypes:vlan-index-type
| | +--rw name?        dot1qtypes:name-type
| | +--ro untagged-ports* if:interface-ref
| | +--ro egress-ports* if:interface-ref
| +--rw protocol-group-database* [db-index] {port-and-protocol-based-vlan}?
| | +--rw db-index          uint16
| | +--rw frame-format-type? dot1qtypes:protocol-frame-format-type
| | +--rw (frame-format)?

```

```

| | | +---:(ethernet-rfc1042-snap8021H)
| | | | +---rw ethertype?          dot1qtypes:ethertype-type
| | | +---:(snap-other)
| | | | +---rw protocol-id?       string
| | | +---:(llc-other)
| | |   +---rw dsap-ssap-pairs
| | |   +---rw llc-address?       string
| | +---rw group-id?             uint32
| +---rw vid-to-fid-allocation* [vids]
| | +---rw vids                  dot1qtypes:vid-range-type
| | +---ro fid?                  uint32
| | +---ro allocation-type?      enumeration
| +---rw fid-to-vid-allocation* [fid]
| | +---rw fid                  uint32
| | +---ro allocation-type?      enumeration
| | +---ro vid*                  dot1qtypes:vlan-index-type
| +---rw vid-to-fid* [vid]
|   +---rw vid                  dot1qtypes:vlan-index-type
|   +---rw fid?                 uint32
+---rw bridge-mst
  +---rw mstid*                  dot1qtypes:mstid-type
  +---rw fid-to-mstid* [fid]
  | +---rw fid                   uint32
  | +---rw mstid?                dot1qtypes:mstid-type
  +---rw fid-to-mstid-allocation* [fids]
    +---rw fids                  dot1qtypes:vid-range-type
    +---rw mstid?                dot1qtypes:mstid-type

```

augment /if:interfaces/if:interface:

```

+---rw bridge-port
  +---rw bridge-name?           -> /bridges/bridge/name
  +---rw component-name?       -> /bridges/bridge[dot1q:name=current()/../bridge-name]/component/name
  +---rw port-type?            identityref
  +---rw pvid?                  dot1qtypes:vlan-index-type
  +---rw default-priority?     dot1qtypes:priority-type
+---rw priority-regeneration
| +---rw priority0?            priority-type
| +---rw priority1?            priority-type
| +---rw priority2?            priority-type
| +---rw priority3?            priority-type

```

```

| +--rw priority4?   priority-type
| +--rw priority5?   priority-type
| +--rw priority6?   priority-type
| +--rw priority7?   priority-type
+--rw pcp-selection? dot1qtypes:pcp-selection-type
+--rw pcp-decoding-table
| +--rw pcp-decoding-map* [pcp]
|   +--rw pcp           pcp-selection-type
|   +--rw priority-map* [priority-code-point]
|     +--rw priority-code-point  priority-type
|     +--rw priority?            priority-type
|     +--rw drop-eligible?       boolean
+--rw pcp-encoding-table
| +--rw pcp-encoding-map* [pcp]
|   +--rw pcp           pcp-selection-type
|   +--rw priority-map* [priority dei]
|     +--rw priority     priority-type
|     +--rw dei          boolean
|     +--rw priority-code-point?  priority-type
+--rw use-dei?          boolean
+--rw drop-encoding?   boolean
+--rw service-access-priority-selection?  boolean
+--rw service-access-priority
| +--rw priority0?   priority-type
| +--rw priority1?   priority-type
| +--rw priority2?   priority-type
| +--rw priority3?   priority-type
| +--rw priority4?   priority-type
| +--rw priority5?   priority-type
| +--rw priority6?   priority-type
| +--rw priority7?   priority-type
o--rw traffic-class
| +--rw traffic-class-map* [priority]
|   +--rw priority     priority-type
|   +--rw available-traffic-class* [num-traffic-class]
|     +--rw num-traffic-class  uint8
|     +--rw traffic-class?     traffic-class-type
+--rw traffic-class-v2
| +--rw traffic-class-table
|   +--rw number-of-traffic-classes?  uint8

```



```

|      +---rw priority0?          traffic-class-type
|      +---rw priority1?          traffic-class-type
|      +---rw priority2?          traffic-class-type
|      +---rw priority3?          traffic-class-type
|      +---rw priority4?          traffic-class-type
|      +---rw priority5?          traffic-class-type
|      +---rw priority6?          traffic-class-type
|      +---rw priority7?          traffic-class-type
+---rw acceptable-frame?          enumeration
+---rw enable-ingress-filtering?  boolean
+---rw enable-restricted-vlan-registration? boolean
+---rw enable-vid-translation-table? boolean
+---rw enable-egress-vid-translation-table? boolean
+---rw protocol-group-vid-set* [group-id] {port-and-protocol-based-vlan}?
|  +---rw group-id      uint32
|  +---rw vid*          dot1qtypes:vlanid
+---rw admin-point-to-point?      enumeration
+---ro protocol-based-vlan-classification? boolean {port-and-protocol-based-vlan}?
+---ro max-vid-set-entries?        uint16 {port-and-protocol-based-vlan}?
+---ro port-number?                dot1qtypes:port-number-type
+---ro address?                    ieee:mac-address
+---ro capabilities?               bits
+---ro type-capabilities?          bits
+---ro external?                   boolean
+---ro oper-point-to-point?        boolean
+---ro media-dependent-overhead?    uint8
+---ro statistics
|  +---ro delay-exceeded-discards?  yang:counter64
|  +---ro mtu-exceeded-discards?    yang:counter64
|  +---ro frame-rx?                 yang:counter64
|  +---ro octets-rx?                yang:counter64
|  +---ro frame-tx?                 yang:counter64
|  +---ro octets-tx?                yang:counter64
|  +---ro discard-inbound?          yang:counter64
|  +---ro forward-outbound?         yang:counter64
|  +---ro discard-lack-of-buffers?  yang:counter64
|  +---ro discard-transit-delay-exceeded? yang:counter64
|  +---ro discard-on-error?         yang:counter64
|  +---ro discard-on-ingress-filtering? yang:counter64 {ingress-filtering}?
+---rw vid-translations* [local-vid]

```

```

| +--rw local-vid      dot1qtypes:vlanid
| +--rw relay-vid?    dot1qtypes:vlanid
+--rw egress-vid-translations* [relay-vid]
    +--rw relay-vid      dot1qtypes:vlanid
    +--rw local-vid?    dot1qtypes:vlanid

```

5.3 Usage of YANG Data Objects

5.3.1 Container `ieee802-dot1q-bridge/bridges`

The data model for interfaces uses a flat list of bridges ("/bridges/bridge"). Each bridge in the list is identified by its name.

5.3.2 List `ieee802-dot1q-bridge/bridges/bridge`

Provides configuration data in support of the Bridge Configuration resources. There is a single bridge data node per Bridge.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
name	dot1qtypes:name-type	rw	mandatory	mandatory	A text string associated with the Bridge, of locally determined significance.	12.4 of IEEE Std 802.1Q-2018	
address	ieee:mac-address	rw	mandatory	mandatory	The MAC address for the Bridge from which the Bridge Identifiers used by the STP, RSTP, and MSTP are derived.	12.4 of IEEE Std 802.1Q-2018	
bridge-type	type-of-bridge	rw	mandatory	mandatory	The type of Bridge.	-	
ports	uint16	ro	optional	mandatory	The number of Bridge Ports (MAC Entities)	12.4 of IEEE Std 802.1Q-2018	
up-time	yang:zero-based-counter32	ro	optional	optional	The count in seconds of the time elapsed since the Bridge was last reset or initialized.	12.4 of IEEE Std 802.1Q-2018	
components	uint32	ro	optional	mandatory	The number of components associated with the Bridge.	-	
component	list (see 5.3.3)	rw	optional	mandatory	The set of components associated with a given Bridge. For example, - A TPMR is associated with a single VLAN unaware component. - A Customer VLAN Bridge	12.3 of IEEE Std 802.1Q-2018	

					is associated with a single VLAN aware component. - A Provider Bridge is associated with a single S-VLAN component and zero or more C-VLAN components.		
--	--	--	--	--	--	--	--

5.3.3 List ieee802-dot1q-bridge/bridges/bridge/component

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
name	string	rw	mandatory	mandatory	The name of the Component.	-	
id	uint32	rw	optional	mandatory	Unique identifier for a particular Bridge component within the system.	12.3, item l) of IEEE Std 802.1Q-2018	
type	type-of-component	rw	mandatory	mandatory	The type of component used to classify a particular Bridge component within a Bridge system comprising multiple components.	12.3, item m) of IEEE Std 802.1Q-2018	
address	ieee:mac-address	rw	optional	optional	Unique EUI-48 Universally Administered MAC address assigned to a Bridge component.	13.24 of IEEE Std 802.1Q-2018 8.13.8 of IEEE Std 802.1Q-2018	
traffic-class-enabled	boolean	rw	optional	mandatory	Indication of Traffic Classes enablement associated with the Bridge Component. A value of True indicates that Traffic Classes are enabled on this Bridge Component. A value of False indicates that the Bridge Component operates with a single priority level for all traffic.	12.4.1.5.1 of IEEE Std 802.1Q-2018	
ports	uint16 (range "1..4095")	ro	optional	mandatory	The number of Bridge Ports associated with the Bridge Component.	12.4.1.1.3, item c) of IEEE Std 802.1Q-2018	
bridge-port	leaf-list -> if:interface-ref	ro	optional	mandatory	List of bridge-port references.	-	

capabilities	container	ro	optional	mandatory	Array of Boolean values of the feature capabilities associated with a given Bridge Component.	12.10.1.1.3, item b) of IEEE Std 802.1Q-2018 12.4.1.5.2 of IEEE Std 802.1Q-2018	
filtering-database	container	rw	optional	mandatory	Contains filtering information used by the Forwarding Process in deciding through which Ports of the Bridge frames should be forwarded.	12.7 of IEEE Std 802.1Q-2018	
permanent-database	container	rw	optional	mandatory	The Permanent Database container models the operations that can be performed on, or affect, the Permanent Database. There is a single Permanent Database per FDB.	-	
bridge-vlan	container	rw	optional	mandatory	The Bridge VLAN container models configuration information that modify, or inquire about, the overall configuration of the Bridges VLAN resources. There is a single Bridge VLAN Configuration managed object per Bridge.	12.10 of IEEE Std 802.1Q-2018	
bridge-mst	container	rw	optional	mandatory	The Bridge MST container models configuration information that modify, or inquire about, the overall configuration of the Bridges MST resources.	12.12 of IEEE Std 802.1Q-2018	

5.3.4 Container ieee802-dot1q-bridge/bridges/bridge/component/capabilities

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
extended-filtering	boolean	ro	optional	mandatory	Can perform filtering on individual multicast addresses controlled by MMRP.	12.4.1.5.2 of IEEE Std 802.1Q-2018	
traffic-classes	boolean	ro	optional	mandatory	Can map priority to multiple traffic classes	12.4.1.5.2 of IEEE Std 802.1Q-2018	

static-entry-individual-port	boolean	ro	optional	mandatory	Static entries per port.	12.4.1.5.2 of IEEE Std 802.1Q-2018	
ivl-capable	boolean	ro	optional	mandatory	Independent VLAN Learning (IVL).	12.4.1.5.2 of IEEE Std 802.1Q-2018	
svl-capable	boolean	ro	optional	mandatory	Shared VLAN Learning (SVL).	12.4.1.5.2 of IEEE Std 802.1Q-2018	
hybrid-capable	boolean	ro	optional	mandatory	Both IVL and SVL simultaneously.	12.4.1.5.2 of IEEE Std 802.1Q-2018	
configurable-pvid-tagging	boolean	ro	optional	mandatory	Whether the implementation supports the ability to override the default PVID setting and its egress status (VLAN-tagged or Untagged) on each port.	12.4.1.5.2 of IEEE Std 802.1Q-2018	
local-vlan-capable	boolean	ro	optional	mandatory	Can support multiple local Bridges, outside the scope of 802.1Q defined VLANs.	12.4.1.5.2 of IEEE Std 802.1Q-2018	

5.3.5 Container ieee802-dot1q-bridge/bridges/bridge/component/filtering-database

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
aging-time	uint32	rw	optional	mandatory	The timeout period in seconds for aging out dynamically-learned forwarding information.	12.7 of IEEE Std 802.1Q-2018 8.8.3 of IEEE Std 802.1Q-2018	
size	yang:gauge32	ro	optional	mandatory	The maximum number of entries that can be held in the FDB.	12.7 of IEEE Std 802.1Q-2018	
static-entries	yang:gauge32	ro	optional	mandatory	The number of Static Filtering entries currently in the FDB.	12.7 of IEEE Std 802.1Q-2018 8.8.1 of IEEE Std 802.1Q-2018	
dynamic-entries	yang:gauge32	ro	optional	mandatory	The number of Dynamic Filtering entries currently in the FDB.	12.7 of IEEE Std 802.1Q-2018 8.8.3 of IEEE Std 802.1Q-2018	
static-vlan-registration-entries	yang:gauge32	ro	optional	mandatory	The number of Static VLAN Registration entries currently in the FDB.	12.7 of IEEE Std 802.1Q-2018 8.8.2 of IEEE Std 802.1Q-2018	

dynamic-vlan-registration-entries	yang:gauge32	ro	optional	mandatory	The number of Dynamic VLAN Registration entries currently in the FDB.	12.7 of IEEE Std 802.1Q-2018 8.8.5 of IEEE Std 802.1Q-2018	
mac-address-registration-entries⁶	yang:gauge32	ro	optional	mandatory	The number of MAC Address Registration entries currently in the FDB.	12.7 of IEEE Std 802.1Q-2018 8.8.4 of IEEE Std 802.1Q-2018	
filtering-entry	list	rw	mandatory	mandatory	Information for the entries associated with the Permanent Database.	-	
vlan-registration-entry	list	rw	optional	mandatory	The VLAN Registration Entries models the operations that can be performed on a single VLAN Registration Entry in the FDB. The set of VLAN Registration Entries within the FDB changes under management control and also as a result of MVRP exchanges.	12.7.5 of IEEE Std 802.1Q-2018	

5.3.6 Container ieee802-dot1q-bridge/bridges/bridge/component/permanent-database

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
size	yang:gauge32	ro	optional	mandatory	The maximum number of entries that can be held in the FDB.	12.7.6 of IEEE Std 802.1Q-2018	
static-entries	yang:gauge32	ro	optional	mandatory	The number of Static Filtering entries currently in the FDB.	12.7.6 of IEEE Std 802.1Q-2018	
static-vlan-registration-entries	yang:gauge32	ro	optional	mandatory	The number of Static VLAN Registration entries currently in the FDB.	12.7.6 of IEEE Std 802.1Q-2018	
filtering-entry	list	rw	optional	mandatory	Information for the entries associated with the Permanent Database.	-	

⁶ if-feature "extended-filtering-services"

5.3.7 Container ieee802-dot1q-bridge/bridges/bridge/component/bridge-vlan

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
version	uint16	ro	optional	mandatory	The version number supported.	12.10.1.3 of IEEE Std 802.1Q-2018	
max-vids	uint16	ro	optional	mandatory	The maximum number of VIDs supported.	12.10.1.3 of IEEE Std 802.1Q-2018	
override-default-pvid	boolean	ro	optional	mandatory	Indicates if the default PVID can be overridden, and its egress status (VLAN-tagged or untagged) on each port.	12.10.1.3 of IEEE Std 802.1Q-2018	
protocol-template⁷	dot1qtypes:protocol-frame-format-type	ro	optional	mandatory	The data-link encapsulation format or the detagged_frame_type in a Protocol Template	12.10.1.7 of IEEE Std 802.1Q-2018	
max-msti	uint16	ro	optional	mandatory	The maximum number of MSTIs supported within an MST region (i.e., the number of spanning tree instances that can be supported in addition to the CIST), for MST Bridges. For SST Bridges, this parameter may be either omitted or reported as 0.	12.10.1.7 of IEEE Std 802.1Q-2018	
vlan	list	rw	optional	mandatory	List of VLAN related configuration nodes associated with the Bridge.	12.10.2 of IEEE Std 802.1Q-2018	
protocol-group-database⁸	list	rw	optional	mandatory	List of the protocol group database entries.	12.10.1.7 of IEEE Std 802.1Q-2018 6.12.3 of IEEE Std 802.1Q-2018	
vid-to-fid-allocation	list	rw	mandatory	mandatory	This list allows inquiries about VID to FID allocations.	-	

⁷ if-feature "port-and-protocol-based-vlan"

⁸ if-feature "port-and-protocol-based-vlan"

fid-to-vid-allocation	list	rw	optional	mandatory	The FID to VID allocations managed object models operations that inquire about FID to VID allocations.	-	
vid-to-fid	list	rw	optional	mandatory	Fixed allocation of a VID to an FID. The underlying system will ensure that subsequent commands that make changes to the VID to FID mapping can override previous associations.	12.10.3.4 of IEEE Std 802.1Q-2018 12.10.3.5 of IEEE Std 802.1Q-2018	

5.3.8 Container `ieee802-dot1q-bridge/bridges/bridge/component/bridge-mst`

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
mstid	list	rw	optional	mandatory	The list of MSTID values that are currently supported by the Bridge.	-	
fid-to-mstid	list	rw	optional	mandatory	The FID to MSTID allocation table.	12.12.2 of IEEE Std 802.1Q-2018	
fid-to-mstid-allocation	list	rw	optional	mandatory	The FID to MSTID allocation table.	-	

6 Station and Media Access Control Connectivity Discovery (ieee802-dot1ab-lldp)

6.1 Overview

The Station and Media Access Control Connectivity Discovery model is defined in IEEE P802.1ABcu/D1.6 Clause 12.

6.2 Tree Diagram

