



**P802.1ASdn/D2.0**  
**December 12, 2023**

(Amendment to  
IEEE Std 802.1AS™-2020 as modified by IEEE Std 802.1AS™-2020/Cor 1-2021 and IEEE Std  
802.1ASdr-2023)

# **Draft Standard for Local and metropolitan area networks— Timing and Synchronization for Time-Sensitive Applications**

## **Amendment: YANG Data Model**

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The text proper of this draft begins with the title page (1). The cover pages (a), (b), (c) etc. are for 802.1 WG information, and will be removed prior to Sponsor Ballot.

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## Editors' Foreword

This draft standard is an amendment. The scope of changes to the base standard is thus strictly limited, as detailed in the [PAR](#).

Information on participation in this project, and in the IEEE 802.1 Working Group can be found [here](#).

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Johannes Specht  
Editor, P802.1ASdn

Email: [johannes.specht.standards@gmail.com](mailto:johannes.specht.standards@gmail.com)

Glenn Parsons

Chair, 802.1 Working Group

Email: [glenn.parsons@ericsson.com](mailto:glenn.parsons@ericsson.com)

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## **Project Authorization Request, Scope, Purpose, and Criteria for Standards Development (CSD)**

The complete amendment PAR, as approved by IEEE NesCom on the 24th of September 2020, can be found at:

<https://development.standards.ieee.org/myproject-web/public/view.html#pardetail/8477>

The 'Scope of the Proposed changes' and the 'Need for the Project' specify the changes to be made by this amendment (see below).

### **Scope of the Proposed changes:**

This amendment specifies a YANG data model that allows configuring and state reporting for all managed objects of the base standard. This amendment specifies a Unified Modeling Language (UML)-based figure to explain the managed objects and the associated YANG data model.

### **Need for the Project:**

YANG (IETF RFC 7950) is a formalized data modeling language that is widely accepted and can be used to simplify network configuration. The ability to manage timing and synchronization via YANG data models is needed for compatibility with modern network management systems.

### **Criteria for Standards Development:**

The complete Criteria for Standards Development (CSD) can be found at:

<https://mentor.ieee.org/802-ec/dcn/20/ec-20-0202-00-ACSD-p802-1asdn.pdf>

# Draft IEEE Standard for Local and metropolitan area networks— Timing and Synchronization for Time- Sensitive Applications Amendment: YANG Data Model

[This amendment is based on IEEE Std 802.1AS™-2020 as modified by IEEE Std 802.1AS™-2020/Cor 1-2021 and IEEE Std 802.1ASdr-2023.]

NOTE—The editing instructions contained in this amendment define how to merge the material contained therein into the existing base standard and its amendments to form the comprehensive standard.

The editing instructions are shown in ***bold italic***. Four editing instructions are used: change, delete, insert, and replace. ***Change*** is used to make corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed by using ***strikethrough*** (to remove old material) and ***underscore*** (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Deletions and insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is used to make changes in figures or equations by removing the existing figure or equation and replacing it with a new one. Editing instructions, change markings, and this NOTE will not be carried over into future editions because the changes will be incorporated into the base standard.<sup>1</sup>

<sup>1</sup>Notes in text, tables, and figures are given for information only, and do not contain requirements needed to implement the standard.

**P802.1ASdn/D2.0**  
**December 12, 2023**

(Amendment to  
IEEE Std 802.1AS™-2020 as modified by IEEE Std 802.1AS™-2020/Cor 1-2021 and IEEE Std  
802.1ASdr-2023)

# **Draft IEEE Standard for Local and metropolitan area networks— Timing and Synchronization for Time-Sensitive Applications Amendment: YANG Data Model**

Prepared by the  
**Time-Sensitive Networking Task Group of IEEE 802.1**

Sponsor  
**LAN/MAN Standards Committee**  
of the  
**IEEE Computer Society**

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**Abstract:** This amendment to IEEE Std 802.1AS™-2020 specifies a YANG data model that allows configuration and state reporting for all managed objects of the base standard.

**Keywords:** YANG, data model, network management, managed objects, IEEE 802.1AS™, synchronization, syntonization, time-aware system

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## Introduction

This introduction is not part of IEEE Std 802.1ASdn™-2023, IEEE Standard for Local and metropolitan area networks—Timing and Synchronization for Time-Sensitive Applications—Amendment: YANG Data Model

The first edition of IEEE Std 802.1AS was published in 2011. A first corrigendum, IEEE Std 802.1AS™-2011/Cor1-2013, provided technical and editorial corrections. A second corrigendum, IEEE Std 802.1AS™-2011/Cor2-2015 provided additional technical and editorial corrections.

The second edition, IEEE Std 802.1AS-2020, added support for multiple gPTP domains, Common Mean Link Delay Service, external port configuration, and Fine Timing Measurement for 802.11 transport. Backward compatibility with IEEE Std 802.1AS-2011 was maintained. The corrigendum IEEE 802.1AS-2020/Cor 1-2021 provides technical and editorial corrections. The amendment IEEE Std 802.1ASdr-2023 changes non-inclusive terms, replacing them with their suitable and inclusive terminology wherever possible.

This amendment to IEEE Std 802.1AS™-2020 specifies a YANG data model that allows configuration and state reporting for all managed objects of the base standard.

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## 2. Normative references

*Insert the following references in alphanumeric order:*

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

IEEE Std 1588e™-20xx, IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems—Amendment: MIB and YANG Data Models.

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

## 4. Acronyms and abbreviations

*Insert the following abbreviations in alphanumeric order, renumbering footnotes as necessary:*

NETCONF      Network Configuration Protocol

UML®          Unified Modeling Language™

## 5. Conformance

### 5.4.2 PTP Instance Options

*Insert the following item 5.4.2 k) 4) after 5.4.2 k) 3) (MIB), renumbering as necessary:*

- 4) If YANG is supported with a remote management protocol, support the YANG data model in Clause 17.

*Change the title of Clause 15 as follows:*

**15. ~~Managed-object definitions~~Management Information Base (MIB)**

*Insert the following new Clause 17:*

## 17. YANG Data Model

YANG (IETF RFC 7950 [B45]) is a data modeling language used to model configuration data and state data for remote network management protocols. Examples of YANG-based remote network management protocols include NETCONF (IETF RFC 6241 [B41]) and RESTCONF (IETF RFC 8040 [B46]). Each remote network management protocol uses a specific encoding on-the-wire, such as XML or JSON. A YANG module specifies the organization and rules for the management data, and a mapping from YANG to the specific encoding enables the data to be understood correctly by both client (e.g., network manager) and server (e.g., PTP Instances).

This clause specifies the YANG data model for IEEE Std 802.1AS.

This clause:

- a) Introduces the organization of the data models, including the relationship with other standards (17.1)
- b) Provides an overview of the hierarchy of the data models using a UML-like representation (17.2)
- c) Summarizes the structure of the YANG data model (17.3)
- d) Reviews security considerations (17.4)
- e) Provides a schema tree as an overview of the YANG module (17.5)
- f) Specifies the YANG module (17.6)

### 17.1 YANG framework

Clause 14 specifies the information model for management of this standard. The data model for a specific management mechanism is derived from the information model. Since YANG-based protocols are an example of a management mechanism, the YANG data model of this clause is derived from Clause 14.

NOTE 1 - The MIB modules specified in Clause 15 were also derived from Clause 14. Consequently, the capabilities and structure of the YANG data models are aligned with those represented by the MIB. However the YANG data model has not been derived from the MIB, and there has been no attempt to include data or modeling constructs that might appear in the MIB but not in the information model.

The information model in Clause 14 is organized as a hierarchy of data sets. Each data set contains one or more related members (items of data that can be read or written). In the context of YANG, each data set is represented as a YANG “container”, and each member is represented as a YANG “leaf”.

#### 17.1.1 Relationship to the IEEE Std 1588 data model

The YANG data models specified in this standard are based on, and augment, those specified in IEEE Std 1588. In particular the `ieee802-dot1as-ptp.yang` module imports the `ieee1588-ptp` module as a whole, augmenting that module as necessary to meet the requirements of this standard. This import makes existing and new IEEE Std 1588 YANG capabilities not specifically addressed by the present standard available to its implementors without delay, without the need to revise or amend IEEE Std 802.1AS.

Some of the data sets in Clause 14 (e.g., `defaultDS`) are derived from IEEE Std 1588, and some of the data sets are unique to IEEE Std 802.1AS (i.e., not derived from IEEE Std 1588). For each data set in Clause 14 that is derived from IEEE Std 1588, a portion of the members are derived from IEEE Std 1588, and the

remaining members are unique to IEEE Std 802.1AS. For the members that are derived from IEEE Std 1588, the specifications in both standards are analogous (i.e., same name, data type, semantics, etc).

The YANG data model for IEEE Std 1588-2019 is published as amendment IEEE Std 1588e. The YANG module of IEEE Std 1588e (ieee1588-ptp.yang) contains the hierarchy (tree) of data sets and their members.

The YANG module of this clause (ieee802-dot1as-ptp.yang) uses the YANG “import” statement to import the YANG module of IEEE Std 1588e. This effectively uses the IEEE Std 1588 YANG tree as the foundation of the IEEE Std 802.1AS YANG tree. By importing the tree and its data set containers, all members from Clause 14 that are derived from IEEE Std 1588 are also imported.

The core of the YANG module for IEEE Std 802.1AS consists of YANG “augment” statements, used to add members to the tree that are unique for IEEE Std 802.1AS.

NOTE 2 - IETF RFC8575 [B48] is the standard YANG data model for IEEE Std 1588-2008. The YANG data model of IEEE Std 1588e is effectively a newer version of RFC8575. Therefore, the YANG module of RFC8575 is not imported by the YANG module of this clause.

## 17.2 IEEE 802.1AS YANG data model

This clause uses a UML-like representation to provide an overview of the hierarchy of the IEEE Std 802.1AS YANG data model.

A representation of the management model is provided in Figures 17-1 through 17-4. The purpose of the diagram is to express the model design in a concise manner. The structure of the representation shows the name of the object followed by a list of properties for the object. The properties indicate their type and accessibility. It should be noted that the representation is meant to express simplified semantics for the properties. It is not meant to provide the specific datatype used to encode the object in either MIB or YANG. In the representation, a box with a white background represents information that comes from sources outside of this IEEE standard. A box with a gray background represents objects that are defined by this IEEE standard.

NOTE 1 - OMG® UML 2.5 [B49] conventions together with C++ language constructs are used in this clause as a representation to convey model structure and relationships.

