P802.1ASdr/D1.2
April 17, 2023
(Amendment to IEEE Std 802.1AS™-2020
as modified by IEEE Std 802.1AS™-2020/Cor 1 - 2021)

Draft Standard for Local and metropolitan area networks—

Timing and Synchronization for Time-Sensitive Applications

Amendment: Inclusive Terminology

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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.

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

The complete amendment PAR, as approved by IEEE NesCom 3rd June 2020, can be found at:

https://development.standards.ieee.org/myproject-web/public/view.html#pardetail/8208

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 changes the non-inclusive, insensitive, and deprecated terminology including those identified by IEEE P1588g and IEEE editorial staff, replacing them with their suitable terminology wherever possible.

Need for the Project:

IEEE Std 802.1AS-2020, includes a profile of IEEE Std 1588-2019, and uses non-inclusive terms to describe port states and clock roles in a Precision Time Protocol (PTP) network. IEEE SA has recently resolved that IEEE standards should be written in such a way as to avoid non-inclusive and insensitive terminology. IEEE P1588g is developing a consensus on the preferred alternative terminology. In order to avoid confusion in industry, this project selects from the IEEE P1588g alternative terms to describe PTP functionality.

Criteria for Standards Development:

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

https://mentor.ieee.org/802-ec/dcn/21/ec-21-0097-00-ACSD-p802-1asdr.pdf

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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.[1]

[1]Notes in text, tables, and figures are given for information only, and do not contain requirements needed to implement the standard.

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Prepared by the
MaintenanceTask Group of IEEE 802.1

Sponsor
LAN/MAN Standards Committee
of the
IEEE Computer Society

IEEE Standards Activities Department
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Abstract: This amendment to IEEE Std 802.1AS™-2020 replaces terminology with alternative terminology identified by IEEE Std 1588g-2022. All changes made in figures are only to replace terminology.

Keywords: best timeTransmitter, frequency offset, Grandmaster Clock, Grandmaster PTP Instance, PTP End Instance, PTP Relay Instance, IEEE 802.1AS™, phase offset, synchronization, syntonization, time-aware system

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Geoffrey Garner, *Editor IEEE Std 802.1AS*
Silvana Rodrigues, *Editor P802.1ASdr*

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Introduction

This introduction is not part of IEEE Std 802.1ASdr™-20xx, IEEE Standard for Local and metropolitan area networks—Timing and Synchronization for Time-Sensitive Applications—Amendment: Inclusive Terminology

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. A corrigendum, IEEE Std 802.1AS™-2020/Cor1-2021, provides technical and editorial corrections.

This amendment to IEEE Std 802.1AS™-2020 replaces terminology with alternative terminology identified by IEEE Std 1588g-2022. All changes made in figures are only to replace terminology.

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IEEE Standard for
Local and Metropolitan Area Networks—

Timing and Synchronization for Time-Sensitive Applications

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1. Overview

1.1 Scope

This standard specifies protocols, procedures, and managed objects used to ensure that the synchronization requirements are met for time-sensitive applications, such as audio, video, and time-sensitive control, across networks, for example, IEEE 802 and similar media. This includes the maintenance of synchronized time during normal operation and following addition, removal, or failure of network components and network reconfiguration. It specifies the use of IEEE 1588™ specifications where applicable in the context of IEEE Std 802.1Q™-2018.[1] Synchronization to an externally provided timing signal [e.g., a recognized timing standard such as Coordinated Universal Time (UTC) or International Atomic Time (TAI)] is not part of this standard but is not precluded.

1.2 Purpose

This standard enables systems to meet the respective jitter, wander, and time-synchronization requirements for time-sensitive applications, including those that involve multiple streams delivered to multiple end stations. To facilitate the widespread use of packet networks for these applications, synchronization information is one of the components needed at each network element where time-sensitive application data are mapped or demapped or a time-sensitive function is performed. This standard leverages the work of the IEEE 1588 Working Group by developing the additional specifications needed to address these requirements.

[1] Information on references can be found in Clause 2.

Change 4 as follows:

4. Acronyms and abbreviations

BT~~M~~C	best ~~master~~timeTransmitter clock
~~BMCA~~BTCA	best ~~master~~timeTransmitter clock algorithm

5. Conformance

5.4 PTP Instance requirements and options

5.4.1 Summary of requirements

Change 5.4.1 e) and f) as follows:

e) Implement the Clock~~Slave~~TimeReceiverSync state machine (10.2.13).

f) Support the following best ~~master~~timeTransmitter clock algorithm (~~BMCA~~BTCA) requirements:

1) Implement the ~~BMCA~~BTCA (10.3.1.1, 10.3.1.2, 10.3.2, 10.3.3, 10.3.4, 10.3.5, 10.3.6, 10.3.8, and 10.3.10).
2) For domain 0, implement specifications for externalPortConfigurationEnabled value of FALSE (10.3.1).
3) Implement the PortAnnounceReceive state machine (10.3.11).
4) Implement the PortAnnounceInformation state machine (10.3.12).
5) Implement the PortStateSelection state machine (10.3.13).
6) Have the ~~BMCA~~BTCA as the default mode of operation, with externalPortConfiguration FALSE, on domain 0.
7) Implement at least one of the possibilities for externalPortConfigurationEnabled (i.e., FALSE, meaning the ~~BMCA~~BTCA is used, and TRUE, meaning external port configuration is used) on domains other than domain 0.

5.4.2 PTP Instance options

Change 5.4.2 b), c), and l) as follows:

b) Support the following media-independent ~~master~~timeTransmitter capability on at least one PTP Port:

1) Implement the PortSyncSyncSend state machine (10.2.12).
2) Implement the PortAnnounceTransmit state machine (10.3.16).
3) Implement the AnnounceIntervalSetting state machine (10.3.17).
4) For transmit of the Announce message, support the message requirements as specified in 10.5, 10.6, and 10.7.

c) Support the following for Grandmaster PTP Instance capability:

1) Support the media-independent ~~master~~timeTransmitter capability specified in item b) of 5.4.2.
2) Support the requirements for a grandmaster-capable PTP Instance (10.1.3).
3) Implement the ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine (10.2.9).
4) Implement the ~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset state machine (10.2.10).
5) Implement the ~~ClockMasterReceive~~ClockTimeTransmitterReceive state machine (10.2.11).

l) Implement both ~~BMCA~~BTCA and external port configuration on domains other than domain 0; if both possibilities are implemented on domains other than domain 0, the default value of externalPortConfigurationEnabled shall be FALSE.

5.4.3 PTP Relay Instance requirements

Change 5.4.3 c) as follows:

c) Support the media-independent ~~master~~timeTransmitter capability specified in item b) of 5.4.2.

5.6 MAC-specific timing and synchronization methods for IEEE Std 802.11-2016

Change 5.6 b) as follows:

b) Support at least one of
   1) the media-dependent ~~master~~timeTransmitter state machines (12.5.1), or
   2) the media-dependent ~~slave~~timeReceiver state machine (12.5.2).

7. Time-synchronization model for a packet network

7.2 Architecture of a time-aware network

7.2.2 Time-aware network consisting of a single gPTP domain

Change the paragraph after Figure 7-1 and related footnote in 7.2.2 as follows:

Any PTP Instance with clock sourcing capabilities can be a potential Grandmaster PTP Instance, and a selection method (the *best ~~master~~timeTransmitter clock algorithm*, or ~~BMCA~~BTCA) ensures that all of the PTP Instances in a gPTP domain use the same Grandmaster PTP Instance.[2] The ~~BMCA~~BTCA is largely identical to that used in IEEE Std 1588-2019, but somewhat simplified. In Figure 7-1 the ~~BMCA~~BTCA process has resulted in the Grandmaster PTP Instance being on the network backbone. If, however, the access network fails, the systems on a local network automatically switch over to one of the potential Grandmaster PTP Instances on the local network that is as least as "good" as any other. For example, in Figure 7-2, the access network link has failed, and a potential Grandmaster PTP Instance that has a GNSS reference source has become the active Grandmaster PTP Instance. As a result, now two gPTP domains exist where there used to be one. Finally, note that when a time-aware system supports more than one domain, one of the domains supported must be domain 0 for backward compatibility with the 2011 edition of this standard, though domain 0 is not necessarily active in a time-aware system.:

7.2.3 Time-aware network consisting of multiple gPTP domains

Change the second paragraph in 7.2.3 as follows:

As in the single-domain case, any of the network technologies of 7.2.1 can be used. The Grandmaster PTP Instance of each domain is selected by the ~~BMCA~~BTCA; in this case, a separate, independent instance of the ~~BMCA~~BTCA is invoked in each domain.

7.2.4 Time-aware networks with redundant Grandmaster PTP Instances and/or redundant paths

Change 7.2.4.2 as follows:

7.2.4.2 Redundancy specified in this standard (~~BMCA~~BTCA)

This standard provides a basic level of redundancy as follows:

— A detection component that triggers when the current Grandmaster PTP Instance stops working (i.e., loss of Sync messages and Announce messages for a period of time) or if the link to the Grandmaster PTP Instance goes down (i.e., immediate loss of Sync messages and Announce messages).
— A correction component that triggers the Best ~~Master~~TimeTransmitter Clock Algorithm (~~BMCA~~BTCA) and the sending of Announce messages so that a new Grandmaster PTP Instance can be elected.
— An action component, where the winning Grandmaster PTP Instance starts sending Announce messages and Sync messages and all the PTP Instances listen to this new Grandmaster PTP Instance.

[2] There are, however, short periods during network reconfiguration when more than one Grandmaster PTP Instance might be active while the ~~BMCA~~BTCA process is taking place.

7.3 Time synchronization

Change 7.3.4 as follows:

7.3.4 Grandmaster PTP Instance (best ~~master~~timeTransmitter) selection and network establishment

All PTP Instances participate in best ~~master~~timeTransmitter selection so that the IEEE 802.1AS protocol can determine the synchronization spanning tree. This synchronization spanning tree can be different from the forwarding spanning tree determined by IEEE 802.1Q™ Rapid Spanning Tree Protocol (RSTP) since the spanning tree determined by RSTP can be suboptimal or even inadequate for synchronization or can be for a different topology of nodes from the synchronization spanning tree.

gPTP requires that all systems in the gPTP domain be time-aware systems, i.e., the protocol does not transfer timing over systems that are not time-aware (e.g., those that meet the requirements of IEEE Std 802.1Q-2018, but do NOT meet the requirements of the present standard). A time-aware system uses the peer-to-peer delay mechanism on each PTP Port to determine if a non-time-aware system is at the other end of the link or between itself and the Pdelay responder. If, on sending Pdelay_Req,

a) No response is received,
b) Multiple responses are received, or
c) The measured propagation delay exceeds a specified threshold, then

the protocol concludes that a non-time-aware system or end-to-end Transparent Clock (TC) (see IEEE Std 1588-2019) is present. In this case, the link attached to the PTP Port is deemed not capable of running gPTP, and the ~~BMCA~~BTCA ignores it. However, the PTP Port continues to attempt the measurement of propagation delay using the peer-to-peer delay mechanism (for full-duplex IEEE 802.3 links), multipoint control protocol (MPCP) messages (for EPON), or IEEE 802.11 messages (for IEEE 802.11 links), and periodically checks whether the link is or is not capable of running the IEEE 802.1AS protocol.

7.4 PTP Instance architecture

The model of a PTP Instance is shown in Figure 7-8

Replace Figure 7-8 with the following figure:.

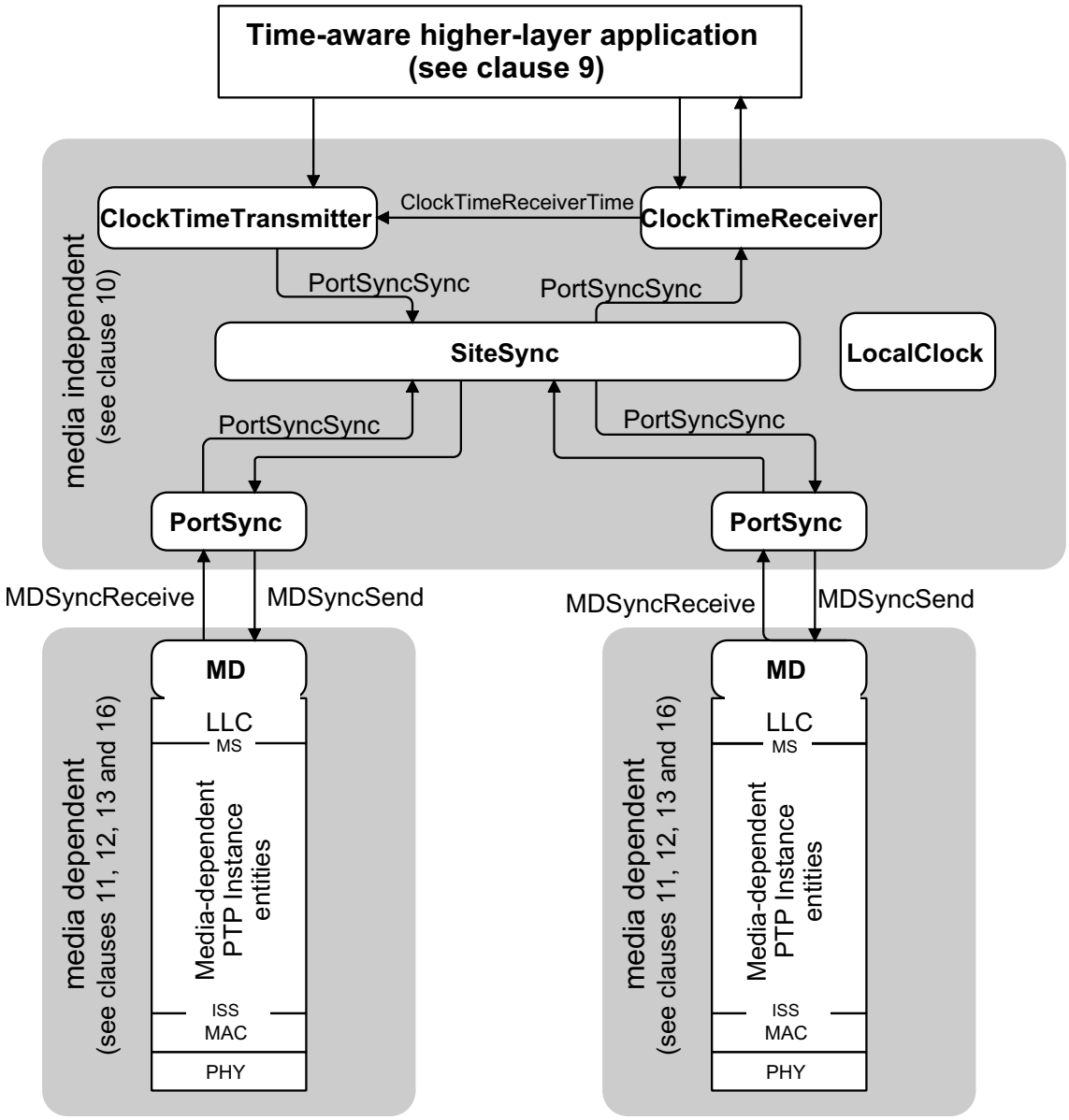

Figure 7-8—PTP Instance model

Change 7.4 b) as follows:

b) A single media-independent part that consists of ~~ClockMaster~~ClockTimeTransmitter, ~~ClockSlave~~ClockTimeReceiver, and SiteSync logical entities, one or more PortSync entities, and a LocalClock entity. The ~~BMCA~~BTCA and forwarding of time information between logical ports and the ~~ClockSlave~~ClockTimeReceiver and ~~ClockMaster~~ClockTimeTransmitter is done by the SiteSync

entity, while the computation of PTP Port-specific delays needed for time-synchronization correction is done by the PortSync entities.

7.5 Differences between gPTP (IEEE Std 802.1AS) and PTP (IEEE Std 1588-2019)

Change 7.5 c) 2) as follows:

c) In gPTP there are only two types of PTP Instances: PTP End Instances and PTP Relay Instances, while IEEE Std 1588-2019 has Ordinary Clocks, Boundary Clocks, end-to-end Transparent Clocks, and P2P Transparent Clocks. A PTP End Instance corresponds to an IEEE 1588 Ordinary Clock, and a PTP Relay Instance is a type of IEEE 1588 Boundary Clock where its operation is very tightly defined, so much so that a PTP Relay Instance with Ethernet ports can be shown to be mathematically equivalent to a P2P Transparent Clock in terms of how synchronization is performed, as shown in 11.1.3. In addition, a PTP Relay Instance can operate in a mode (i.e., the mode where the variable syncLocked is TRUE; see 10.2.5.15) where the PTP Relay Instance is equivalent to a P2P Transparent Clock in terms of when time-synchronization messages are sent. A time-aware system measures link delay and residence time and communicates these in a correction field. In summary, a PTP Relay Instance conforms to the specifications for a Boundary Clock in IEEE Std 1588-2019, but a PTP Relay Instance does not conform to the complete specifications for a P2P Transparent Clock in IEEE Std 1588-2019 because:

1) When syncLocked is FALSE, the PTP Relay Instance sends Sync according to the specifications for a Boundary Clock, and
2) The PTP Relay Instance invokes the ~~BMCA~~BTCA and has PTP Port states.

8. IEEE 802.1AS concepts and terminology

8.4 Messages

8.4.3 Generation of event message timestamps

Change 8.4.3 NOTE 2 as follows:

NOTE 2—In general, the timestamps can be generated at a timestamp measurement plane that is removed from the reference plane. Furthermore, the timestamp measurement plane, and therefore the time offset of this plane from the reference plane, is likely to be different for inbound and outbound event messages. To meet the requirement of this clause, the generated timestamps should be corrected for these offsets. Figure 8-2 illustrates these offsets. Based on this model the appropriate corrections are as follows:

egressTimestamp = egressMeasuredTimestamp + egressLatency

ingressTimestamp = ingressMeasuredTimestamp − ingressLatency

where the timestamps relative to the reference plane, egressTimestamp and ingressTimestamp, are computed from the timestamps relative to the timestamp measurement plane, egressMeasuredTimestamp and ingressMeasuredTimestamp, respectively, using their respective latencies, egressLatency and ingressLatency. Failure to make these corrections results in a time offset between the ~~slave~~timeReceiver and ~~master~~timeTransmitter clocks.

8.5 Ports

8.5.2 Port identity

8.5.2.3 Port number

Change second paragraph of 8.5.2.3 as follows:

The portNumber value 0 is assigned to the interface between the ~~ClockMaster~~ClockTimeTransmitter and ClockSource entities (see 10.1 and Figure 10-1). The value 0xFFFF is reserved.

8.6 PTP Instance characterization

8.6.1 PTP Instance type

Change NOTE in 8.6.1 as follows:

NOTE—Attributes c) through i) can be considered to be associated with the ~~ClockMaster~~ClockTimeTransmitter entity of the PTP Instance.

8.6.2 PTP Instance attributes

8.6.2.1 priority1

Change first paragraph of 8.6.2.1 as follows:

priority1 is used in the execution of the ~~BMCA~~BTCA (see 10.3). The value of priority1 is an integer selected from the range 0 through 255. The ordering of priority1 in the operation of the ~~BMCA~~BTCA (see 10.3.4 and 10.3.5) is specified as follows. A ~~ClockMaster~~ClockTimeTransmitter A shall be deemed better than a ~~ClockMaster~~ClockTimeTransmitter B if the value of priority1 of A is numerically less than that of B.

Change* NOTE 2, and NOTE 3 *of 8.6.2.1 as follows:

NOTE 2—The ~~BMCA~~BTCA (see 10.3) considers priority1 before other attributes; the priority1 attribute can therefore be used to force a desired ordering of PTP Instances for best ~~master~~timeTransmitter selection.

NOTE 3—The settings for priority1 in Table 8-1 guarantee that a PTP Instance that is grandmaster-capable is always preferred by the ~~BMCA~~BTCA over a PTP Instance that is not grandmaster-capable.

8.6.2.2 clockClass

Change first paragraph in 8.6.2.2 as follows:

The clockClass attribute denotes the traceability of the synchronized time distributed by a ~~ClockMaster~~ClockTimeTransmitter when it is the Grandmaster PTP Instance.