```
module: ieee802-dot1ab-lldp
  +--rw lldp
    +--rw message-fast-tx?          uint32
    +--rw message-tx-hold-multiplier?  uint32
    +--rw message-tx-interval?        uint32
    +--rw reinit-delay?              uint32
    +--rw tx-credit-max?              uint32
    +--rw tx-fast-init?               uint32
    +--rw notification-interval?      uint32
    +--ro remote-statistics
      | +--ro last-change-time?      yang:timestamp
      | +--ro remote-inserts?        yang:zero-based-counter32
      | +--ro remote-deletes?        yang:zero-based-counter32
      | +--ro remote-drops?          yang:zero-based-counter32
      | +--ro remote-ageouts?        yang:zero-based-counter32
    +--ro local-system-data
      | +--ro chassis-id-subtype?     ieee:chassis-id-subtype-type
      | +--ro chassis-id?             ieee:chassis-id-type
      | +--ro system-name?            string
      | +--ro system-description?     string
      | +--ro system-capabilities-supported?  lldp-types:system-capabilities-map
      | +--ro system-capabilities-enabled?  lldp-types:system-capabilities-map
    +--rw port* [name dest-mac-address]
      +--rw name                      if:interface-ref
      +--rw dest-mac-address           ieee:mac-address
      +--rw admin-status?              enumeration
      +--rw notification-enable?       boolean
      +--rw tlvs-tx-enable?            bits
      +--rw message-fast-tx?           uint32
      +--rw message-tx-hold-multiplier? uint32
      +--rw message-tx-interval?       uint32
      +--rw reinit-delay?              uint32
```

```

+---rw tx-credit-max?                uint32
+---rw tx-fast-init?                 uint32
+---rw notification-interval?        uint32
+---rw management-address-tx-port* [address-subtype man-address]
| +---rw address-subtype             identityref
| +---rw man-address                  lldp-types:man-addr-type
| +---rw tx-enable?                  boolean
| +---ro addr-len?                   uint32
| +---ro if-subtype?                 lldp-types:man-addr-if-subtype
| +---ro if-id?                      uint32
+---ro port-id-subtype?              ieee:port-id-subtype-type
+---ro port-id?                      ieee:port-id-type
+---ro port-desc?                   string
+---ro tx-statistics
| +---ro total-frames?               yang:counter32
| +---ro total-length-errors?       yang:counter32
+---ro rx-statistics
| +---ro total-ageouts?              yang:zero-based-counter32
| +---ro total-discarded-frames?    yang:counter32
| +---ro error-frames?               yang:counter32
| +---ro total-frames?               yang:counter32
| +---ro total-discarded-tlvs?      yang:counter32
| +---ro total-unrecognized-tlvs?   yang:counter32
+---ro remote-systems-data* [time-mark remote-index]
  +---ro time-mark                   yang:timeticks
  +---ro remote-index                 uint32
  +---ro remote-too-many-neighbors?  boolean
  +---ro remote-changes?             boolean
  +---ro chassis-id-subtype?         ieee:chassis-id-subtype-type
  +---ro chassis-id?                 ieee:chassis-id-type
  +---ro port-id-subtype?            ieee:port-id-subtype-type
  +---ro port-id?                    ieee:port-id-type
  +---ro port-desc?                  string
  +---ro system-name?                 string
  +---ro system-description?          string
  +---ro system-capabilities-supported? lldp-types:system-capabilities-map
  +---ro system-capabilities-enabled? lldp-types:system-capabilities-map
  +---ro management-address* [address-subtype address]
  | +---ro address-subtype            identityref
  | +---ro address                    lldp-types:man-addr-type

```

```

| +---ro if-subtype?          lldp-types:man-addr-if-subtype
| +---ro if-id?              uint32
+---ro remote-unknown-tlv* [tlv-type]
| +---ro tlv-type            uint32
| +---ro tlv-info?          binary
+---ro remote-org-defined-info* [info-identifier info-subtype info-index]
  +---ro info-identifier      uint32
  +---ro info-subtype        uint32
  +---ro info-index          uint32
  +---ro remote-info?        binary

```

notifications:

```

+---n remote-table-change
  +---ro remote-insert?      -> /lldp/remote-statistics/remote-inserts
  +---ro remote-delete?     -> /lldp/remote-statistics/remote-deletes
  +---ro remote-drops?       -> /lldp/remote-statistics/remote-drops
  +---ro remote-ageouts?    -> /lldp/remote-statistics/remote-ageouts

```

6.3 Usage of YANG Data Objects

6.3.1 Container ieee802-dot1ab-lldp/lldp

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
message-fast-tx	uint32	rw	optional	mandatory	Time interval in timer ticks between transmissions during fast transmission periods(i.e., txFast is non-zero)	9.2.5.5 of IEEE Std 802.1AB-2016	
message-tx-hold-multiplier	uint32	rw	optional	mandatory	Multiplier of msg-tx-interval	9.2.5.6 of IEEE Std 802.1AB-2016	
message-tx-interval	uint32	rw	optional	mandatory	Time interval in timer ticks between transmissions during normal transmission periods (i.e., txFast is zero).	9.2.5.7 of IEEE Std 802.1AB-2016	
reinit-delay	uint32	rw	optional	mandatory	Initial value for the fast transmitting LLDPDU.	9.2.5.19 of IEEE Std 802.1AB-2016	
tx-credit-max	uint32	rw	optional	mandatory	The maximum number of consecutive LLDPDUs that can be transmitted at any time.	9.2.5.17 of IEEE Std 802.1AB-2016	

tx-fast-init	uint32	rw	optional	mandatory	Initial value for the fast transmitting LLDPDU.	9.2.5.19 of IEEE Std 802.1AB-2016	
notification-interval	uint32	rw	optional	mandatory	Controls the transmission of LLDP notifications.	9.2.5.7 of IEEE Std 802.1AB-2016	
remote-statistics	container	ro	optional	mandatory	LLDP remote operational statistics data.	-	
local-system-data	container	ro	optional	mandatory	LLDP local system operational data.	-	
port	list	rw	optional	mandatory	LLDP configuration information for a particular port.	-	

6.3.2 Container ieee802-dot1ab-lldp/lldp/remote-statistics

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
last-change-time	yang:timestamp	ro	optional	mandatory	The value of sysUpTime object	11.5.1 of IEEE Std 802.1AB-2016: lldpV2StatsRemTablesLastChangeTime	
remote-inserts	yang:zero-based-counter32	ro	optional	mandatory	The number of times the complete set of information advertised by a particular MSAP has been inserted into tables contained in remote-systems-data and lldpExtensions objects.	11.5.1 of IEEE Std 802.1AB-2016: lldpV2StatsRemTablesInserts	
remote-deletes	yang:zero-based-counter32	ro	optional	mandatory	The number of times the complete set of information advertised by a particular MSAP has been deleted from tables contained in remote-systems-data and lldpExtensions objects.	11.5.1 of IEEE Std 802.1AB-2016: lldpV2StatsRemTablesDeletes	
remote-drops	yang:zero-based-counter32	ro	optional	mandatory	The number of times the complete set of information advertised by a particular MSAP could not be entered into tables contained in remote-systems-data and lldpExtensions objects because of insufficient resources.	11.5.1 of IEEE Std 802.1AB-2016: lldpV2StatsRemTablesDrops	

remote-ageouts	yang:zero-based-counter32	ro	optional	mandatory	The number of times the complete set of information advertised by a particular MSAP has been deleted from tables contained in remote-systems-data and lldpExtensions objects because the information timeliness interval has expired.	11.5.1 of IEEE Std 802.1AB-2016: lldpV2StatsRemTablesAgeouts	
-----------------------	---------------------------	----	----------	-----------	---	--	--

6.3.3 Container ieee802-dot1ab-lldp/lldp/local-system-data

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
chassis-id-subtype	ieee:chassis-id-subtype-type	ro	optional	mandatory	The type of encoding used to identify the chassis associated with the local system.	8.5.2.2 of IEEE Std 802.1AB-2016	
chassis-id	ieee:chassis-id-type	ro	optional	mandatory	Chassis component associated with the local system.	8.5.2.3 of IEEE Std 802.1AB-2016	
system-name	string	ro	optional	mandatory	System name of the local system.	8.5.6.2 of IEEE Std 802.1AB-2016	
system-description	string	ro	optional	mandatory	System description of the local system.	8.5.7.2 of IEEE Std 802.1AB-2016	
system-capabilities-supported	lldp-types:system-capabilities-map	ro	optional	mandatory	System capabilities are supported on the local system.	8.5.8.1 of IEEE Std 802.1AB-2016	
system-capabilities-enabled	lldp-types:system-capabilities-map	ro	optional	mandatory	System capabilities that are enabled on the local system.	8.5.8.2 of IEEE Std 802.1AB-2016	

6.3.4 Container ieee802-dot1ab-lldp/lldp/port

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
name	if:interface-ref	rw	mandatory	mandatory	The port name used to identify the port component (contained in the local chassis with the LLDP agent) associated with this entry.	-	

dest-mac-address	ieee:mac-address	rw	mandatory	mandatory	Destination MAC address	-	
admin-status	enumeration	rw	optional	mandatory	Administratively status of the local LLDP agent.	9.2.5.1 of IEEE Std 802.1AB-2016	
notification-enable	boolean	rw	optional	mandatory	Notification status	-	
tlvs-tx-enable	bits	rw	optional	mandatory	LLDP TLVs whose transmission is allowed on the local LLDP agent by the network management.	9.1.2.1 of IEEE Std 802.1AB-2016	
message-fast-tx	uint32	rw	optional	mandatory			
message-tx-hold-multiplier	uint32	rw	optional	mandatory			
message-tx-interval	uint32	rw	optional	mandatory			
reinit-delay	uint32	rw	optional	mandatory			
tx-credit-max	uint32	rw	optional	mandatory			
tx-fast-init	uint32	rw	optional	mandatory			
notification-interval	uint32	rw	optional	mandatory			
management-address-tx-port	list	rw	optional	mandatory	Set of ports (represented as a PortList) on which the local system management address instance will be transmitted.	-	
port-id-subtype	ieee:port-id-subtype-type	ro	optional	mandatory	Port identifier encoding used in the associated 'port-id' object.	8.5.3.2 of IEEE Std 802.1AB-2016	
port-id	ieee:port-id-type	ro	optional	mandatory	Port component associated with a given port in the local system.	8.5.3.3 of IEEE Std 802.1AB-2016	
port-desc	string	ro	optional	mandatory	802 LAN station's port description associated with the local system.	8.5.5.2 of IEEE Std 802.1AB-2016	
tx-statistics	container	ro	optional	optional	LLDP frame transmission statistics for a particular port.	-	

rx-statistics	container	ro	optional	optional	LLDP frame reception statistics for a particular port.	-	
remote-systems-data	list	ro	optional	mandatory	Information about a particular physical network connection.	-	

6.4 Notifications

6.4.1 remote-table-change (optional)

A rem-table-change notification is sent when the value of remote-table-last-change-time changes. It can be utilized by an NMS to trigger LLDP remote systems table maintenance polls.

6.5 Augmentation by Module ieee802-dot1q-lldp-basic-tlv (IEEE 802.1Qcz-d2-0)

6.5.1 Additional Leaves for /ieee802-dot1ab-lldp

Augments lldp with information needed for system level extension tlvs

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
vid-usage-digest-tlv-extension	container	rw	optional	optional	VID Usage Digest TLV	IEEE Std 802.1Q-2018 Annex D.2.5	
management-vid-tlv-extension	container	rw	optional	optional	Management VID TLV	IEEE Std 802.1Q-2018 Annex D.2.6	

6.5.2 Additional Leaves for /ieee802-dot1ab-lldp/port

Augments port with basic extension tlvs

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
------	------	--------	--------------	---------------	-------------	-----------	--

tlvs-tx-org-basic-enable	bits	rw	optional	optional	Bitmap that includes the basicSet of tlvs from Table D.1 of 802.1Q-2018	IEEE Std 802.1Q-2018 Annex D.2	
port-vlan-id-tlv-extension	container	rw	optional	optional	Port VLAN ID TLV	IEEE Std 802.1Q-2018 Annex D.2.1	
port-and-protocol-vlan-id-extension	container	rw	optional	optional	Port and Protocol VLAN ID TLV	IEEE Std 802.1Q-2018 Annex D.2.2.2	
port-vlan-name-tlv-extension	container	rw	optional	optional	Port VLAN NAME TLV	IEEE Std 802.1Q-2018 Annex D.2.3	
protocol-identity-tlv-extension	container	rw	optional	optional	Protocol Identity TLV	IEEE Std 802.1Q-2018 Annex D.2.4	
link-aggregation-tlv-extension	container	rw	optional	optional	Link Aggregation TLV	IEEE Std 802.1AX-2014 Annex F.1	

6.5.3 Additional Leaves for /ieee802-dot1ab-lldp/port/remote-systems-data

Augments port remote-systems-data with received basic extension tlvs

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
port-vlan-id-tlv-extension	container	ro	optional	optional	Port VLAN ID TLV	IEEE Std 802.1Q-2018 Annex D.2.1	
port-and-protocol-vlan-id-extension	container	ro	optional	optional	Port and Protocol VLAN ID TLV	IEEE Std 802.1Q-2018 Annex D.2.2.2	
port-vlan-name-tlv-extension	container	ro	optional	optional	Port VLAN NAME TLV	IEEE Std 802.1Q-2018 Annex D.2.3	

protocol-identity-tlv-extension	container	ro	optional	optional	Protocol Identity TLV	IEEE Std 802.1Q-2018 Annex D.2.4	
link-aggregation-tlv-extension	container	ro	optional	optional	Link Aggregation TLV	IEEE Std 802.1AX-2014 Annex F.1	
vid-usage-digest-tlv-extension	container	ro	optional	optional	VID Usage Digest TLV	IEEE Std 802.1Q-2018 Annex D.2.5	
management-vid-tlv-extension	container	ro	optional	optional	Management VID TLV	IEEE Std 802.1Q-2018 Annex D.2.6	

7 IEEE Standard for Ethernet (ieee802-ethernet-interface)

7.1 Overview

The IEEE Standard for Ethernet model is defined in IEEE 802.3.2-2019.

This model only augments ietf-interfaces/interface. The augmentations are described in the respective chapters of this document.

7.1.1 Main Features

The module ietf-ethernet-interface comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

7.1.1.1 Feature *ethernet-pfc*

This device supports Ethernet priority flow-control.

This feature is **not required** in 60802. If a device supports the ethernet-pfc feature, then the leaf /interfaces/interface/ethernet/flow-control/pfc/enable is mandatory to allow 60802 configuration entities to disable this feature.

7.1.1.2 Feature *ethernet-pause*

This device supports Ethernet PAUSE.

This feature is **not required** in 60802

7.1.1.3 Feature *dynamic-rate-control*

This feature indicates that the device supports Ethernet interfaces lowering the average data rate of the MAC sublayer, with frame granularity, by using Rate Control to dynamically increase the inter-packet gap for some types of Ethernet interface. Only valid for Ethernet interfaces operating at speeds (data rates) above 1000 Mb/s.

This feature is **not required** in 60802

Reference: IEEE Std 802.3, 30.3.1.1.33 aRateControlAbility.

7.1.1.4 Feature *csma-cd*

This feature indicates that the device supports Ethernet interfaces running at half-duplex using CSMA/CD.

This feature is **not required** in 60802

7.1.1.5 Feature *trx-power-level-reporting-supported*

This feature indicates the support for optical transceiver power level monitoring and reporting capability. When 'true', the given interface supports the optical power level monitoring and reporting function. Otherwise, the value is 'false'.

This feature is **not required** in 60802.

7.1.1.6 Feature *fec-supported*

This object indicates the support of operation of the optional FEC sublayer of the 1G-EPON PHY specified in IEEE Std 802.3, 65.2. The value of 'unknown' is reported in the initialization, for non FEC support state or type not yet known. The value of 'not supported' is reported when the sublayer is not supported. The value of 'supported' is reported when the sublayer is supported. This object is applicable for an OLT, with the same value for all logical links, and for an ONU.

Reference: IEEE Std 802.3, 30.5.1.1.15.

This feature is **not required** in 60802.

7.1.1.7 Feature *uni-directional-link-fault*

This feature means the device supports Uni Directional Link Fault detection.

Reference: IEEE Std 802.3, 57.1.2:a, 30.3.6.1.6 aOAMLocalConfiguration and 30.3.6.1.7 aOAMRemoteConfiguration.

This feature is **not required** in 60802.

7.1.1.8 Feature *remote-loopback-initiate*

This feature means the device supports being the initiator of remote loopback.

Reference: IEEE Std 802.3, 57.1.2:b, 30.3.6.1.6 aOAMLocalConfiguration

This feature is **not required** in 60802.

7.1.1.9 Feature *remote-loopback-respond*

This feature means the device supports responding to remote loopback control OAMPDUs received from the peer"

Reference: IEEE Std 802.3, 57.1.2:b, 30.3.6.1.7 aOAMRemoteConfiguration

This feature is **not required** in 60802.

7.1.1.10 Feature *link-monitoring-local*

This feature means the device monitors the link at the local side and can generate Link Event OAMPDUs to the peer device.

Reference: IEEE Std 802.3, 57.1.2:c:1, 30.3.6.1.6 aOAMLocalConfiguration, and 30.3.6.1.7 aOAMRemoteConfiguration.

This feature is **not required** in 60802.

7.1.1.11 Feature *link-monitoring-remote*

This feature means the device can process Link Event OAMPDUs received from the peer device and report itself about this event on its own management interface.

Reference: IEEE Std 802.3, 57.1.2:c:1, 30.3.6.1.6 aOAMLocalConfiguration, and 30.3.6.1.7 aOAMRemoteConfiguration.

This feature is **not required** in 60802.

7.1.1.12 Feature *remote-mib-retrieval-initiate*

This feature means the device supports data retrieval from the peer device. I.e. the device can send Variable Requests OAMPDUs to the peer side and process the received Variable Response OAMPDUs.

Reference: IEEE Std 802.3, 57.1.2:c:2, 30.3.6.1.6 aOAMLocalConfiguration, and 30.3.6.1.7 aOAMRemoteConfiguration.

This feature is **not required** in 60802.

7.1.1.13 Feature *remote-mib-retrieval-respond*

This feature means the device allows the peer device to retrieve data from the managed device. I.e. the device can process received Variable Requests OAMPDUs and respond with Variable Response OAMPDUs.

Reference: IEEE Std 802.3, 57.1.2:c:2, 30.3.6.1.6 aOAMLocalConfiguration, and 30.3.6.1.7 aOAMRemoteConfiguration.

This feature is **not required** in 60802.

7.2 Tree Diagram