NOTE 2 - This standard specifies YANG for Clause 14 of this standard. There are optional features in the YANG module of IEEE Std 1588 that are not specified in Clause 14, and therefore not shown in the figures of this subclause. If optional IEEE Std 1588 YANG features are implemented, conformance is specified by IEEE Std 1588.

For all figures, Clause 14 data that is imported from the ieee1588-ptp.yang module is shown in white, and Clause 14 data in augments of ieee802-dot1as-ptp.yang is shown in gray.

Figure 17-1 provides an overview of the IEEE Std 802.1AS YANG tree. The top level instance-list provides the list of one or more PTP Instances, each with data sets. For each PTP Instance, port-ds-list provides the list of one or more PTP Ports, each with data sets. The common-services apply to all PTP Instances, including the Common Mean Link Delay Service (cmls).

Figure 17-2 provides detail for the data sets of each PTP Instance, including each data set member.

Figure 17-3 provides detail for the data sets of each PTP Port, including each data set member.

NOTE 2 - 14.8.4 specifies ptpPortEnabled (ptp-port-enabled), which is provided in YANG as the semantically equivalent node in ieee1588-ptp named port-enable (in port-ds of Figure 17-3). 14.8.15 specifies

1 mgtSettableLogAnnounceInterval (mgt-settable-log-announce-interval), which is provided in YANG as the semantically  
2 equivalent node in ieee1588-ptp named log-announce-interval (in port-ds of Figure 17-3). 14.8.20 specifies  
3 mgtSettableLogSyncInterval (mgt-settable-log-sync-interval), which is provided in YANG as the semantically  
4 equivalent node in ieee1588-ptp named log-sync-interval (in port-ds of Figure 17-3).  
5

6 Figure 17-4 provides detail for the common services, including each data set member. The Common Mean  
7 Link Delay Service (cmls) has a data sets for the service itself (e.g., default-ds), and data sets for each PTP  
8 Link Port.  
9

10 NOTE 3 - 14.16.9 specifies neighborRateRatio (neighbor-rate-ratio), which is provided in YANG as the semantically  
11 equivalent node in ieee1588-ptp named scaled-neighbor-rate-ratio (in link-port-ds of Figure 17-4).  
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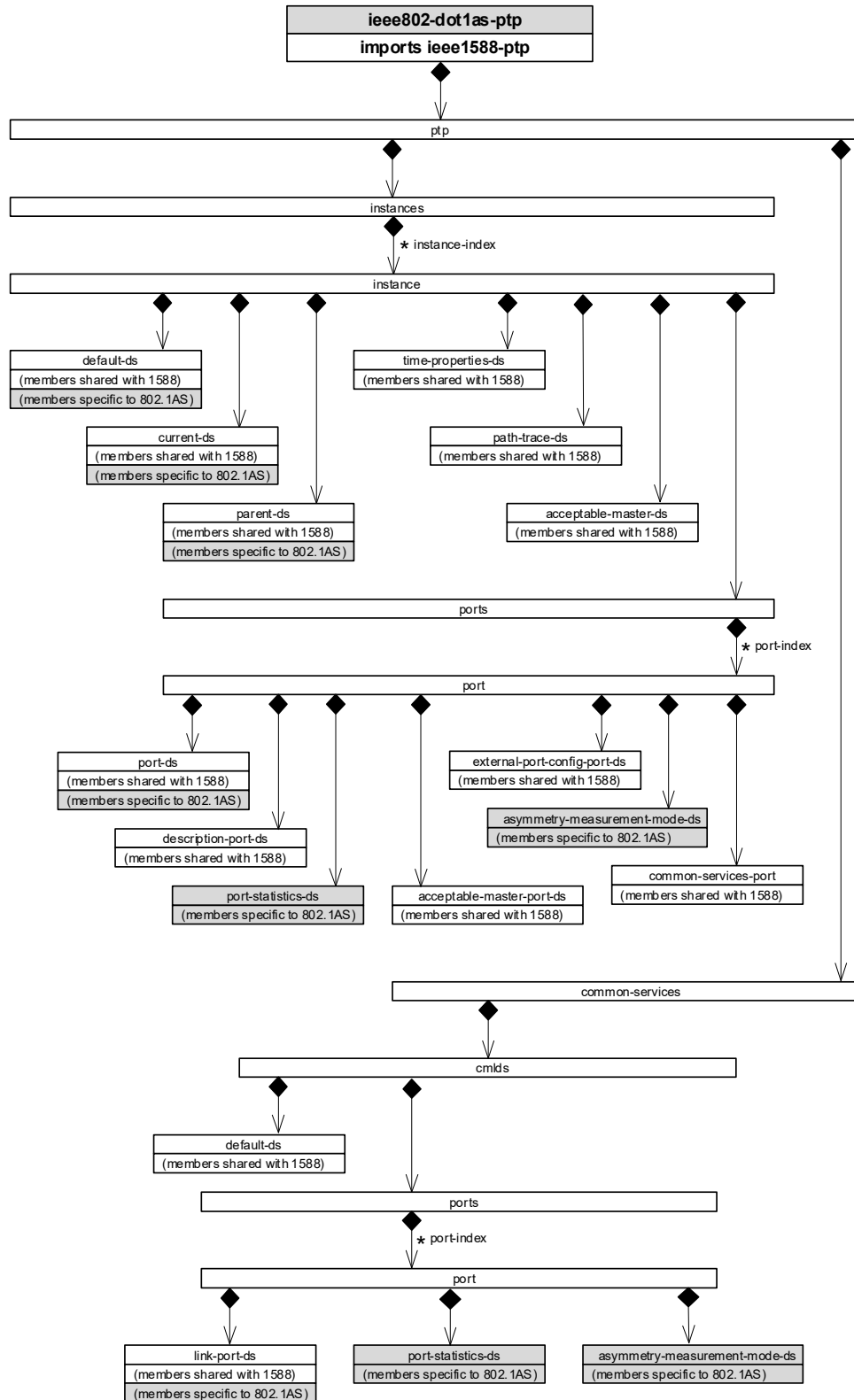


Figure 17-1—Overview of YANG tree

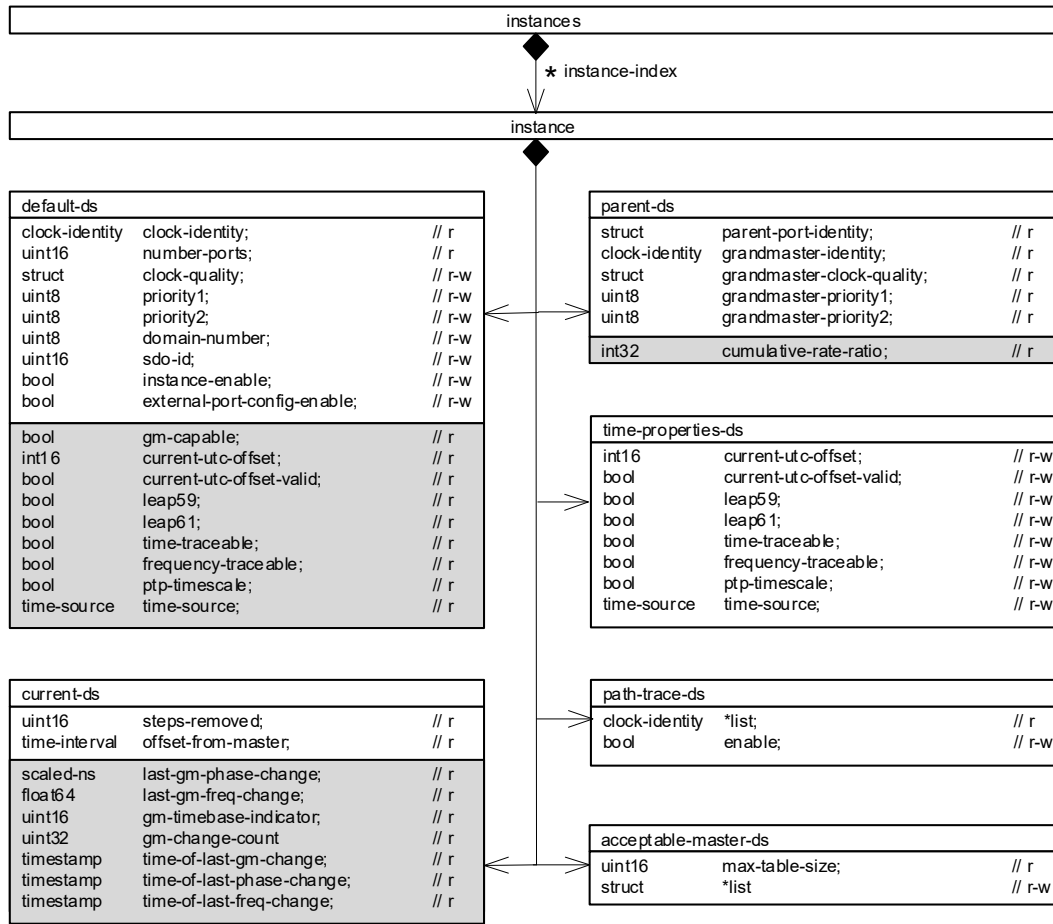


Figure 17-2—PTP Instance detail

NOTE 4 - IEEE Std 1588-2019 uses the original terminology of 'master' and 'slave', and therefore ieee1588-ptp.yang uses that terminology. IEEE Std 802.1ASdr-2023 uses the alternative terminology of 'timeTransmitter' and 'timeReceiver' (from IEEE Std 1588g-2022), and therefore Clause 14 uses that terminology. In the UML-like diagrams, and associated YANG data model, YANG nodes that are imported from ieee1588-ptp.yang use the original terminology, but are equivalent to the corresponding data set members from Clause 14 (using alternate terminology). This includes:

- 1588 acceptable-master-ds is equivalent to 802.1AS acceptable-time-transmitter-ds.
- 1588 acceptable-master-port-ds is equivalent to 802.1AS acceptable-time-transmitter-port-ds.
- 1588 current-ds.offset-from-master is equivalent to 802.1AS current-ds.offset-from-time-transmitter.