Change the paragraph after b) in 8.6.2.2 as follows:

The ordering of clockClass in the operation of the best ~~master~~timeTransmitter clock algorithm (see 10.3.4 and 10.3.5) is specified as follows. When comparing clockClass values, PTP Instance A shall be deemed better than PTP Instance B if the value of the clockClass of A is lower than that of B.

8.6.2.3 clockAccuracy

Change first paragraph in 8.6.2.3 as follows:

The clockAccuracy attribute indicates the expected time accuracy of a ~~ClockMaster~~ClockTimeTransmitter.

Change paragraph after b) in 8.6.2.3 as follows:

The ordering of clockAccuracy in the operation of the best ~~master~~timeTransmitter clock algorithm (see 10.3.4 and 10.3.5) is specified as follows. When comparing clockAccuracy values, PTP Instance A shall be deemed better than PTP Instance B if the value of the clockAccuracy of A is lower than that of B.

8.6.2.4 offsetScaledLogVariance

Change first paragraph in 8.6.2.4 as follows:

The offsetScaledLogVariance is a scaled, offset representation of an estimate of the PTP variance. The PTP variance characterizes the precision and frequency stability of the ~~ClockMaster~~ClockTimeTransmitter. The PTP variance is the square of PTP Deviation (PTPDEV) (see B.1.3.2).

Change paragraph after b) in 8.6.2.4 as follows:

The ordering of offsetScaledLogVariance in the operation of the best ~~master~~timeTransmitter clock algorithm (see 10.3.4 and 10.3.5) is specified as follows. When comparing offsetScaledLogVariance values, PTP Instance A shall be deemed better than PTP Instance B if the value of the offsetScaledLogVariance of A is lower than that of B.

8.6.2.5 priority2

Change the first paragraph in 8.6.2.5 as follows:

priority2 is used in the execution of the ~~BMCA~~BTCA (see 10.3). The value of priority2 shall be an integer selected from the range 0 through 255. The ordering of priority2 in the operation of the ~~BMCA~~BTCA is the same as the ordering of priority1 (see 8.6.2.1).

Change the NOTE in 8.6.2.5 as follows:

NOTE—IEEE 802.1AS performance is improved when the number of hops between the Grandmaster PTP Instance and a ~~slave~~timeReceiver PTP End Instance is reduced. When ~~BMCA~~BTCA attributes are equal in a network, the preceding recommendations for priority2 select a PTP Relay Instance in order to reduce the number of hops (rather than use clockIdentity alone).

8.6.2.7 timeSource

Change the first paragraph in 8.6.2.7 as follows:

The timeSource is an information only attribute indicating the type of source of time used by a ~~ClockMaster~~ClockTimeTransmitter. The value is not used in the selection of the Grandmaster PTP Instance. The data type of timeSource shall be TimeSource, which is an Enumeration8. The values of TimeSource are specified in Table 8-2. These represent categories. For example, the global positioning system (GPS) entry includes not only the GPS system of the U.S. Department of Defense but the European Galileo system and other present and future GNSSs.

9. Application interfaces

9.1 Overview of the interfaces

Change second paragraph in 9.1 as follows:

The following subclauses define one application interface between the ClockSource entity and ~~ClockMaster~~ClockTimeTransmitter entity (see 10.1.2) and four application interfaces between the ClockTarget entity and ~~ClockSlave~~ClockTimeReceiver entity (see 10.1.2). The ClockSource is an entity that can be used as an external timing source for the gPTP domain. The ClockSource entity either contains or has access to a clock (see 3.3). The ClockTarget entity represents any application that uses information provided by the ~~ClockSlave~~ClockTimeReceiver entity via any of the application interfaces.

Replace Figure 9-1 with the following figure:

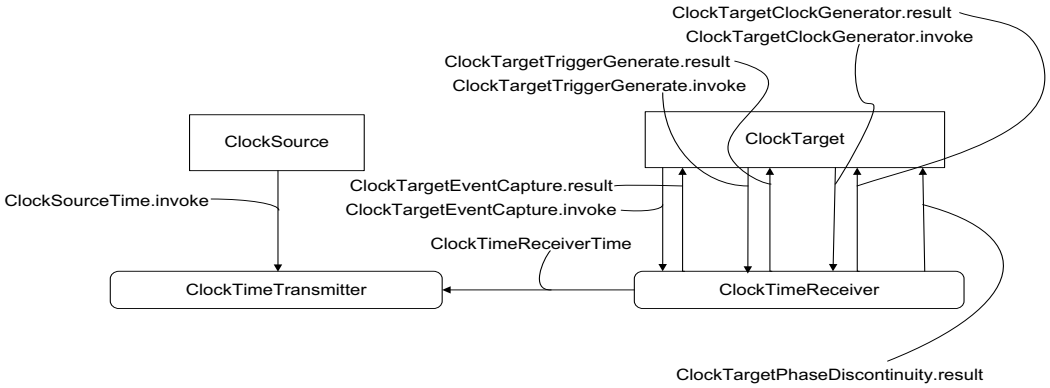

Figure 9-1—Application interfaces

9.2 ClockSourceTime interface

Change 9.2.1 as follows:

9.2.1 General

This interface is used by the ClockSource entity to provide time to the ~~ClockMaster~~ClockTimeTransmitter entity of a PTP Instance. The ClockSource entity invokes the ClockSourceTime.invoke function. The function provides the time, relative to the ClockSource, at which the function was invoked.

9.3 ClockTargetEventCapture interface

Change 9.3.1 as follows:

9.3.1 General

This interface is used by the ClockTarget entity to request the synchronized time of an event that it signals to the ~~ClockSlave~~ClockTimeReceiver entity of a PTP Instance. The ClockTarget entity invokes the

ClockTargetEventCapture.invoke function to signal an event to the ~~ClockSlave~~ClockTimeReceiver entity. The ~~ClockSlave~~ClockTimeReceiver entity invokes the ClockTargetEventCapture.result function to return the time of the event relative to the current Grandmaster Clock or, if no PTP Instance is grandmaster-capable, the LocalClock. The ClockTargetEventCapture.result function also returns gmPresent, to indicate to the ClockTarget whether a Grandmaster PTP Instance is present.

9.3.2 ClockTargetEventCapture.invoke parameters

Change 9.3.2.1 as follows:

9.3.2.1 domainNumber (UInteger8)

This parameter is the domain number of the ~~ClockSlave~~ClockTimeReceiver entity that is requested to provide the synchronized time of the signaled event.

Change 9.3.3 as follows:

9.3.3 ClockTargetEventCapture.result parameters

```
ClockTargetEventCapture.result {
        domainNumber,
        ~~slave~~timeReceiverTimeCallback,
        gmPresent
}
```

Change 9.3.3.1 as follows:

9.3.3.1 domainNumber (UInteger8)

This parameter is the domain number of the ~~ClockSlave~~ClockTimeReceiver entity that is providing the synchronized time of the signaled event.

Change 9.3.3.2 as follows:

9.3.3.2 ~~slave~~timeReceiverTimeCallback (ExtendedTimestamp)

The value of ~~slave~~timeReceiverTimeCallback is the time, relative to the Grandmaster Clock, that the corresponding ClockTargetEventCapture.invoke function is invoked.

NOTE—The invocation of the ClockTargetEventCapture.invoke function and the detection of this invocation by the ~~ClockSlave~~ClockTimeReceiver entity are simultaneous in this abstract interface.

9.4 ClockTargetTriggerGenerate interface

Change 9.4.1 as follows:

9.4.1 General

This interface is used by the ClockTarget entity to request that the ~~ClockSlave~~ClockTimeReceiver entity send a result at a specified time relative to the Grandmaster Clock. The ClockTarget entity invokes the ClockTargetTriggerGenerate.invoke function to indicate the synchronized time of the event. The ~~ClockSlave~~ClockTimeReceiver entity invokes the ClockTargetTriggerGenerate.result function to either signal the event at the requested synchronized time or indicate an error condition.

Change 9.4.2 as follows:

9.4.2 ClockTargetTriggerGenerate.invoke parameters

ClockTargetTriggerGenerate.invoke {
domainNumber,
~~slave~~timeReceiverTimeCallback
}

Change 9.4.2.1 as follows:

9.4.2.1 domainNumber (UInteger8)

This parameter is the domain number of the ~~ClockSlave~~ClockTimeReceiver entity that is requested to signal an event at the specified time.

Change 9.4.2.2 as follows:

9.4.2.2 ~~slave~~timeReceiverTimeCallback (ExtendedTimestamp)

If ~~slave~~timeReceiverTimeCallback is nonzero, its value is the synchronized time the corresponding ClockTargetTriggerGenerate.result function, i.e., the trigger, is to be invoked. If ~~slave~~timeReceiverTimeCallback is zero, any previous ClockTargetTriggerGenerate.invoke function for which a ClockTargetTriggerGenerate.result function has not yet been issued is canceled.

9.4.3 ClockTargetTriggerGenerate.result parameters

Change 9.4.3.1 as follows:

9.4.3.1 domainNumber (UInteger8)

This parameter is the domain number of the ~~ClockSlave~~ClockTimeReceiver entity that is triggering an event at the specified time.

9.4.3.2 errorCondition (Boolean)

Change NOTE in 9.4.3.2 as follows:

NOTE—For example, the ClockTargetTriggerGenerate.result function is invoked with errorCondition = TRUE if the requested ~~slave~~timeReceiverTimeCallback is a time prior to the synchronized time when the corresponding ClockTargetTriggerGenerate.invoke function is invoked. As another example, the ClockTargetTriggerGenerate.result function is invoked with errorCondition = TRUE if a discontinuity in the synchronized time causes the requested ~~slave~~timeReceiverTimeCallback to be skipped over.

Change 9.4.4 as follows:

9.4.4 ClockTargetTriggerGenerate interface definition

The invocation of the ClockTargetTriggerGenerate.invoke function causes the ~~ClockSlave~~ClockTimeReceiver entity to store the value of the ~~slave~~timeReceiverTimeCallback parameter in an internal variable (replacing any previous value of that variable) until the synchronized time, or LocalClock time if gmPresent is FALSE, equals the value of that variable, at which time the ClockTargetTriggerGenerate.result function is invoked with errorCondition = FALSE. If it is not possible to

invoke the ClockTargetTriggerGenerate.result function at ~~slave~~timeReceiverTimeCallback, e.g., if ~~slave~~timeReceiverTimeCallback is earlier than the synchronized time (or LocalClock time if gmPresent is FALSE) when the ClockTargetTriggerGenerate.invoke function is invoked, the ClockTargetTriggerGenerate.result function is invoked with errorCondition = TRUE. Invocation of the ClockTargetTriggerGenerate.invoke function with ~~slave~~timeReceiverTimeCallback = 0 (which is earlier than any synchronized time) is used to cancel a pending request.

9.5 ClockTargetClockGenerator interface

Change 9.5.1 as follows:

9.5.1 General

This interface is used by the ClockTarget entity to request that the ~~ClockSlave~~ClockTimeReceiver entity deliver a periodic clock signal of specified period and phase. The ClockTarget entity invokes the ClockTargetClockGenerator.invoke function to request that the ~~ClockSlave~~ClockTimeReceiver entity generate the periodic clock signal. The ~~ClockSlave~~ClockTimeReceiver entity invokes the ClockTargetClockGenerator.result function at significant instants of the desired clock signal.

Change 9.5.2 as follows:

9.5.2 ClockTargetClockGenerator.invoke parameters

```
ClockTargetClockGenerator.invoke {
        domainNumber,
        clockPeriod,
        ~~slave~~timeReceiverTimeCallbackPhase
}
```

Change 9.5.2.1 as follows:

9.5.2.1 domainNumber (UInteger8)

This parameter is the domain number of the ~~ClockSlave~~ClockTimeReceiver entity that is requested to deliver a periodic clock signal.

Change 9.5.2.3 as follows:

9.5.2.2 ~~slave~~timeReceiverTimeCallbackPhase (ExtendedTimestamp)

The value of ~~slave~~timeReceiverTimeCallbackPhase describes phase of the generated clock signal by specifying a point on the timescale in use such that ClockTargetClockGenerator.result invocations occur at synchronized times that differ from ~~slave~~timeReceiverTimeCallbackPhase by $n \times$ clockPeriod, where n is an integer.

NOTE—The value of ~~slave~~timeReceiverTimeCallbackPhase can be earlier or later than the synchronized time the ClockTargetClockGenerator.invoke function is invoked; use of a ~~slave~~timeReceiverTimeCallbackPhase value in the future does not imply that the initiation of the periodic clock signal is suppressed until that synchronized time.

Change 9.5.3 as follows:

9.5.3 ClockTargetClockGenerator.result parameters

ClockTargetClockGenerator.result {
domainNumber,
~~slave~~timeReceiverTimeCallback,
}

Change 9.5.3.1 as follows:

9.5.3.1 domainNumber (UInteger8)

This parameter is the domain number of the ~~ClockSlave~~ClockTimeReceiver entity that is delivering a periodic clock signal.

Change 9.5.3.2 as follows:

9.5.3.2 ~~slave~~timeReceiverTimeCallback (ExtendedTimestamp)

The value of ~~slave~~timeReceiverTimeCallback is the synchronized time of this event.

9.6 ClockTargetPhaseDiscontinuity interface

Change 9.6.1 as follows:

9.6.1 General

This interface provides discontinuity information, sent from the Grandmaster PTP Instance, to an application within an end station. It is used by the ~~ClockSlave~~ClockTimeReceiver entity to supply sufficient information to the ClockTarget entity to enable the ClockTarget entity to determine whether a phase or frequency discontinuity has occurred. The ~~ClockSlave~~ClockTimeReceiver invokes the ClockTargetPhaseDiscontinuity.result function in the SEND_SYNC_INDICATION block of the ~~ClockSlave~~ClockTimeReceiverSync state machine (see 10.2.13 and Figure 10-9). The invocation occurs when a PortSyncSync structure is received, after the needed information has been computed by the ~~ClockSlave~~ClockTimeReceiverSync state machine.

9.6.2 ClockTargetPhaseDiscontinuity.result parameters

Change 9.6.2.1 as follows:

9.6.2.1 domainNumber (UInteger8)

This parameter is the domain number of the ~~ClockSlave~~ClockTimeReceiver entity that is providing discontinuity information.

10. Media-independent layer specification

10.1 Overview

Change 10.1.2 as follows:

10.1.2 Model of operation

A PTP Instance contains a best ~~master~~timeTransmitter selection function and a synchronization function. These functions include PTP Port-specific aspects and aspects associated with the PTP Instance as a whole. The functions are distributed among a number of entities, which together describe the behavior of a compliant implementation. The functions are specified by a number of state machines.

The model for the media-independent layer of a PTP Instance is shown in Figure 10-1. It includes a single SiteSync entity, ~~ClockMaster~~ClockTimeTransmitter entity, and ~~ClockSlave~~ClockTimeReceiver entity for the PTP Instance as a whole, plus one PortSync for each PTP Port. The PTP Instance also includes one MD entity for each PTP Port, which is part of the media-dependent layer. The media-dependent functions performed by the MD entity are described in the clauses for the respective media. In addition to the entities, Figure 10-1 shows the information that flows between the entities via the PortSyncSync, MDSyncSend, and MDSyncReceive structures (see 10.2.2.3, 10.2.2.1, and 10.2.2.2, respectively).

The SiteSync, ~~ClockMaster~~ClockTimeTransmitter, ~~ClockSlave~~ClockTimeReceiver, and PortSync entities each contain a number of cooperating state machines, which are described later in this clause (the MD entity state machines are described in the respective media-dependent clauses). The ~~ClockMaster~~ClockTimeTransmitter entity receives information from an external time source, known as a *ClockSource entity* (see 9.2), via an application interface, and provides the information to the SiteSync entity. The ~~ClockSlave~~ClockTimeReceiver entity receives Grandmaster Clock time-synchronization and current Grandmaster PTP Instance information from the SiteSync entity, and makes the information available to an external application, known as a *clockTarget entity* (see 9.3 through 9.6), via one or more application service interfaces. The SiteSync entity executes the portion of best ~~master~~timeTransmitter clock selection associated with the PTP Instance as a whole, i.e., it uses the best ~~master~~timeTransmitter information received on each PTP Port to determine which PTP Port has received the best information, and updates the states of all the ports (see 10.3.1.1 for a discussion of PTP Port states). It also distributes synchronization information received on the ~~SlavePort~~TimeReceiverPort to all the ports whose state is ~~MasterPort~~TimeTransmitterPort (see 10.3.1.1). The PortSync entity for a ~~SlavePort~~TimeReceiverPort receives best ~~master~~timeTransmitter selection information from the PTP Instance at the other end of the associated link, compares this to the current best ~~master~~timeTransmitter information that it has, and forwards the result of the comparison to the Site Sync entity. The PortSync entity for a ~~SlavePort~~TimeReceiverPort also receives time-synchronization information from the MD entity associated with the PTP Port, and forwards it to the SiteSync entity. The PortSync entity for a ~~MasterPort~~TimeTransmitterPort sends best ~~master~~timeTransmitter selection and time-synchronization information to the MD entity for the PTP Port, which in turn sends the respective messages.

Replace Figure 10-1 with the following figure:

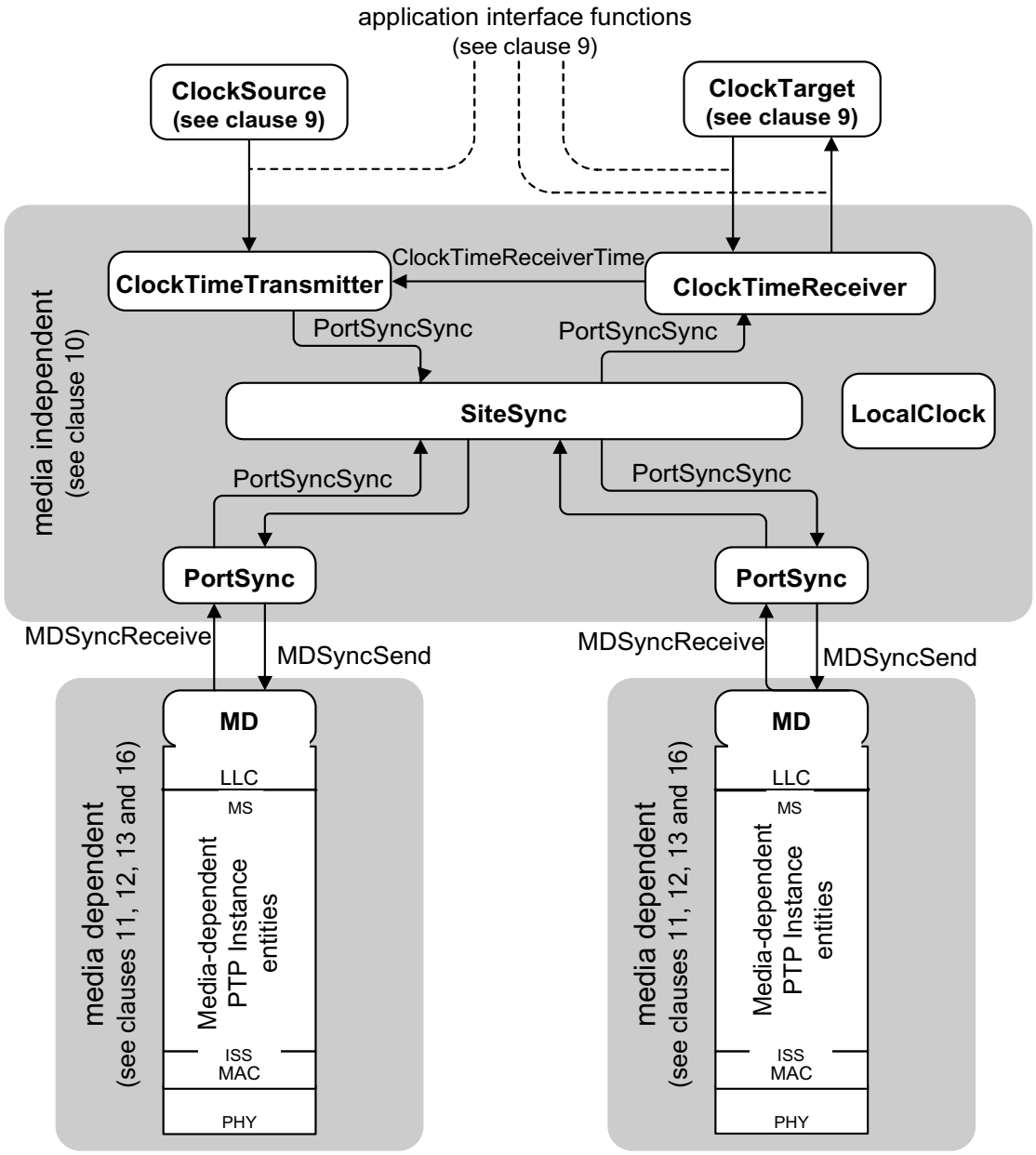

Figure 10-1—Model for media-independent layer of PTP Instance

NOTE—This clause does not require a one-to-one correspondence between the PortSync entities of PTP Instances attached to the same gPTP communication path (see 3.11), i.e., more than two PTP Instances can be attached to a gPTP communication path that uses a shared medium and meet the requirements of this clause. However, it is possible for a media-dependent clause to have additional requirements that limit the gPTP communication paths to point-to-point links for that medium; in this case, each link has exactly two PortSync entities, which can be considered to be in one-to-one correspondence. One example of this is the full-duplex point-to-point media-dependent layer specified in 11. In addition, one or more gPTP communication paths can be logically point-to-point but traverse the same shared medium.