```
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
    |   +---ro out-lpi-transitions? yang:counter64
    |   +---ro out-lpi-time?        decimal64
  +---ro mac-control
    +---ro in-frames-mac-control-unknown? yang:counter64
    +---ro in-frames-mac-control-extension? yang:counter64
    +---ro out-frames-mac-control-extension? yang:counter64

```

7.3 Usage of YANG Data Objects

7.3.1 Container ethernet

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
auto-negotiation	container	rw	presence	not required	<p>The presence of this container indicates that auto-negotiation is supported on this Ethernet interface.</p> <p>Contains auto-negotiation transmission parameters. This container contains a data node that allows the advertised duplex value in the negotiation to be restricted. If not specified then the default behavior for the duplex data node is to negotiate all available values for the particular type of Ethernet PHY associated with the interface.</p> <p>If auto-negotiation is enabled, and PAUSE frame based flow control has not been explicitly configured, then the default PAUSE frame based flow control capabilities that are negotiated allow for bi-directional or egress-only PAUSE frame based flow control.</p> <p>If auto-negotiation is enabled, and PAUSE frame based flow control has been explicitly configured, then the configuration settings restrict the values that may be negotiated. However, it should be noted that the protocol does not allow only egress PAUSE frame based flow control to be negotiated without also allowing bi-directional PAUSE frame based flow control.</p>	IEEE Std 802.3, Clause 28 and Annexes 28A-D	

duplex	duplex-type	rw	optional	mandatory	Operational duplex mode of the Ethernet interface.	IEEE Std 802.3, 30.3.1.1.32 aDuplexStatus	
speed	eth-if-speed-type	rw	optional	mandatory	Operational speed (data rate) of the Ethernet interface. The default value is implementation-dependent.	-	
flow-control	container	rw	optional	optional	Holds the different types of Ethernet PAUSE frame based flow control that can be enabled.	-	
max-frame-length	uint16	ro	optional	optional	This indicates the MAC frame length (including FCS bytes) at which frames are dropped for being too long.	IEEE Std 802.3, 30.3.1.1.37 aMaxFrameLength	
mac-control-extension-control	boolean	ro	optional	optional	A value that identifies the current EXTENSION MAC Control function, as specified in IEEE Std 802.3, Annex 31C.	IEEE Std 802.3, 30.3.8.3 aEXTENSIONMACCtrlStatus IEEE Std 802.3.1, dot3ExtensionMacCtrlStatus	
frame-limit-slow-protocol	uint64	ro	optional	optional	The maximum number of Slow Protocol frames of a given subtype that can be transmitted in a one second interval. The default value is 10.	IEEE Std 802.3, 30.3.1.1.38 aSlowProtocolFrameLimit	
capabilities	container	ro	optional	optional	Container with all Ethernet interface specific capabilities.	-	
statistics	container	ro	optional	optional	Contains statistics specific to Ethernet interfaces. Discontinuities in the values of counters in the container can occur at re-initialization of the management system, and at other times as indicated by the value of the 'discontinuity-time' leaf defined in the ietf-interfaces YANG module (IETF RFC 8343).	-	

8 Keystore model (ietf-keystore)

8.1 Overview

The Keystore model is defined draft-ietf-netconf-keystore-22.

8.1.1 Main Features

The module ietf-interfaces comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

8.1.1.1 Feature *central-keystore-supported*

The 'central-keystore-supported' feature indicates that the server supports the keystore.

This feature is **not required** in 60802.

8.1.1.2 Feature *local-definitions-supported*

The 'local-definitions-supported' feature indicates that the server supports locally-defined keys.

This feature is **not required** in 60802.

8.2 Tree Diagram

```
module: ietf-keystore
  +--rw keystore
    +--rw asymmetric-keys
      | +--rw asymmetric-key* [name]
      |   +--rw name                string
      |   +--rw public-key-format  identityref
      |   +--rw public-key         binary
      |   +--rw private-key-format? identityref
      |   +--rw (private-key-type)
      |     | +--:(cleartext-private-key)
      |     | | +--rw cleartext-private-key?  binary
      |     | +--:(hidden-private-key)
      |     | | +--rw hidden-private-key?     empty
      |     | +--:(encrypted-private-key) {private-key-encryption}?
      |     |   +--rw encrypted-private-key
      |     |     +--rw encrypted-by
      |     |       | +--rw (encrypted-by-choice)
```



```

|         |         |         +---:(symmetric-key-ref)
|         |         |         | +---rw symmetric-key-ref?   ks:symmetric-key-ref
|         |         |         +---:(asymmetric-key-ref)
|         |         |         +---rw asymmetric-key-ref?   ks:asymmetric-key-ref
|         |         +---rw encrypted-value-format   identityref
|         |         +---rw encrypted-value           binary
| +---rw certificates
| | +---rw certificate* [name]
| | | +---rw name                               string
| | | +---rw cert-data                           end-entity-cert-cms
| | | +---n certificate-expiration {certificate-expiration-notification}?
| | | | +--- expiration-date   yang:date-and-time
| +---x generate-certificate-signing-request {certificate-signing-request-generation}?
| | +---w input
| | | +---w csr-info   ct:csr-info
| | +---ro output
| | | +---ro certificate-signing-request   ct:csr
+---rw symmetric-keys
  +---rw symmetric-key* [name]
    +---rw name                               string
    +---rw key-format?                         identityref
    +---rw (key-type)
      +---:(cleartext-key)
      | +---rw cleartext-key?   binary
      +---:(hidden-key)
      | +---rw hidden-key?     empty
      +---:(encrypted-key) {symmetric-key-encryption}?
        +---rw encrypted-key
          +---rw encrypted-by
            | +---rw (encrypted-by-choice)
            | | +---:(symmetric-key-ref)
            | | | +---rw symmetric-key-ref?   ks:symmetric-key-ref
            | | | +---:(asymmetric-key-ref)
            | | | +---rw asymmetric-key-ref?   ks:asymmetric-key-ref
            +---rw encrypted-value-format   identityref
            +---rw encrypted-value           binary

```

8.3 Usage of YANG Data Objects

8.3.1 Container keystore

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
asymmetric-keys	container	rw	optional	???	A list of asymmetric keys.	-	
symmetric-keys	container	rw	optional	???	A list of symmetric keys.	-	

8.3.2 List asymmetric-keys/asymmetric-key

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
name	string	rw	mandatory	mandatory	An arbitrary name for the asymmetric key.	-	
public-key-format	identityref	rw	mandatory	mandatory	The "public-key-format" node is an identity-reference to the "public-key-format" abstract base identity discussed in draft-ietf-netconf-crypto-types-19	draft-ietf-netconf-crypto-types-19	
public-key	binary	rw	mandatory	mandatory	The "public-key" node is the public key data in the selected format.	draft-ietf-netconf-crypto-types-19	
private-key-format	identityref	rw	optional	optional	The "private-key-format" node is an identity-reference to the "private-key-format" abstract base identity discussed in draft-ietf-netconf-crypto-types-19	draft-ietf-netconf-crypto-types-19	
private-key-type	choice	rw	optional	optional	The "choice" statement enables the private key data to be cleartext, encrypted, or hidden.	draft-ietf-netconf-crypto-types-19	
certificates	container	rw	optional	optional	Certificates associated with this asymmetric key.	-	

generate-certificate-signing-request	action	x			Generates a certificate signing request structure for the associated asymmetric key using the passed subject and attribute values. This action statement is only available when the associated 'public-key-format' node's value is 'subject-public-key-info-format'.	draft-ietf-netconf-crypto-types-19	
---	--------	---	--	--	---	------------------------------------	--

8.3.3 List symmetric-keys/symmetric-key

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
name	string	rw	mandatory	mandatory	An arbitrary name for the symmetric key.	-	
key-format	identityref	rw	optional	optional	Identifies the symmetric key's format. Implementations SHOULD ensure that the incoming symmetric key value is encoded in the specified format. For encrypted keys, the value is the same as it would have been if the key were not encrypted.	draft-ietf-netconf-crypto-types-19	
key-type	choice	rw	optional	optional	Choice between key types.	draft-ietf-netconf-crypto-types-19	

8.4 Notifications

8.4.1 certificate-expiration

A notification indicating that the configured certificate is either about to expire or has already expired.

9 Truststore model (ietf-truststore)

9.1 Overview

The Trust Anchors model is defined in draft-ietf-netconf-trust-anchors-10.

9.1.1 Main Features

The module ietf-truststore comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

9.1.1.1 Feature *truststore-supported*

The 'truststore-supported' feature indicates that the server supports the Truststore (i.e., implements the 'ietf-truststore' module).

This feature is **optional** in 60802.

9.1.1.2 Feature *local-definitions-supported*

The 'local-definitions-supported' feature indicates that the server supports locally-defined trust anchors.

This feature is **optional** in 60802.

9.1.1.3 Feature *certificates*

The 'certificates' feature indicates that the server implements the /truststore/certificate-bags subtree.

This feature is **optional** in 60802.

9.1.1.4 Feature *public-keys*

The 'public-keys' feature indicates that the server implements the /truststore/public-key-bags subtree.

This feature is **optional** in 60802.

9.2 Tree Diagram