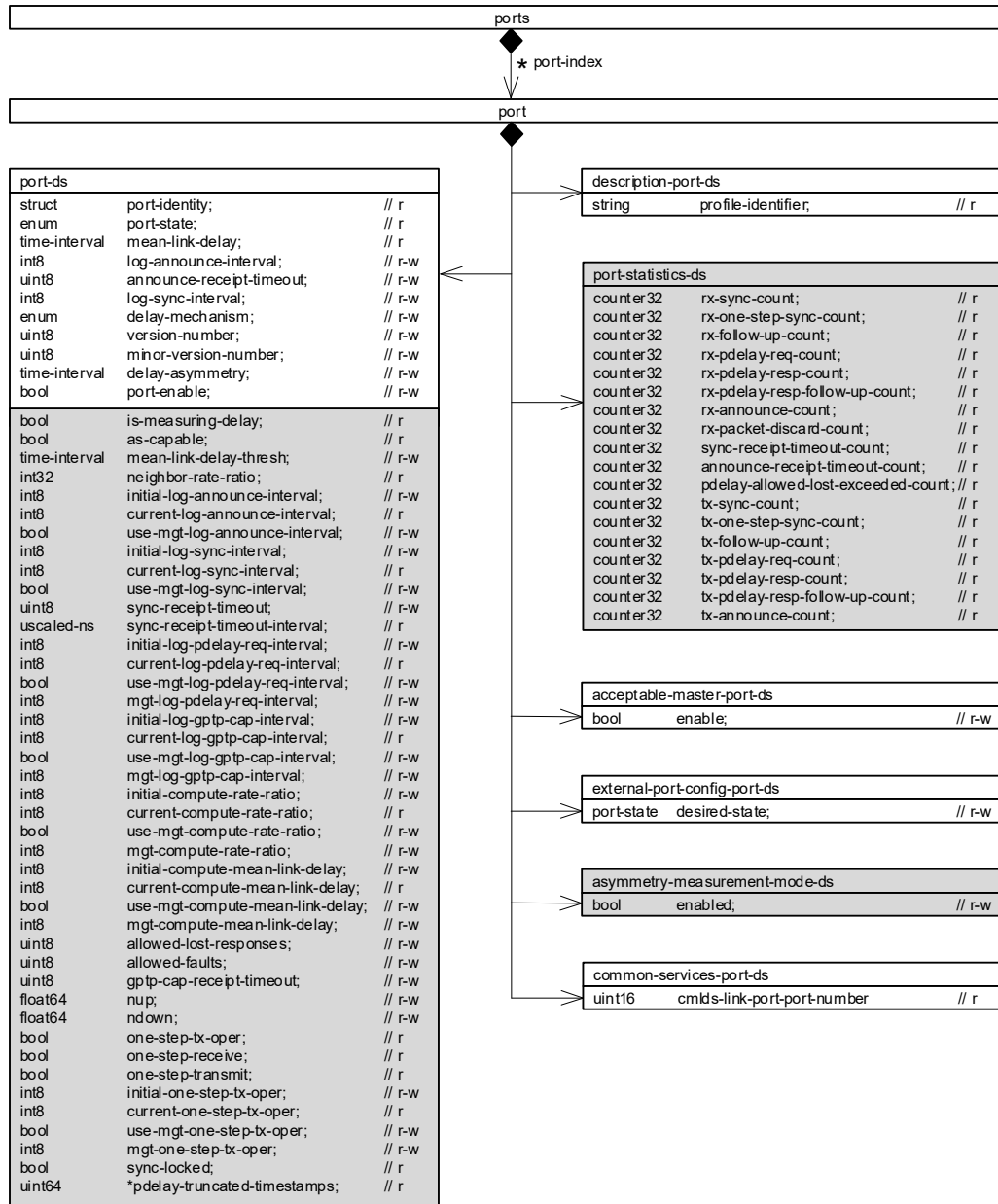


Figure 17-3—PTP Port detail

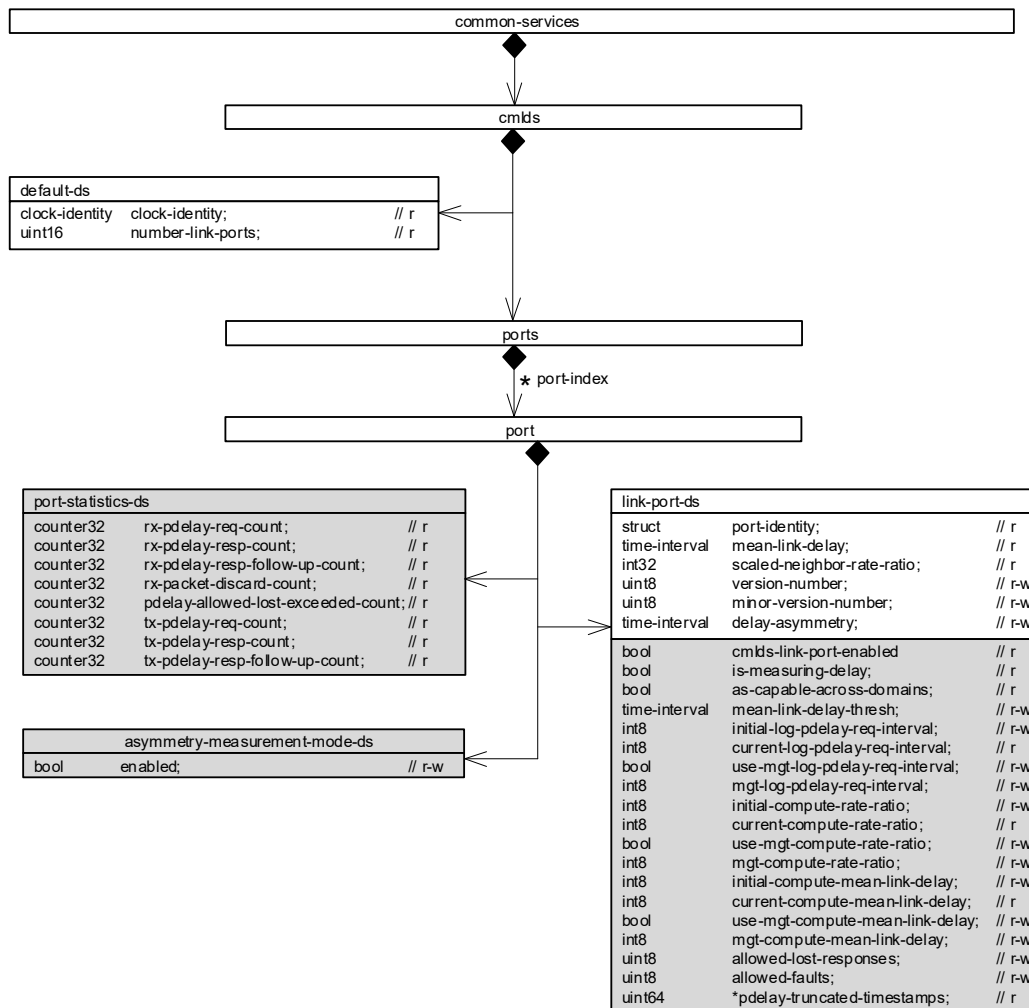


Figure 17-4—Common services detail

### 17.3 Structure of the YANG data model

The YANG data model specified by this standard uses the YANG modules summarized in Table 17-1.<sup>1</sup>

In the YANG module definitions, if any discrepancy between the “description” text and the corresponding definition in any other part of this standard occur, the definitions outside this clause (Clause 17) take precedence..

<sup>1</sup>An amendment’s designation is often used to refer to functionality in an IEEE standard after the amendment has been incorporated in a revision of the standard, even if the functionality has been revised. The amendment that added each YANG module is identified to help locate the relevant provisions of this standard.

Table 17-1—Summary of the YANG modules

Module	Managed functionality	YANG specification notes
ietf-yang-types	Type definitions	IETF RFC 6991 - Common YANG Data Types.
ieee1588-ptp	Clause 14	IEEE Std 1588e - MIB and YANG Data Models. IEEE Std 802.1ASdn imports this YANG module as its foundational tree, including a subset of members from Clause 14.
ieee802-dot1as-ptp	Clause 14	IEEE Std 802.1ASdn - YANG Data Model. The YANG module of this clause uses YANG augments to add members from Clause 14 that are unique to IEEE Std 802.1AS.

## 17.4 Security considerations

The YANG module specified in this document defines a schema for data that is designed to be accessed via network management protocols such as NETCONF ([B41]) and RESTCONF ([B46]). NETCONF and RESTCONF protocols provide the means to secure communication between client and server, using secure transport layers such as Secure Shell (SSH) ([B42]) and Transport Layer Security (TLS) ([B44]).

It is the responsibility of a system's implementor and administrator to ensure that the protocol entities in the system that support NETCONF, and any other remote configuration protocols that make use of these YANG modules, are properly configured to allow access only to those principals (users) that have legitimate rights to read or write data nodes. This standard does not specify how the credentials of those users are to be stored or validated.

The Network Configuration Access Control Model (NACM) ([B43]) provides the means to restrict access for particular NETCONF or RESTCONF users to a preconfigured subset of all available NETCONF or RESTCONF protocol operations and content.

There are a number of data sets in this YANG module that contain writable data nodes ([B45]), such as:

```
/ptp/instances/instance/default-ds
/ptp/instances/instance/path-trace-ds
/ptp/instances/instance/acceptable-master-ds
/ptp/instances/instance/ports/port/port-ds
/ptp/instances/instance/ports/port/acceptable-master-port-ds
/ptp/instances/instance/ports/port/external-port-config-port-ds
/ptp/instances/instance/ports/port/asymmetry-measurement-mode-ds
/ptp/cmls/ports/port/link-port-ds
/ptp/cmls/ports/port/asymmetry-measurement-mode-ds
```

Write operations (e.g., edit-config) to these data nodes without proper protection can have a negative effect on network operations. Specifically, an inappropriate configuration of them may adversely impact a PTP synchronization network. For example, loss of synchronization on a clock, accuracy degradation on a set of clocks, or even break down of a whole synchronization network.

## 17.5 YANG schema tree definitions

The schema tree in this clause is provided as an overview of the YANG module in 17.6. The symbols and their meaning are specified in YANG Tree Diagrams (IETF RFC 8340 [B47]).