The time-synchronization state machines are described in 10.2. The best ~~master~~timeTransmitter clock selection state machines are described in 10.3. The attributes and format of the Announce message are described in 10.5 and 10.6. The timing characterization of the protocol is described in 10.7.

10.1.3 Grandmaster-capable PTP Instance

Change NOTE 2 in 10.1.3 as follows:

NOTE 2—While a PTP Instance that is not grandmaster-capable can never be the Grandmaster PTP Instance of the gPTP domain, such a PTP Instance contains a best ~~master~~timeTransmitter selection function, invokes the best ~~master~~timeTransmitter selection algorithm, and conveys synchronization information received from the current Grandmaster PTP Instance.

10.2 Time-synchronization state machines

Change 10.2.1 as follows:

10.2.1 Overview

The time-synchronization function in a PTP Instance is specified by a number of cooperating state machines. Figure 10-2 illustrates these state machines, their local variables, their interrelationships, and the global variables and structures used to communicate between them. The figure indicates the interaction between the state machines and the media-dependent layer and LocalClock entity.

Replace Figure 10-2 with the following figure :

Notes:
a) selectedState for each port and gmPresent are set by Port State Selection state machine (see 10.3.12)
b) currentTime is a global variable that is always equal to the current time relative to the local oscillator
c) application interfaces to higher layers are not shown
d) the ClockTimeTransmitterSyncReceive, ClockTimeTransmitterSyncSend, and ClockTimeTransmitterSyncOffset state machines are optional for PTP Instances that are not grandmaster-capable.

Figure 10-2—Time-synchronization state machines—overview and interrelationships

The ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive, ~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset, and ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machines are optional for PTP Instances that are not grandmaster-capable (see 8.6.2.1 and 10.1.3). These state machines may be present in a PTP Instance that is not grandmaster-capable; however, any information supplied by them, via the ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine, to the SiteSyncSync state machine is not used by the SiteSyncSync state machine if the PTP Instance is not grandmaster-capable.

The media-independent layer state machines in Figure 10-2 are as follows:

a) ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive (one instance per PTP Instance): receives ClockSourceTime.invoke functions from the ClockSource entity and notifications of LocalClock entity ticks (see 10.2.4.18), updates ~~masterTime~~timeTransmitterTime, and provides ~~masterTime~~timeTransmitterTime to ~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset and ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machines.

b) ~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset (one instance per PTP Instance): receives syncReceiptTime from the ~~ClockSlave~~ClockTimeReceiver entity and ~~masterTime~~timeTransmitterTime from the ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive state machine, computes phase offset and frequency offset between ~~masterTime~~timeTransmitterTime and syncReceiptTime if the PTP Instance is not the Grandmaster PTP Instance, and provides the frequency and phase offsets to the ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine.

c) ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend (one instance per PTP Instance): receives ~~master~~timeTransmitterTime from the ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive state machine, receives phase and frequency offset between ~~master~~timeTransmitterTime and syncReceiptTime from the ~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset state machine, and provides ~~masterTime~~timeTransmitterTime (i.e., synchronized time) and the phase and frequency offset to the SiteSync entity using a PortSyncSync structure.

d) PortSyncSyncReceive (one instance per PTP Instance, per PTP Port): receives time-synchronization information from the MD entity of the corresponding PTP Port, computes accumulated rateRatio, computes syncReceiptTimeoutTime, and sends the information to the SiteSync entity.

e) SiteSyncSync (one instance per PTP Instance): receives time-synchronization information, accumulated rateRatio, and syncReceiptTimeoutTime from the PortSync entity of the current ~~slave~~timeReceiver port or from the ~~ClockMaster~~ClockTimeTransmitter entity; and sends the information to the PortSync entities of all the ports and to the ~~ClockSlave~~ClockTimeReceiver entity.

f) PortSyncSyncSend (one instance per PTP Instance, per PTP Port): receives time-synchronization information from the SiteSync entity, requests that the MD entity of the corresponding PTP Port send a time-synchronization event message, receives the syncEventEgressTimestamp for this event message from the MD entity, uses the most recent time-synchronization information received from the SiteSync entity and the timestamp to compute time-synchronization information that will be sent by the MD entity in a general message (e.g., for full-duplex IEEE 802.3 media) or a subsequent event message (e.g., for IEEE 802.11 media), and sends this latter information to the MD entity.

g) ~~ClockSlave~~ClockTimeReceiverSync (one instance per PTP Instance): receives time-synchronization information from the SiteSync entity; computes ~~clockSlave~~ClockTimeReceiverTime and syncReceiptTime; sets syncReceiptLocalTime, GmTimeBaseIndicator, lastGmPhaseChange, and lastGmFreqChange; sends ~~clockSlave~~ClockTimeReceiverTime to the ~~ClockMaster~~ClockTimeTransmitter entity; and provides information to the ClockTarget entity (via the ClockTargetPhaseDiscontinuity interface; see 9.6) to enable that entity to determine if a phase or frequency discontinuity has occurred.

10.2.2 Data structures communicated between state machines

10.2.2.1 MDSyncSend

Change 10.2.2.1.6 as follows:

10.2.2.1.6 preciseOriginTimestamp (Timestamp)

The preciseOriginTimestamp is the sourceTime of the ~~ClockMaster~~ClockTimeTransmitter entity of the Grandmaster PTP Instance, with any fractional nanoseconds truncated, when the received time-synchronization information was sent by the Grandmaster PTP Instance. The preciseOriginTimestamp is the value of the preciseOriginTimestamp member of the most recently received PortSyncSync structure from the PortSync entity of this PTP Port (see 10.2.2.3.8).

Change 10.2.2.1.7 as follows:

10.2.2.1.7 upstreamTxTime (UScaledNs)

The upstreamTxTime is given by the following equation:

$$\text{upstreamTxTime} = \text{syncEventIngressTimestamp} - \frac{\text{meanLinkDelay}}{\text{neighborRateRatio}}$$

where

syncEventIngressTimestamp	corresponds to the receipt of the time-synchronization information at the ~~slave~~timeReceiver port of this PTP Instance
meanLinkDelay	is defined in 10.2.5.8
neighborRateRatio	is defined in 10.2.5.7
upstreamTxTime	is the value of the upstreamTxTime member of the most recently received PortSyncSync structure from the PortSync entity of this PTP Port (see 10.2.2.3.9)

10.2.2.2 MDSyncReceive

10.2.2.2.1 General

Change the first paragraph in 10.2.2.2.1 as follows:

This structure contains information that is sent by the MD entity of a PTP Port to the PortSync entity of that PTP Port. It provides the PortSync entity with ~~master~~timeTransmitter clock timing information and timestamp of receipt of a time-synchronization event message compensated for propagation time on the upstream link. The information is sent to the PortSync entity upon receipt of time-synchronization information by the MD entity of the PTP Port. The information is in turn provided by the PortSync entity to the SiteSync entity. The information is used by the PortSyncSyncReceive state machine of the PortSync entity to compute the rate ratio of the Grandmaster Clock relative to the local clock and is communicated to the SiteSync entity, and then the SiteSync entity communicates it to the other PortSync entities for use in computing ~~master~~timeTransmitter clock timing information.

Change 10.2.2.2.4 as follows:

10.2.2.2.4 sourcePortIdentity (PortIdentity)

The sourcePortIdentity is the value of the sourcePortIdentity of the time-synchronization event message received by this PTP Port. It is the portIdentity of the upstream ~~MasterPort~~TimeTransmitterPort that sent the event message.

Change 10.2.2.2.5 as follows:

10.2.2.2.5 logMessageInterval (Integer8)

The logMessageInterval is the value of the logMessageInterval of the time-synchronization event message received by this PTP Port. It is the currentLogSyncInterval (see 10.7.2.3) of the upstream ~~MasterPort~~TimeTransmitterPort that sent the event message.

Change 10.2.2.2.6 as follows:

10.2.2.2.6 preciseOriginTimestamp (Timestamp)

The preciseOriginTimestamp is the sourceTime of the ~~ClockMaster~~ClockTimeTransmitter entity of the Grandmaster PTP Instance, with any fractional nanoseconds truncated, when the time-synchronization event message was sent by the Grandmaster PTP Instance.

Change 10.2.2.2.7 as follows:

10.2.2.2.7 upstreamTxTime (UScaledNs)

The upstreamTxTime is given by the following equation:

$$\text{upstreamTxTime} = \text{syncEventIngressTimestamp} - \frac{\text{meanLinkDelay}}{\text{neighborRateRatio}}$$

where

syncEventIngressTimestamp	corresponds to the receipt of the time-synchronization information at the ~~slave~~timeReceiver port of this PTP Instance (i.e., at this PTP Port)
meanLinkDelay	is defined in 10.2.5.8
neighborRateRatio	is defined in 10.2.5.7

10.2.2.3 PortSyncSync

Change 10.2.2.3.1 as follows:

10.2.2.3.1 General

This structure is sent by the PortSync and ~~ClockMaster~~ClockTimeTransmitter entities to the SiteSync entity and also from the SiteSync entity to the PortSync and ~~ClockSlave~~ClockTimeReceiver entities.

When sent from the PortSync or ~~ClockMaster~~ClockTimeTransmitter entity, it provides the SiteSync entity with ~~master~~timeTransmitter clock timing information, timestamp of receipt of a time-synchronization event message compensated for propagation time on the upstream link, and the time at which sync receipt timeout occurs if a subsequent Sync message is not received by then. The information is used by the SiteSync entity

to compute the rate ratio of the Grandmaster Clock relative to the local clock and is communicated to the other PortSync entities for use in computing ~~master~~timeTransmitter clock timing information.

When sent from the SiteSync entity to the PortSync or ~~ClockSlave~~ClockTimeReceiver entity, the structure contains information needed to compute the synchronization information that will be included in respective fields of the time-synchronization event and general messages that will be sent and also to compute the synchronized time that the ~~ClockSlave~~ClockTimeReceiver entity will supply to the ClockTarget entity.

```
PortSyncSync    {
        domainNumber,
        localPortNumber,
        syncReceiptTimeoutTime,
        followUpCorrectionField,
        sourcePortIdentity,
        logMessageInterval,
        preciseOriginTimestamp,
        upstreamTxTime,
        rateRatio,
        gmTimeBaseIndicator,
        lastGmPhaseChange,
        lastGmFreqChange
}
```

The parameters of the PortSyncSync structure are defined in the following subclauses for when the structure is sent from the PortSync or ~~ClockMaster~~ClockTimeTransmitter entity to the SiteSync entity. If the structure is sent from the SiteSync entity to the PortSync or ~~ClockSlave~~ClockTimeReceiver entity, the member values are copied from the most recently received PortSyncSync structure where the PTP Port that received this structure has PTP Port state of ~~SlavePort~~TimeReceiverPort.

Change 10.2.2.3.3 as follows:

10.2.2.3.3 localPortNumber (UInteger16)

If the structure is sent by a PortSync entity, the localPortNumber is the port number of the PTP Port whose PortSync entity sent this structure. If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the localPortNumber is zero.

Change 10.2.2.3.4 as follows:

10.2.2.3.4 syncReceiptTimeoutTime (UScaledNs)

If the structure is sent by a PortSync entity, the syncReceiptTimeoutTime is the value of the local time (i.e., the free-running, local clock time) at which sync receipt timeout occurs if a subsequent time-synchronization event message is not received by that time. If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the syncReceiptTimeoutTime is $FFFFFFFFFFFFFFFF_{16}$ [see item h) in 10.2.9.2.1].

Change 10.2.2.3.5 as follows:

10.2.2.3.5 followUpCorrectionField (ScaledNs)

If the structure is sent by a PortSync entity, the followUpCorrectionField is the value of the followUpcorrectionField member of the MDSyncReceive structure whose receipt caused the sending of this structure (see 10.2.2.2.2). If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the followUpCorrectionField is the sub-nanosecond portion of the ~~ClockMaster~~ClockTimeTransmitter time.

Change 10.2.2.3.6 as follows:

10.2.2.3.6 sourcePortIdentity (PortIdentity)

If the structure is sent by a PortSync entity, the sourcePortIdentity is the value of the sourcePortIdentity member of the MDSyncReceive structure whose receipt caused the sending of this structure (see 10.2.2.2.4). If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the clockIdentity member of the sourcePortIdentity is the clockIdentity of this PTP Instance, and the portNumber member of the sourcePortIdentity is 0.

Change 10.2.2.3.7 as follows:

10.2.2.3.7 logMessageInterval (Integer8)

If the structure is sent by a PortSync entity, the logMessageInterval is the value of the logMessageInterval member of the MDSyncReceive structure whose receipt caused the sending of this structure (see 10.2.2.2.5). If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the logMessageInterval is the value of ~~clockMasterLogSyncInterval~~clockTimeTransmitterLogSyncInterval (see 10.7.2.4).

Change 10.2.2.3.8 as follows:

10.2.2.3.8 preciseOriginTimestamp (Timestamp)

If the structure is sent by a PortSync entity, the preciseOriginTimestamp is the value of the preciseOriginTimestamp member of the MDSyncReceive structure whose receipt caused the sending of this structure (see 10.2.2.2.6). If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the preciseOriginTimestamp is the ~~ClockMaster~~ClockTimeTransmitter time truncated to the next lower nanosecond.

Change 10.2.2.3.9 as follows:

10.2.2.3.9 upstreamTxTime (UScaledNs)

If the structure is sent by a PortSync entity, the upstreamTxTime is the value of the upstreamTxTime member of the MDSyncReceive structure whose receipt caused the sending of this structure (see 10.2.2.2.7). If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the upstreamTxTime is the local clock time corresponding to the ~~ClockMaster~~ClockTimeTransmitter time.

Change 10.2.2.3.10 as follows:

10.2.2.3.10 rateRatio (Float64)

If the structure is sent by a PortSync entity, the rateRatio is the value of the rateRatio member of the MDSyncReceive structure whose receipt caused the sending of this structure (see 10.2.2.2.8). It is equal to

the ratio of the frequency of the Grandmaster Clock to the frequency of the LocalClock entity of the PTP Instance at the other end of the link attached to this PTP Port, i.e., the PTP Instance that sent the most recently-received time-synchronization event message (see 10.2.8.1.4). If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the rateRatio is equal to gmRateRatio (see 10.2.4.14).

Change 10.2.2.3.11 as follows:

10.2.2.3.11 gmTimeBaseIndicator (UInteger16)

If the structure is sent by a PortSync entity, the gmTimeBaseIndicator is the value of the gmTimeBaseIndicator member of the MDSyncReceive structure whose receipt caused the sending of this structure (see 10.2.2.2.9). If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the gmTimeBaseIndicator is equal to clockSourceTimeBaseIndicator (see 10.2.4.8).

Change 10.2.2.3.12 as follows:

10.2.2.3.12 lastGmPhaseChange (ScaledNs)

If the structure is sent by a PortSync entity, the lastGmPhaseChange is the value of the lastGmPhaseChange member of the MDSyncReceive structure whose receipt caused the sending of this structure (see 10.2.2.2.9). If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the lastGmPhaseChange is equal to clockSourcePhaseOffset (see 10.2.4.7).

Change 10.2.2.3.13 as follows:

10.2.2.3.13 lastGmFreqChange (Float64)

If the structure is sent by a PortSync entity, the lastGmFreqChange is the value of the lastGmFreqChange member of the MDSyncReceive structure whose receipt caused the sending of this structure (see 10.2.2.2.9). If the structure is sent by a ~~ClockMaster~~ClockTimeTransmitter entity, the lastGmFreqChange is equal to clockSourceFreqOffset (see 10.2.4.6).

Change 10.2.3 as follows

10.2.3 Overview of global variables used by time synchronization state machines

Subclauses 10.2.4 and 10.2.5 define global variables used by time synchronization state machines whose scopes are as follows:

— Per PTP Instance (i.e., per domain)
— Per PTP Instance, per PTP Port
— Instance used by the Common Mean Link Delay Service (CMLDS) (see 11.2.17) (i.e., variable is common across all LinkPorts)
— Instance used by CMLDS, per LinkPort

Table 10-1 summarizes the scope of each global variable of 10.2.4 and 10.2.5.

Table 10-1—Summary of scope of global variables used by time synchronization state machines (see 10.2.4 and 10.2.5)

Variable name	Subclause of definition	Per PTP Instance (i.e., per domain)	Per PTP Instance, per PTP Port	Instance used by CMLDS (i.e., variable is common across all LinkPorts)	Instance used by CMLDS, per LinkPort
BEGIN	10.2.4.1	Yes	No	Yes	No
~~clockMasterSyncInterval~~clockTimeTransmitterSyncInterval	10.2.4.2	Yes	No	No	No
~~clockSlave~~clockTimeReceiverTime	10.2.4.3	Yes	No	No	No
syncReceiptTime	10.2.4.4	Yes	No	No	No
syncReceiptLocalTime	10.2.4.5	Yes	No	No	No
clockSourceFreqOffset	10.2.4.6	Yes	No	No	No
clockSourcePhaseOffset	10.2.4.7	Yes	No	No	No
clockSourceTimeBaseIndicator	10.2.4.8	Yes	No	No	No
clockSourceTimeBaseIndicatorOld	10.2.4.9	Yes	No	No	No
clockSourceLastGmPhaseChange	10.2.4.10	Yes	No	No	No
clockSourceLastGmFreqChange	10.2.4.11	Yes	No	No	No
currentTime	10.2.4.12	Yes	No	No	No
gmPresent	10.2.4.13	Yes	No	No	No
gmRateRatio	10.2.4.14	Yes	No	No	No
gmTimeBaseIndicator	10.2.4.15	Yes	No	No	No
lastGmPhaseChange	10.2.4.16	Yes	No	No	No
lastGmFreqChange	10.2.4.17	Yes	No	No	No
localClockTickInterval	10.2.4.18	Yes	No	No	No
localTime	10.2.4.19	Yes	No	No	No
selectedState	10.2.4.20	Yes	No	No	No
~~masterTime~~timeTransmitterTime	10.2.4.21	Yes	No	No	No
thisClock	10.2.4.22	Yes	No	Yes	No
parentLogSyncInterval	10.2.4.23	Yes	No	No	No
instanceEnable	10.2.4.24	Yes	No	No	No
syncReceiptTimeoutTime	10.2.4.25	Yes	No	No	No
asCapable	10.2.5.1	No	Yes	No	No
asymmetryMeasurementMode	10.2.5.2	No	Yes[a]	No	Yes
syncReceiptTimeoutTimeInterval	10.2.5.3	No	Yes	No	No
currentLogSyncInterval	10.2.5.4	No	Yes	No	No
initialLogSyncInterval	10.2.5.5	No	Yes	No	No
syncInterval	10.2.5.6	No	Yes	No	No
neighborRateRatio	10.2.5.7	No	Yes[a]	No	Yes

Table 10-1—Summary of scope of global variables used by time synchronization state machines (see 10.2.4 and 10.2.5) *(continued)*

Variable name	Subclause of definition	Per PTP Instance (i.e., per domain)	Per PTP Instance, per PTP Port	Instance used by CMLDS (i.e., variable is common across all LinkPorts)	Instance used by CMLDS, per LinkPort
meanLinkDelay	10.2.5.8	No	Yes[a]	No	Yes
delayAsymmetry	10.2.5.9	No	Yes[a]	No	Yes
computeNeighborRateRatio	10.2.5.10	No	Yes[a]	No	Yes
computeMeanLinkDelay	10.2.5.11	No	Yes[a]	No	Yes
portOper[b]	10.2.5.12	No	Yes	No	Yes
ptpPortEnabled	10.2.5.13	No	Yes	No	No
thisPort	10.2.5.14	No	Yes	No	Yes
syncLocked	10.2.5.15	No	Yes	No	No
neighborGptpCapable	10.2.5.16	No	Yes	No	No
syncSlowdown	10.2.5.17	No	Yes	No	No
oldSyncInterval	10.2.5.18	No	Yes	No	No
gPtpCapableMessageSlowdown	10.2.5.19	No	Yes	No	No
gPtpCapableMessageInterval	10.2.5.20	No	Yes	No	No
oldGptpCapableMessageInterval	10.2.5.21	No	Yes	No	No
currentLogGptpCapableMessageInterval	10.2.5.22	No	Yes	No	No
initialLogGptpCapableMessageInterval	10.2.5.23	No	Yes	No	No

[a] The instance of this variable that is per PTP Instance, per PTP Port exists only for domain 0.
[b] There is one instance of this variable per physical port, which is accessible by all PTP Ports and LinkPorts associated with the physical port.