```
module: ietf-truststore
+--rw truststore
  +--rw certificate-bags! {certificates}?
  | +--rw certificate-bag* [name]
  |   +--rw name          string
  |   +--rw description?  string
  |   +--rw certificate* [name]
```

```

|         +---rw name                string
|         +---rw cert                trust-anchor-cert-cms
|         +---n certificate-expiration
|         +--- expiration-date      yang:date-and-time
+---rw public-key-bags! {public-keys}?
  +---rw public-key-bag* [name]
    +---rw name                    string
    +---rw description?            string
    +---rw public-key* [name]
      +---rw name                  string
      +---rw public-key-format     identityref
      +---rw public-key            binary

```

9.3 Usage of YANG Data Objects

9.3.1 Container truststore

The Truststore contains bags of certificates and public keys.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
certificate-bags	container	rw	optional	optional		-	
public-key-bags	container	rw	optional	optional		-	

9.3.2 List /truststore/certificate-bags/certificate-bag

The container /truststore/certificate-bags is available if the feature "certificates" is set. It is a presence-container which indicates that certificate bags have been configured. It contains a list with a collection of certificate bags. The list must contain at least one element.

Each bag of certificates SHOULD be for a specific purpose. For instance, one bag could be used to authenticate a specific set of servers, while another could be used to authenticate a specific set of clients.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
name	string	rw	mandatory	mandatory	An arbitrary name for this bag of certificates.	-	

description	string	rw	optional	optional	A description for this bag of certificates. The intended purpose for the bag SHOULD be described.	-	
certificate	list	rw	optional	optional	List of certificates	-	

9.3.3 List /truststore/public-keys-bags/public-key-bag

The container /truststore/public-keys-bags is available if the feature “certificates” is set. It is a presence-container which indicates that public keys have been configured. It contains a list with a collection of public key bags. The list must contain at least one element.

Each bag of keys SHOULD be for a specific purpose. For instance, one bag could be used authenticate a specific set of servers, while another could be used to authenticate a specific set of clients.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
name	string	rw	mandatory	???	An arbitrary name for this bag of public keys.	-	
description	string	rw	optional	???	A description for this bag public keys. The intended purpose for the bag SHOULD be described.		
public-key	list	rw	optional	???	List of public keys		

10 Timesync model (draft ieee1588-ntp)

10.1 Overview

The Timesync model is only available as draft version at the moment. It is available in the path /standard/ieee/draft/1588 in the YANG github repository and is the first balloted draft of the YANG module of amendment IEEE P1588e.

10.1.1 Main Features

The module ieee1588-ntp comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

10.1.1.1 Feature *fault-log*

Logging of faults detected in the PTP Instance.

This feature is **not required** in 60802.

10.1.1.2 Feature *unicast-negotiation*

Unicast negotiation conducted through use of TLVs.

This feature is **not required** in 60802.

10.1.1.3 Feature *path-trace*

Use of the PATH_TRACE TLV for tracing the route of a PTP Announce message through the PTP Network.

This feature is **not required** in 60802.

10.1.1.4 Feature *alternate-timescale*

The transmission of an ALTERNATE_TIME_OFFSET_INDICATOR TLV entity from the Grandmaster PTP Instance may indicate the offset of an alternate timescale from the timescale in use in the domain.

This feature is **not required** in 60802.

10.1.1.5 Feature *holdover-upgrade*

A holdover-upgradable PTP Instance can potentially become the Grandmaster PTP Instance in the event the previous Grandmaster PTP Instance is disconnected or its characteristics degrade.

This feature is **not required** in 60802.

10.1.1.6 Feature *cmllds*

The Common Mean Link Delay Service (CMLDS) is an optional service that enables any PTP Port that would normally obtain the value of a link's <meanLinkDelay> and <neighborRateRatio> using the peer-to-peer method to instead obtain these values from this optional service. The CMLDS service is available to all PTP Instances communicating with a specific transport mechanism, over the physical link between two PTP Nodes.

This feature is **mandatory** in 60802.

10.1.1.7 Feature *timestamp-correction*

Correction of timestamps using configurable management data.

This feature is **not required** in 60802.

10.1.1.8 Feature *asymmetry-correction*

Calculation of the <delayAsymmetry> on a Direct PTP Link between two PTP Instances connected using an applicable bidirectional medium.

This feature is **not required** in 60802.

10.1.1.9 Feature *slave-monitoring*

Mechanism for monitoring timing information in a PTP Port in the slave state. The slave-monitoring feature specifies TLVs that the Slave PTP Instance transmits with this information, typically in a Signaling message.

This feature is **not required** in 60802.

10.1.1.10 Feature *enhanced-metrics*

Mechanism for propagating estimates of various inaccuracy components affecting the overall expected PTP Instance Time accuracy. The metrics will be updated and available for utilization at the various points along the PTP timing chain: from the Grandmaster Instance, up to a leaf PTP Instance in the synchronization tree. Each PTP Instance along the timing path updates the relevant metrics based on its contribution to the expected degradation in PTP Instance Time accuracy due to various induced timing error components.

This feature is **not required** in 60802.

10.1.1.11 Feature *grandmaster-cluster*

Mechanism for faster selection of the Grandmaster PTP Instance from the set of PTP Instances for which this option is both implemented and enabled.

This feature is **not required** in 60802.

10.1.1.12 Feature *alternate-master*

Mechanism for PTP Ports on a PTP Communication Path that are not currently the MASTER port of that PTP Communication Path to exchange PTP timing information with other PTP Ports on the same PTP Communication Path, and for each of the other PTP Ports to acquire knowledge of the characteristics of the transmission path between itself and each alternate master PTP Port.

This feature is **not required** in 60802.

10.1.1.13 Feature *unicast-discovery*

Mechanism for PTP to be used over a network that does not provide multicast. A PTP Instance is configured with the addresses of PTP Ports of other PTP Instances with which it should attempt to establish unicast communication. The PTP Instance may request that these PTP Ports transmit unicast Announce, Sync, and Delay_Resp messages to it.

This feature is **not required** in 60802.

10.1.1.14 Feature *acceptable-master*

Mechanism that allows PTP Ports in the SLAVE state to be configured to refuse to synchronize to PTP Instances not on the acceptable master list.

This feature is **not required** in 60802.

10.1.1.15 Feature *external-port-config*

External port configuration allows an external entity (such as YANG-based remote management) to disable the IEEE Std 1588 state machines that control each port's state, including the BMCA. Each port's state is then configured by the external entity.

This feature is **mandatory** in 60802.

10.1.1.16 Feature *performance-monitoring*

Collection of performance monitoring logs that can be read using management.

This feature is **not required** in 60802.

10.1.1.17 Feature *l1-sync*

Layer 1-based synchronization performance enhancement

This feature is **not required** in 60802.

10.2 Tree Diagram

```
module: ieee1588-ptp
  +--rw ptp
    +--rw instance-list* [instance-number]
```

```

| +--rw instance-number          uint32
| +--rw default-ds
| | +--rw instance-type?        instance-type-enumeration
| | +--rw instance-enable?     boolean
| | +--ro clock-identity?      clock-identity-type
| | +--rw number-ports?        uint16
| | +--rw clock-quality
| | | +--rw clock-class?        uint8
| | | +--rw clock-accuracy?     uint8
| | | +--rw offset-scaled-log-variance?  uint16
| | +--rw priority1?           uint8
| | +--rw priority2?           uint8
| | +--rw domain-number?       uint8
| | +--rw sdo-id?              uint16
| | +--rw slave-only?          boolean
| | +--rw current-time
| | | +--rw seconds-field?      uint64
| | | +--rw nanoseconds-field?  uint32
| | +--rw external-port-config-enable?  boolean {external-port-config}?
| | +--rw max-steps-removed?    uint16
| | x--rw two-step-flag?        boolean
| +--rw current-ds
| | +--rw steps-removed?        uint16
| | +--rw offset-from-master?   time-interval-type
| | +--rw mean-delay?           time-interval-type
| | x--rw mean-path-delay?      time-interval-type
| | +--rw synchronization-uncertain?  boolean
| +--rw parent-ds
| | +--rw parent-port-identity
| | | +--rw clock-identity?     clock-identity-type
| | | +--rw port-number?        uint16
| | +--rw parent-stats?         boolean
| | +--rw observed-parent-offset-scaled-log-variance?  uint16
| | +--rw observed-parent-clock-phase-change-rate?    int32
| | +--rw grandmaster-identity?  clock-identity-type
| | +--rw grandmaster-clock-quality
| | | +--rw clock-class?        uint8
| | | +--rw clock-accuracy?     uint8
| | | +--rw offset-scaled-log-variance?  uint16
| | +--rw grandmaster-priority1?  uint8

```

```

| | +--rw grandmaster-priority2?          uint8
| | +--rw protocol-address
| | | +--rw network-protocol?  identityref
| | | +--rw address-length?    uint16
| | | +--rw address-field?     binary
| | +--rw synchronization-uncertain?    boolean
| +--rw time-properties-ds
| | +--rw current-utc-offset-valid?  boolean
| | +--rw current-utc-offset?       int16
| | +--rw leap59?                   boolean
| | +--rw leap61?                   boolean
| | +--rw time-traceable?           boolean
| | +--rw frequency-traceable?      boolean
| | +--rw ptp-timescale?            boolean
| | +--rw time-source?              identityref
| +--rw description-ds
| | +--ro manufacturer-identity?  binary
| | +--ro product-description?    string
| | +--ro product-revision?       string
| | +--rw user-description?       string
| +--rw fault-log-ds {fault-log}?
| | +--ro number-of-fault-records?  uint16
| | +--rw fault-record-list* [index]
| | | +--rw index          uint16
| | | +--rw time
| | | | +--rw seconds-field?  uint64
| | | | +--rw nanoseconds-field?  uint32
| | | | +--rw severity?      fault-severity-enumeration
| | | | +--rw name?         string
| | | | +--rw value?        string
| | | | +--rw description?  string
| | +--rw reset?           boolean
| +--rw path-trace-ds {path-trace}?
| | +--rw enable?  boolean
| | +--ro list*    clock-identity-type
| +--rw alternate-timescale-ds {alternate-timescale}?
| | +--ro max-key?  uint8
| | +--rw list* [key-field]
| | | +--rw key-field      uint8
| | | +--rw enable?      boolean

```

```

| |     +---rw current-offset?      int32
| |     +---rw jump-seconds?        int32
| |     +---rw time-of-next-jump?   uint64
| |     +---rw display-name?        string
| +---rw holdover-upgrade-ds {holdover-upgrade}?
| |     +---rw enable?              boolean
| +---rw grandmaster-cluster-ds {grandmaster-cluster}?
| |     +---ro max-table-size?      uint8
| |     +---rw log-query-interval?  int8
| |     +---rw port-address* [index]
| |         +---rw index            uint16
| |         +---rw network-protocol? identityref
| |         +---rw address-length?  uint16
| |         +---rw address-field?   binary
| +---rw acceptable-master-ds {acceptable-master}?
| |     +---rw enable?              boolean
| |     +---ro max-table-size?      uint8
| |     +---rw list* [index]
| |         +---rw index            uint8
| |         +---ro acceptable-clock-identity? clock-identity-type
| |         +---rw acceptable-port-number? uint16
| |         +---rw alternate-priority1? uint8
| +---rw performance-monitoring-ds {performance-monitoring}?
| |     +---rw enable?              boolean
| |     +---ro record-list* [index]
| |         +---ro index            uint16
| |         +---ro measurement-valid? boolean
| |         +---ro period-complete?  boolean
| |         +---ro pm-time?          yang:timestamp
| |         +---ro average-master-slave-delay? time-interval-type
| |         +---ro minimum-master-slave-delay? time-interval-type
| |         +---ro maximum-master-slave-delay? time-interval-type
| |         +---ro stddev-master-slave-delay? time-interval-type
| |         +---ro average-slave-master-delay? time-interval-type
| |         +---ro minimum-slave-master-delay? time-interval-type
| |         +---ro maximum-slave-master-delay? time-interval-type
| |         +---ro stddev-slave-master-delay? time-interval-type
| |         +---ro average-mean-path-delay? time-interval-type
| |         +---ro minimum-mean-path-delay? time-interval-type
| |         +---ro maximum-mean-path-delay? time-interval-type

```