### 17.5.1 Tree diagram for ieee802-dot1as-ptp.yang

```
module: ieee802-dot1as-ptp

  augment /ptp:ptp/ptp:instances/ptp:instance/ptp:default-ds:
    +--ro gm-capable?          boolean
    +--ro current-utc-offset?   int16
    +--ro current-utc-offset-valid? boolean
    +--ro leap59?              boolean
    +--ro leap61?              boolean
    +--ro time-traceable?       boolean
    +--ro frequency-traceable?  boolean
    +--ro ptp-timescale?        boolean
    +--ro time-source?          identityref

  augment /ptp:ptp/ptp:instances/ptp:instance/ptp:current-ds:
    +--ro last-gm-phase-change? scaled-ns
```

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```

1      +--ro last-gm-freq-change?          float64
2      +--ro gm-timebase-indicator?        uint16
3      +--ro gm-change-count?              yang:counter32
4      +--ro time-of-last-gm-change?        yang:timestamp
5      +--ro time-of-last-phase-change?      yang:timestamp
6      +--ro time-of-last-freq-change?      yang:timestamp
7      augment /ptp:ptp/ptp:instances/ptp:instance/ptp:parent-ds:
8          +--ro cumulative-rate-ratio?     int32
9      augment /ptp:ptp/ptp:instances/ptp:instance/ptp:ports/ptp:port/ptp:port-ds:
10         +--ro is-measuring-delay?         boolean
11         +--ro as-capable?                 boolean
12         +--rw mean-link-delay-thresh?     ptp:time-interval
13         +--ro neighbor-rate-ratio?        int32
14         +--rw initial-log-announce-interval? int8
15         +--ro current-log-announce-interval? int8
16         +--rw use-mgt-log-announce-interval? boolean
17         +--rw initial-log-sync-interval?   int8
18         +--ro current-log-sync-interval?   int8
19         +--rw use-mgt-log-sync-interval?   boolean
20         +--rw sync-receipt-timeout?        uint8
21         +--ro sync-receipt-timeout-interval? unscaled-ns
22         +--rw initial-log-pdelay-req-interval? int8
23         +--ro current-log-pdelay-req-interval? int8
24         +--rw use-mgt-log-pdelay-req-interval? boolean
25         +--rw mgt-log-pdelay-req-interval? int8
26         +--rw initial-log-gptp-cap-interval? int8
27         +--ro current-log-gptp-cap-interval? int8
28         +--rw use-mgt-log-gptp-cap-interval? boolean
29         +--rw mgt-log-gptp-cap-interval?   int8
30         +--rw initial-compute-rate-ratio?  int8
31         +--ro current-compute-rate-ratio?  int8
32         +--rw use-mgt-compute-rate-ratio?  boolean
33         +--rw mgt-compute-rate-ratio?      int8
34         +--rw initial-compute-mean-link-delay? int8
35         +--ro current-compute-mean-link-delay? int8
36         +--rw use-mgt-compute-mean-link-delay? boolean
37         +--rw mgt-compute-mean-link-delay? int8
38         +--rw allowed-lost-responses?      uint8
39         +--ro allowed-faults?              uint8
40         +--rw gptp-cap-receipt-timeout?    uint8
41         +--rw nup?                         float64
42         +--rw ndown?                       float64
43         +--ro one-step-tx-oper?            boolean
44         +--ro one-step-receive?            boolean
45         +--ro one-step-transmit?           boolean
46         +--rw initial-one-step-tx-oper?    int8
47         +--ro current-one-step-tx-oper?    int8
48         +--rw use-mgt-one-step-tx-oper?    boolean
49         +--rw mgt-one-step-tx-oper?        int8
50         +--ro sync-locked?                 boolean
51         +--ro pdelay-truncated-timestamps* uint64
52      augment /ptp:ptp/ptp:instances/ptp:instance/ptp:ports/ptp:port:
53          +--rw port-statistics-ds
54              +--ro rx-sync-count?          yang:counter32
55              +--ro rx-one-step-sync-count? yang:counter32
56              +--ro rx-follow-up-count?      yang:counter32
57              +--ro rx-pdelay-req-count?     yang:counter32
58              +--ro rx-pdelay-resp-count?    yang:counter32
59              +--ro rx-pdelay-resp-follow-up-count? yang:counter32

```

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```

1      +---ro rx-announce-count?                yang:counter32
2      +---ro rx-packet-discard-count?          yang:counter32
3      +---ro sync-receipt-timeout-count?       yang:counter32
4      +---ro announce-receipt-timeout-count?   yang:counter32
5      +---ro pdelay-allowed-lost-exceeded-count? yang:counter32
6      +---ro tx-sync-count?                    yang:counter32
7      +---ro tx-one-step-sync-count?           yang:counter32
8      +---ro tx-follow-up-count?               yang:counter32
9      +---ro tx-pdelay-req-count?              yang:counter32
10     +---ro tx-pdelay-resp-count?             yang:counter32
11     +---ro tx-pdelay-resp-follow-up-count?   yang:counter32
12     +---ro tx-announce-count?                yang:counter32
13     augment /ptp:ptp/ptp:instances/ptp:instance/ptp:ports/ptp:port:
14       +---rw asymmetry-measurement-mode-ds
15       +---rw enabled?    boolean
16     augment /ptp:ptp/ptp:common-services/ptp:cmlds/ptp:ports/ptp:port/ptp:link-
17     port-ds:
18       +---ro cmlds-link-port-enabled?        boolean
19       +---ro is-measuring-delay?              boolean
20       +---ro as-capable-across-domains?       boolean
21       +---rw mean-link-delay-thresh?          ptp:time-interval
22       +---rw initial-log-pdelay-req-interval? int8
23       +---ro current-log-pdelay-req-interval? int8
24       +---rw use-mgt-log-pdelay-req-interval? boolean
25       +---rw mgt-log-pdelay-req-interval?     int8
26       +---rw initial-compute-rate-ratio?      int8
27       +---ro current-compute-rate-ratio?      int8
28       +---rw use-mgt-compute-rate-ratio?      boolean
29       +---rw mgt-compute-rate-ratio?          int8
30       +---ro initial-compute-mean-link-delay? int8
31       +---ro current-compute-mean-link-delay? int8
32       +---rw use-mgt-compute-mean-link-delay? boolean
33       +---rw mgt-compute-mean-link-delay?     int8
34       +---rw allowed-lost-responses?          uint8
35       +---rw allowed-faults?                  uint8
36       +---ro pdelay-truncated-timestamps*    uint64
37     augment /ptp:ptp/ptp:common-services/ptp:cmlds/ptp:ports/ptp:port:
38       +---rw port-statistics-ds
39       +---ro rx-pdelay-req-count?              yang:counter32
40       +---ro rx-pdelay-resp-count?             yang:counter32
41       +---ro rx-pdelay-resp-follow-up-count?   yang:counter32
42       +---ro rx-packet-discard-count?          yang:counter32
43       +---ro pdelay-allowed-lost-exceeded-count? yang:counter32
44       +---ro tx-pdelay-req-count?              yang:counter32
45       +---ro tx-pdelay-resp-count?             yang:counter32
46       +---ro tx-pdelay-resp-follow-up-count?   yang:counter32
47     augment /ptp:ptp/ptp:common-services/ptp:cmlds/ptp:ports/ptp:port:
48       +---rw asymmetry-measurement-mode-ds
49       +---rw enabled?    boolean
50
51
52
53
54

```



**17.6 YANG module<sup>1 2</sup>**

Although not formally specified by this standard, the YANG module specified by IEEE Std 1588e (ieee1588-ptp.yang) serves as the foundation of the YANG module specified in this clause.

**17.6.1 Module ieee802-dot1as-ptp.yang**

```

module ieee802-dot1as-ptp {
  yang-version 1.1;
  namespace urn:ieee:std:802.1AS:yang:ieee802-dot1as-ptp;
  prefix dot1as-ptp;

  import ietf-yang-types {
    prefix yang;
  }
  import ieee1588-ptp {
    prefix ptp;
  }

  organization
    "IEEE 802.1 Working Group";
  contact
    "WG-URL: http://ieee802.org/1/
    WG-EMail: stds-802-1-1@ieee.org

    Contact: IEEE 802.1 Working Group Chair
             Postal: C/O IEEE 802.1 Working Group
             IEEE Standards Association
             445 Hoes Lane
             Piscataway, NJ 08854
             USA

    E-mail: stds-802-1-chairs@ieee.org";
  description
    "Management objects that control timing and synchronization
    for time sensitive applications, as specified in
    IEEE Std 802.1AS-2020.

    Copyright (C) IEEE (2023).
    This version of this YANG module is part of IEEE Std 802.1AS;
    see the standard itself for full legal notices.";

  revision 2023-04-04 {
    description
      "Published as part of IEEE Std 802.1ASdn-2023.
      Initial version.";
    reference
      "IEEE Std 802.1ASdn-2023 - YANG Data Model";
  }

  typedef scaled-ns {
    type string {
      pattern "[0-9A-F]{2}(-[0-9A-F]{2}){11}";
    }
  }

```

<sup>1</sup>Copyright release for YANG modules: Users of this standard may freely reproduce the YANG modules contained in this subclause so that they can be used for their intended purpose.

<sup>2</sup>An ASCII version of the YANG modules are attached to the PDF version of this standard, and can be obtained by Web browser from the IEEE 802.1 Website at <https://1.ieee802.org/yang-modules/>.

```
1      }
2      description
3          "The IEEE Std 802.1AS ScaledNs type represents
4          signed values of time and time interval in units
5          of 2^16 ns, as a signed 96-bit integer.
6          YANG does not support a signed 96-bit integer.
7          Each of the 12 octets is represented in YANG as a pair of
8          hexadecimal characters, using uppercase for a letter.
9          Each octet in the array is separated by the dash
10         character. The most significant octet is first.";
11     reference
12         "6.4.3.1 of IEEE Std 802.1AS-2020";
13 }
14 typedef unscaled-ns {
15     type string {
16         pattern "[0-9A-F]{2}(-[0-9A-F]{2}){11}";
17     }
18     description
19         "The IEEE Std 802.1AS UScaledNs type represents
20         unsigned values of time and time interval in units
21         of 2^16 ns, as an unsigned 96-bit integer.
22         YANG does not support an unsigned 96-bit integer.
23         Each of the 12 octets is represented in YANG as a pair of
24         hexadecimal characters, using uppercase for a letter.
25         Each octet in the array is separated by the dash
26         character. The most significant octet is first.";
27     reference
28         "6.4.3.2 of IEEE Std 802.1AS-2020";
29 }
30 typedef float64 {
31     type string {
32         pattern "[0-9A-F]{2}(-[0-9A-F]{2}){7}";
33     }
34     description
35         "The IEEE Std 802.1AS Float64 type represents
36         IEEE Std 754 binary64 (64-bit
37         double-precision floating-point format).
38         YANG does not support floating-point,
39         Each of the 8 octets is represented in YANG as a pair of
40         hexadecimal characters, using uppercase for a letter.
41         Each octet in the array is separated by the dash
42         character. The most significant octet is first.";
43     reference
44         "6.4.2 of IEEE Std 802.1AS-2020";
45 }
46 augment "/ptp:ptp/ptp:instances/ptp:instance/ptp:default-ds" {
47     description
48         "Augment IEEE Std 1588 defaultDS.";
49     leaf gm-capable {
50         type boolean;
51         config false;
52         description
53             "The value is true if the time-aware system is capable
54             of being a grandmaster, and false if the time-aware
55             system is not capable of being a grandmaster.";
```