10.2.4 Per PTP Instance global variables

Change 10.2.4.2 as follows:

10.2.4.2 ~~clockMasterSyncInterval~~clockTimeTransmitterSyncInterval: A variable containing the mean time interval between successive messages providing time-synchronization information by the ~~ClockMaster~~ClockTimeTransmitter entity to the SiteSync entity. This value is given by $1000000000 \times 2^{\text{~~clockMasterLogSyncInterval~~clockTimeTransmitterLogSyncInterval}}$ ns, where ~~clockMasterLogSyncInterval~~clockTimeTransmitterLogSyncInterval is the logarithm to base 2 of the mean time between the successive providing of time-synchronization information by the ~~ClockMaster~~ClockTimeTransmitter entity (see 10.7.2.4). The data type for ~~clockMasterSyncInterval~~clockTimeTransmitterSyncInterval is UScaledNs.

Change 10.2.4.3 as follows:

10.2.4.3 ~~clockSlave~~ClockTimeReceiver~~Time~~: The synchronized time maintained, at the ~~slave~~timeReceiver, at the granularity of the LocalClock entity [i.e., a new value is computed every localClockTickInterval (see 10.2.4.18) by the ~~ClockSlave~~ClockTimeReceiver entity]. The data type for ~~clockSlave~~ClockTimeReceiverTime is ExtendedTimestamp.

Change 10.2.4.4 as follows:

10.2.4.4 syncReceiptTime: The synchronized time computed by the ~~ClockSlave~~ClockTimeReceiver entity at the instant time-synchronization information, contained in a PortSyncSync structure, is received. The data type for syncReceiptTime is ExtendedTimestamp.

Change 10.2.4.8 as follows:

10.2.4.8 clockSourceTimeBaseIndicator: A global variable that is set equal to the timeBaseIndicator parameter of the ClockSourceTime.invoke application interface function (see 9.2.2.3), by the ~~ClockMaster~~ClockTimeTransmitter entity. The parameter timeBaseIndicator of ClockSourceTime.invoke is set by the ClockSource entity and is changed by that entity whenever the time base changes. The data type for clockSourceTimeBaseIndicator is UInteger16.

Change 10.2.4.15 as follows:

10.2.4.15 gmTimeBaseIndicator: The most recent value of gmTimeBaseIndicator provided to the ~~ClockSlave~~ClockTimeReceiverSync state machine via a PortSyncSync structure. The data type for gmTimeBaseIndicator is UInteger16.

Change 10.2.4.16 as follows:

10.2.4.16 lastGmPhaseChange: The most recent value of lastGmPhaseChange provided to the ~~ClockSlave~~ClockTimeReceiverSync state machine via a PortSyncSync structure. The data type for lastGmPhaseChange is ScaledNs.

Change 10.2.4.17 as follows:

10.2.4.17 lastGmFreqChange: The most recent value of lastGmFreqChange provided to the ~~ClockSlave~~ClockTimeReceiverSync state machine via a PortSyncSync structure. The data type for lastGmFreqChange is Float64.

Change 10.2.4.21 as follows:

10.2.4.21 ~~masterTime~~timeTransmitterTime: The time maintained by the ~~ClockMaster~~ClockTimeTransmitter entity, based on information received from the ClockSource and LocalClock entities. The data type for ~~masterTime~~timeTransmitterTime is ExtendedTimestamp.

Change 10.2.4.23 as follows:

10.2.4.23 parentLogSyncInterval: The most recent logMessageInterval value received on the ~~slave~~timeReceiver port. If this PTP Instance is the Grandmaster PTP Instance, then this is the ~~clockMasterLogSyncInterval~~clockTimeTransmitterLogSyncInterval (see 10.7.2.4). The data type for parentLogSyncInterval is Integer8.

10.2.5 Per-port global variables

Change 10.2.5,15 as follows:

10.2.5.15 syncLocked: A Boolean, set by the PortSyncSyncSend state machine (see 10.2.12.3), that indicates that this PTP Port, when operating as a ~~master~~timeTransmitter port, shall transmit a Sync as soon as possible after the ~~slave~~timeReceiver port received a Sync (ignoring syncInterval). If FALSE, the PTP Port shall use the timing set by syncInterval.

10.2.7 SiteSyncSync state machine

10.2.7.1 State machine variables

Change 10.2.7.1.1 as follows:

10.2.7.1.1 rcvdPSSyncSSS: A Boolean variable that notifies the current state machine when a PortSyncSync structure (see 10.2.2.3) is received from the PortSyncSyncReceive state machine of a PortSync entity or from the ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine of the ~~ClockMaster~~ClockTimeTransmitter entity. This variable is reset by this state machine.

10.2.7.2 State machine functions

Change 10.2.7.2.2 as follows:

10.2.7.2.2 txPSSync (txPSSyncPtrSSS): Transmits a copy of the PortSyncSync structure pointed to by txPSSyncPtrSSS to the PortSyncSyncSend state machine of each PortSync entity and the ~~ClockSlave~~ClockTimeReceiverSync state machine of the ~~ClockSlave~~ClockTimeReceiver entity of this PTP Instance.

Change 10.2.7.3 as follows:

10.2.7.3 State diagram

The SiteSyncSync state machine shall implement the function specified by the state diagram in Figure 10-3, the local variables specified in 10.2.7.1, the functions specified in 10.2.7.2, the structure specified in 10.2.2.3, and the relevant global variables and functions specified in 10.2.4 through 10.2.6. The state machine receives time-synchronization information, accumulated rateRatio, and syncReceiptTimeoutTime from the PortSync entity (PortSyncSyncReceive state machine) of the current ~~slave~~timeReceiver port or from the ~~ClockMaster~~ClockTimeTransmitter entity (~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine). If the information was sent by a PortSync entity, the state machine also receives the portIdentity of the PTP Port on the upstream PTP Instance that sent the information to this PTP Instance (if the information was sent by the ~~ClockMaster~~ClockTimeTransmitter entity, the portIdentity is that of the ~~ClockMaster~~ClockTimeTransmitter entity, i.e., it has clockIdentity equal to the clockIdentity of this PTP Instance and portNumber 0). The state machine sends a PortSyncSync structure to the PortSync entities of all the ports and to the ~~ClockSlave~~ClockTimeReceiver entity.

Replace Figure 10-3 with the following figure:

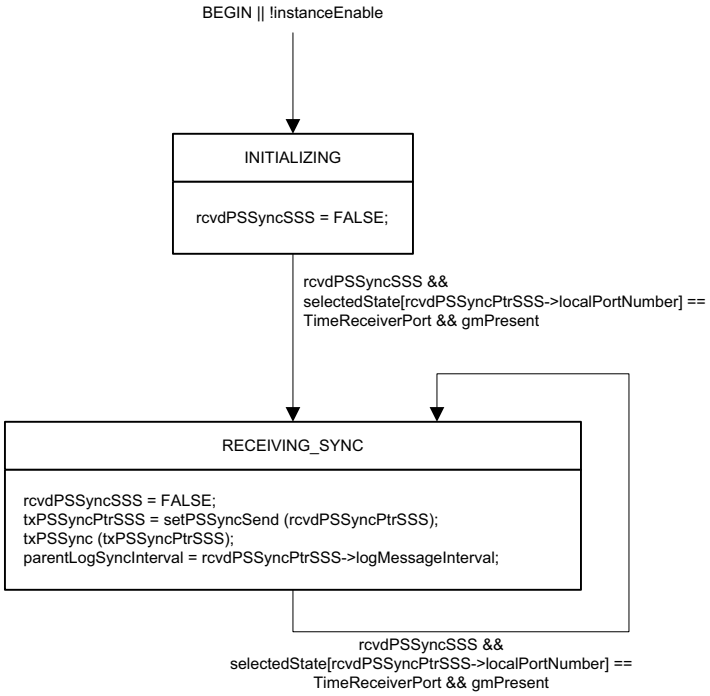

Figure 10-3—SiteSyncSync state machine

10.2.8 PortSyncSyncReceive state machine

10.2.8.1 State machine variables

Change 10.2.8.1.4 as follows:

10.2.8.1.4 rateRatio: A Float64 variable that holds the ratio of the frequency of the Grandmaster Clock to the frequency of the LocalClock entity. This frequency ratio is computed by:

a) Measuring the ratio of the Grandmaster Clock frequency to the LocalClock frequency at the Grandmaster PTP Instance and initializing rateRatio to this value in the ~~ClockMasterSend~~ClockTimeTransmitterSyncSend state machine of the Grandmaster PTP Instance and

b) Accumulating, in the PortSyncSyncReceive state machine of each PTP Instance, the frequency offset of the LocalClock entity of the PTP Instance at the remote end of the link attached to that PTP Port to the frequency of the LocalClock entity of this PTP Instance.

Change the title of 10.2.9 as follows:

10.2.9 ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine

10.2.9.2 State machine functions

Change 10.2.9.2.1 as follows:

10.2.9.2.1 setPSSyncCMSS (gmRateRatio): Creates a PortSyncSync structure to be transmitted, and returns a pointer to this structure. The members are set as follows:

a) localPortNumber is set to 0.

b) preciseOriginTimestamp is set equal to the ~~masterTime~~timeTransmitterTime, with any fractional nanoseconds truncated.

c) followUpCorrectionField is set equal to the sum of

1) The fractional nanoseconds portion of ~~masterTime~~timeTransmitterTime.fractionalNanoseconds and

2) The quantity gmRateRatio × (currentTime – localTime).

d) The clockIdentity member of sourcePortIdentity is set equal to the clockIdentity of this PTP Instance.

e) The portNumber member of the sourcePortIdentity is set to 0.

NOTE 1—This quantity and localPortNumber are redundant; both are retained so that the SiteSync entity can process PortSyncSync structures received from a PortSync entity or the ~~ClockMaster~~ClockTimeTransmitter entity in the same manner.

f) logMessageInterval is set to ~~clockMasterLogSyncInterval~~clockTimeTransmitterLogSyncInterval.

g) upstreamTxTime is set equal to localTime.

h) syncReceiptTimeoutTime is set equal to $FFFFFFFFFFFFFFFF_{16}$, which indicates that there is no sync receipt timeout.

NOTE 2—A ~~ClockMaster~~ClockTimeTransmitter entity does not receive Sync messages, and there is no notion of sync receipt timeout.

i) rateRatio is set equal to gmRateRatio.

j) gmTimeBaseIndicator is set equal to clockSourceTimeBaseIndicator.

k) lastGmPhaseChange is set equal to clockSourcePhaseOffset.

l) lastGmFreqChange is set equal to clockSourceFreqOffset.

m) domainNumber is set equal to the domain number of this gPTP domain.

Change 10.2.9.2.2 as follows:

10.2.9.2.2 txPSSyncCMSS (txPSSyncPtrCMSS): Transmits a copy of the PortSyncSync structure pointed to by txPSSyncPtrCMSS to the SiteSync state machine.

10.2.9.2.3 ~~computeClockMasterSyncInterval~~computeClockTimeTransmitterSyncInterval(): Computes the value of ~~clockMasterSyncInterval~~clockTimeTransmitterSyncInterval (see 10.2.4.2) as $1000000000 \times 2^{\text{clockTimeTransmitterLogSyncInterval}\sout{\text{clockMasterLogSyncInterval}}}$ ns, where ~~clockMasterLogSyncInterval~~clockTimeTransmitterLogSyncInterval is the minimum currentLogSyncInterval value, taken over all the PTP Ports of the PTP Instance (see 10.7.2.4).

Change 10.2.9.3 as follows:

10.2.9.3 State diagram

The ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine shall implement the function specified by the state diagram in Figure 10-5, the local variables specified in 10.2.9.1, the functions specified in 10.2.9.2, the structure specified in 10.2.2.3, and the relevant global variables and functions specified in 10.2.4 through 10.2.6. The state machine receives ~~masterTime~~timeTransmitterTime and clockSourceTimeBaseIndicator from the ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive state machine, and phase and frequency offset between ~~masterTime~~timeTransmitterTime and syncReceiptTime from the ~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset state machine. It provides ~~masterTime~~timeTransmitterTime (i.e., synchronized time) and the phase and frequency offset to the SiteSync entity via a PortSyncSync structure.

The ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine is optional for PTP Instances that are not grandmaster-capable (see 8.6.2.1, 10.1.3, and 10.2.1). This state machine may be present in a PTP Instance that is not grandmaster-capable; however, any information supplied by it to the SiteSyncSync state machine is not used by the SiteSyncSync state machine if the PTP Instance is not grandmaster-capable.

Replace Figure 10-5 with the following figure:

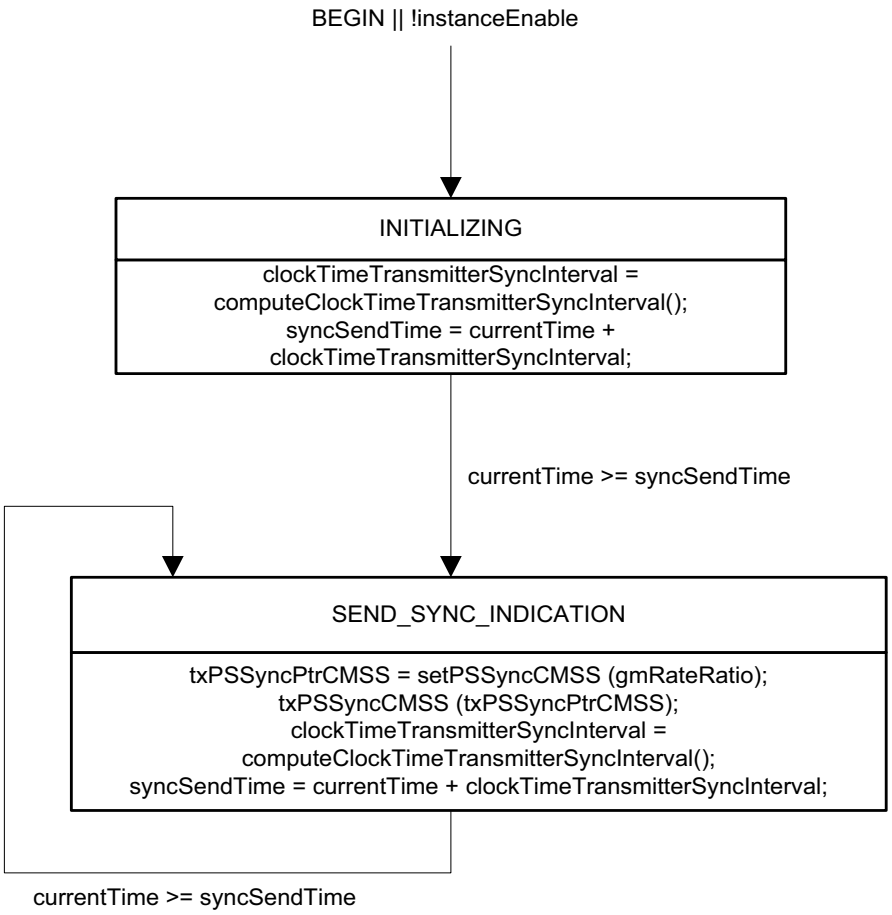

Figure 10-5—~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine

Change the title of 10.2.10 as follows:

10.2.10 ~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset state machine

10.2.10.1 State machine variables

Change 10.2.10.1.1 as follows:

10.2.10.1.1 rcvdSyncReceiptTime: A Boolean variable that notifies the current state machine that syncReceiptTime has been updated by the ~~ClockSlave~~ClockTimeReceiver entity. This variable is reset by this state machine.

10.2.10.2 State machine functions

Change 10.2.10.2.1 as follows:

10.2.10.2.1 computeClockSourceFreqOffset(): Computes and returns clockSourceFreqOffset (see 10.2.4.6), using successive values of ~~masterTime~~timeTransmitterTime computed by the ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive state machine (see 10.2.11) and successive values of syncReceiptTime computed by the ~~ClockSlave~~ClockTimeReceiverSync state machine (see 10.2.13). The data type for the returned value is Float64. Any scheme that uses this information to compute clockSourceFreqOffset is acceptable as long as the performance requirements specified in B.2.4 are met.

NOTE—As one example, clockSourceFreqOffset can be estimated as the ratio of the duration of a time interval measured by the ClockSource entity to the duration of the same time interval computed from ~~ClockSlave~~ClockTimeReceiverTime values, minus 1.

Change 10.2.10.3 as follows:

10.2.10.3 State diagram

The ~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset state machine shall implement the function specified by the state diagram in Figure 10-6, the local variable specified in 10.2.10.1, the function specified in 10.2.10.2, and the relevant global variables and functions specified in 10.2.4 through 10.2.6. The state machine receives syncReceiptTime from the ~~ClockSlave~~ClockTimeReceiverSync state machine and ~~masterTime~~timeTransmitterTime from the ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive state machine. It computes clockSourcePhaseOffset and clockSourceFrequency offset if this PTP Instance is not currently the Grandmaster PTP Instance, i.e., if selectedState[0] is equal to PassivePort.

The ~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset state machine is optional for PTP Instances that are not grandmaster-capable (see 8.6.2.1, 10.1.3, and 10.2.1). This state machine may be present in a PTP Instance that is not grandmaster-capable; however, any information supplied by it, via the ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine, to the SiteSyncSync state machine is not used by the SiteSyncSync state machine if the PTP Instance is not grandmaster-capable.