```

| | +---ro stddev-mean-path-delay?      time-interval-type
| | +---ro average-offset-from-master?  time-interval-type
| | +---ro minimum-offset-from-master?  time-interval-type
| | +---ro maximum-offset-from-master?  time-interval-type
| | +---ro stddev-offset-from-master?   time-interval-type
| +---rw enhanced-metrics-ds {enhanced-metrics}?
| | +---rw enable?      boolean
| +---rw port-ds-list* [port-number]
| | +---rw port-number      uint16
| | +---rw port-state?     port-state-enumeration
| | +---rw underlying-interface? if:interface-ref
| | +---rw port-enable?    boolean
| | +---rw log-min-delay-req-interval?  int8
| | +---rw mean-link-delay?  time-interval-type
| x---rw peer-mean-path-delay?  time-interval-type
| | +---rw log-announce-interval?      int8
| | +---rw announce-receipt-timeout?   uint8
| | +---rw log-sync-interval?         int8
| | +---rw delay-mechanism?           delay-mechanism-enumeration
| | +---rw log-min-pdelay-req-interval? int8
| | +---rw version-number?           uint8
| | +---rw minor-version-number?     uint8
| | +---rw delay-asymmetry?          time-interval-type
| | +---rw master-only?              boolean
| +---rw timestamp-correction-port-ds {timestamp-correction}?
| | +---rw egress-latency?  time-interval-type
| | +---rw ingress-latency? time-interval-type
| +---rw asymmetry-correction-port-ds {asymmetry-correction}?
| | +---rw enable?          boolean
| | +---rw constant-asymmetry? time-interval-type
| | +---rw scaled-delay-coefficient? relative-difference-type
| +---rw description-port-ds
| | +---rw profile-identifier?  binary
| | +---rw protocol-address
| | | +---rw network-protocol?  identityref
| | | +---rw address-length?    uint16
| | | +---rw address-field?    binary
| +---rw unicast-negotiation-port-ds {unicast-negotiation}?
| | +---rw enable?      boolean
| +---rw alternate-master-port-ds {alternate-master}?

```

```

| | +---rw number-of-alt-masters?          uint8
| | +---rw tx-alt-multicast-sync?         boolean
| | +---rw log-alt-multicast-sync-interval? int8
+---rw unicast-discovery-port-ds {unicast-discovery}?
| | +---ro max-table-size?               uint16
| | +---rw log-query-interval?           int8
| | +---rw port-address* [index]
| | | +---rw index                       uint16
| | | +---rw network-protocol?           identityref
| | | +---rw address-length?             uint16
| | | +---rw address-field?              binary
+---rw acceptable-master-port-ds {acceptable-master}?
| | +---rw enable?                       boolean
+---rw ll-sync-basic-port-ds {ll-sync}?
| | +---rw enabled?                      boolean
| | +---rw tx-coherent-is-required?      boolean
| | +---rw rx-coherent-is-required?      boolean
| | +---rw congruent-is-required?        boolean
| | +---rw opt-params-enabled?           boolean
| | +---rw log-llsync-interval?          int8
| | +---rw llsync-receipt-timeout?       uint8
| | +---ro link-alive?                   boolean
| | +---ro is-tx-coherent?                boolean
| | +---ro is-rx-coherent?                boolean
| | +---ro is-congruent?                  boolean
| | +---ro llsync-state?                  llsync-state-enumeration
| | +---rw peer-tx-coherent-is-required? boolean
| | +---rw peer-rx-coherent-is-required? boolean
| | +---rw peer-congruent-is-required?    boolean
| | +---ro peer-is-tx-coherent?            boolean
| | +---ro peer-is-rx-coherent?            boolean
| | +---ro peer-is-congruent?              boolean
+---rw ll-sync-opt-params-port-ds {ll-sync}?
| | +---rw timestamps-corrected-tx?      boolean
| | +---ro phase-offset-tx-valid?         boolean
| | +---ro phase-offset-tx?               time-interval-type
| | +---ro phase-offset-tx-timestamp
| | | +---ro seconds-field?               uint64
| | | +---ro nanoseconds-field?           uint32
| | +---ro frequency-offset-tx-valid?     boolean

```

```

| | +--ro frequency-offset-tx?          time-interval-type
| | +--ro frequency-offset-tx-timestamp
| |   +--ro seconds-field?             uint64
| |   +--ro nanoseconds-field?        uint32
|--ro communication-cap-port-ds
| | +--ro sync
| | | +--ro multicast-capable?         boolean
| | | +--ro unicast-capable?          boolean
| | | +--ro unicast-negotiation-capable? boolean
| | | +--ro unicast-negotiation-required? boolean
| | +--ro delay-req
| |   +--ro multicast-capable?         boolean
| |   +--ro unicast-capable?          boolean
| |   +--ro unicast-negotiation-capable? boolean
| |   +--ro unicast-negotiation-required? boolean
+--rw performance-monitoring-port-ds {performance-monitoring}?
| | +--ro record-list-peer-delay* [index]
| | | +--ro index                      uint16
| | | +--ro pm-time?                  yang:timestamp
| | | +--ro average-mean-link-delay?  time-interval-type
| | | +--ro min-mean-link-delay?      time-interval-type
| | | +--ro max-mean-link-delay?      time-interval-type
| | | +--ro stddev-mean-link-delay?   time-interval-type
| | +--ro record-list* [index]
| | | +--ro index                      uint16
| | | +--ro pm-time?                  yang:timestamp
| | | +--ro announce-tx?               yang:zero-based-counter32
| | | +--ro announce-rx?               yang:zero-based-counter32
| | | +--ro announce-foreign-rx?      yang:zero-based-counter32
| | | +--ro sync-tx?                  yang:zero-based-counter32
| | | +--ro sync-rx?                  yang:zero-based-counter32
| | | +--ro follow-up-tx?             yang:zero-based-counter32
| | | +--ro follow-up-rx?             yang:zero-based-counter32
| | | +--ro delay-req-tx?              yang:zero-based-counter32
| | | +--ro delay-req-rx?              yang:zero-based-counter32
| | | +--ro delay-req-tx?              yang:zero-based-counter32
| | | +--ro delay-req-rx?              yang:zero-based-counter32
| | | +--ro pdelay-req-tx?             yang:zero-based-counter32
| | | +--ro pdelay-req-rx?             yang:zero-based-counter32
| | | +--ro pdelay-req-tx?             yang:zero-based-counter32

```

```

|     |     +---ro pdelay-resp-rx?          yang:zero-based-counter32
|     |     +---ro pdelay-resp-follow-up-tx? yang:zero-based-counter32
|     |     +---ro pdelay-resp-follow-up-rx? yang:zero-based-counter32
| +---rw common-services-port
|     | +---rw cmllds-link-port-port-number? uint16 {cmllds}?
| +---rw external-port-config-port-ds {external-port-config}?
|     | +---rw desired-state?    port-state-enumeration
| +---rw slave-monitoring-port-ds {slave-monitoring}?
|     | +---rw enable?           bits
|     | +---rw events-per-rx-sync-timing-tlv? uint8
|     | +---rw events-per-rx-sync-computed-tlv? uint8
|     | +---rw events-per-tx-timestamps-tlv? uint8
|     | +---rw tx-event-type?    uint8
|     | +---rw rx-sync-timing-tlv-message-m? uint8
|     | +---rw rx-sync-computed-tlv-message-m? uint8
|     | +---rw tx-timestamps-tlv-message-m? uint8
x---rw transparent-clock-default-ds
| x---ro clock-identity?    clock-identity-type
| x---rw number-ports?     uint16
| x---rw delay-mechanism?  delay-mechanism-enumeration
| x---rw primary-domain?   uint8
x---rw transparent-clock-port-ds-list* [port-number]
| x---rw port-number       uint16
| x---rw log-min-pdelay-req-interval? int8
| x---rw faulty-flag?     boolean
| x---rw peer-mean-path-delay? time-interval-type
+---rw common-services
  +---rw cmllds {cmllds}?
    +---rw default-ds
      | +---ro clock-identity?    clock-identity-type
      | +---rw number-link-ports? uint16
      +---rw port-list* [port-number]
        +---rw port-number       uint16
        +---ro underlying-interface? if:interface-ref
        +---ro domain-number?    uint8
        +---ro sdo-id?           uint16
        +---ro service-measurement-valid? boolean
        +---ro mean-link-delay?  time-interval-type
        +---ro scaled-neighbor-rate-ratio? int32
        +---rw log-min-pdelay-req-interval? int8

```



```

+--rw version-number?                uint8
+--rw minor-version-number?          uint8
+--rw delay-asymmetry?               time-interval-type
+--rw timestamp-correction-port-ds {timestamp-correction}?
| +--rw egress-latency?              time-interval-type
| +--rw ingress-latency?             time-interval-type
+--rw asymmetry-correction-port-ds {asymmetry-correction}?
| +--rw enable?                      boolean
| +--rw constant-asymmetry?          time-interval-type
| +--rw scaled-delay-coefficient?    relative-difference-type
+--rw performance-monitoring-port-ds {performance-monitoring}?
  +--ro record-list-peer-delay* [index]
    | +--ro index                     uint16
    | +--ro pm-time?                  yang:timestamp
    | +--ro average-mean-link-delay?  time-interval-type
    | +--ro min-mean-link-delay?      time-interval-type
    | +--ro max-mean-link-delay?      time-interval-type
    | +--ro stddev-mean-link-delay?   time-interval-type
  +--ro record-list* [index]
    +--ro index                       uint16
    +--ro pm-time?                     yang:timestamp
    +--ro announce-tx?                 yang:zero-based-counter32
    +--ro announce-rx?                 yang:zero-based-counter32
    +--ro announce-foreign-rx?        yang:zero-based-counter32
    +--ro sync-tx?                     yang:zero-based-counter32
    +--ro sync-rx?                     yang:zero-based-counter32
    +--ro follow-up-tx?                yang:zero-based-counter32
    +--ro follow-up-rx?                yang:zero-based-counter32
    +--ro delay-req-tx?                yang:zero-based-counter32
    +--ro delay-req-rx?                yang:zero-based-counter32
    +--ro delay-resp-tx?               yang:zero-based-counter32
    +--ro delay-resp-rx?               yang:zero-based-counter32
    +--ro pdelay-req-tx?               yang:zero-based-counter32
    +--ro pdelay-req-rx?               yang:zero-based-counter32
    +--ro pdelay-resp-tx?              yang:zero-based-counter32
    +--ro pdelay-resp-rx?              yang:zero-based-counter32
    +--ro pdelay-resp-follow-up-tx?    yang:zero-based-counter32
    +--ro pdelay-resp-follow-up-rx?    yang:zero-based-counter32

```

10.3 Usage of YANG Data Objects

10.3.1 List /ieee1588/ptp/instance-list

The container /ieee1588/ptp contains all nodes for the PTP data sets.

/ieee1588/ptp/instance-list is a list of one or more PTP Instances in the product (PTP Node). Each PTP Instance represents a distinct instance of PTP implementation (i.e. distinct Ordinary Clock, Boundary Clock, or Transparent Clock), maintaining a distinct time. PTP Instances may be created or deleted dynamically in implementations that support dynamic create/delete.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
instance-number	uint32	rw	mandatory	mandatory	The instance-list is indexed using a number that is unique per PTP Instance within the PTP Node, applicable to the management context only (i.e. not used in PTP messages). The domain-number of the PTP Instance is not used as the key to instance-list, since it is possible for a PTP Node to contain multiple PTP Instances using the same domain-number.	8.1.4.2 of IEEE Std 1588-2019	
default-ds	container	rw	optional	mandatory	The default data set of the PTP Instance.	8.2.1 of IEEE Std 1588-2019	
current-ds	container	rw	optional	mandatory	Provides current data from operation of the protocol.	8.2.2 of IEEE Std 1588-2019	
parent-ds	container	rw	optional	mandatory	Provides data learned from the parent of this PTP Instance (i.e. master port on the other side of the path/link).	8.2.3 of IEEE Std 1588-2019	
time-properties-ds	container	rw	optional	mandatory	Provides data learned from the current Grandmaster PTP Instance.	8.2.4 of IEEE Std 1588-2019	
description-ds	container	rw	optional	mandatory	Provides descriptive information for the PTP Instance.	8.2.5 of IEEE Std 1588-2019	

fault-log-ds⁹	container	rw	optional	optional	Represents an optional mechanism for logging of faults that occur in the PTP Instance. If one member of fault-log-ds is supported, all members shall be supported.	8.2.6 of IEEE Std 1588-2019	
path-trace-ds¹⁰	container	rw	optional	optional	Provides data for the optional path trace mechanism.	16.2 of IEEE Std 1588-2019	
alternate-timescale-ds¹¹	container	rw	optional	optional	Provides data for the optional alternate timescale offsets mechanism.	16.3 of IEEE Std 1588-2019	
holdover-upgrade-ds¹²	container	rw	optional	optional	Provides data for the optional holdover upgrade mechanism.	16.4 of IEEE Std 1588-2019	
grandmaster-cluster-ds¹³	container	rw	optional	optional	Provides data for the optional grandmaster cluster mechanism.	17.2.3 of IEEE Std 1588-2019	
acceptable-master-ds¹⁴	container	rw	optional	optional	Provides data for the optional acceptable master table mechanism.	17.5.3 of IEEE Std 1588-2019	
performance-monitoring-ds¹⁵	container	rw	optional	optional	Provides data for the optional performance monitoring mechanism, scoped to the PTP Instance.	Annex J of IEEE Std 1588-2019	
enhanced-metrics-ds¹⁶	container	rw	optional	optional	Provides data for the optional enhanced synchronization accuracy metrics mechanism.	16.12 of IEEE Std 1588-2019	

⁹ if-feature “fault-log”

¹⁰ if-feature “path-trace”

¹¹ if-feature “alternate-timescale”

¹² if-feature “holdover-upgrade”

¹³ if-feature “grandmaster-cluster”

¹⁴ if-feature “acceptable-master”

¹⁵ if-feature “performance-monitoring”

¹⁶ if-feature “enhanced-metrics”

port-ds-list	container	rw	optional	mandatory	List of data for each PTP Port in the PTP Instance. The list is structured as leaves for each member of the IEEE Std 1588 portDS (primary port data set), followed by containers for each optional port data set.	8.1.4.2 of IEEE Std 1588-2019	
---------------------	-----------	----	----------	-----------	---	-------------------------------	--

11 Scheduled Traffic model (ieee802-dot1q-sched)

11.1 Overview

The Scheduled Traffic model is defined in IEEE 802.1Qcw-d1-2.

11.1.1 Main Features

The module ieee802-dot1q-shed comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

11.1.1.1 Feature *scheduled-traffic*

Enhancements for Scheduled Traffic supported.

This feature is **mandatory** in 60802 for cCA.

11.2 Tree Diagram

```

augment /if:interfaces/if:interface/dot1q:bridge-port:
  +--rw gate-parameter-table {scheduled-traffic}?
    +--rw queue-max-sdu-table* [traffic-class]
      | +--rw traffic-class          dot1q-types:traffic-class-type
      | +--rw queue-max-sdu?        uint32
      | +--ro transmission-overflow? yang:counter64
    +--rw gate-enabled?             boolean
    +--rw admin-gate-states?        uint8
    +--ro oper-gate-states?         uint8
    +--rw admin-control-list
      | +--rw gate-control-entry* [index]
      |   +--rw index              uint32

```