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```

1         reference
2           "14.2.7 of IEEE Std 802.1AS-2020";
3     }
4
5     leaf current-utc-offset {
6       when "../current-utc-offset-valid='true'";
7       type int16;
8       config false;
9       description
10        "Offset from UTC (TAI - UTC).
11        The offset is in units of seconds.
12        This leaf applies to the ClockTimeTransmitter entity
13        (i.e., local only, unrelated to a remote GM).";
14       reference
15         "14.2.8 of IEEE Std 802.1AS-2020";
16     }
17
18     leaf current-utc-offset-valid {
19       type boolean;
20       config false;
21       description
22        "The value of current-utc-offset-valid shall be true
23        if the value of current-utc-offset is known to be
24        correct, otherwise it shall be false.
25        This leaf applies to the ClockTimeTransmitter entity
26        (i.e., local only, unrelated to a remote GM).";
27       reference
28         "14.2.9 of IEEE Std 802.1AS-2020";
29     }
30
31     leaf leap59 {
32       type boolean;
33       config false;
34       description
35        "If the timescale is PTP, a true value for leap59
36        shall indicate that the last minute of the
37        current UTC day contains 59 seconds.
38        If the timescale is not PTP, the value shall be
39        false.
40        This leaf applies to the ClockTimeTransmitter entity
41        (i.e., local only, unrelated to a remote GM).";
42       reference
43         "14.2.10 of IEEE Std 802.1AS-2020";
44     }
45
46     leaf leap61 {
47       type boolean;
48       config false;
49       description
50        "If the timescale is PTP, a true value for leap61
51        shall indicate that the last minute of the
52        current UTC day contains 61 seconds.
53        If the timescale is not PTP, the value shall be
54        false.
55        This leaf applies to the ClockTimeTransmitter entity
56        (i.e., local only, unrelated to a remote GM).";
57       reference
58         "14.2.11 of IEEE Std 802.1AS-2020";
59     }

```

```

1      leaf time-traceable {
2          type boolean;
3          config false;
4          description
5              "The value of time-traceable shall be true if the
6               timescale is traceable to a primary reference;
7               otherwise, the value shall be false.
8               This leaf applies to the ClockTimeTransmitter entity
9               (i.e., local only, unrelated to a remote GM).";
10         reference
11             "14.2.12 of IEEE Std 802.1AS-2020";
12     }
13
14     leaf frequency-traceable {
15         type boolean;
16         config false;
17         description
18             "The value of frequency-traceable shall be true if
19              the frequency determining the timescale is traceable
20              to a primary reference; otherwise, the value shall
21              be false.
22              This leaf applies to the ClockTimeTransmitter entity
23              (i.e., local only, unrelated to a remote GM).";
24         reference
25             "14.2.13 of IEEE Std 802.1AS-2020";
26     }
27
28     leaf ptp-timescale {
29         type boolean;
30         config false;
31         description
32             "If ptp-timescale is true, the timescale of
33              the ClockTimeTransmitter entity is PTP, which is
34              the elapsed time since the PTP epoch measured
35              using the second defined by International Atomic
36              Time (TAI).
37              If ptp-timescale is false, the timescale of
38              the ClockTimeTransmitter entity is ARB, which is
39              the elapsed time since an arbitrary epoch.
40              This leaf applies to the ClockTimeTransmitter entity
41              (i.e., local only, unrelated to a remote GM).";
42         reference
43             "14.2.14 of IEEE Std 802.1AS-2020";
44     }
45
46     leaf time-source {
47         type identityref {
48             base ptp:time-source;
49         }
50         config false;
51         description
52             "The source of time used by the Grandmaster Clock
53              This leaf applies to the ClockTimeTransmitter entity
54              (i.e., local only, unrelated to a remote GM).";
55         reference
56             "14.2.15 of IEEE Std 802.1AS-2020";
57     }
58 }

```

```

1      augment "/ptp:ptp/ptp:instances/ptp:instance/ptp:current-ds" {
2          description
3              "Augment IEEE Std 1588 currentDS.";
4
5          leaf last-gm-phase-change {
6              type scaled-ns;
7              config false;
8              description
9                  "Phase change that occurred on the most recent
10                     change in either the Grandmaster PTP Instance
11                     or gm-timebase-indicator leaf.";
12              reference
13                  "14.3.4 of IEEE Std 802.1AS-2020";
14          }
15
16          leaf last-gm-freq-change {
17              type float64;
18              config false;
19              description
20                  "Frequency change that occurred on the most recent
21                     change in either the Grandmaster PTP Instance
22                     or gm-timebase-indicator leaf.";
23              reference
24                  "14.3.5 of IEEE Std 802.1AS-2020";
25          }
26
27          leaf gm-timebase-indicator {
28              type uint16;
29              config false;
30              description
31                  "The timeBaseIndicator of the current
32                     Grandmaster PTP Instance.";
33              reference
34                  "14.3.6 of IEEE Std 802.1AS-2020";
35          }
36
37          leaf gm-change-count {
38              type yang:counter32;
39              config false;
40              description
41                  "This statistics counter tracks the number of times
42                     the Grandmaster PTP Instance has changed in a
43                     gPTP domain.";
44              reference
45                  "14.3.7 of IEEE Std 802.1AS-2020";
46          }
47
48          leaf time-of-last-gm-change {
49              type yang:timestamp;
50              config false;
51              description
52                  "System time when the most recent Grandmaster Clock
53                     change occurred in a gPTP domain.
54                     This leaf's type is YANG timestamp, which is based
55                     on system time. System time is an unsigned integer
56                     in units of 10 milliseconds, using an epoch defined
57                     by the implementation (typically time of boot-up).";
58              reference

```

```

1      "14.3.8 of IEEE Std 802.1AS-2020";
2    }
3
4    leaf time-of-last-phase-change {
5      type yang:timestamp;
6      config false;
7      description
8        "System time when the most recent change in Grandmaster
9        Clock phase occurred.
10       This leaf's type is YANG timestamp, which is based
11       on system time. System time is an unsigned integer
12       in units of 10 milliseconds, using an epoch defined
13       by the implementation (typically time of boot-up).";
14      reference
15        "14.3.9 of IEEE Std 802.1AS-2020";
16    }
17
18    leaf time-of-last-freq-change {
19      type yang:timestamp;
20      config false;
21      description
22        "System time when the most recent change in Grandmaster
23        Clock frequency occurred.
24       This leaf's type is YANG timestamp, which is based
25       on system time. System time is an unsigned integer
26       in units of 10 milliseconds, using an epoch defined
27       by the implementation (typically time of boot-up).";
28      reference
29        "14.3.10 of IEEE Std 802.1AS-2020";
30    }
31
32    augment "/ptp:ptp/ptp:instances/ptp:instance/ptp:parent-ds" {
33      description
34        "Augment IEEE Std 1588 parentDS.";
35
36      leaf cumulative-rate-ratio {
37        type int32;
38        config false;
39        description
40          "Estimate of the ratio of the frequency of the Grandmaster
41          Clock to the frequency of the LocalClock entity of this
42          PTP Instance. cumulative-rate-ratio is expressed as
43          the fractional frequency offset multiplied by 2^41,
44          i.e., the quantity (rateRatio - 1.0) (2^41).";
45        reference
46          "14.4.3 of IEEE Std 802.1AS-2020";
47      }
48    }
49
50    augment "/ptp:ptp/ptp:instances/ptp:instance/ptp:ports/ptp:port/ptp:port-ds" {
51      description
52        "Augment IEEE Std 1588 portDS.
53
54        14.8.4 of IEEE Std 802.1AS-2020 specifies ptpPortEnabled
55        (ptp-port-enabled), which is provided in YANG as the
56        semantically equivalent node in ieee1588-ptp named
57        port-enable (in port-ds).

```

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```

1      14.8.15 of IEEE Std 802.1AS-2020 specifies
2      mgtSettableLogAnnounceInterval
3      (mgt-settable-log-announce-interval), which is provided in
4      YANG as the semantically equivalent node in ieee1588-ptp named
5      log-announce-interval (in port-ds). In the context of
6      IEEE Std 802.1AS, log-announce-interval cannot be used
7      unless use-mgt-log-announce-interval is true.
8
9      14.8.20 of IEEE Std 802.1AS-2020 specifies
10     mgtSettableLogSyncInterval
11     (mgt-settable-log-sync-interval), which is provided in YANG
12     as the semantically equivalent node in ieee1588-ptp named
13     log-sync-interval (in port-ds). In the context of
14     IEEE Std 802.1AS, log-sync-interval cannot be used
15     unless use-mgt-log-sync-interval is true.”;
16
17     leaf is-measuring-delay {
18         type boolean;
19         config false;
20         description
21             “Boolean that is true if the port is measuring
22             PTP Link propagation delay.”;
23         reference
24             “14.8.6 of IEEE Std 802.1AS-2020”;
25     }
26
27     leaf as-capable {
28         type boolean;
29         config false;
30         description
31             “Boolean that is true if and only if it is determined
32             that this PTP Instance and the PTP Instance at the
33             other end of the link attached to this port can
34             interoperate with each other via the IEEE Std
35             802.1AS protocol.”;
36         reference
37             “10.2.5.1 of IEEE Std 802.1AS-2020
38             14.8.7 of IEEE Std 802.1AS-2020”;
39     }
40
41     leaf mean-link-delay-thresh {
42         type ptp:time-interval;
43         description
44             “Propagation time threshold for mean-link-delay,
45             above which a port is not considered capable of
46             participating in the IEEE Std 802.1AS protocol.”;
47         reference
48             “14.8.9 of IEEE Std 802.1AS-2020”;
49     }
50
51     leaf neighbor-rate-ratio {
52         type int32;
53         config false;
54         description
55             “Estimate of the ratio of the frequency of the LocalClock
56             entity of the PTP Instance at the other end of the
57             link attached to this PTP Port, to the frequency of the
58             LocalClock entity of this PTP Instance.
59             neighbor-rate-ratio is expressed as the fractional