Replace Figure 10-6 with the following figure:

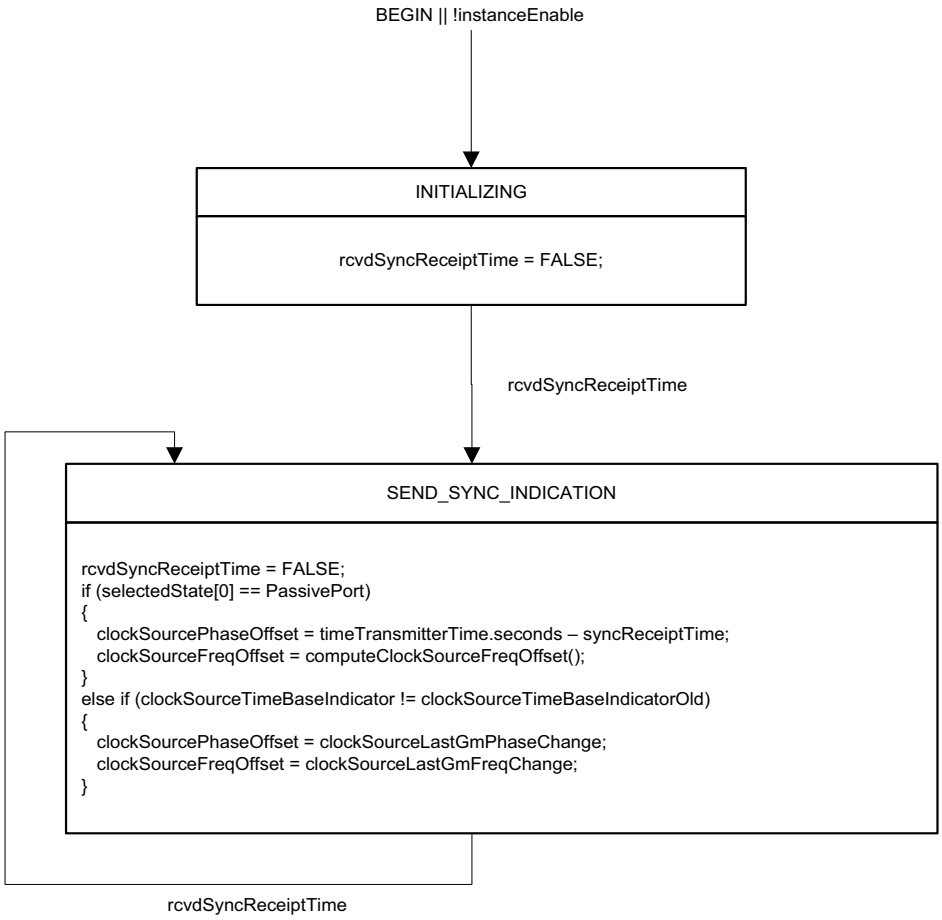

Figure 10-6—~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset state machine

Change the title of 10.2.11 as follows:

10.2.11 ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive state machine

10.2.11.2 State machine functions

Change 10.2.11.2.2 as follows:

10.2.11.2.2 ~~updateMasterTime~~updateTimeTransmitterTime(): Updates the global variable ~~masterTime~~timeTransmitterTime (see 10.2.4.21), based on information received from the ClockSource and LocalClock entities. It is the responsibility of the application to filter ~~master~~timeTransmitter times appropriately. As one example, ~~masterTime~~timeTransmitterTime can be set equal to the sourceTime member of the ClockSourceTime.invoke function when this function is invoked at the ClockSource entity and can be incremented by localClockTickInterval (see 10.2.4.18) multiplied by gmRateRatio (see 10.2.4.14) when rcvdLocalClockTickCMSR is TRUE.

Change 10.2.11.3 as follows:

10.2.11.3 State diagram

The ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive state machine shall implement the function specified by the state diagram in Figure 10-7, the local variables specified in 10.2.11.1, the functions specified in 10.2.11.2, and the relevant global variables and functions specified in 10.2.4 through 10.2.6. The state machine updates the global variable ~~masterTime~~timeTransmitterTime with information received from the ClockSource entity via the ClockSourceTime.invoke function and information received from the LocalClock entity. It also computes gmRateRatio, i.e., the ratio of the ClockSource entity frequency and the LocalClock entity frequency.

The ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive state machine is optional for PTP Instances that are not grandmaster-capable (see 8.6.2.1, 10.1.3, and 10.2.1). This state machine may be present in a PTP Instance that is not grandmaster-capable; however, any information supplied by it, via the ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine, to the SiteSyncSync state machine is not used by the SiteSyncSync state machine if the PTP Instance is not grandmaster-capable.

Replace Figure 10-7 with the following figure:

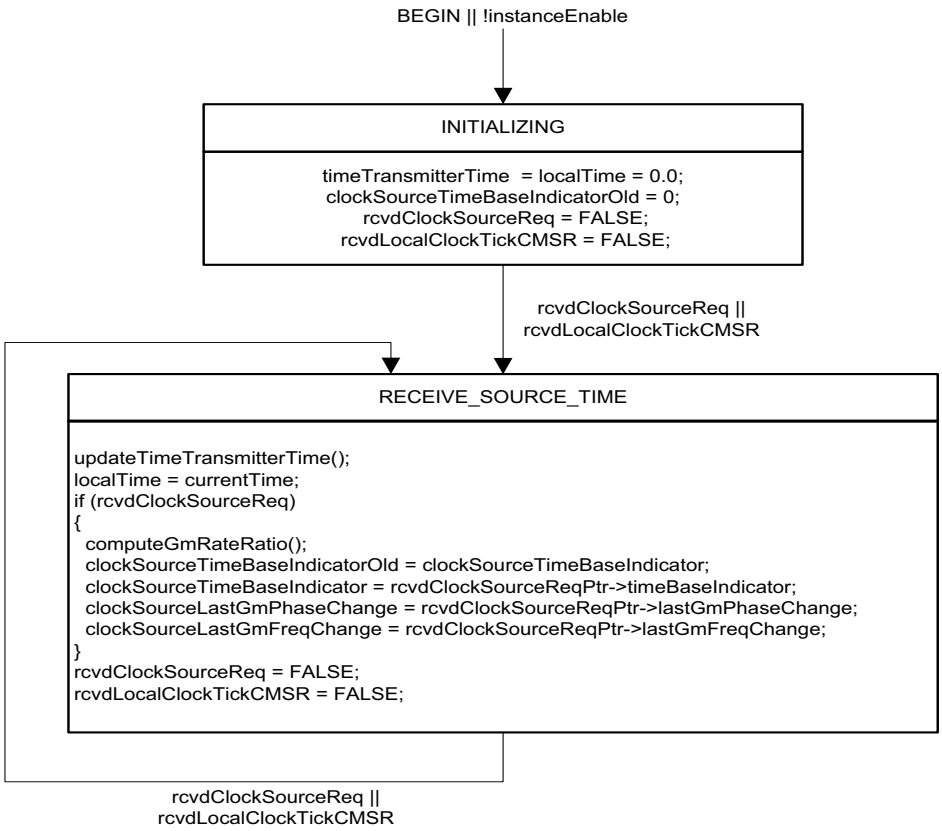

Figure 10-7—~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive state machine

10.2.12 PortSyncSyncSend state machine

Change 10.2.12.3 as follows:

10.2.12.3 State diagram

The PortSyncSyncSend state machine shall implement the function specified by the state diagram in Figure 10-8, the local variables specified in 10.2.12.1, the functions specified in 10.2.12.2, the structures specified in 10.2.2.1 through 10.2.2.3, and the relevant global variables and functions specified in 10.2.4 through 10.2.6. The state machine receives time-synchronization information from the SiteSyncSync state machine, corresponding to the receipt of the most recent synchronization information on either the ~~slave~~timeReceiver port, if this PTP Instance is not the Grandmaster PTP Instance, or from the ~~ClockMasterSyncSend~~ClockTimeTransmitterSyncSend state machine, if this PTP Instance is the Grandmaster PTP Instance. The state machine causes time-synchronization information to be sent to the MD entity if this PTP Port is a ~~MasterPort~~TimeTransmitterPort.

Replace Figure 10-8 with the following figure:

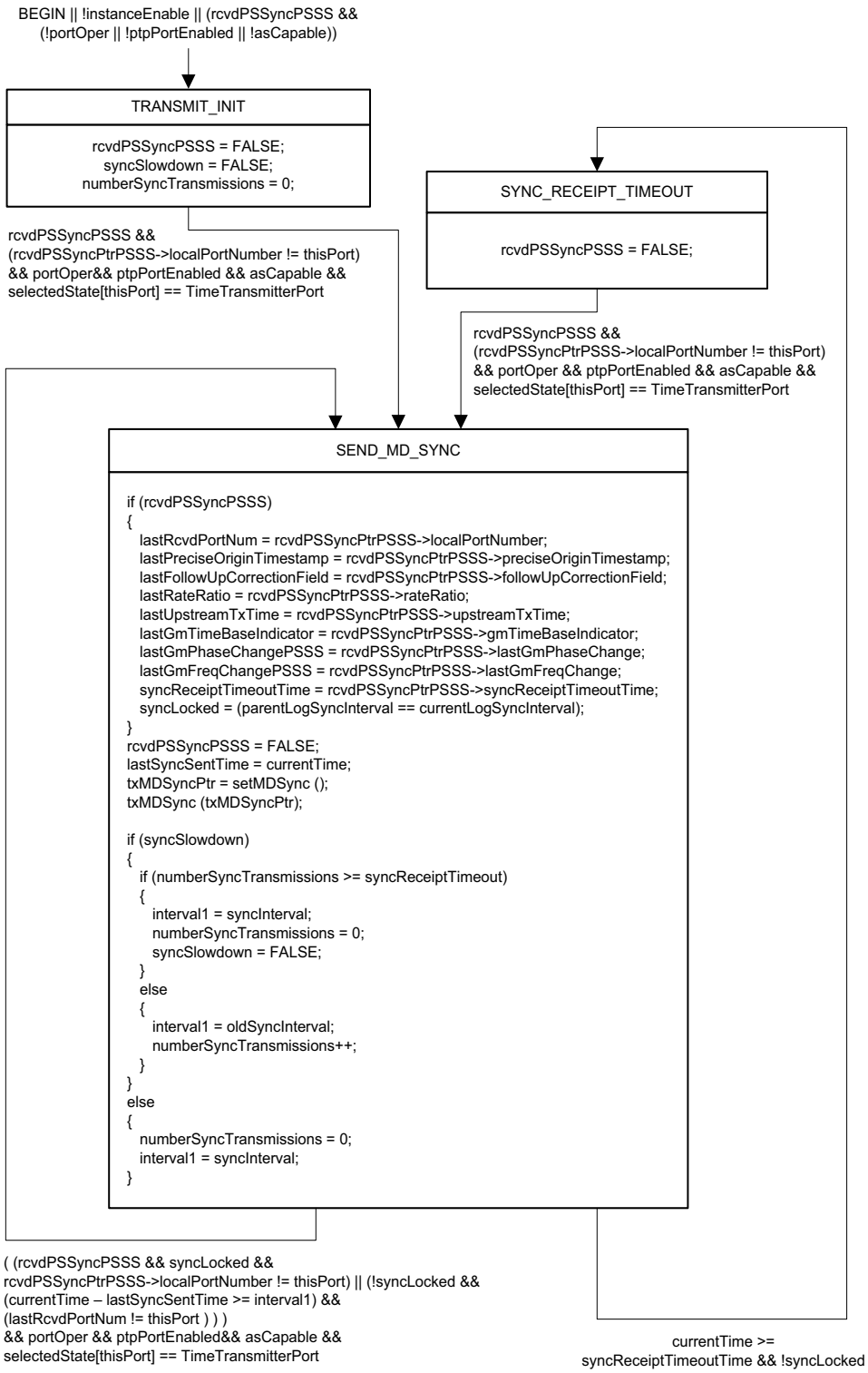

Figure 10-8—PortSyncSyncSend state machine

Change the title of 10.2.13 as follows:

10.2.13 ~~ClockSlave~~ClockTimeReceiverSync state machine

Change 10.2.13.2 as follows:

10.2.13.2 State machine functions

10.2.13.2.1 update~~Slave~~TimeReceiverTime(): Updates the global variable clock~~Slave~~TimeReceiverTime (see 10.2.4.3), based on information received from the SiteSync and LocalClock entities. It is the responsibility of the application to filter ~~slave~~timeReceiver times appropriately (see B.3 and B.4 for examples). As one example, clock~~Slave~~TimeReceiverTime can be:

a) Set to syncReceiptTime at every LocalClock update immediately after a PortSyncSync structure is received, and

b) Incremented by localClockTickInterval (see 10.2.4.18) multiplied by the rateRatio member of the previously received PortSyncSync structure during all other LocalClock updates.

If no PTP Instance is grandmaster-capable, i.e., gmPresent is FALSE, then clock~~Slave~~TimeReceiverTime is set to the time provided by the LocalClock. This function is invoked when rcvdLocalClockTickCSS is TRUE.

Change 10.2.13.2.2 as follows:

10.2.13.2.2 invokeApplicationInterfaceFunction (functionName): Invokes the application interface function whose name is functionName. For the ~~ClockSlave~~ClockTimeReceiverSync state machine, functionName is clockTargetPhaseDiscontinuity.result (see 9.6.2).

Change 10.2.13.3 as follows:

10.2.13.3 State diagram

The ~~ClockSlave~~ClockTimeReceiverSync state machine shall implement the function specified by the state diagram in Figure 10-9, the local variables specified in 10.2.13.1, the functions specified in 10.2.13.2, and the relevant global variables and functions specified in 10.2.4 through 10.2.6. The state machine receives a PortSyncSync structure from the SiteSyncSync state machine. It computes syncReceiptTime and clock~~Slave~~TimeReceiverTime, and sets syncReceiptLocalTime (i.e., the time relative to the LocalClock entity corresponding to syncReceiptTime), GmTimeBaseIndicator, lastGmPhaseChange, and lastGmFreqChange. It provides clock~~Slave~~TimeReceiverTime to the ~~ClockMasterSyncOffset~~ClockTimeTransmitterSyncOffset state machine, and provides information to the ClockTarget entity (via the ClockTargetPhaseDiscontinuity interface; see 9.6) to enable that entity to determine if a phase or frequency discontinuity has occurred.

The per-PTP Port global variables used in the ~~ClockSlave~~ClockTimeReceiverSync state machine are determined based on rcvdPSSyncPtrCSS->localPortNumber, as follows:

a) If rcvdPSSyncPtrCSS->localPortNumber > 0, the per-PTP Port global variables of PTP Port number rcvdPSSyncPtrCSS->localPortNumber are used.

b) If rcvdPSSyncPtrCSS->localPortNumber == 0, the values of the used per-PTP Port global variables are fixed as follows:

1) meanLinkDelay = 0

2) delayAsymmetry = 0

3) neighborRateRatio = 1.0

Replace Figure 10-9 with the following figure:

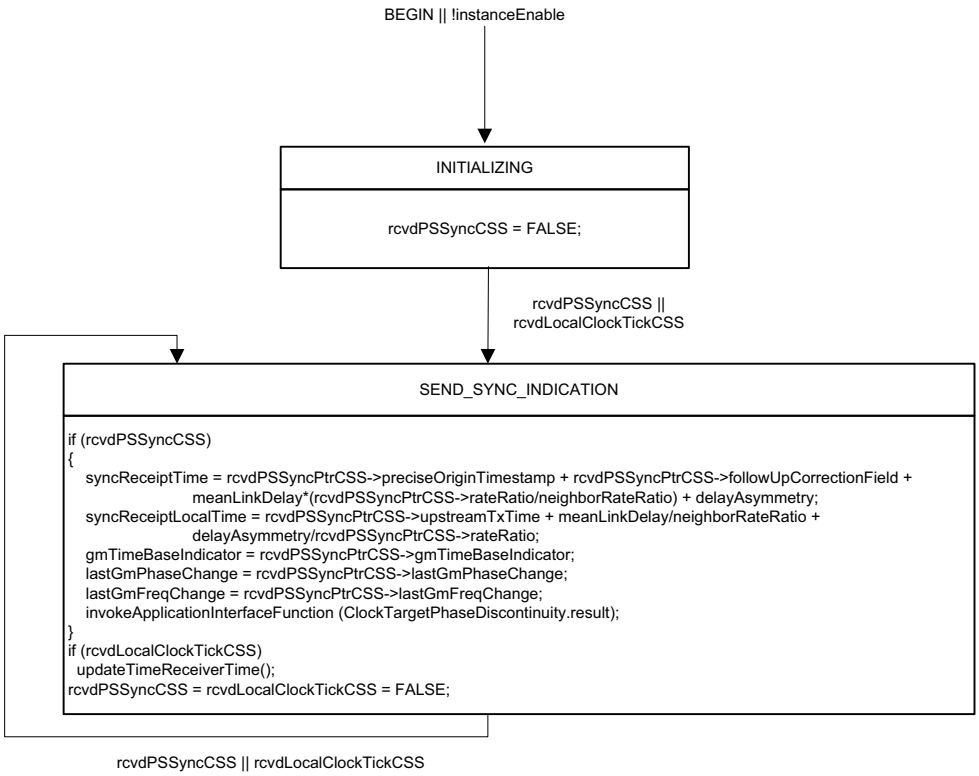

Figure 10-9—~~ClockSlave~~ClockTimeReceiver~~Sync~~ state machine

Change the title of 10.3 as follows:

10.3 Best ~~master~~timeTransmitter clock selection, external port configuration, and announce interval setting state machines

Change the title of 10.3.1 as follows:

10.3.1 Best ~~master~~timeTransmitter clock selection and external port configuration overview

Change 10.3.1.1 as follows:

10.3.1.1 General

There are two methods for setting the Grandmaster PTP Instance and time-synchronization spanning tree for a gPTP domain:

a) The ~~BMCA~~BTCA is used to determine the Grandmaster PTP Instance for a gPTP domain and construct the time-synchronization spanning tree with that Grandmaster PTP Instance as the root. In

this case, the network is configured automatically, i.e., the PTP Port states are set, using the results of the ~~BMCA~~BTCA.

b) The PTP Port states are configured to force a desired Grandmaster PTP Instance and to construct a desired time-synchronization spanning tree with the Grandmaster PTP Instance as the root.

The PTP Port state definitions are given in Table 10-2.

The per PTP Instance global variable externalPortConfigurationEnabled indicates whether method a) or b) is used; a value of TRUE indicates method b), and a value of FALSE indicates method a) (see 10.3.9.24). The data type of externalPortConfigurationEnabled is Boolean. Method a) is implemented and is the default mode of operation (i.e., externalPortConfigurationEnabled is FALSE) on domain 0 to maintain backward compatibility. For domains other than domain 0, the following statements apply:

c) At least one of the possibilities [method a) or b)] is implemented.

d) Both possibilities can be implemented.

e) If both possibilities are implemented, the default value of externalPortConfigurationEnabled is FALSE.

Once an Announce message is transmitted by a PTP Port, subsequent timing information (see 7.4) transmitted by that PTP Port is derived from the Grandmaster PTP Instance indicated in that Announce message.

Table 10-2—PTP Port state definitions

PTP Port state	Description
~~MasterPort~~TimeTransmitterPort	Any PTP Port, P, of the PTP Instance that is closer to the root than any other PTP Port of the gPTP communication path connected to P.
~~SlavePort~~TimeReceiverPort	The one PTP Port of the PTP Instance that is closest to the root PTP Instance. If the root is grandmaster-capable, the ~~SlavePort~~TimeReceiverPort is also closest to the Grandmaster PTP Instance. The PTP Instance does not transmit Sync or Announce messages on the ~~SlavePort~~TimeReceiverPort.
PassivePort	Any PTP Port of the PTP Instance whose PTP Port state is not ~~MasterPort~~TimeTransmitterPort, ~~SlavePort~~TimeReceiverPort, or DisabledPort.
DisabledPort	Any PTP Port of the PTP Instance for which the variables portOper, ptpPortEnabled, and asCapable are not all TRUE.
NOTE—PTP Port states are per PTP Port and per domain (i.e., per PTP Instance; see 8.1).	

NOTE—Information contained in Sync and associated Follow_Up messages received on PTP Ports whose PTP Port state is PassivePort is discarded; the SiteSyncSync state machine (see 10.2.7) uses only information received from a PTP Port whose PTP Port state is ~~SlavePort~~TimeReceiverPort.

An example ~~master~~timeTransmitter/~~slave~~timeReceiver hierarchy of PTP Instances is shown in Figure 10-10. The Grandmaster PTP Instance ports all have PTP Port state of ~~MasterPort~~TimeTransmitterPort. All the other PTP Instances have exactly one ~~slave~~timeReceiver port. The time-synchronization spanning tree is composed of the PTP Instances and the links that do not have an endpoint PTP Port whose PTP Port state is PassivePort.