```

|     +---rw operation-name          identityref
|     +---rw time-interval-value?    uint32
|     +---rw gate-states-value       uint8
+---ro oper-control-list
| +---ro gate-control-entry* [index]
|     +---ro index                    uint32
|     +---ro operation-name           identityref
|     +---ro time-interval-value?    uint32
|     +---ro gate-states-value       uint8
+---rw admin-cycle-time
| +---rw numerator?                  uint32
| +---rw denominator?                uint32
+---ro oper-cycle-time
| +---ro numerator?                  uint32
| +---ro denominator?                uint32
+---rw admin-cycle-time-extension?   uint32
+---ro oper-cycle-time-extension?    uint32
+---rw admin-base-time
| +---rw seconds?                    uint64
| +---rw nanoseconds?                uint32
+---ro oper-base-time
| +---ro seconds?                    uint64
| +---ro nanoseconds?                uint32
+---rw config-change?                 boolean
+---ro config-change-time
| +---ro seconds?                    uint64
| +---ro nanoseconds?                uint32
+---ro tick-granularity?              uint32
+---ro current-time
| +---ro seconds?                    uint64
| +---ro nanoseconds?                uint32
+---ro config-pending?                boolean
+---ro config-change-error?           yang:counter64
+---rw supported-list-max?            uint32
+---rw supported-cycle-max
| +---rw numerator?                  uint32
| +---rw denominator?                uint32
+---rw supported-interval-max?        uint32

```

11.3 Usage of YANG Data Objects

The module `ieee-dot1q-sched` does not define a separate YANG tree. It only augments the `ietf-interfaces` model.

12 Preemption model (`ieee802-dot1q-preemption`)

12.1 Overview

The Preemption model is defined in IEEE 802.1Qcw-d1-2.

12.1.1 Main Features

The module `ieee-802-dot1q-preemption` comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

12.1.1.1 Feature *frame-preemption*

Frame preemption supported.

This feature is **mandatory** in 60802 for ccA.

12.2 Tree Diagram

```
module: ieee802-dot1q-preemption

  augment /if:interfaces/if:interface/dot1q:bridge-port:
    +--rw frame-preemption-parameters {frame-preemption}?
      +--rw frame-preemption-status-table* [priority]
        | +--rw priority                dot1q-types:priority-type
        | +--rw frame-preemption-status? enumeration
        +--ro hold-advance?              uint32
        +--ro release-advance?          uint32
        +--ro preemption-active?       boolean
        +--ro hold-request?             enumeration
```

12.3 Usage of YANG Data Objects

The module `ieee-dot1q-preemption` does not define a separate YANG tree. It only augments the `ietf-interfaces` model.

13 YANG Push model (ietf-yang-push)

13.1 Overview

The YANG Push model is defined in RFC 8641.

13.1.1 Main Features

The module ietf-yang-push comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

13.1.1.1 Feature *on-change*

This feature indicates that on-change triggered subscriptions are supported.

This feature is **mandatory** in 60802.

13.2 Tree Diagram

```
module: ietf-yang-push
```

```
augment /sn:establish-subscription/sn:input:
  +---w (update-trigger)?
    +---:(periodic)
      | +---w periodic!
      |   +---w period          centiseconds
      |   +---w anchor-time?   yang:date-and-time
      +---:(on-change) {on-change}?
        +---w on-change!
          +---w dampening-period? centiseconds
          +---w sync-on-start?   boolean
          +---w excluded-change*  change-type
augment /sn:establish-subscription/sn:input/sn:target:
  +---:(datastore)
    +--- datastore                identityref
    +--- (selection-filter)?
      +---:(by-reference)
        | +--- selection-filter-ref  selection-filter-ref
      +---:(within-subscription)
        +--- (filter-spec)?
          +---:(datastore-subtree-filter)
```

```

        | +-- datastore-subtree-filter? <anydata> {sn:subtree}?
        +---:(datastore-xpath-filter)
            +-- datastore-xpath-filter? yang:xpath1.0 {sn:xpath}?
augment /sn:modify-subscription/sn:input:
+---w (update-trigger)?
+---:(periodic)
| +---w periodic!
| +---w period centiseconds
| +---w anchor-time? yang:date-and-time
+---:(on-change) {on-change}?
+---w on-change!
+---w dampening-period? centiseconds
augment /sn:modify-subscription/sn:input/sn:target:
+---:(datastore)
+-- datastore identityref
+-- (selection-filter)?
+---:(by-reference)
| +-- selection-filter-ref selection-filter-ref
+---:(within-subscription)
+-- (filter-spec)?
+---:(datastore-subtree-filter)
| +-- datastore-subtree-filter? <anydata> {sn:subtree}?
+---:(datastore-xpath-filter)
+-- datastore-xpath-filter? yang:xpath1.0 {sn:xpath}?
augment /sn:subscription-started:
+---ro (update-trigger)?
+---:(periodic)
| +---ro periodic!
| +---ro period centiseconds
| +---ro anchor-time? yang:date-and-time
+---:(on-change) {on-change}?
+---ro on-change!
+---ro dampening-period? centiseconds
+---ro sync-on-start? boolean
+---ro excluded-change* change-type
augment /sn:subscription-started/sn:target:
+---:(datastore)
+-- datastore identityref
+-- (selection-filter)?
+---:(by-reference)

```



```

    | +-- selection-filter-ref          selection-filter-ref
+--:(within-subscription)
  +-- (filter-spec)?
    +--:(datastore-subtree-filter)
    | +-- datastore-subtree-filter?   <anydata> {sn:subtree}?
    +--:(datastore-xpath-filter)
    | +-- datastore-xpath-filter?     yang:xpath1.0 {sn:xpath}?
augment /sn:subscription-modified:
+--ro (update-trigger)?
+--:(periodic)
| +--ro periodic!
|   +--ro period          centiseconds
|   +--ro anchor-time?   yang:date-and-time
+--:(on-change) {on-change}?
+--ro on-change!
+--ro dampening-period?   centiseconds
+--ro sync-on-start?      boolean
+--ro excluded-change*    change-type
augment /sn:subscription-modified/sn:target:
+--:(datastore)
+-- datastore              identityref
+-- (selection-filter)?
+--:(by-reference)
| +-- selection-filter-ref  selection-filter-ref
+--:(within-subscription)
+-- (filter-spec)?
+--:(datastore-subtree-filter)
| +-- datastore-subtree-filter? <anydata> {sn:subtree}?
+--:(datastore-xpath-filter)
| +-- datastore-xpath-filter?   yang:xpath1.0 {sn:xpath}?
augment /sn:filters:
+--rw selection-filter* [filter-id]
+--rw filter-id          string
+--rw (filter-spec)?
+--:(datastore-subtree-filter)
| +--rw datastore-subtree-filter? <anydata> {sn:subtree}?
+--:(datastore-xpath-filter)
| +--rw datastore-xpath-filter?   yang:xpath1.0 {sn:xpath}?
augment /sn:subscriptions/sn:subscription:
+--rw (update-trigger)?

```

```

+---:(periodic)
| +---rw periodic!
|   +---rw period          centiseconds
|   +---rw anchor-time?   yang:date-and-time
+---:(on-change) {on-change}?
  +---rw on-change!
    +---rw dampening-period? centiseconds
    +---rw sync-on-start?   boolean
    +---rw excluded-change* change-type
augment /sn:subscriptions/sn:subscription/sn:target:
+---:(datastore)
  +---rw datastore          identityref
  +---rw (selection-filter)?
    +---:(by-reference)
    | +---rw selection-filter-ref      selection-filter-ref
  +---:(within-subscription)
    +---rw (filter-spec)?
      +---:(datastore-subtree-filter)
      | +---rw datastore-subtree-filter? <anydata> {sn:subtree}?
      +---:(datastore-xpath-filter)
      | +---rw datastore-xpath-filter? yang:xpath1.0 {sn:xpath}?

rpcs:
+---x resync-subscription {on-change}?
  +---w input
  +---w id      sn:subscription-id

notifications:
+---n push-update
| +---ro id?          sn:subscription-id
| +---ro datastore-contents? <anydata>
| +---ro incomplete-update? empty
+---n push-change-update {on-change}?
  +---ro id?          sn:subscription-id
  +---ro datastore-changes
  | +---ro yang-patch
  |   +---ro patch-id      string
  |   +---ro comment?     string
  |   +---ro edit* [edit-id]
  |   +---ro edit-id      string

```

	+++ro operation	enumeration
	+++ro target	target-resource-offset
	+++ro point?	target-resource-offset
	+++ro where?	enumeration
	+++ro value?	<anydata>
	+++ro incomplete-update?	empty

13.3 Usage of YANG Data Objects

The module ietf-yang-push does not define a separate YANG tree. It only augments the ietf-subscribed-notifications model and defines an RPC and notifications.

13.3.1 Remote Procedure Calls

13.3.1.1 resync-subscription

This RPC allows a subscriber of an active on-change subscription to request a full push of objects.

if-feature “on-change”

13.3.2 Notifications

13.3.2.1 push-update

This notification contains a push update that in turn contains data subscribed to via a subscription.

This notification is mandatory for 60802 devices.

13.3.2.2 push-change-update

This notification contains an on-change push update.

This notification is mandatory for 60802 devices.

14 Subscription to YANG Notifications model (ietf-subscribed-notifications)

14.1 Overview

The Subscription to YANG Notifications model is defined in RFC 8639.

14.1.1 Main Features

The module ietf-interfaces comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

14.1.1.1 Feature *configured*

This feature indicates that configuration of subscriptions is supported.

This feature is **mandatory** in 60802.

14.1.1.2 Feature *dscp*

This feature indicates that a publisher supports the ability to set the Differentiated Services Code Point (DSCP) value in outgoing packets.

This feature is **optional** in 60802.

14.1.1.3 Feature *encode-json*

This feature indicates that JSON encoding of notification messages is supported.

This feature is **optional** in 60802.

14.1.1.4 Feature *encode-xml*

This feature indicates that XML encoding of notification messages is supported.

This feature is **mandatory** in 60802.

14.1.1.5 Feature *interface-designation*

This feature indicates that a publisher supports sourcing all receiver interactions for a configured subscription from a single designated egress interface.

This feature is **optional** in 60802.

14.1.1.6 Feature *qos*

This feature indicates that a publisher supports absolute dependencies of one subscription's traffic over another as well as weighted bandwidth sharing between subscriptions. Both of these are Quality of Service (QoS) features that allow differentiated treatment of notification messages between a publisher and a specific receiver.

This feature is **optional** in 60802.

14.1.1.7 Feature *replay*

This feature indicates that historical event record replay is supported. With replay, it is possible for past event records to be streamed in chronological order.

This feature is **optional** in 60802.

14.1.1.8 Feature *subtree*

This feature indicates support for YANG subtree filtering.

Reference: "RFC 6241: Network Configuration Protocol (NETCONF), Section 6

This feature is **mandatory** in 60802.

14.1.1.9 Feature *supports-vrf*

This feature indicates that a publisher supports VRF configuration for configured subscriptions.

Reference "RFC 8529: YANG Data Model for Network Instances, Section 6

This feature is **optional** in 60802.

14.1.1.10 Feature *xpath*

This feature indicates support for XPath filtering.

This feature is **optional** in 60802.

14.2 Tree Diagram

```
module: ietf-subscribed-notifications
  +--ro streams
  |   +--ro stream* [name]
  |       +--ro name                string
  |       +--ro description?        string
  |       +--ro replay-support?     empty {replay}?
  |       +--ro replay-log-creation-time yang:date-and-time {replay}?
  |       +--ro replay-log-aged-time? yang:date-and-time {replay}?
  +--rw filters
  |   +--rw stream-filter* [name]
  |       +--rw name                string
  |       +--rw (filter-spec)?
  |           +--:(stream-subtree-filter)
  |               | +--rw stream-subtree-filter? <anydata> {subtree}?
  |               +--:(stream-xpath-filter)
  |                   +--rw stream-xpath-filter? yang:xpath1.0 {xpath}?
  +--rw subscriptions
  |   +--rw subscription* [id]
```

```

+--rw id subscription-id
+--rw (target)
| +--:(stream)
|   +--rw (stream-filter)?
|   | +--:(by-reference)
|   | | +--rw stream-filter-name stream-filter-ref
|   | +--:(within-subscription)
|   |   +--rw (filter-spec)?
|   |   | +--:(stream-subtree-filter)
|   |   | | +--rw stream-subtree-filter? <anydata> {subtree}?
|   |   | +--:(stream-xpath-filter)
|   |   | +--rw stream-xpath-filter? yang:xpath1.0 {xpath}?
|   +--rw stream stream-ref
|   +--ro replay-start-time? yang:date-and-time {replay}?
|   +--rw configured-replay? empty {configured,replay}?
+--rw stop-time? yang:date-and-time
+--rw dscp? inet:dscp {dscp}?
+--rw weighting? uint8 {qos}?
+--rw dependency? subscription-id {qos}?
+--rw transport? transport {configured}?
+--rw encoding? encoding
+--rw purpose? string {configured}?
+--rw (notification-message-origin)? {configured}?
| +--:(interface-originated)
| | +--rw source-interface? if:interface-ref {interface-designation}?
| +--:(address-originated)
|   +--rw source-vrf? -> /ni:network-instances/network-instance/name {supports-vrf}?
|   +--rw source-address? inet:ip-address-no-zone
+--ro configured-subscription-state? enumeration {configured}?
+--rw receivers
  +--rw receiver* [name]
    +--rw name string
    +--ro sent-event-records? yang:zero-based-counter64
    +--ro excluded-event-records? yang:zero-based-counter64
    +--ro state enumeration
    +---x reset {configured}?
      +--ro output
        +--ro time yang:date-and-time

```

rpcs:

```

+---x establish-subscription
| +---w input
| | +---w (target)
| | | +---:(stream)
| | | | +---w (stream-filter)?
| | | | | +---:(by-reference)
| | | | | | +---w stream-filter-name          stream-filter-ref
| | | | | | +---:(within-subscription)
| | | | | | | +---w (filter-spec)?
| | | | | | | | +---:(stream-subtree-filter)
| | | | | | | | | +---w stream-subtree-filter? <anydata> {subtree}?
| | | | | | | | | +---:(stream-xpath-filter)
| | | | | | | | | | +---w stream-xpath-filter? yang:xpath1.0 {xpath}?
| | | | | +---w stream          stream-ref
| | | | | +---w replay-start-time? yang:date-and-time {replay}?
| | | +---w stop-time?          yang:date-and-time
| | | +---w dscp?              inet:dscp {dscp}?
| | | +---w weighting?         uint8 {qos}?
| | | +---w dependency?        subscription-id {qos}?
| | | +---w encoding?          encoding
| +---ro output
| | +---ro id                  subscription-id
| | +---ro replay-start-time-revision? yang:date-and-time {replay}?
+---x modify-subscription
| +---w input
| | +---w id                  subscription-id
| | +---w (target)
| | | +---:(stream)
| | | | +---w (stream-filter)?
| | | | | +---:(by-reference)
| | | | | | +---w stream-filter-name          stream-filter-ref
| | | | | | +---:(within-subscription)
| | | | | | | +---w (filter-spec)?
| | | | | | | | +---:(stream-subtree-filter)
| | | | | | | | | +---w stream-subtree-filter? <anydata> {subtree}?
| | | | | | | | | +---:(stream-xpath-filter)
| | | | | | | | | | +---w stream-xpath-filter? yang:xpath1.0 {xpath}?
| | +---w stop-time?          yang:date-and-time
+---x delete-subscription
| +---w input

```