```

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```

1         frequency offset multiplied by 2^41,
2         i.e., the quantity (rateRatio - 1.0) (2^41).";
3     reference
4         "14.8.11 of IEEE Std 802.1AS-2020";
5 }
6
6 leaf initial-log-announce-interval {
7     type int8;
8     description
9         "When use-mgt-log-announce-interval is false
10        (i.e., change with Signaling message), this is the
11        the logarithm to base 2 of the announce
12        interval used when the port is initialized.";
13    reference
14        "14.8.12 of IEEE Std 802.1AS-2020";
15 }
16
16 leaf current-log-announce-interval {
17     type int8;
18     config false;
19     description
20        "Logarithm to base 2 of the current
21        announce interval.";
22    reference
23        "14.8.13 of IEEE Std 802.1AS-2020";
24 }
25
25 leaf use-mgt-log-announce-interval {
26     type boolean;
27     description
28        "Boolean that determines the source of the
29        announce interval.
30        If the value is true, the announce interval
31        (current-log-announce-interval) is set equal to the value
32        of mgt-log-announce-interval.
33        If the value is false, the announce interval is determined
34        by the AnnounceIntervalSetting state machine (i.e., changed
35        with Signaling message).";
36    reference
37        "14.8.14 of IEEE Std 802.1AS-2020";
38 }
39
39 leaf initial-log-sync-interval {
40     type int8;
41     description
42        "When use-mgt-log-sync-interval is false
43        (i.e., change with Signaling message), this is the
44        the logarithm to base 2 of the sync
45        interval used when the port is initialized.";
46    reference
47        "14.8.17 of IEEE Std 802.1AS-2020";
48 }
49
49 leaf current-log-sync-interval {
50     type int8;
51     config false;
52     description
53        "Logarithm to base 2 of the current sync
54        interval.";

```



```
1         reference
2         "14.8.18 of IEEE Std 802.1AS-2020";
3     }
4
5     leaf use-mgt-log-sync-interval {
6         type boolean;
7         description
8             "Boolean that determines the source of the
9             sync interval.
10            If the value is true, the sync interval
11            (current-log-sync-interval) is set equal to the value
12            of mgt-log-sync-interval.
13            If the value is false, the sync interval is determined
14            by the SyncIntervalSetting state machine (i.e., changed
15            with Signaling message).";
16         reference
17         "14.8.19 of IEEE Std 802.1AS-2020";
18     }
19
20     leaf sync-receipt-timeout {
21         type uint8;
22         description
23             "Number of sync intervals that a timeReceiver port waits
24             without receiving synchronization information, before
25             assuming that the timeTransmitter is no longer transmitting
26             synchronization information and that the BTCA needs to be
27             run, if appropriate.";
28         reference
29         "14.8.21 of IEEE Std 802.1AS-2020";
30     }
31
32     leaf sync-receipt-timeout-interval {
33         type uscaled-ns;
34         config false;
35         description
36             "Time interval after which sync receipt timeout occurs
37             if time-synchronization information has not been
38             received during the interval.";
39         reference
40         "14.8.22 of IEEE Std 802.1AS-2020";
41     }
42
43     leaf initial-log-pdelay-req-interval {
44         type int8;
45         description
46             "When use-mgt-log-pdelay-req-interval is false
47             (i.e., change with Signaling message), this is the
48             the logarithm to base 2 of the Pdelay_Req transmit
49             interval used when the port is initialized.";
50         reference
51         "14.8.23 of IEEE Std 802.1AS-2020";
52     }
53
54     leaf current-log-pdelay-req-interval {
55         type int8;
56         config false;
57         description
58             "Logarithm to base 2 of the current Pdelay_Req transmit
59             interval.";
```

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```

1         reference
2           "14.8.24 of IEEE Std 802.1AS-2020";
3     }
4
5     leaf use-mgt-log-pdelay-req-interval {
6         type boolean;
7         description
8           "Boolean that determines the source of the
9            Pdelay_Req transmit interval.
10           If the value is true, the Pdelay_Req transmit interval
11            (current-log-pdelay-req-interval) is set equal to the value
12            of mgt-log-pdelay-req-interval.
13           If the value is false, the Pdelay_Req transmit interval is
14            determined by the LinkDelayIntervalSetting state machine
15            (i.e., changed with Signaling message).";
16         reference
17           "14.8.25 of IEEE Std 802.1AS-2020";
18     }
19
20     leaf mgt-log-pdelay-req-interval {
21         type int8;
22         description
23           "Logarithm to base 2 of the Pdelay_Req transmit interval,
24            used if use-mgt-log-pdelay-req-interval is true.
25            This value is not used if use-mgt-log-pdelay-req-interval
26            is false.";
27         reference
28           "14.8.26 of IEEE Std 802.1AS-2020";
29     }
30
31     leaf initial-log-gptp-cap-interval {
32         type int8;
33         description
34           "When use-mgt-log-gptp-cap-interval is false
35            (i.e., change with Signaling message), this is the
36            the logarithm to base 2 of the gPTP capable message
37            interval used when the port is initialized.";
38         reference
39           "14.8.27 of IEEE Std 802.1AS-2020";
40     }
41
42     leaf current-log-gptp-cap-interval {
43         type int8;
44         config false;
45         description
46           "Logarithm to base 2 of the current gPTP capable message
47            interval.";
48         reference
49           "14.8.28 of IEEE Std 802.1AS-2020";
50     }
51
52     leaf use-mgt-log-gptp-cap-interval {
53         type boolean;
54         description
55           "Boolean that determines the source of the
56            gPTP capable message interval.
57           If the value is true, the gPTP capable message interval
58            (current-log-gptp-cap-interval) is set equal to the value
59            of mgt-gptp-cap-req-interval.

```

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```

1         If the value is false, the gPTP capable message interval is
2         determined by the GptpCapableMessageIntervalSetting
3         state machine (i.e., changed with Signaling message).";
4     reference
5         "14.8.29 of IEEE Std 802.1AS-2020";
6 }
7
8 leaf mgt-log-gptp-cap-interval {
9     type int8;
10    description
11        "Logarithm to base 2 of the gPTP capable message interval,
12        used if use-mgt-log-gptp-cap-interval is true.
13        This value is not used if use-mgt-log-pdelay-req-interval
14        is false.";
15    reference
16        "14.8.30 of IEEE Std 802.1AS-2020";
17 }
18
19 leaf initial-compute-rate-ratio {
20     type int8;
21     description
22         "When use-mgt-compute-rate-ratio is false
23         (i.e., change with Signaling message), this is the
24         initial value of computeNeighborRateRatio.";
25     reference
26         "14.8.31 of IEEE Std 802.1AS-2020";
27 }
28
29 leaf current-compute-rate-ratio {
30     type int8;
31     config false;
32     description
33         "Current value of computeNeighborRateRatio.";
34     reference
35         "14.8.32 of IEEE Std 802.1AS-2020";
36 }
37
38 leaf use-mgt-compute-rate-ratio {
39     type boolean;
40     description
41         "Boolean that determines the source of
42         computeNeighborRateRatio..
43         If the value is true, computeNeighborRateRatio
44         is set equal to the value of mgt-compute-rate-ratio.
45         If the value is false, computeNeighborRateRatio is
46         determined by the LinkDelayIntervalSetting
47         state machine (i.e., changed with Signaling message).";
48     reference
49         "14.8.33 of IEEE Std 802.1AS-2020";
50 }
51
52 leaf mgt-compute-rate-ratio {
53     type int8;
54     description
55         "Value of computeNeighborRateRatio, used if
56         use-mgt-compute-rate-ratio is true.
57         This value is not used if use-mgt-compute-rate-ratio
58         is false.";
59     reference

```

```
1         "14.8.34 of IEEE Std 802.1AS-2020";
2     }
3
4     leaf initial-compute-mean-link-delay {
5         type int8;
6         description
7             "When use-mgt-compute-mean-link-delay is false
8             (i.e., change with Signaling message), this is the
9             initial value of computeMeanLinkDelay.";
10        reference
11            "14.8.35 of IEEE Std 802.1AS-2020";
12    }
13
14    leaf current-compute-mean-link-delay {
15        type int8;
16        config false;
17        description
18            "Current value of computeMeanLinkDelay.";
19        reference
20            "14.8.36 of IEEE Std 802.1AS-2020";
21    }
22
23    leaf use-mgt-compute-mean-link-delay {
24        type boolean;
25        description
26            "Boolean that determines the source of
27            computeMeanLinkDelay.
28            If the value is true, computeMeanLinkDelay
29            is set equal to the value of mgt-compute-mean-link-delay.
30            If the value is false, computeMeanLinkDelay is
31            determined by the LinkDelayIntervalSetting
32            state machine (i.e., changed with Signaling message).";
33        reference
34            "14.8.37 of IEEE Std 802.1AS-2020";
35    }
36
37    leaf mgt-compute-mean-link-delay {
38        type int8;
39        description
40            "Value of computeMeanLinkDelay, used if
41            use-mgt-compute-mean-link-delay is true.
42            This value is not used if use-mgt-compute-mean-link-delay
43            is false.";
44        reference
45            "14.8.38 of IEEE Std 802.1AS-2020";
46    }
47
48    leaf allowed-lost-responses {
49        type uint8;
50        description
51            "Number of Pdelay_Req messages for which a valid response
52            is not received, above which a port is considered to not
53            be exchanging peer delay messages with its neighbor.";
54        reference
55            "14.8.39 of IEEE Std 802.1AS-2020";
56    }
57
58    leaf allowed-faults {
59        type uint8;
```

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```
1      description
2        "Number of faults above which asCapable is set to false.";
3      reference
4        "14.8.40 of IEEE Std 802.1AS-2020";
5    }
6
7    leaf gtp-cap-receipt-timeout {
8      type uint8;
9      description
10       "Number of transmission intervals that a port waits without
11       receiving the gTP capable TLV, before assuming that the
12       neighbor port is no longer invoking the gTP protocol.";
13      reference
14        "14.8.41 of IEEE Std 802.1AS-2020";
15    }
16
17    leaf nup {
18      type float64;
19      description
20       "For an OLT port of an IEEE Std 802.3 EPON link, this value
21       is the effective index of refraction for the EPON
22       upstream wavelength light of the optical path";
23      reference
24        "14.8.43 of IEEE Std 802.1AS-2020";
25    }
26
27    leaf ndown {
28      type float64;
29      description
30       "For an OLT port of an IEEE 802.3 EPON link, this value
31       is the effective index of refraction for the EPON
32       downstream wavelength light of the optical path";
33      reference
34        "14.8.44 of IEEE Std 802.1AS-2020";
35    }
36
37    leaf one-step-tx-oper {
38      type boolean;
39      config false;
40      description
41       "This value is true if the port is sending one-step
42       Sync messages, and false if the port is sending
43       two-step Sync and Follow-Up messages.";
44      reference
45        "14.8.45 of IEEE Std 802.1AS-2020";
46    }
47
48    leaf one-step-receive {
49      type boolean;
50      config false;
51      description
52       "This value is true if the port is capable of
53       receiving and processing one-step Sync messages.";
54      reference
55        "14.8.46 of IEEE Std 802.1AS-2020";
56    }
57
58    leaf one-step-transmit {
59      type boolean;
```