Replace Figure 10-10 with the following figure:

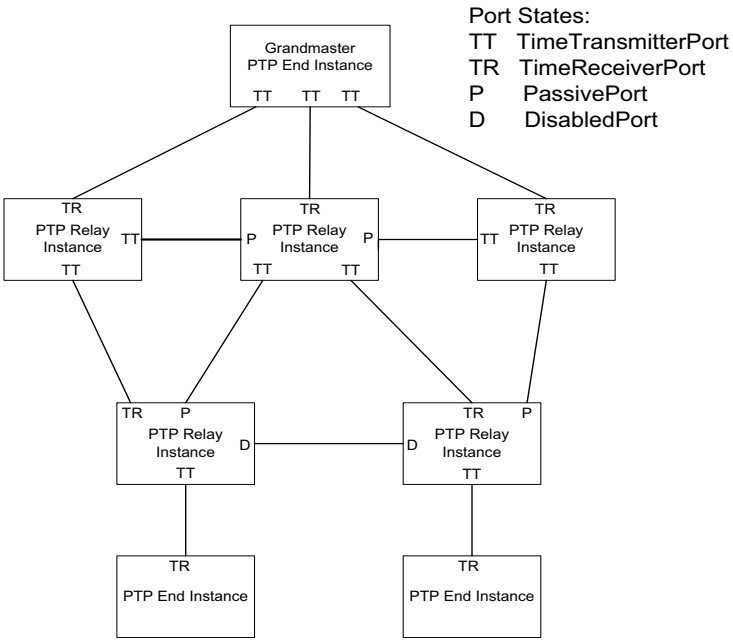

Figure 10-10—Example ~~master~~timeTransmitter/~~slave~~timeReceiver hierarchy of PTP Instances

Change 10.3.1.2 as follows:

10.3.1.2 Best ~~master~~timeTransmitter clock algorithm overview

In the ~~BMCA~~BTCA (i.e., method a) of 10.3.1.1), best ~~master~~timeTransmitter selection information is exchanged between PTP Instances of time-aware systems via Announce messages (see 10.5 and 10.6). Each Announce message contains time-synchronization spanning tree vector information that identifies one PTP Instance as the root of the time-synchronization spanning tree and, if the PTP Instance is grandmaster-capable, the Grandmaster PTP Instance. Each PTP Instance in turn uses the information contained in the Announce messages it receives, along with its knowledge of itself, to compute which of the PTP Instances that it has knowledge of ought to be the root of the spanning tree and, if grandmaster-capable, the Grandmaster PTP Instance. As part of constructing the time-synchronization spanning tree, each PTP Port of each PTP Instance is assigned a PTP Port state from Table 10-2 by state machines associated with the ports and with the PTP Instance as a whole.

NOTE—The ~~BMCA~~BTCA described in this standard is the default ~~BMCA~~BTCA according to the specifications of 9.3 of IEEE Std 1588-2019. It is also equivalent to a subset of the Rapid Spanning Tree Protocol (RSTP) described in IEEE Std 802.1Q-2018 (though the full RSTP described in IEEE Std 802.1Q-2018 is not equivalent to the full ~~BMCA~~BTCA described in IEEE Std 1588-2019). The ~~BMCA~~BTCA description here uses the formalism of the RSTP description in IEEE Std 802.1Q-2018.

Change 10.3.1.3 as follows:

10.3.1.3 external port configuration overview

In external port configuration (i.e., method b) of 10.3.1.1), an external entity determines the synchronization spanning tree and sets the PTP Port states accordingly. The method used by the external entity to determine the synchronization spanning tree is outside the scope of this standard. However, as with the ~~BMCA~~BTCA, Announce messages are used to transport information on the time-synchronization spanning tree and Grandmaster PTP Instance time properties information from one PTP Instance to the next in the tree. The external entity sets the state of a PTP Port by setting the value of externalPortConfigurationPortDS.desiredState to the desired state.

Change 10.3.2 as follows:

10.3.2 systemIdentity

The systemIdentity attribute of a PTP Instance is a UInteger112 (i.e., a 14-byte, unsigned integer) formed by concatenating the following attributes, in the following order, from most significant to least significant octet:

a) priority1 (1 octet; see 8.6.2.1)
b) clockClass (1 octet; see 8.6.2.2 and 6.4.3.8)
c) clockAccuracy (1 octet; see 8.6.2.3 and 6.4.3.8)
d) offsetScaledLogVariance (2 octets; see 8.6.2.4 and 6.4.3.8)
e) priority2 (1 octet; see 8.6.2.5)
f) clockIdentity (8 octets; see 8.5.2.2 and 6.4.3.6)

The systemIdentity attribute is defined for convenience when comparing two PTP Instances to determine, when using the ~~BMCA~~BTCA (i.e., method a) of 10.3.1.1), which is a better candidate for root and if the PTP Instance is grandmaster-capable (i.e., the value of priority1 is less than 255; see 8.6.2.1). Two PTP Instances are compared as follows. Let the systemIdentity of PTP Instance A be S_A and the systemIdentity of PTP Instance B be S_B. Let the clockIdentity of A be C_A and the clockIdentity of B be C_B. Then, if $C_A \neq C_B$, i.e., A and B represent different PTP Instances,

g) A is better than B if and only if $S_A < S_B$, and
h) B is better than A if and only if $S_B < S_A$.

If $C_A = C_B$, i.e., A and B represent the same PTP Instance,

i) $S_A < S_B$ means that A represents an upgrading of the PTP Instance compared to B or, equivalently, B represents a downgrading of the PTP Instance compared to A,
j) $S_B < S_A$ means that B represents an upgrading of the PTP Instance compared to A or, equivalently, A represents a downgrading of the PTP Instance compared to B, and
k) $S_A = S_B$ means that A and B represent the same PTP Instance that has not changed.

Comparisons g) and h) in this subclause imply that, with the ordering of attributes in the systemIdentity, the clockIdentity is a tie-breaker when two different PTP Instances that have identical attributes a) through e) are compared.

Comparisons g) and h) also imply that a PTP Instance that is grandmaster-capable is always better than another PTP Instance that is not grandmaster-capable because the priority1 is less than 255 if the PTP Instance is grandmaster-capable and is equal to 255 if it is not grandmaster-capable (see 8.6.2.1).

The cases where A and B represent different PTP Instances and represent the same PTP Instance are handled separately in the ~~BMCA~~BTCA. When comparing two different PTP Instances, the better PTP Instance is

selected as the Grandmaster PTP Instance candidate. However, if A and B represent the same PTP Instance with attributes that have changed, the PTP Instance is considered as having the most recent attributes when doing subsequent comparisons with other PTP Instances.

Change 10.3.3 as follows:

10.3.3 stepsRemoved

Every PTP Instance has a stepsRemoved associated with it. For the root PTP Instance, and therefore the Grandmaster PTP Instance when the root is grandmaster-capable, it is zero. For all other PTP Instances, it is the number of gPTP communication paths in the path from the root to the respective PTP Instance.

NOTE—For example, stepsRemoved for a ~~slave~~timeReceiver port on the same gPTP communication path as the Grandmaster PTP Instance will have a value of 1, indicating that a single path was traversed.

The stepsRemoved attributes of different ports of a PTP Instance are compared after comparisons of other attributes that take precedence (i.e., priority1, clockClass, clockAccuracy, offsetScaledLogVariance, priority2) do not result in one PTP Port being declared better than the other. Among the ports whose stepsRemoved attributes are compared, the PTP Port on the PTP Instance with the lowest stepsRemoved is assigned the state of ~~SlavePort~~TimeReceiverPort for that PTP Instance (the root PTP Instance does not have a ~~SlavePort~~TimeReceiverPort). This lowest stepsRemoved is also considered the stepsRemoved for the PTP Instance. If a PTP Instance has two or more ports with the same stepsRemoved, then the PTP Port with the smallest portNumber is selected as the ~~SlavePort~~TimeReceiverPort.

Change 10.3.4 as follows:

10.3.4 time-synchronization spanning tree priority vectors

PTP Instances send best ~~master~~timeTransmitter selection information to each other in Announce messages. The information is structured in a time-synchronization spanning tree priority vector. Time-synchronization spanning tree priority vectors provide the basis for a concise specification of the ~~BMCA~~BTCA's determination of the time-synchronization spanning tree and Grandmaster PTP Instance. A priority vector is formed by concatenating the following attributes, in the following order, from most significant to least significant octet:

a) rootSystemIdentity (14 octets; see 10.3.2)
b) stepsRemoved (2 octets; see 10.3.3)
c) sourcePortIdentity (i.e., portIdentity of the transmitting PTP Instance; 10 octets; see 8.5.2 and 10.6.2)
d) portNumber of the receiving PTP Port (2 octets; see 8.5.2.3)

The first two components of a priority vector are significant throughout the gPTP domain; they are propagated via Announce messages and updated through invocation of ~~BMCA~~BTCA state machines. The next component is assigned hop-by-hop for each gPTP communication path or PTP Instance and thus is of local significance only. It is used as a tie-breaker in decisions between time-synchronization spanning tree priority vectors that are otherwise equal. The fourth component is not conveyed in Announce messages, but is used as a tie-breaker within a PTP Instance.

The set of all time-synchronization spanning tree priority vectors is totally ordered. For all components, a lesser numerical value is better, and earlier components in the preceding list are more significant. In addition, as mentioned earlier, a priority vector that reflects a root PTP Instance that is grandmaster-capable is always better than a priority vector that reflects a root PTP Instance that is not grandmaster-capable. As each PTP Port receives a priority vector, via an Announce message, from ports closer to the root, additions

are made to one or more components to yield a worse priority vector. This process of receiving information, adding to it, and passing it on, can be described in terms of the message priority vector received and a set of priority vectors used to facilitate the computation of a priority vector for each PTP Port, to be transmitted in further Announce Messages to PTP Instances further from the root.

Change 10.3.5 as follows:

10.3.5 Priority vector calculations

The portPriorityVector is the time-synchronization spanning tree priority vector held for the PTP Port when the reception of Announce messages and any pending update of information has been completed:

portPriorityVector = {rootSystemIdentity : stepsRemoved : sourcePortIdentity : portNumber}

A messagePriorityVector is the time-synchronization spanning tree priority vector conveyed in a received Announce Message. For a PTP Instance S receiving an Announce Message on PTP Port P_S with portNumber PN_S, from a ~~MasterPort~~TimeTransmitterPort with portIdentity P_M on PTP Instance M claiming a rootSystemIdentity of R_M and a stepsRemoved of SR_M:

messagePriorityVector = {R_M : SR_M : P_M : PN_S}

This messagePriorityVector is superior to the portPriorityVector and will replace it if, and only if, the messagePriorityVector is better than the portPriorityVector, or the Announce message has been transmitted from the same ~~master~~timeTransmitter PTP Instance and ~~MasterPort~~TimeTransmitterPort as the portPriorityVector, i.e., if the following is true:

((R_M < rootSystemIdentity)) ||

((R_M == rootSystemIdentity) && (SR_M < stepsRemoved)) ||

((R_M == rootSystemIdentity) && (SR_M == stepsRemoved) && (P_M < sourcePortIdentity (of current ~~master~~timeTransmitter PTP Instance))) ||

((R_M == rootSystemIdentity) && (SR_M == stepsRemoved)

&& (P_M == sourcePortIdentity (of current ~~master~~timeTransmitter PTP Instance)) && (PN_S < portNumber)) ||

((P_M.clockIdentity == sourcePortIdentity.clockIdentity (of current ~~master~~timeTransmitter PTP Instance)) && (P_M.portNumber == sourcePortIdentity.PortNumber (of the current ~~master~~timeTransmitter PTP Instance)))

A gmPathPriorityVector can be calculated from a received portPriorityVector by adding one to the stepsRemoved component:

gmPathPriorityVector = {R_M : SR_M + 1 : P_M : PN_S}

The systemPriorityVector for a PTP Instance S with systemIdentity S_S and clockIdentity C_S is the priority vector that would, with the portIdentity of the ~~SlavePort~~TimeReceiverPort set equal to the portIdentity of the transmitting PTP Port, be used as the message priority vector in Announce Messages transmitted on S's ports whose state is ~~MasterPort~~TimeTransmitterPort if S was selected as the root:

$$\text{systemPriorityVector} = \{S_S : 0 : \{C_S : 0\} : 0\}$$

The gmPriorityVector for S is the best of the set comprising the systemPriorityVector vector plus every gmPathPriorityVector for which the clockIdentity of the ~~master~~timeTransmitter PTP Instance portIdentity is not the clockIdentity of S. If the systemPriorityVector is best, S has been selected as the root. When the best gmPathPriorityVector is that of PTP Port PN_S above, then:

$$\text{gmPriorityVector} = \{S_S : 0 : \{C_S : 0\} : 0\} \text{ if S is better than } R_M, \text{ or}$$

$$\text{gmPriorityVector} = \{R_M : SR_M + 1 : P_M : PN_S\} \text{ if S is worse than } R_M.$$

The ~~master~~timeTransmitterPriorityVector for a PTP Port Q on PTP Instance S is the gmPriorityVector with S's clockIdentity C_S substituted for the clockIdentity of the ~~master~~timeTransmitter portIdentity, and Q's portNumber PN_Q substituted for the portNumber of the ~~master~~timeTransmitter portIdentity and for the portNumber of the receiving PTP Port:

~~master~~timeTransmitterPriorityVector = $\{S_S : 0 : \{C_S : PN_Q\} : PN_Q\}$ if S is better than R_M, or
~~master~~timeTransmitterPriorityVector = $\{R_M : SR_M + 1 : \{C_S : PN_Q\} : PN_Q\}$ if S is worse than R_M.

If the ~~master~~timeTransmitterPriorityVector is better than the portPriorityVector, the PTP Port will be the ~~MasterPort~~TimeTransmitterPort for the attached gPTP communication path and the portPriorityVector will be updated. The messagePriorityVector information in Announce messages transmitted by a PTP Port always includes the first three components of the ~~master~~timeTransmitterPriorityVector of the PTP Port.

NOTE—The consistent use of lower numerical values to indicate better information is deliberate as the ~~MasterPort~~TimeTransmitterPort that is closest to the root, i.e., has a numerically lowest path cost component, is selected from amongst potential alternatives for any given gPTP communication path. Adopting the conventions that lower numerical values indicate better information, that where possible more significant priority components are encoded earlier in the octet sequence of an Announce message, and that earlier octets in the encoding of individual components are more significant allows concatenated octets that compose a priority vector to be compared as if they were a multiple octet encoding of a single number, without regard to the boundaries between the encoded components. To reduce the confusion that naturally arises from having the lesser of two numerical values represent the better of the two, i.e., the one to be chosen all other factors being equal, this clause uses the following consistent terminology. Relative numeric values are described as "least," "lesser," "equal," and "greater," and their comparisons as "less than," "equal to," or "greater than," while relative time-synchronization spanning tree priorities are described as "best," "better," "the same," "different," and "worse" and their comparisons as "better than," "the same as," "different from," and "worse than." The operators "<" and "==" represent less than and equal to, respectively. The terms "superior" and "inferior" are used for comparisons that are not simply based on priority, but can include the fact that the priority vector of a ~~MasterPort~~TimeTransmitterPort can replace an earlier vector transmitted in an Announce message by the same PTP Port.

10.3.6 PTP Port state assignments

Change 10.3.6.1 as follows:

10.3.6.1 PTP Port state assignments when the ~~BMCA~~BTCA is used

The ~~BMCA~~BTCA assigns one of the following PTP Port states to each PTP Port: ~~MasterPort~~TimeTransmitterPort, ~~SlavePort~~TimeReceiverPort, PassivePort, or DisabledPort.

The DisabledPort state is assigned if portOper is FALSE (see 10.2.5.12), ptpPortEnabled is FALSE (see 10.2.5.13), or asCapable is FALSE (see 10.2.5.1).

A PTP Port for which portOper, ptpPortEnabled, and asCapable are all TRUE has its PTP Port state assigned according to the source and relative priority of the time-synchronization spanning tree portPriorityVector (see 10.3.4 and 10.3.5) as follows:

a) If the PTP Instance is not the root, the source of the gmPriorityVector is the ~~SlavePort~~TimeReceiverPort.
b) Each PTP Port whose portPriorityVector is its ~~master~~timeTransmitterPriorityVector is a ~~MasterPort~~TimeTransmitterPort.
c) Each PTP Port, other than the ~~SlavePort~~TimeReceiverPort, whose portPriorityVector has been received from another PTP Instance or another PTP Port on this PTP Instance is a PassivePort.

Change 10.3.6.2 as follows:

10.3.6.2 PTP Port state assignments when external port configuration is used

If external port configuration is used, one of the states ~~MasterPort~~TimeTransmitterPort, ~~SlavePort~~TimeReceiverPort, PassivePort, or DisabledPort is assigned to each PTP Port by an external entity, as described in this subclause.

The DisabledPort state is assigned if portOper is FALSE (see 10.2.5.12), ptpPortEnabled is FALSE (see 10.2.5.13), or asCapable is FALSE (see 10.2.5.1).

The member externalPortConfigurationPortDS.desiredState (see 14.12.2) is used by an external entity to set the state of the respective PTP Port to ~~MasterPort~~TimeTransmitterPort, ~~SlavePort~~TimeReceiverPort, or PassivePort. When this member is set, its value is copied to the per PTP Port local variable portStateInd (see 10.3.15.1.1). If portOper, ptpPortEnabled, and asCapable are all TRUE for this PTP Port, the PTP Port state is set equal to the value of externalPortConfigurationPortDS.desiredState by copying the value of this member to the element of the selectedState array (see 10.2.4.20) for this PTP Port.

Change the title of 10.3.7 as follows:

10.3.7 Overview of best ~~master~~timeTransmitter clock selection, external port configuration, and announce interval setting state machines

Change 10.3.7.1 as follows:

10.3.7.1 Best ~~master~~timeTransmitter clock selection state machines overview

The best ~~master~~timeTransmitter clock selection function in a PTP Instance is specified by a number of cooperating state machines. Figure 10-11 is not itself a state machine, but illustrates the machines, their local variables, their interrelationships, their performance parameters, and the global variables and structures used to communicate between them.

Replace Figure 10-11 with the following figure:

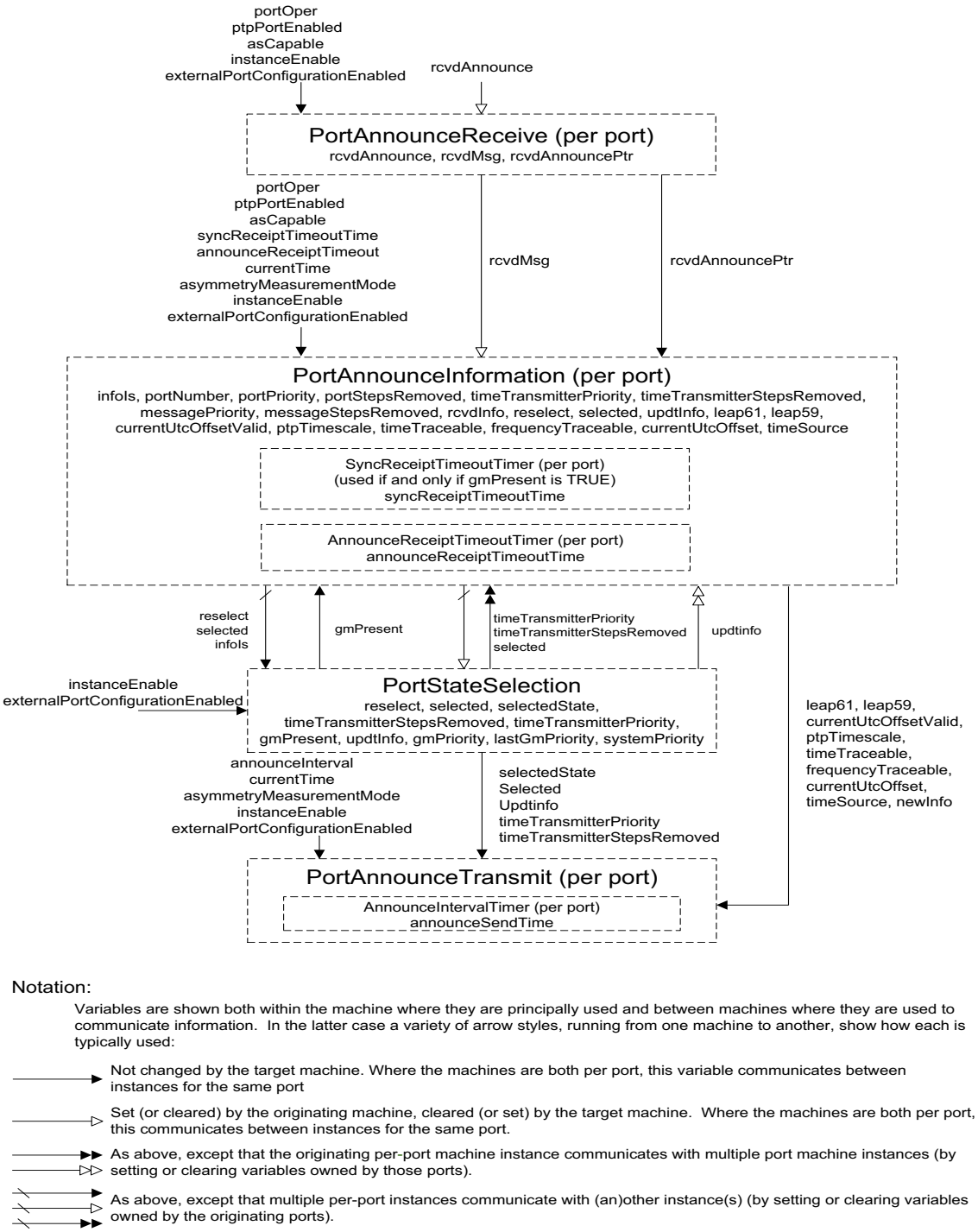

Figure 10-11—Best ~~master~~timeTransmitter clock selection state machines—overview and interrelationships

NOTE—The ~~BMCA~~BTCA state machines are all invoked by the media-independent layer, i.e., by the SiteSync and PortSync entities. The media-dependent layer, i.e., the MD entity, simply takes an Announce message received from the PortSync entity of the same PTP Port and gives it to the next lower layer (e.g., IEEE 802.3, IEEE 802.11). It is the PortSync entity that generates and consumes Announce messages.