```

|      +---w id      subscription-id
+---x kill-subscription
      +---w input
      +---w id      subscription-id

```

notifications:

```

+---n replay-completed {replay}?
| +--ro id      subscription-id
+---n subscription-completed {configured}?
| +--ro id      subscription-id
+---n subscription-modified
| +--ro id
| +--ro (target)
| | +---:(stream)
| |   +--ro (stream-filter)?
| |   | +---:(by-reference)
| |   | | +--ro stream-filter-name
| |   | | +---:(within-subscription)
| |   | | +--ro (filter-spec)?
| |   | |   +---:(stream-subtree-filter)
| |   | |   | +--ro stream-subtree-filter?
| |   | |   +---:(stream-xpath-filter)
| |   | |   +--ro stream-xpath-filter?
| |   +--ro stream
| |   +--ro replay-start-time?
| +--ro stop-time?
| +--ro dscp?
| +--ro weighting?
| +--ro dependency?
| +--ro transport?
| +--ro encoding?
| +--ro purpose?
+---n subscription-resumed
| +--ro id      subscription-id
+---n subscription-started {configured}?
| +--ro id
| +--ro (target)
| | +---:(stream)
| |   +--ro (stream-filter)?
| |   | +---:(by-reference)

```

subscription-id

stream-filter-ref

<anydata> {subtree}?

yang:xpath1.0 {xpath}?

stream-ref

yang:date-and-time {replay}?

yang:date-and-time

inet:dscp {dscp}?

uint8 {qos}?

subscription-id {qos}?

transport {configured}?

encoding

string {configured}?

subscription-id


```

| | | | +--ro stream-filter-name          stream-filter-ref
| | | | +---:(within-subscription)
| | | |   +--ro (filter-spec)?
| | | |     +---:(stream-subtree-filter)
| | | |       | +--ro stream-subtree-filter? <anydata> {subtree}?
| | | |       +---:(stream-xpath-filter)
| | | |         +--ro stream-xpath-filter? yang:xpath1.0 {xpath}?
| | | +--ro stream                        stream-ref
| | | +--ro replay-start-time?            yang:date-and-time {replay}?
| | | +--ro replay-previous-event-time?   yang:date-and-time {replay}?
| +--ro stop-time?                       yang:date-and-time
| +--ro dscp?                             inet:dscp {dscp}?
| +--ro weighting?                       uint8 {qos}?
| +--ro dependency?                      subscription-id {qos}?
| +--ro transport?                      transport {configured}?
| +--ro encoding?                       encoding
| +--ro purpose?                         string {configured}?
+---n subscription-suspended
| +--ro id          subscription-id
| +--ro reason      identityref
+---n subscription-terminated
  +--ro id          subscription-id
  +--ro reason      identityref

```

14.3 Usage of YANG Data Objects

14.3.1 List /ietf-subscribed-notifications/streams/stream

The list /ietf-subscribed-notifications/streams/stream identifies the built-in event streams that are supported by the publisher.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference
name	string	ro	mandatory	mandatory	A handle for a system-provided event stream made up of a sequential set of event records, each of which is characterized by its own domain and semantics.	-
description	string	ro	optional	optional	A description of the event stream, including such information as the type of	-

					event records that are available in this event stream.		
replay-support ¹⁷	empty	ro	optional	optional	Indicates that event record replay is available on this event stream.	-	
replay-log-creation-time ¹⁸	yang:date-and-time	ro	mandatory	mandatory	The timestamp of the creation of the log used to support the replay function on this event stream. This time might be earlier than the earliest available information contained in the log. This object is updated if the log resets for some reason.	-	
replay-log-aged-time ¹⁹	yang:date-and-time	ro	optional	optional	The timestamp associated with the last event record that has been aged out of the log. This timestamp identifies how far back in history this replay log extends, if it doesn't extend back to the 'replay-log-creation-time'. This object MUST be present if replay is supported and any event records have been aged out of the log.	-	

14.3.2 List /ietf-subscribed-notifications/filters/stream-filter

The list /ietf-subscribed-notifications/filters/stream-filter contains a list of configurable filters that can be applied to subscriptions. This facilitates the reuse of complex filters once defined.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
name	string	ro	mandatory	mandatory			
filter-spec	choice	rw	mandatory	mandatory	The content filter specification for this request.		

¹⁷ if-feature "replay"

¹⁸ if-feature "replay"

¹⁹ if-feature "replay"

14.3.3 List /ietf-subscribed-notifications/subscriptions/subscription

The list /ietf-subscribed-notifications/subscriptions/subscription contains the list of currently active subscriptions, i.e., subscriptions that are currently in effect, used for subscription management and monitoring purposes. This includes subscriptions that have been set up via RPC primitives as well as subscriptions that have been established via configuration.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
id	subscription-id	rw	mandatory	mandatory	Identifier of a subscription; unique in a given publisher.	-	
target	choice	rw	mandatory	mandatory	Identifies the source of information against which a subscription is being applied as well as specifics on the subset of information desired from that source.	-	
stop-time	yang:date-and-time	rw	optional	optional	Identifies a time after which notification messages for a subscription should not be sent.	-	
dscp²⁰	inet:dscp	rw	optional	optional	The desired network transport priority level.	-	
weighting²¹	uint8	rw	optional	optional	Relative weighting for a subscription.	-	
dependency²²	subscription-id	rw	optional	optional	Provides the 'subscription-id' of a parent subscription.	-	
transport²³	transport	rw	optional	optional	For a configured subscription, this leaf specifies the transport used to deliver messages destined for all receivers of that subscription.	-	

²⁰ if-feature "dscp"

²¹ if-feature "qos"

²² if-feature "qos"

²³ if-feature "configured"

encoding	encoding	rw	optional	optional	The type of encoding for notification messages.	-	
purpose²⁴	string	rw	optional	optional	Open text allowing a configuring entity to embed the originator or other specifics of this subscription.	-	
notification-message-origin²⁵	choice	rw	optional	optional	Identifies the egress interface on the publisher from which notification messages are to be sent.	-	
configured-subscription-state²⁶	enumeration	ro	optional	optional	The presence of this leaf indicates that the subscription originated from configuration, not through a control channel or RPC. The value indicates the state of the subscription as established by the publisher.	-	
receivers	container	rw	mandatory	mandatory	Set of receivers in a subscription.	-	

14.4 Remote Procedure Calls

14.4.1 establish-subscription

This RPC allows a subscriber to create (and possibly negotiate) a subscription on its own behalf.

14.4.2 modify-subscription

This RPC allows a subscriber to modify a dynamic subscription's parameters.

14.4.3 delete-subscription

This RPC allows a subscriber to delete a subscription that was previously created by that same subscriber using the 'establish-subscription' RPC.

²⁴ if-feature "configured"

²⁵ if-feature "configured"

²⁶ if-feature "configured"

14.4.4 kill-subscription

This RPC allows an operator to delete a dynamic subscription without restrictions on the originating subscriber or underlying transport session.

14.5 Notifications

14.5.1 replay-completed

This notification is sent to indicate that all of the replay notifications have been sent.

if-feature "replay"

14.5.2 subscription-completed

This notification is sent to indicate that a subscription has finished passing event records, as the 'stop-time' has been reached.

if-feature "configured"

14.5.3 subscription-modified

This notification indicates that a subscription has been modified.

14.5.4 subscription-resumed

This notification indicates that a subscription that had previously been suspended has resumed. Notifications will once again be sent.

14.5.5 subscription-started

This notification indicates that a subscription has started and notifications will now be sent.

if-feature "configured"

14.5.6 subscription-suspended

This notification indicates that a suspension of the subscription by the publisher has occurred. No further notifications will be sent until the subscription resumes.

14.5.7 subscription-terminated

This notification indicates that a subscription has been terminated.

15 LLDP extension YANG model for the basicSet (ieee802-dot1q-lldp-basic-tlv)

15.1 Overview

The LLDP extension tlvs for the basicSet model is defined in IEEE 802.1CBcz/D12.0.

15.1.1 Main Features

The module ietf-interfaces comprises the feature-definitions listed in this section.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

15.1.1.1 Feature *congestion-isolation*

Feature Congestion Indication.

This feature is **not required** in 60802.

15.2 Tree Diagram

```
module: ieee802-dot1q-lldp-basic-tlv
```

```
augment /lldp:lldp:
  +--rw vid-usage-digest-tlv-extension
  | +--ro vid-usage-digest?  uint32
  +--rw management-vid-tlv-extension
     +--rw management-vid?  dot1qtypes:vlanid
augment /lldp:lldp/lldp:port:
  +--rw tlvs-tx-org-basic-enable?          bits
  +--rw port-vlan-id-tlv-extension
  | +--rw port-vlan-id?  dot1qtypes:vlanid
  +--rw port-and-protocol-vlan-id-extension
  | +--rw port-vlan-id?  dot1qtypes:vlanid
  | +--rw flags?        bits
  +--rw port-vlan-name-tlv-extension
  | +--rw vlan-id?      dot1qtypes:vlanid
  | +--rw port-vlan-name?  string
  +--rw protocol-identity-tlv-extension
  | +--rw protocol-identity?  string
  +--rw link-aggregation-tlv-extension
```

```

    +---rw aggregation-status?  bits
    +---rw aggregated-port-id?  uint32
augment /lldp:lldp/lldp:port/lldp:remote-systems-data:
+---ro port-vlan-id-tlv-extension
| +---ro port-vlan-id?  dot1qtypes:vlanid
+---ro port-and-protocol-vlan-id-extension
| +---ro port-vlan-id?  dot1qtypes:vlanid
| +---ro flags?        bits
+---ro port-vlan-name-tlv-extension
| +---ro vlan-id?      dot1qtypes:vlanid
| +---ro port-vlan-name?  string
+---ro protocol-identity-tlv-extension
| +---ro protocol-identity?  string
+---ro link-aggregation-tlv-extension
| +---ro aggregation-status?  bits
| +---ro aggregated-port-id?  uint32
+---ro vid-usage-digest-tlv-extension
| +---ro vid-usage-digest?  uint32
+---ro management-vid-tlv-extension
    +---ro management-vid?  dot1qtypes:vlanid

```

15.3 Usage of YANG Data Objects

The module `ieee802-dot1q-llbp-basic-tlv` does not define a separate YANG tree. It only augments the `ieee802-dot1ab-llbp` model.

16 System Capabilities model (`ietf-system-capabilities`)

16.1 Overview

The module `"ietf-system-capabilities"` is defined to provide a structure that can be used to discover (as read-only operational state) any YANG related system capability. It is defined in `draft-ietf-netconf-capabilities-21`.

16.1.1 Main Features

This module imports the feature `on-change` from `ietf-yang-push`.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

16.1.1.1 Feature *on-change*

This feature indicates that on-change triggered subscriptions are supported.

This feature is **mandatory** in 60802.

16.2 Tree Diagram

```
module: ietf-system-capabilities
  +--ro system-capabilities
    +--ro datastore-capabilities* [datastore]
      +--ro datastore          -> /yanglib:yang-library/datastore/name
      +--ro per-node-capabilities* []
        +--ro (node-selection)?
          +--:(node-selector)
            +--ro node-selector?   nacm:node-instance-identifier
```

16.3 Usage of YANG Data Objects

16.3.1 List `/ietf-system-capabilities/datastore-capabilities`

Capabilities values per datastore.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
datastore	leafref	ro	mandatory	mandatory	The datastore for which capabilities are defined.	-	
per-node-capabilities	list	ro	mandatory	mandatory	Each list entry specifies capabilities for the selected data nodes. The same capabilities apply for the data nodes in the subtree below the selected nodes.	-	

16.4 Augmentation by Module `ietf-notification-capabilities` (draft-ietf-notification-capabilities)

16.4.1 Additional Container `/ietf-system-capabilities/subscription-capabilities`

Capabilities related to YANG-Push subscriptions and notifications

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
max-nodes-per-update	uint32	ro	optional	optional	Maximum number of data nodes that can be sent in an update.	RFC 8641: Subscription to YANG Notifications for Datastore. Updates, the 'update-too-big' error/identity	
periodic-notifications-supported	notification-support	ro	optional	optional	Specifies whether the publisher is capable of sending 'periodic' notifications for the selected data nodes including any subtrees that may exist below them.	RFC 8641: Subscription to YANG Notifications for Datastore Updates, 'periodic' subscription concept	
update-period	choice	ro	optional	optional	Supported update period value or values for 'periodic' subscriptions.		
on-change-supported²⁷	notification-support	ro	optional	mandatory	Specifies whether the publisher is capable of sending 'on-change' notifications for the selected data nodes and the subtree below them.	RFC 8641: Subscription to YANG Notifications for Datastore Updates, on-change concept	
minimum-dampening-period²⁸	uint32	ro	optional	optional	The minimum dampening-period supported for 'on-change' subscriptions for the selected data nodes.	RFC 8641: Subscription to YANG Notifications for Datastore Updates, the dampening-period leaf in the ietf-yang-push YANG module	
supported-excluded-change-type²⁹	union	ro	optional	optional	The change types that can be excluded in YANG-Push subscriptions for the selected data nodes.	RFC 8641: Subscription to YANG Notifications for Datastore	

²⁷ if-feature "yp:on-change"

²⁸ if-feature "yp:on-change"

²⁹ if-feature "yp:on-change"

						Updates, the change-type typedef in the ietf-yang-push YANG module	
--	--	--	--	--	--	--	--

16.4.2 Additional Container /ietf-system-capabilities/datastore-capabilities/per-node-capabilities/subscription-capabilities

Capabilities related to YANG-Push subscriptions and notifications

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
max-nodes-per-update	uint32	ro	optional	optional	Maximum number of data nodes that can be sent in an update.	RFC 8641: Subscription to YANG Notifications for Datastore. Updates, the 'update-too-big' error/identity	
periodic-notifications-supported	notification-support	ro	optional	optional	Specifies whether the publisher is capable of sending 'periodic' notifications for the selected data nodes including any subtrees that may exist below them.	RFC 8641: Subscription to YANG Notifications for Datastore Updates, 'periodic' subscription concept	
update-period	choice	ro	optional	optional	Supported update period value or values for 'periodic' subscriptions.		
on-change-supported ³⁰	notification-support	ro	optional	optional	Specifies whether the publisher is capable of sending 'on-change' notifications for the selected data nodes and the subtree below them.	RFC 8641: Subscription to YANG Notifications for Datastore Updates, on-change concept	
minimum-dampening-period ³¹	uint32	ro	optional	optional	The minimum dampening-period supported for 'on-change'	RFC 8641: Subscription to YANG Notifications for Datastore	

³⁰ if-feature "yp:on-change"

³¹ if-feature "yp:on-change"

					subscriptions for the selected data nodes.	Updates, the dampening-period leaf in the ietf-yang-push YANG module	
supported-excluded-change-type³²	union	ro	optional	optional	The change types that can be excluded in YANG-Push subscriptions for the selected data nodes.	RFC 8641: Subscription to YANG Notifications for Datastore Updates, the change-type typedef in the ietf-yang-push YANG module	

17 Notification Capabilities model (ietf-notification-capabilities)

17.1 Overview

The module "ietf-notification-capabilities" provides YANG-Push related capability information. It is defined in draft-ietf-netconf-capabilities-21.

17.1.1 Main Features

This module imports the feature on-change from ietf-yang-push.

It is optional for a server to support features, so these functionalities are optional in the YANG tree.

17.1.1.1 Feature *on-change*

This feature indicates that on-change triggered subscriptions are supported.

This feature is **mandatory** in 60802.

17.2 Tree Diagram