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```

1      config false;
2      description
3          "This value is true if the port is capable of
4          transmitting one-step Sync messages.";
5      reference
6          "14.8.47 of IEEE Std 802.1AS-2020";
7  }
8
9  leaf initial-one-step-tx-oper {
10     type int8;
11     description
12         "When use-mgt-one-step-tx-oper is false
13         (i.e., change with Signaling message), this is the
14         initial value of current-one-step-tx-oper.";
15     reference
16         "14.8.48 of IEEE Std 802.1AS-2020";
17 }
18
19 leaf current-one-step-tx-oper {
20     type int8;
21     config false;
22     description
23         "This value is true if the port is configured to
24         transmit one-step Sync messages, either via management
25         (mgt-one-step-tx-oper) or Signaling. If both
26         current-one-step-tx-oper and one-step-transmit
27         are true, the port transmits one-step Sync messages
28         (i.e., one-step-tx-oper true).";
29     reference
30         "14.8.49 of IEEE Std 802.1AS-2020";
31 }
32
33 leaf use-mgt-one-step-tx-oper {
34     type boolean;
35     description
36         "Boolean that determines the source of
37         current-one-step-tx-oper.
38         If the value is true, current-one-step-tx-oper
39         is set equal to the value of mgt-one-step-tx-oper.
40         If the value is false, current-one-step-tx-oper is
41         determined by the OneStepTxOperSetting
42         state machine (i.e., changed with Signaling message).";
43     reference
44         "14.8.50 of IEEE Std 802.1AS-2020";
45 }
46
47 leaf mgt-one-step-tx-oper {
48     type int8;
49     description
50         "If use-mgt-one-step-tx-oper is true,
51         current-one-step-tx-oper is set equal to this value.
52         This value is not used if use-mgt-one-step-tx-oper
53         is false.";
54     reference
55         "14.8.51 of IEEE Std 802.1AS-2020";
56 }
57
58 leaf sync-locked {
59     type boolean;

```

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```

1      config false;
2      description
3          "This value is true if the port will transmit a Sync as
4          soon as possible after the timeReceiver port receives a Sync
5          message.";
6      reference
7          "14.8.52 of IEEE Std 802.1AS-2020";
8  }
9
10     leaf-list pdelay-truncated-timestamps {
11         type uint64 {
12             range "0..281474976710655";
13         }
14         config false;
15         description
16             "For full-duplex IEEE Std 802.3 media, and CSN media that use
17             the peer-to-peer delay mechanism to measure path delay,
18             the values of the four elements of this leaf-list correspond
19             to the timestamps t1, t2, t3, and t4, listed in that order.
20             Each timestamp is expressed in units of 2-16 ns (i.e., the
21             value of each array element is equal to the remainder obtained
22             upon dividing the respective timestamp, expressed in units of
23             2-16 ns, by 248). At any given time, the timestamp values
24             stored in the array are for the same, and most recently
25             completed, peer delay message exchange. For each timestamp,
26             only 48-bits are valid (the upper 16-bits are always zero).";
27         reference
28             "14.8.53 of IEEE Std 802.1AS-2020";
29     }
30 }
31
32 augment "/ptp:ptp/ptp:instances/ptp:instance/ptp:ports/ptp:port" {
33     description
34         "Augment to add port-statistics-ds to IEEE Std 1588 PTP Port.";
35
36     container port-statistics-ds {
37         description
38             "Provides counters associated with the port of the
39             PTP Instance.";
40         reference
41             "14.10 of IEEE Std 802.1AS-2020";
42
43         leaf rx-sync-count {
44             type yang:counter32;
45             config false;
46             description
47                 "Counter that increments every time synchronization
48                 information is received.";
49             reference
50                 "14.10.2 of IEEE Std 802.1AS-2020";
51         }
52
53         leaf rx-one-step-sync-count {
54             type yang:counter32;
55             config false;
56             description
57                 "Counter that increments every time a one-step Sync
58                 message is received.";
59             reference

```

```
1         "14.10.3 of IEEE Std 802.1AS-2020";
2     }
3
4     leaf rx-follow-up-count {
5         type yang:counter32;
6         config false;
7         description
8             "Counter that increments every time a Follow_Up
9             message is received.";
10        reference
11            "14.10.4 of IEEE Std 802.1AS-2020";
12    }
13
14    leaf rx-pdelay-req-count {
15        type yang:counter32;
16        config false;
17        description
18            "Counter that increments every time a Pdelay_Req
19            message is received.";
20        reference
21            "14.10.5 of IEEE Std 802.1AS-2020";
22    }
23
24    leaf rx-pdelay-resp-count {
25        type yang:counter32;
26        config false;
27        description
28            "Counter that increments every time a Pdelay_Resp
29            message is received.";
30        reference
31            "14.10.6 of IEEE Std 802.1AS-2020";
32    }
33
34    leaf rx-pdelay-resp-follow-up-count {
35        type yang:counter32;
36        config false;
37        description
38            "Counter that increments every time a Pdelay_Resp_Follow_Up
39            message is received.";
40        reference
41            "14.10.7 of IEEE Std 802.1AS-2020";
42    }
43
44    leaf rx-announce-count {
45        type yang:counter32;
46        config false;
47        description
48            "Counter that increments every time an Announce
49            message is received.";
50        reference
51            "14.10.8 of IEEE Std 802.1AS-2020";
52    }
53
54    leaf rx-packet-discard-count {
55        type yang:counter32;
56        config false;
57        description
58            "Counter that increments every time a PTP message
59            of the respective PTP Instance is discarded.";
```



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```

1         reference
2           "14.10.9 of IEEE Std 802.1AS-2020";
3     }
4
5     leaf sync-receipt-timeout-count {
6       type yang:counter32;
7       config false;
8       description
9         "Counter that increments every time a sync receipt
10        timeout occurs.";
11       reference
12         "14.10.10 of IEEE Std 802.1AS-2020";
13     }
14
15     leaf announce-receipt-timeout-count {
16       type yang:counter32;
17       config false;
18       description
19         "Counter that increments every time an announce receipt
20        timeout occurs.";
21       reference
22         "14.10.11 of IEEE Std 802.1AS-2020";
23     }
24
25     leaf pdelay-allowed-lost-exceeded-count {
26       type yang:counter32;
27       config false;
28       description
29         "Counter that increments every time the value of the
30        variable lostResponses exceeds the value of the variable
31        allowedLostResponses, in the RESET state of the
32        MDPdelayReq state machine.";
33       reference
34         "14.10.12 of IEEE Std 802.1AS-2020";
35     }
36
37     leaf tx-sync-count {
38       type yang:counter32;
39       config false;
40       description
41         "Counter that increments every time synchronization
42        information is transmitted.";
43       reference
44         "14.10.13 of IEEE Std 802.1AS-2020";
45     }
46
47     leaf tx-one-step-sync-count {
48       type yang:counter32;
49       config false;
50       description
51         "Counter that increments every time a one-step Sync
52        message is transmitted.";
53       reference
54         "14.10.14 of IEEE Std 802.1AS-2020";
55     }
56
57     leaf tx-follow-up-count {
58       type yang:counter32;
59       config false;

```

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```

1      description
2          "Counter that increments every time a Follow_Up
3          message is transmitted.";
4      reference
5          "14.10.15 of IEEE Std 802.1AS-2020";
6  }
7
8      leaf tx-pdelay-req-count {
9          type yang:counter32;
10         config false;
11         description
12             "Counter that increments every time a Pdelay_Req
13             message is transmitted.";
14         reference
15             "14.10.16 of IEEE Std 802.1AS-2020";
16     }
17
18     leaf tx-pdelay-resp-count {
19         type yang:counter32;
20         config false;
21         description
22             "Counter that increments every time a Pdelay_Resp
23             message is transmitted.";
24         reference
25             "14.10.17 of IEEE Std 802.1AS-2020 14.10.17";
26     }
27
28     leaf tx-pdelay-resp-follow-up-count {
29         type yang:counter32;
30         config false;
31         description
32             "Counter that increments every time a Pdelay_Resp_Follow_Up
33             message is transmitted.";
34         reference
35             "14.10.18 of IEEE Std 802.1AS-2020";
36     }
37
38     leaf tx-announce-count {
39         type yang:counter32;
40         config false;
41         description
42             "Counter that increments every time an Announce
43             message is transmitted.";
44         reference
45             "14.10.19 of IEEE Std 802.1AS-2020";
46     }
47 }
48
49 augment "/ptp:ptp/ptp:instances/ptp:instance/ptp:ports/ptp:port" {
50     description
51         "Augment to add asymmetry-measurement-mode-ds to
52         IEEE Std 1588 PTP Port.";
53
54     container asymmetry-measurement-mode-ds {
55         description
56             "Represents the capability to enable/disable the Asymmetry
57             Compensation Measurement Procedure on a PTP Port.
58             This data set is used instead of the CMLDS

```

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```

1      asymmetry-measurement-mode-ds when only a single PTP
2      Instance is present (i.e., CMLDS is not used).";
3      reference
4      "14.13 of IEEE Std 802.1AS-2020
5      Annex G of IEEE Std 802.1AS-2020";
6
7      leaf enabled {
8          type boolean;
9          description
10             "For full-duplex IEEE Std 802.3 media, the value is true
11             if an asymmetry measurement is being performed for the
12             link attached to this PTP Port, and false otherwise.
13             For all other media, the value shall be false.";
14     }
15 }
16
17 augment "/ptp:ptp/ptp:common-services/ptp:cmllds/ptp:ports/ptp:port/ptp:link-
18 port-ds" {
19     description
20         "Augment IEEE Std 1588 cmlldsLinkPortDS.
21
22         14.16.9 of IEEE Std 802.1AS-2020 specifies neighborRateRatio
23         (neighbor-rate-ratio), which is provided in YANG as the
24         semantically equivalent node in ieee1588-ptp named
25         scaled-neighbor-rate-ratio (in link-port-ds).";
26
27     leaf cmllds-link-port-enabled {
28         type boolean;
29         config false;
30         description
31             "Boolean that is true if both delay-mechanism is common-p2p
32             and the value of ptp-port-enabled is true, for at least one
33             PTP Port that uses the CMLDS; otherwise, the value is false.";
34         reference
35             "11.2.18.1 of IEEE Std 802.1AS-2020
36             14.16.3 of IEEE Std 802.1AS-2020";
37     }
38
39     leaf is-measuring-delay {
40         type boolean;
41         config false;
42         description
43             "This leaf is analogous to is-measuring-delay
44             for a PTP Port, but applicable to this Link Port.";
45         reference
46             "14.16.4 of IEEE Std 802.1AS-2020";
47     }
48
49     leaf as-capable-across-domains {
50         type boolean;
51         config false;
52         description
53             "This leaf is true when all PTP Instances (domains)
54             for this Link Port detect proper exchange of Pdelay
55             messages.";
56         reference
57             "11.2.2 of IEEE Std 802.1AS-2020
58             14.16.5 of IEEE Std 802.1AS-2020";
59     }

```