The following media-independent layer state machines are in Figure 10-11:

a) PortAnnounceReceive (one instance per PTP Instance, per PTP Port): receives Announce information from the MD entity of the same PTP Port, determines if the Announce message is qualified and, if so, sets the rcvdMsg variable. This state machine is invoked by the PortSync entity of the PTP Port.

b)

c) PortAnnounceTransmit (one instance per PTP Instance, per PTP Port): if the PTP Port state is ~~MasterPort~~TimeTransmitterPort, transmits Announce information to the MD entity when an announce interval has elapsed, PTP Port states have been updated, and portPriority and portStepsRemoved information has been updated with newly determined ~~master~~timeTransmitterPriority and ~~master~~timeTransmitterStepsRemoved information. This state machine is invoked by the PortSync entity of the PTP Port and is also used when external port configuration is used.

Change 10.3.7.2 as follows:

10.3.7.2 External port configuration state machines overview

The external port configuration function in a PTP Instance is specified by a number of cooperating state machines. Figure 10-12 is not itself a state machine, but illustrates the machines, their local variables, their interrelationships, their performance parameters, and the global variables and structures used to communicate between them.

NOTE—The external port configuration state machines are all invoked by the media-independent layer and are per PTP Port, i.e., they are invoked by the PortSync entity for the respective PTP Port. The media-dependent layer, i.e., the MD entity, simply takes an Announce message received from the PortSync entity of the same PTP Port and gives it to the next lower layer (e.g., IEEE 802.3, IEEE 802.11). It is the PortSync entity that generates and consumes Announce messages.

The following media-independent layer state machines are in Figure 10-12:

a) PortAnnounceInformationExt (one instance per PTP Instance, per PTP Port): Receives and stores new Announce information received in Announce messages.

b) PortStateSettingExt (one instance per PTP Instance): Copies the desired PTP Port state for the PTP Port to the respective selectedState array element, updates gmPresent, computes ~~master~~timeTransmitterStepsRemoved, stores the time properties information in the respective global variables, and computes the gmPriorityVector and ~~master~~timeTransmitterPriorityVector.

c) PortAnnounceTransmit (one instance per PTP Instance, per PTP Port): If the PTP Port state is ~~MasterPort~~TimeTransmitterPort, transmits Announce information to the MD entity when an announce interval has elapsed, PTP Port states have been updated, and portPriority and portStepsRemoved information has been updated with newly determined ~~master~~timeTransmitterPriority and ~~master~~timeTransmitterStepsRemoved information. This state machine is invoked by the PortSync entity of the PTP Port and is also used when the ~~BMCA~~BTCA is used.

Replace Figure 10-12 with the following figure:

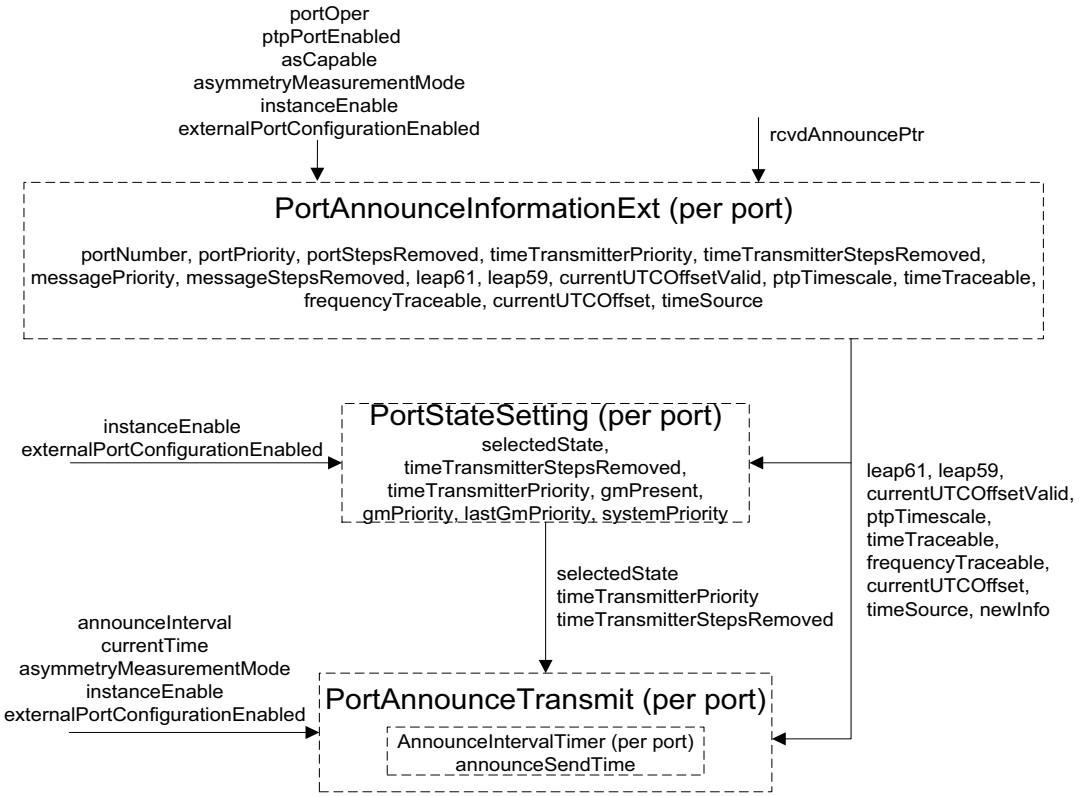

Figure 10-12—External port configuration state machines—overview and interrelationships

Change 10.3.8 as follows:

10.3.8 Overview of global variables used by best ~~master~~timeTransmitter clock selection, external port configuration, and announce interval setting state machines

Subclauses 10.3.9 and 10.3.10 define global variables used by best ~~master~~timeTransmitter clock selection, external port configuration, and announce interval setting state machines whose scopes are as follows:

- — Per PTP Instance (i.e., per domain)
- — Per PTP Instance, per PTP Port
- — Instance used by CMLDS (see 11.2.17) (i.e., variable is common across all LinkPorts)
- — Instance used by CMLDS, per LinkPort

Table 10-3 summarizes the scope of each global variable of 10.3.9 and 10.3.10.

10.3.9 Per PTP Instance global variables

Change 10.3.9.1 as follows:

Table 10-3—Summary of scope of global variables used by best ~~master~~timeTransmitter clock selection, external port configuration, and announce interval setting state machines (see 10.3.9 and 10.3.10)

Variable name	Subclause of definition	Per PTP Instance (i.e., per domain)	Per PTP Instance, per PTP Port	Instance used by CMLDS (i.e., variable is common across all LinkPorts)	Instance used by CMLDS, per LinkPort
reselect	10.3.9.1	Yes	No	No	No
selected	10.3.9.2	Yes	No	No	No
~~master~~timeTransmitterStepsRemoved	10.3.9.3	Yes	No	No	No
leap61	10.3.9.4	Yes	No	No	No
leap59	10.3.9.5	Yes	No	No	No
currentUtcOffsetValid	10.3.9.6	Yes	No	No	No
ptpTimescale	10.3.9.7	Yes	No	No	No
timeTraceable	10.3.9.8	Yes	No	No	No
frequencyTraceable	10.3.9.9	Yes	No	No	No
currentUtcOffset	10.3.9.10	Yes	No	No	No
timeSource	10.3.9.11	Yes	No	No	No
sysLeap61	10.3.9.12	Yes	No	No	No
sysLeap59	10.3.9.13	Yes	No	No	No
sysCurrentUtcOffsetValid	10.3.9.14	Yes	No	No	No
sysPtpTimescale	10.3.9.15	Yes	No	No	No
sysTimeTraceable	10.3.9.16	Yes	No	No	No
sysFrequencyTraceable	10.3.9.17	Yes	No	No	No
sysCurrentUtcOffset	10.3.9.18	Yes	No	No	No
sysTimeSource	10.3.9.19	Yes	No	No	No
systemPriority	10.3.9.20	Yes	No	No	No
gmPriority	10.3.9.21	Yes	No	No	No
lastGmPriority	10.3.9.22	Yes	No	No	No
pathTrace	10.3.9.23	Yes	No	No	No
externalPortConfigurationEnabled	10.3.9.24	Yes	No	No	No
lastAnnouncePort	10.3.9.25	Yes	No	No	No
announceReceiptTimeoutTimeInterval	10.3.10.1	No	Yes	No	No
announceSlowdown	10.3.10.2	No	Yes	No	No
oldAnnounceInterval	10.3.10.3	No	Yes	No	No
infoIs	10.3.10.4	No	Yes	No	No
~~master~~timeTransmitterPriority	10.3.10.5	No	Yes	No	No

Table 10-3—Summary of scope of global variables used by best ~~master~~timeTransmitter clock selection, external port configuration, and announce interval setting state machines (see 10.3.9 and 10.3.10) *(continued)*

Variable name	Subclause of definition	Per PTP Instance (i.e., per domain)	Per PTP Instance, per PTP Port	Instance used by CMLDS (i.e., variable is common across all LinkPorts)	Instance used by CMLDS, per LinkPort
currentLogAnnounceInterval	10.3.10.6	No	Yes	No	No
initialLogAnnounceInterval	10.3.10.7	No	Yes	No	No
announceInterval	10.3.10.8	No	Yes	No	No
messageStepsRemoved	10.3.10.9	No	Yes	No	No
newInfo	10.3.10.10	No	Yes	No	No
portPriority	10.3.10.11	No	Yes	No	No
portStepsRemoved	10.3.10.12	No	Yes	No	No
rcvdAnnouncePtr	10.3.10.13	No	Yes	No	No
rcvdMsg	10.3.10.14	No	Yes	No	No
updtInfo	10.3.10.15	No	Yes	No	No
annLeap61	10.3.10.16	No	Yes	No	No
annLeap59	10.3.10.17	No	Yes	No	No
annCurrentUtcOffsetValid	10.3.10.18	No	Yes	No	No
annPtpTimescale	10.3.10.19	No	Yes	No	No
annTimeTraceable	10.3.10.20	No	Yes	No	No
annFrequencyTraceable	10.3.10.21	No	Yes	No	No
annCurrentUtcOffset	10.3.10.22	No	Yes	No	No
annTimeSource	10.3.10.23	No	Yes	No	No
receivedPathTrace	10.3.10.24	No	Yes	No	No

10.3.9.1 reselect: A Boolean array of length numberPorts+1 (see 8.6.2.8). Setting reselect[j], where 0 ≤ j ≤ numberPorts, to TRUE causes the STATE_SELECTION block of the PortStateSelection state machine (see 10.3.13) to be re-entered, which in turn causes the PTP Port state of each PTP Port of the PTP Instance to be updated (via the function updtStatesTree(); see 10.3.13.2.4). This variable is used only by the ~~BMCA~~BTCA, i.e., not by the explicit port state configuration option.

Change 10.3.9.2 as follows:

10.3.9.2 selected: A Boolean array of length numberPorts+1 (see 8.6.2.8). selected[j], where 0 ≤ j ≤ numberPorts, is set to TRUE immediately after the PTP Port states of all the ports are updated. This value indicates to the PortAnnounceInformation state machine (see 10.3.12) that it can update the portPriorityVector and other variables for each PTP Port. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option; however, its value does not impact the explicit port state configuration option (see the NOTE in 10.3.16.3).

NOTE—Array elements 0 of the reselect and selected arrays are not used, except that the function clearReselectTree() sets reselect[0] to FALSE when it sets the entire array to zero and the function setSelectedTree() sets selected[0] to TRUE when it sets the entire array to TRUE. This action is taken only for convenience, so that array element j can correspond to PTP Port j. Note also that, in contrast, selectedState[0] is not used (see 10.2.4.20).

Change 10.3.9.3 as follows:

10.3.9.3 ~~master~~timeTransmitter~~Steps~~Removed: The value of stepsRemoved for the PTP Instance, after the PTP Port states of all the ports have been updated (see 10.3.13.2.4 for details on the computation of ~~master~~timeTransmitter~~Steps~~Removed). The data type for ~~master~~timeTransmitter~~Steps~~Removed is UInteger16. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.4 as follows:

10.3.9.4 leap61: A Boolean variable whose value is TRUE if the last minute of the current UTC day, relative to the current Grandmaster Clock, contains 61 s and FALSE if the last minute of the current UTC day does not contain 61 s. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.5 as follows:

10.3.9.5 leap59: A Boolean variable whose value is TRUE if the last minute of the current UTC day, relative to the current Grandmaster Clock, contains 59 s and FALSE if the last minute of the current UTC day does not contain 59 s. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.6 as follows:

10.3.9.6 currentUtcOffsetValid: A Boolean variable whose value is TRUE if currentUtcOffset (see 10.3.9.10), relative to the current Grandmaster Clock, is known to be correct and FALSE if currentUtcOffset is not known to be correct. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.7 as follows:

10.3.9.7 ptpTimescale: A Boolean variable whose value is TRUE if the timescale of the current Grandmaster Clock is PTP (see 8.2.1) and FALSE if the timescale is ARB. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.8 as follows:

10.3.9.8 timeTraceable: A Boolean variable whose value is TRUE if both ~~clockSlave~~ClockTimeReceiverTime [i.e., the synchronized time maintained at the ~~slave~~timeReceiver (see 10.2.4.3)] and currentUtcOffset (see 10.3.9.10), relative to the current Grandmaster Clock, are traceable to a primary reference and FALSE if one or both are not traceable to a primary reference. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.9 as follows:

10.3.9.9 frequencyTraceable: A Boolean variable whose value is TRUE if the frequency that determines ~~clockSlave~~ClockTimeReceiverTime, i.e., the frequency of the LocalClockEntity multiplied by the most

recently computed rateRatio by the PortSyncSyncReceive state machine (see 10.2.8.1.4), is traceable to a primary reference and FALSE if this frequency is not traceable to a primary reference. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.10 as follows:

10.3.9.10 currentUtcOffset: The difference between TAI time and UTC time, i.e., TAI time minus UTC time, in seconds, and relative to the current Grandmaster Clock, when known. Otherwise, the value has no meaning (see 10.3.9.6). The data type for currentUtcOffset is Integer16. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

NOTE—For example, 2006-01-01 00:00:00 UTC and 2006-01-01 00:00:33 TAI represent the same instant of time. At this time, currentUtcOffset was equal to 33 s.[3]

Change 10.3.9.11 as follows:

10.3.9.11 timeSource: The value of the timeSource attribute of the current Grandmaster PTP Instance. The data type for timeSource is TimeSource (see 8.6.2.7). This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.12 as follows:

10.3.9.12 sysLeap61: A Boolean variable whose value is TRUE if the last minute of the current UTC day, relative to the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance, contains 61 s and FALSE if the last minute of the current UTC day does not contain 61 s. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.13 as follows:

10.3.9.13 sysLeap59: A Boolean variable whose value is TRUE if the last minute of the current UTC day, relative to the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance, contains 59 s and FALSE if the last minute of the current UTC day does not contain 59 s. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.14 as follows:

10.3.9.14 sysCurrentUtcOffsetValid: A Boolean variable whose value is TRUE if currentUtcOffset (see 10.3.9.10), relative to the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance, is known to be correct and FALSE if currentUtcOffset is not known to be correct. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.15 as follows:

10.3.9.15 sysPtpTimescale: A Boolean variable whose value is TRUE if the timescale of the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance is PTP (see 8.2.1) and FALSE if the timescale of the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance is ARB. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

[3]Note also that a leap second was not added at the end of the last UTC minute of 2005-12-31.

Change 10.3.9.16 as follows:

10.3.9.16 sysTimeTraceable: A Boolean variable whose value is TRUE if both ~~masterTime~~timeTransmitterTime [i.e., the time maintained by the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance (see 10.2.4.21)] and currentUtcOffset (see 10.3.9.10), relative to the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance, are traceable to a primary reference and FALSE if one or both are not traceable to a primary reference. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.17 as follows:

10.3.9.17 sysFrequencyTraceable: A Boolean variable whose value is TRUE if the frequency that determines ~~masterTime~~timeTransmitterTime of the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance, i.e., the frequency of the LocalClockEntity multiplied by the most recently computed gmRateRatio by the ~~ClockMasterSyncReceive~~ClockTimeTransmitterSyncReceive state machine (see 10.2.4.14 and 10.2.11), is traceable to a primary reference and FALSE if this frequency is not traceable to a primary reference. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.9.18 as follows:

10.3.9.18 sysCurrentUtcOffset: The difference between TAI time and UTC time, i.e., TAI time minus UTC time, in seconds, and relative to the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance, when known. Otherwise, the value has no meaning (see 10.3.9.14). The data type for sysCurrentUtcOffset is Integer16. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

NOTE—See the NOTE in 10.3.9.10 for more detail on the sign convention.

Change 10.3.9.19 as follows:

10.3.9.19 sysTimeSource: The value of the timeSource attribute of the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance (see 8.6.2.7). The data type for sysTimeSource is TimeSource.

Change 10.3.9.22 as follows:

10.3.9.22 lastGmPriority: The previous gmPriorityVector for the PTP Instance, prior to the most recent invocation of the PortStateSelection state machine. The data type for lastGmPriority is UInteger224 (see 10.3.4). lastGmPriority is used only by the ~~BMCA~~BTCA, i.e., not by the explicit port state configuration option.

Change 10.3.9.23 as follows:

10.3.9.23 pathTrace: An array that contains the clockIdentities of the successive PTP Instances that receive, process, and send Announce messages. The data type for pathTrace is ClockIdentity[N], where N is the number of PTP Instances, including the Grandmaster PTP Instance, that the Announce information has traversed. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

NOTE 1—N is equal to stepsRemoved+1 (see 10.6.3.2.6). The size of the pathTrace array can change after each reception of an Announce message, up to the maximum size for the respective medium. For example, the maximum value of N for a full-duplex IEEE 802.3 medium is 179. This is obtained from the fact that the number of PTP octets in an Announce message is 68 + 8N, where N is the number of entries in the pathTrace array (see 10.6.3.1 and Table 10-11), and the maximum payload size for full-duplex IEEE 802.3 media is 1500 octets. Setting 68 + 8N = 1500, and solving for N gives N = 179.