```

module: ietf-notification-capabilities
  augment /sysc:system-capabilities:
    +--ro subscription-capabilities
      +--ro max-nodes-per-update?          uint32

```

³² if-feature "yp:on-change"

```

+---ro periodic-notifications-supported?  notification-support
+---ro (update-period)?
| +---:(minimum-update-period)
| | +---ro minimum-update-period?        uint32
| +---:(supported-update-period)
|   +---ro supported-update-period*      uint32
+---ro on-change-supported?              notification-support
|   {yp:on-change}?
+---ro minimum-dampening-period?         uint32
|   {yp:on-change}?
+---ro supported-excluded-change-type*   union
|   {yp:on-change}?
augment /sysc:system-capabilities/sysc:datastore-capabilities
  /sysc:per-node-capabilities:
+---ro subscription-capabilities
+---ro max-nodes-per-update?             uint32
+---ro periodic-notifications-supported? notification-support
+---ro (update-period)?
| +---:(minimum-update-period)
| | +---ro minimum-update-period?        uint32
| +---:(supported-update-period)
|   +---ro supported-update-period*      uint32
+---ro on-change-supported?              notification-support
|   {yp:on-change}?
+---ro minimum-dampening-period?         uint32
|   {yp:on-change}?
+---ro supported-excluded-change-type*   union
|   {yp:on-change}?

```

17.3 Usage of YANG Data Objects

The module `ietf-notification-capabilities` does not define a separate YANG tree. It only augments the `ietf-system-capabilities` model.

18 NACM model (`ietf-netconf-acm`)

18.1 Overview

The NACM model is defined in RFC8341.

18.2 Tree Diagram

```
module: ietf-netconf-acm
  +--rw nacm
    +--rw enable-nacm?          boolean
    +--rw read-default?        action-type
    +--rw write-default?       action-type
    +--rw exec-default?        action-type
    +--rw enable-external-groups? boolean
    +--ro denied-operations    yang:zero-based-counter32
    +--ro denied-data-writes   yang:zero-based-counter32
    +--ro denied-notifications yang:zero-based-counter32
    +--rw groups
      | +--rw group* [name]
      |   +--rw name          group-name-type
      |   +--rw user-name*    user-name-type
    +--rw rule-list* [name]
      +--rw name            string
      +--rw group*         union
      +--rw rule* [name]
        +--rw name          string
        +--rw module-name?  union
        +--rw (rule-type)?
          | +--:(protocol-operation)
          | | +--rw rpc-name?          union
          | +--:(notification)
          | | +--rw notification-name?  union
          | +--:(data-node)
          | +--rw path                  node-instance-identifier
        +--rw access-operations?  union
        +--rw action                action-type
        +--rw comment?             string
```

18.3 Usage of YANG Data Objects

Editor's Note: 60802 usage must be evaluated by a security specialist

18.3.1 Container /ietf-netconf-acm/nacm

Parameters for NETCONF access control model.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
enable-nacm	boolean	rw	optional	???	Enables or disables all NETCONF access control enforcement.	-	
read-default	action-type	rw	optional	???	Controls whether read access is granted if no appropriate rule is found for a particular read request.	-	
write-default	action-type	rw	optional	???	Controls whether create, update, or delete access is granted if no appropriate rule is found for a particular write request.	-	
exec-default	action-type	rw	optional	???	Controls whether exec access is granted if no appropriate rule is found for a particular protocol operation request.	-	
enable-external-groups	boolean	rw	optional	???	Controls whether the server uses the groups reported by the NETCONF transport layer when it assigns the user to a set of NACM groups. If this leaf has the value 'false', any group names reported by the transport layer are ignored by the server.	-	
denied-operations	yang:zero-based-counter32	ro	mandatory	mandatory	Number of times since the server last restarted that a protocol operation request was denied.	-	
denied-data-writes	yang:zero-based-counter32	ro	mandatory	mandatory	Number of times since the server last restarted that a protocol operation request to alter a configuration datastore was denied.	-	
denied-notifications	yang:zero-based-counter32	ro	mandatory	mandatory	Number of times since the server last restarted that a notification was dropped for a subscription because access to the event type was denied.	-	
groups	container	rw	optional	???	NETCONF access control groups. Contains a list of configured groups.	-	

rule-list	list	rw	optional	???	An ordered collection of access control rules.	-	
-----------	------	----	----------	-----	--	---	--

19 NMDA model (ietf-datstores and ietf-origin)

19.1 Overview

The NMDA model is defined in RFC 8342.

19.2 Tree Diagram

The model doesn't define leaves and thus has no tree diagram.

19.3 Usage of YANG Data Objects

The model doesn't define leaves. It merely defines an extension do NETCONF/YANG for new datstores.

20 NETCONF Monitoring model (ietf-netconf-monitoring)

20.1 Overview

The NETCONF monitoring model is defined in RFC 6022.

20.2 Tree Diagram

```

module: ietf-netconf-monitoring
  +--ro netconf-state
    +--ro capabilities
      | +--ro capability* inet:uri
    +--ro datstores
      | +--ro datastore* [name]
      |   +--ro name netconf-datastore-type
      |   +--ro locks!
      |     +--ro (lock-type)?
      |       +--:(global-lock)
      |         | +--ro global-lock

```

```

|         |         +---ro locked-by-session    uint32
|         |         +---ro locked-time         yang:date-and-time
|         +---:(partial-lock)
|             +---ro partial-lock* [lock-id]
|                 +---ro lock-id             uint32
|                 +---ro locked-by-session    uint32
|                 +---ro locked-time         yang:date-and-time
|                 +---ro select*            yang:xpath1.0
|                 +---ro locked-node*       instance-identifier
+---ro schemas
| +---ro schema* [identifier version format]
|     +---ro identifier    string
|     +---ro version      string
|     +---ro format       identityref
|     +---ro namespace    inet:uri
|     +---ro location*    union
+---ro sessions
| +---ro session* [session-id]
|     +---ro session-id    uint32
|     +---ro transport     identityref
|     +---ro username      string
|     +---ro source-host?  inet:host
|     +---ro login-time    yang:date-and-time
|     +---ro in-rpcs?      yang:zero-based-counter32
|     +---ro in-bad-rpcs?  yang:zero-based-counter32
|     +---ro out-rpc-errors? yang:zero-based-counter32
|     +---ro out-notifications? yang:zero-based-counter32
+---ro statistics
    +---ro netconf-start-time? yang:date-and-time
    +---ro in-bad-hellos?      yang:zero-based-counter32
    +---ro in-sessions?       yang:zero-based-counter32
    +---ro dropped-sessions?   yang:zero-based-counter32
    +---ro in-rpcs?           yang:zero-based-counter32
    +---ro in-bad-rpcs?       yang:zero-based-counter32
    +---ro out-rpc-errors?    yang:zero-based-counter32
    +---ro out-notifications? yang:zero-based-counter32

```

```

rpcs:
+---x get-schema
+---w input

```



```

| +---w identifier    string
| +---w version?     string
| +---w format?      identityref
+--ro output
   +--ro data?

```

20.3 Usage of YANG Data Objects

20.3.1 Container /ietf-netconf-monitoring/netconf-state

The netconf-state container is the root of the monitoring data model.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
capabilities	container	ro	optional	optional	Contains the list of NETCONF capabilities supported by the server.	-	
datastores	container	ro	optional	optional	Contains the list of NETCONF configuration datastores.	-	
schemas	container	ro	optional	optional	Contains the list of data model schemas supported by the server.	-	
sessions	container	ro	optional	optional	The sessions container includes session-specific data for NETCONF management sessions. The session list MUST include all currently active NETCONF sessions.	-	
statistics	container	ro	optional	optional	Statistical data pertaining to the NETCONF server.	-	

20.4 Remote Procedure Calls

20.4.1 get-schema

This operation is used to retrieve a schema from the NETCONF server.

21 YANG Library model (ietf-yang-library)

21.1 Overview

The YANG Library model is defined in RFC 8525.

21.2 Tree Diagram

```
module: ietf-yang-library
  +--ro yang-library
    | +--ro module-set* [name]
    | | +--ro name string
    | | +--ro module* [name]
    | | | +--ro name yang:yang-identifier
    | | | +--ro revision? revision-identifier
    | | | +--ro namespace inet:uri
    | | | +--ro location* inet:uri
    | | | +--ro submodule* [name]
    | | | | +--ro name yang:yang-identifier
    | | | | +--ro revision? revision-identifier
    | | | | +--ro location* inet:uri
    | | | +--ro feature* yang:yang-identifier
    | | | +--ro deviation* -> ../../module/name
    | | +--ro import-only-module* [name revision]
    | | +--ro name yang:yang-identifier
    | | +--ro revision union
    | | +--ro namespace inet:uri
    | | +--ro location* inet:uri
    | | +--ro submodule* [name]
    | | +--ro name yang:yang-identifier
    | | +--ro revision? revision-identifier
    | | +--ro location* inet:uri
    | +--ro schema* [name]
    | | +--ro name string
    | | +--ro module-set* -> ../../module-set/name
    | +--ro datastore* [name]
    | | +--ro name ds:datastore-ref
    | | +--ro schema -> ../../schema/name
    | +--ro content-id string
  x--ro modules-state
```

```

x--ro module-set-id    string
x--ro module* [name revision]
  x--ro name            yang:yang-identifier
  x--ro revision        union
  +--ro schema?        inet:uri
  x--ro namespace      inet:uri
  x--ro feature*       yang:yang-identifier
  x--ro deviation* [name revision]
  | x--ro name          yang:yang-identifier
  | x--ro revision      union
  x--ro conformance-type enumeration
  x--ro submodule* [name revision]
    x--ro name          yang:yang-identifier
    x--ro revision      union
    +--ro schema?      inet:uri

```

notifications:

```

+---n yang-library-update
| +--ro content-id    -> /yang-library/content-id
x---n yang-library-change
  x--ro module-set-id -> /modules-state/module-set-id

```

21.3 Usage of YANG Data Objects

21.3.1 Container /ietf-yang-library/yang-library

Container holding the entire YANG library of this server.

Leaf	Type	Access	Usage (YANG)	Usage (60802)	Description	Reference	
module-set	list	ro	optional	mandatory		-	
schema	list	ro	optional	mandatory			
datastore	list	ro	optional	mandatory			
content-id	string	ro	optional	mandatory			

21.3.2 Container /ietf-yang-library/modules-state

This container is obsolete and shall not be used for 60802.

21.4 Notifications

21.4.1 yang-library-update

Generated when any YANG library information on the server has changed.

22 NETCONF Base Notifications model (ietf-netconf-notifications)

22.1 Overview

The NETCONF base notifications model is defined in RFC 6470.

22.2 Tree Diagram

```
module: ietf-netconf-notifications
```

```
notifications:
  +---n netconf-config-change
  |   +---ro changed-by
  |   |   +---ro (server-or-user)
  |   |   |   +---:(server)
  |   |   |   |   +---ro server?           empty
  |   |   |   +---:(by-user)
  |   |   |   |   +---ro username           string
  |   |   |   |   +---ro session-id        nc:session-id-or-zero-type
  |   |   |   |   +---ro source-host?     inet:ip-address
  |   |   |   +---ro datastore?          enumeration
  |   |   +---ro edit* []
  |   |   |   +---ro target?              instance-identifier
  |   |   |   +---ro operation?          nc:edit-operation-type
  +---n netconf-capability-change
  |   +---ro changed-by
  |   |   +---ro (server-or-user)
  |   |   |   +---:(server)
  |   |   |   |   +---ro server?           empty
  |   |   |   +---:(by-user)
  |   |   |   |   +---ro username           string
  |   |   |   |   +---ro session-id        nc:session-id-or-zero-type
```

```

| |      +---ro source-host?  inet:ip-address
| +---ro added-capability*   inet:uri
| +---ro deleted-capability* inet:uri
| +---ro modified-capability* inet:uri
+---n netconf-session-start
| +---ro username           string
| +---ro session-id        nc:session-id-or-zero-type
| +---ro source-host?      inet:ip-address
+---n netconf-session-end
| +---ro username           string
| +---ro session-id        nc:session-id-or-zero-type
| +---ro source-host?      inet:ip-address
| +---ro killed-by?        nc:session-id-type
| +---ro termination-reason enumeration
+---n netconf-confirmed-commit
  +---ro username           string
  +---ro session-id        nc:session-id-or-zero-type
  +---ro source-host?      inet:ip-address
  +---ro confirm-event     enumeration
  +---ro timeout?         uint32

```

22.3 Usage of YANG Data Objects

The model doesn't define leaves. It merely defines the basic NETCONF notifications.

22.4 Notifications

22.4.1 netconf-config-change

Generated when the NETCONF server detects that the <running> or <startup> configuration datastore has been changed by a management session.

22.4.2 netconf-capability-change

Generated when the NETCONF server detects that the server capabilities have changed. Indicates which capabilities have been added, deleted, and/or modified.

22.4.3 netconf-session-start

Generated when a NETCONF server detects that a NETCONF session has started.

22.4.4 netconf-session-end

Generated when a NETCONF server detects that a NETCONF session has terminated.

22.4.5 netconf-confirmed-commit

Generated when a NETCONF server detects that a confirmed-commit event has occurred.