```

1      }
2
3      leaf mean-link-delay-thresh {
4          type ptp:time-interval;
5          description
6              "Propagation time threshold for mean-link-delay,
7               above which a Link Port is not considered capable of
8               participating in the IEEE Std 802.1AS protocol.";
9          reference
10             "14.16.7 of IEEE Std 802.1AS-2020";
11     }
12
13     leaf initial-log-pdelay-req-interval {
14         type int8;
15         description
16             "This leaf is analogous to initial-log-pdelay-req-interval
17              for a PTP Port, but applicable to this Link Port.";
18         reference
19             "14.16.10 of IEEE Std 802.1AS-2020";
20     }
21
22     leaf current-log-pdelay-req-interval {
23         type int8;
24         config false;
25         description
26             "This leaf is analogous to current-log-pdelay-req-interval
27              for a PTP Port, but applicable to this Link Port.";
28         reference
29             "14.16.11 of IEEE Std 802.1AS-2020";
30     }
31
32     leaf use-mgt-log-pdelay-req-interval {
33         type boolean;
34         description
35             "This leaf is analogous to use-mgt-log-pdelay-req-interval
36              for a PTP Port, but applicable to this Link Port.";
37         reference
38             "14.16.12 of IEEE Std 802.1AS-2020";
39     }
40
41     leaf mgt-log-pdelay-req-interval {
42         type int8;
43         description
44             "This leaf is analogous to mgt-log-pdelay-req-interval
45              for a PTP Port, but applicable to this Link Port.";
46         reference
47             "14.16.13 of IEEE Std 802.1AS-2020";
48     }
49
50     leaf initial-compute-rate-ratio {
51         type int8;
52         description
53             "This leaf is analogous to initial-compute-rate-ratio
54              for a PTP Port, but applicable to this Link Port.";
55         reference
56             "14.16.14 of IEEE Std 802.1AS-2020";
57     }
58
59     leaf current-compute-rate-ratio {

```

```
1      type int8;
2      config false;
3      description
4          "This leaf is analogous to current-compute-rate-ratio
5          for a PTP Port, but applicable to this Link Port.";
6      reference
7          "14.16.15 of IEEE Std 802.1AS-2020";
8  }
9
10     leaf use-mgt-compute-rate-ratio {
11         type boolean;
12         description
13             "This leaf is analogous to use-mgt-compute-rate-ratio
14             for a PTP Port, but applicable to this Link Port.";
15         reference
16             "14.16.16 of IEEE Std 802.1AS-2020";
17     }
18
19     leaf mgt-compute-rate-ratio {
20         type int8;
21         description
22             "This leaf is analogous to mgt-compute-rate-ratio
23             for a PTP Port, but applicable to this Link Port.";
24         reference
25             "14.16.17 of IEEE Std 802.1AS-2020";
26     }
27
28     leaf initial-compute-mean-link-delay {
29         type int8;
30         description
31             "This leaf is analogous to initial-compute-mean-link-delay
32             for a PTP Port, but applicable to this Link Port.";
33         reference
34             "14.16.18 of IEEE Std 802.1AS-2020";
35     }
36
37     leaf current-compute-mean-link-delay {
38         type int8;
39         config false;
40         description
41             "This leaf is analogous to current-compute-mean-link-delay
42             for a PTP Port, but applicable to this Link Port.";
43         reference
44             "14.16.19 of IEEE Std 802.1AS-2020";
45     }
46
47     leaf use-mgt-compute-mean-link-delay {
48         type boolean;
49         description
50             "This leaf is analogous to use-mgt-compute-mean-link-delay
51             for a PTP Port, but applicable to this Link Port.";
52         reference
53             "14.16.20 of IEEE Std 802.1AS-2020";
54     }
55
56     leaf mgt-compute-mean-link-delay {
57         type int8;
58         description
59             "This leaf is analogous to mgt-compute-mean-link-delay
```

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```

1         for a PTP Port, but applicable to this Link Port.";
2     reference
3         "14.16.21 of IEEE Std 802.1AS-2020";
4 }
5
6     leaf allowed-lost-responses {
7         type uint8;
8         description
9             "This leaf is analogous to allowed-lost-responses
10            for a PTP Port, but applicable to this Link Port.";
11        reference
12            "14.16.22 of IEEE Std 802.1AS-2020";
13    }
14
15    leaf allowed-faults {
16        type uint8;
17        description
18            "This leaf is analogous to allowed-faults
19            for a PTP Port, but applicable to this Link Port.";
20        reference
21            "14.16.23 of IEEE Std 802.1AS-2020";
22    }
23
24    leaf-list pdelay-truncated-timestamps {
25        type uint64 {
26            range "0..281474976710655";
27        }
28        config false;
29        description
30            "This leaf is analogous to pdelay-truncated-timestamps
31            for a PTP Port, but applicable to this Link Port.";
32        reference
33            "14.16.25 of IEEE Std 802.1AS-2020";
34    }
35 }
36
37 augment "/ptp:ptp/ptp:common-services/ptp:cmllds/ptp:ports/ptp:port" {
38     description
39         "Augment to add port-statistics-ds to IEEE Std 1588 Link Port.";
40
41     container port-statistics-ds {
42         description
43             "This container is analogous to port-statistics-ds
44             for a PTP Port, but applicable to this Link Port.";
45         reference
46             "14.17 of IEEE Std 802.1AS-2020";
47
48         leaf rx-pdelay-req-count {
49             type yang:counter32;
50             config false;
51             description
52                 "This leaf is analogous to rx-pdelay-req-count
53                 for a PTP Port, but applicable to this Link Port.";
54             reference
55                 "14.17.2 of IEEE Std 802.1AS-2020";
56         }
57
58         leaf rx-pdelay-resp-count {
59             type yang:counter32;

```

```
1      config false;
2      description
3          "This leaf is analogous to rx-pdelay-resp-count
4          for a PTP Port, but applicable to this Link Port.";
5      reference
6          "14.17.3 of IEEE Std 802.1AS-2020";
7  }
8
9  leaf rx-pdelay-resp-follow-up-count {
10     type yang:counter32;
11     config false;
12     description
13         "This leaf is analogous to rx-pdelay-resp-follow-up-count
14         for a PTP Port, but applicable to this Link Port.";
15     reference
16         "14.17.4 of IEEE Std 802.1AS-2020";
17 }
18
19 leaf rx-packet-discard-count {
20     type yang:counter32;
21     config false;
22     description
23         "This leaf is analogous to rx-packet-discard-count
24         for a PTP Port, but applicable to this Link Port.";
25     reference
26         "14.17.5 of IEEE Std 802.1AS-2020";
27 }
28
29 leaf pdelay-allowed-lost-exceeded-count {
30     type yang:counter32;
31     config false;
32     description
33         "This leaf is analogous to
34         pdelay-allowed-lost-exceeded-count
35         for a PTP Port, but applicable to this Link Port.";
36     reference
37         "14.17.6 of IEEE Std 802.1AS-2020";
38 }
39
40 leaf tx-pdelay-req-count {
41     type yang:counter32;
42     config false;
43     description
44         "This leaf is analogous to tx-pdelay-req-count
45         for a PTP Port, but applicable to this Link Port.";
46     reference
47         "14.17.7 of IEEE Std 802.1AS-2020";
48 }
49
50 leaf tx-pdelay-resp-count {
51     type yang:counter32;
52     config false;
53     description
54         "This leaf is analogous to tx-pdelay-resp-count
55         for a PTP Port, but applicable to this Link Port.";
56     reference
57         "14.17.8 of IEEE Std 802.1AS-2020";
58 }
```

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```
1         leaf tx-pdelay-resp-follow-up-count {
2             type yang:counter32;
3             config false;
4             description
5                 "This leaf is analogous to tx-pdelay-resp-follow-up-count
6                 for a PTP Port, but applicable to this Link Port.";
7             reference
8                 "14.17.9 of IEEE Std 802.1AS-2020";
9         }
10    }
11
12    augment "/ptp:ptp/ptp:common-services/ptp:cmls/ptp:ports/ptp:port" {
13        description
14            "Augment to add asymmetry-measurement-mode-ds to
15            IEEE Std 1588 Link Port.";
16
17        container asymmetry-measurement-mode-ds {
18            description
19                "This container is analogous to asymmetry-measurement-mode-ds
20                for a PTP Port, but applicable to this Link Port.";
21            reference
22                "14.18 of IEEE Std 802.1AS-2020";
23
24            leaf enabled {
25                type boolean;
26                description
27                    "This leaf is analogous to
28                    asymmetry-measurement-mode-ds.enabled
29                    for a PTP Port, but applicable to this Link Port.";
30            }
31        }
32    }
33
34
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```



## Annex A

(normative)

### Protocol Implementation Conformance Statement (PICS) proforma<sup>3</sup>

#### A.19 Remote management

*Insert the following row at the end of the table in A.19:*

Item	Feature	Status	References	Support
RMGT-4	If a remote management protocol that supports YANG is listed in RMGT-2, is the YANG data model of Clause 17 supported?	RMGT:O	item k) 4) of 5.4.2, Clause 17	Yes [ ]    No [ ]

<sup>3</sup> Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this annex so that it can be used for its intended purpose and may further publish the completed PICS.

## Annex F

(informative)

### PTP profile included in this standard

#### F.4 PTP options

*Change F.4 c) as follows:*

- c) The management mechanism is the mechanism specified in Clause 14 ~~and~~, Clause 15, and  
Clause 17.

## Annex H

(informative)

### Bibliography

*Insert the following bibliography references in alphanumeric order:*

[B40] IETF RFC 6087, Guidelines for Authors and Reviewers of YANG Data Model Documents, January 2011.

[B41] IETF RFC 6241, Network Configuration Protocol (NETCONF), June 2011.

[B42] IETF RFC 6242, Using the NETCONF Protocol over Secure Shell (SSH), June 2011.

[B43] IETF RFC 8341, Network Configuration Access Control Model, March 2018.

[B44] IETF RFC 7589, Using the NETCONF Protocol over Transport Layer Security (TLS) with Mutual X.509 Authentication, June 2015.

[B45] IETF RFC 7950, The YANG 1.1 Data Modeling Language, August 2016.

[B46] IETF RFC 8040, RESTCONF Protocol, January 2017.

[B47] IETF RFC 8340, YANG Tree Diagrams, March 2018.

[B48] IETF RFC 8575, YANG Data Model for the Precision Time Protocol (PTP).

[B49] OMG Unified Modeling Language (OMG UML), Version 2.5, March 2015.