NOTE 2—The current behavior for the path trace feature is documented in 10.3.11.2.1 and 10.3.16.2.1 and is as follows:

- Item c) of 10.3.11.2.1, the description of the qualifyAnnounce() function of the PortAnnounceReceive state machine, indicates that if a path trace TLV is present and one of the elements of the pathSequence array field is equal to the clockIdentity of the clock where the TLV is being processed, the Announce message is not qualified.
- Item d) of 10.3.11.2.1 (qualifyAnnounce() function) indicates that if the Announce message is qualified and a path trace TLV is present, the pathSequence array of the TLV is copied to the pathTrace array (described in this subclause) and the clockIdentity of the PTP Instance that processes the Announce message is appended to the array. However, if a path trace TLV is not present, the path trace array is empty.
- Item f) of 10.3.16.2.1, the description of the txAnnounce() function of the PortAnnounceTransmit state machine, indicates that a path trace TLV is constructed and appended to an Announce message just before the Announce message is transmitted only if the pathTrace array is not empty and appending the TLV does not cause the media-dependent layer frame to exceed any respective maximum size. If appending the TLV does cause a respective maximum frame size to be exceeded or if the pathTrace array is empty, the TLV is not appended.
- As a result of the behaviors of the qualifyAnnounce() and txAnnounce() functions described in this note, the path trace feature is not used, i.e., a path trace TLV is not appended to an Announce message and the pathTrace array is empty, once appending a clockIdentity to the TLV would cause the frame carrying the Announce message to exceed its maximum size.

NOTE 3—Once the value of stepsRemoved of an Announce message reaches 255, the Announce message is not qualified [see item b) of 10.3.11.2.1].

Change 10.3.9.24 as follows:

10.3.9.24 externalPortConfigurationEnabled: A variable whose value indicates whether PTP Port states are externally configured or determined by the ~~BMCA~~BTCA. The data type shall be Boolean. The value TRUE indicates that the PTP Port states are externally configured; the value FALSE indicates that the PTP Port states are determined by the ~~BMCA~~BTCA. This variable is used by both the ~~BMCA~~BTCA and the external port configuration option.

Change 10.3.9.25 as follows:

10.3.9.25 lastAnnouncePort: The PTP Port number of the PTP Port on which the most recent Announce message was received. This variable is used by the PortAnnounceInformationExt and PortStateSettingExt state machines for the external port configuration option. This variable is not used by the ~~BMCA~~BTCA. The data type for this variable is UInteger16.

10.3.10 Per-port global variables

Change 10.3.10.1 as follows:

10.3.10.1 announceReceiptTimeoutTimeInterval: The time interval after which announce receipt timeout occurs if an Announce message has not been received during the interval. The value of announceReceiptTimeoutTimeInterval is equal to announceReceiptTimeout (see 10.7.3.2) multiplied by the announceInterval (see 10.3.10.8) for the PTP Port at the other end of the link to which this PTP Port is attached. The value of announceInterval for the PTP Port at the other end of the link is computed from logMessageInterval of the received Announce message (see 10.6.2.2.14). The data type for announceReceiptTimeoutTimeInterval is UScaledNs. This variable is used only by the ~~BMCA~~BTCA, i.e., not by the explicit port state configuration option.

Change 10.3.10.2 as follows:

10.3.10.2 announceSlowdown: A Boolean that is set to TRUE if the AnnounceIntervalSetting state machine (see Figure 10-19 in item 10.3.17.3) receives a TLV that requests a larger Announce message transmission interval (see 10.7.2.2) and FALSE otherwise. When announceSlowdown is set to TRUE, the PortAnnounceTransmit state machine (see Figure 10-18) continues to send Announce messages at the old (i.e., faster) rate until a number of Announce messages equal to announceReceiptTimeout (see 10.7.3.2) have been sent, but with the logMessageInterval field of the PTP common header set equal to the new announce interval (i.e., corresponding to the slower rate). After announceReceiptTimeout Announce messages have been sent, subsequent Announce messages are sent at the new (i.e., slower) rate and with the logMessageInterval field of the PTP common header set to the new announce interval. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option. When announceSlowdown is set to FALSE, the PortAnnounceTransmit state machine immediately sends Announce messages at the new (i.e., faster or the same) rate.

NOTE—If a receiver of Announce messages requests a slower rate, the receiver will continue to use the upstream announceInterval value, which it obtains from the logMessageInterval field of received Announce messages, until it receives an Announce message where that value has changed. If, immediately after requesting a slower Announce message rate, up to announceReceiptTimeout minus one consecutive Announce messages sent to the receiver are lost, announce receipt timeout could occur if the sender had changed to the slower rate immediately. Delaying the slowing down of the sending rate of Announce messages for announceReceiptTimeout messages prevents announce receipt timeout from occurring until at least announceReceiptTimeout Announce messages have been lost. Note that networks with high packet loss can still experience announce receipt timeout under high-packet-loss conditions; however, the announce receipt timeout condition occurs only after at least announceReceiptTimeout Announce messages have been lost.

Change 10.3.10.3 as follows:

10.3.10.3 oldAnnounceInterval: The saved value of the previous announce interval, when a new announce interval is requested via a Signaling message that contains a message interval request TLV. The data type for oldAnnounceInterval is UScaledNs. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.4 as follows:

10.3.10.4 infoIs: An Enumeration2 that takes the values Received, Mine, Aged, or Disabled to indicate the origin and state of the PTP Port's time-synchronization spanning tree information:

a) If infoIs is Received, the PTP Port has received current information (i.e., announce receipt timeout has not occurred and, if gmPresent is TRUE, sync receipt timeout also has not occurred) from the ~~master~~timeTransmitter PTP Instance for the attached gPTP communication path.

b) If infoIs is Mine, information for the PTP Port has been derived from the ~~SlavePort~~TimeReceiverPort for the PTP Instance (with the addition of ~~SlavePort~~TimeReceiverPort stepsRemoved). This includes the possibility that the ~~SlavePort~~TimeReceiverPort is the PTP Port whose portNumber is 0, i.e., the PTP Instance is the root of the gPTP domain.

c) If infoIs is Aged, announce receipt timeout or, when gmPresent is TRUE, sync receipt timeout has occurred.

d) If portOper, ptpPortEnabled, and asCapable are not all TRUE, infoIs is Disabled.

The variable infoIs is used only by the ~~BMCA~~BTCA, i.e., not by the explicit port state configuration option.

Change 10.3.10.5 as follows:

10.3.10.5 ~~master~~timeTransmitterPriority: The ~~master~~timeTransmitterPriorityVector for the PTP Port. The data type for ~~master~~timeTransmitterPriority is UInteger224 (see 10.3.4). This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.6 as follows:

10.3.10.6 currentLogAnnounceInterval: The current value of the logarithm to base 2 of the mean time interval, in seconds, between the sending of successive Announce messages (see 10.7.2.2). This value is set in the AnnounceIntervalSetting state machine (see 10.3.17). The data type for currentLogAnnounceInterval is Integer8. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.7 as follows:

10.3.10.7 initialLogAnnounceInterval: The initial value of the logarithm to base 2 of the mean time interval, in seconds, between the sending of successive Announce messages (see 10.7.2.2). The data type for initialLogAnnounceInterval is Integer8. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.8 as follows:

10.3.10.8 announceInterval: A variable containing the mean Announce message transmission interval for the PTP Port. This value is set in the AnnounceIntervalSetting state machine (see 10.3.17). The data type for announceInterval is UScaledNs. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.9 as follows:

10.3.10.9 messageStepsRemoved: The value of stepsRemoved contained in the received Announce information. The data type for messageStepsRemoved is UInteger16. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.10 as follows:

10.3.10.10 newInfo: A Boolean variable that is set to cause a PTP Port to transmit Announce information; specifically, it is set when an announce interval has elapsed (see Figure 10-18), PTP Port states have been updated, and portPriority and portStepsRemoved information has been updated with newly determined ~~master~~timeTransmitterPriority and ~~master~~timeTransmitterStepsRemoved information. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.11 as follows:

10.3.10.11 portPriority: The portPriorityVector for the PTP Port. The data type for portPriority is UInteger224 (see 10.3.4). This variable is used only by the ~~BMCA~~BTCA, i.e., not by the explicit port state configuration option.

Change 10.3.10.12 as follows:

10.3.10.12 portStepsRemoved: The value of stepsRemoved for the PTP Port. portStepsRemoved is set equal to ~~master~~timeTransmitterStepsRemoved (see 10.3.9.3) after ~~master~~timeTransmitterStepsRemoved is updated. The data type for portStepsRemoved is UInteger16. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.13 as follows:

10.3.10.13 rcvdAnnouncePtr: A pointer to a structure that contains the fields of a received Announce message. This variable is used by both the ~~BMCA~~BTCA and the explicit PTP Port state configuration option.

Change 10.3.10.14 as follows:

10.3.10.14 rcvdMsg: A Boolean variable that is TRUE if a received Announce message is qualified and FALSE if it is not qualified. This variable is used only by the ~~BMCA~~BTCA, i.e., not by the explicit port state configuration option.

Change 10.3.10.15 as follows:

10.3.10.15 updtInfo: A Boolean variable that is set to TRUE to indicate that the PortAnnounceInformation state machine (see 10.3.12) should copy the newly determined ~~master~~timeTransmitterPriority and ~~master~~timeTransmitterStepsRemoved to portPriority and portStepsRemoved, respectively. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option; however, its value does not impact the explicit port state configuration option (see the NOTE in 10.3.16.3).

Change 10.3.10.16 as follows:

10.3.10.16 annLeap61: A global variable in which the leap61 flag (see 10.6.2.2.8) of a received Announce message is saved. The data type for annLeap61 is Boolean. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.17 as follows:

10.3.10.17 annLeap59: A global variable in which the leap59 flag (see 10.6.2.2.8) of a received Announce message is saved. The data type for annLeap59 is Boolean. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.18 as follows:

10.3.10.18 annCurrentUtcOffsetValid: A global variable in which the currentUtcOffsetValid flag (see 10.6.2.2.8) of a received Announce message is saved. The data type for annCurrentUtcOffsetValid is Boolean. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.19 as follows:

10.3.10.19 annPtpTimescale: A global variable in which the ptpTimescale flag (see 10.6.2.2.8) of a received Announce message is saved. The data type for annPtpTimescale is Boolean. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.20 as follows:

10.3.10.20 annTimeTraceable: A global variable in which the timeTraceable flag (see 10.6.2.2.8) of a received Announce message is saved. The data type for annTimeTraceable is Boolean. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.21 as follows:

10.3.10.21 annFrequencyTraceable: A global variable in which the frequencyTraceable flag (see 10.6.2.2.8) of a received Announce message is saved. The data type for annFrequencyTraceable is Boolean. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.22 as follows:

10.3.10.22 annCurrentUtcOffset: A global variable in which the currentUtcOffset field (see 10.6.3.2.1) of a received Announce message is saved. The data type for annCurrentUtcOffset is Integer16. This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

Change 10.3.10.23 as follows:

10.3.10.23 annTimeSource: A global variable in which the timeSource field (see 10.6.3.2.1) of a received Announce message is saved. The data type for annTimeSource is TimeSource (see 8.6.2.7). This variable is used by both the ~~BMCA~~BTCA and the explicit port state configuration option.

10.3.12 PortAnnounceInformation state machine

10.3.12.2 State machine functions

Change 10.3.12.2.1as follows:

10.3.12.2.1 rcvInfo (rcvdAnnouncePtr): Decodes the messagePriorityVector (see 10.3.4 and 10.3.5) and stepsRemoved 10.6.3.2.6) field from the Announce information pointed to by rcvdAnnouncePtr (see 10.3.10.13), and then:

a) Stores the messagePriorityVector and stepsRemoved field value in messagePriorityPAI and messageStepsRemoved, respectively, and then:

1) If the received message conveys the PTP Port state ~~MasterPort~~TimeTransmitterPort and the messagePriorityVector is the same as the portPriorityVector of the PTP Port, returns Repeated~~Master~~TimeTransmitterInfo; else

2) If the received message conveys the PTP Port state ~~MasterPort~~TimeTransmitterPort and the messagePriorityVector is superior to the portPriorityVector of the PTP Port, returns Superior~~Master~~TimeTransmitterInfo; else

3) If the received message conveys the PTP Port state ~~MasterPort~~TimeTransmitterPort, and the messagePriorityVector is worse than the portPriorityVector of the PTP Port, returns Inferior~~Master~~TimeTransmitterInfo; else

4) Returns OtherInfo.

NOTE—In accordance with 10.3.5, the messagePriorityVector is superior to the portPriorityVector of the PTP Port if, and only if, the messagePriorityVector is better than the portPriorityVector, or the Announce message has been transmitted from the same ~~master~~timeTransmitter PTP Instance and ~~MasterPort~~TimeTransmitterPort as the portPriorityVector. In steps a) 1) to a) 4) in this subclause, rcvInfo() first checks whether the messagePriorityVector and portPriorityVector are the same (and the received message conveys the PTP Port state ~~MasterPort~~TimeTransmitterPort), before checking whether the messagePriorityVector is superior to the portPriorityVector. The reason for this sequence is that Repeated~~Master~~TimeTransmitterInfo needs to be returned if the messagePriorityVector and portPriorityVector are the same, while Superior~~Master~~TimeTransmitterInfo needs to be returned in other instances where the Announce message has been transmitted from the same ~~master~~timeTransmitter PTP Instance and ~~MasterPort~~TimeTransmitterPort as the portPriorityVector (if the test for Superior~~Master~~TimeTransmitterInfo were done before the test for Repeated~~Master~~TimeTransmitterInfo, Superior~~Master~~TimeTransmitterInfo would be returned when Repeated~~Master~~TimeTransmitterInfo is desired).

Change 10.3.12.3 as follows:

10.3.12.3 State diagram

The PortAnnounceInformation state machine shall implement the function specified by the state diagram in Figure 10-14, the local variables specified in 10.3.12.1, the functions specified in 10.3.12.2, and the relevant global variables specified in 10.2.4, 10.2.5, 10.3.9, 10.3.10, and 11.2.13. This state machine is used only if externalPortConfigurationEnabled is FALSE (if this variable is TRUE, the PortAnnounceInformationExt state machine is used instead). The state machine receives new qualified Announce information from the PortAnnounceReceive state machine (see 10.3.11) of the same PTP Port and determines if the Announce information is better than the current best ~~master~~timeTransmitter information it knows. The state machine also updates the current best ~~master~~timeTransmitter information when it receives updated PTP Port state information from the PortStateSelection state machine (see 10.3.13) and when announce receipt timeout or, when gmPresent is TRUE, sync receipt timeout occurs.

1 ***Replace Figure 10-14 with the following figure:***

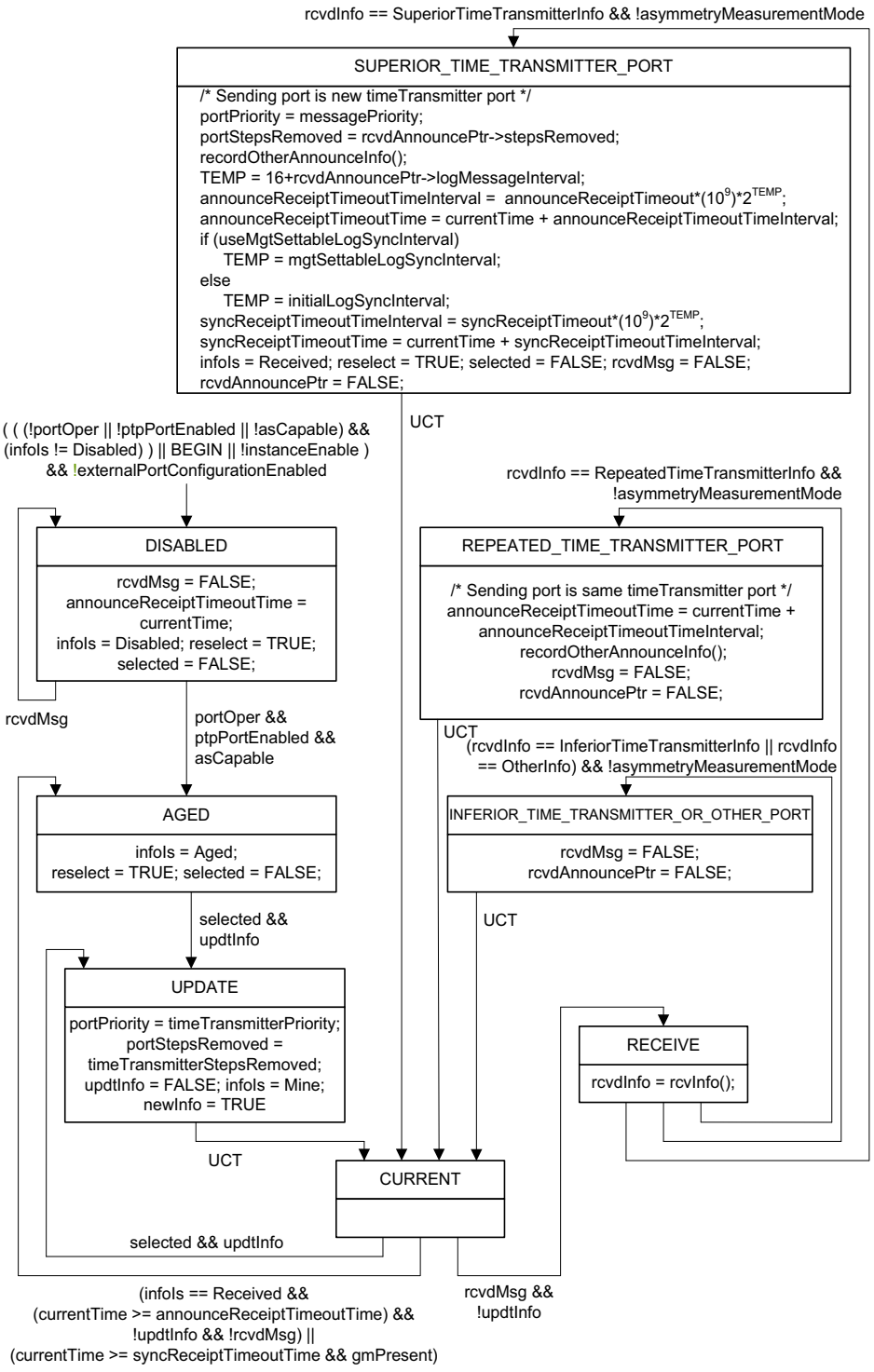

Figure 10-14—PortAnnounceInformation state machine

10.3.13 PortStateSelection state machine

10.3.13.2 State machine functions

Change 10.3.13.2.4 as follows:

10.3.13.2.4 updtStatesTree(): Performs the following operations (see 10.3.4 and 10.3.5 for details on the priority vectors):

a) Computes the gmPathPriorityVector for each PTP Port that has a portPriorityVector and for which neither announce receipt timeout nor, if gmPresent is TRUE, sync receipt timeout have occurred,

b) Saves gmPriority (see 10.3.9.21) in lastGmPriority (see 10.3.9.22), computes the gmPriorityVector for the PTP Instance and saves it in gmPriority, chosen as the best of the set consisting of the systemPriorityVector (for this PTP Instance) and the gmPathPriorityVector for each PTP Port for which the clockIdentity of the ~~master~~timeTransmitter port is not equal to thisClock (see 10.2.4.22),

c) Sets the per PTP Instance global variables leap61, leap59, currentUtcOffsetValid, ptpTimescale, timeTraceable, frequencyTraceable, currentUtcOffset, and timeSource as follows:

   1) If the gmPriorityVector was set to the gmPathPriorityVector of one of the ports, then leap61, leap59, currentUtcOffsetValid, ptpTimescale, timeTraceable, frequencyTraceable, currentUtcOffset, and timeSource are set to annLeap61, annLeap59, annCurrentUtcOffsetValid, annPtpTimescale, annTimeTraceable, annFrequencyTraceable, annCurrentUtcOffset, and annTimeSource, respectively, for that PTP Port.

   2) If the gmPriorityVector was set to the systemPriorityVector, then leap61, leap59, currentUtcOffsetValid, ptpTimescale, timeTraceable, frequencyTraceable, currentUtcOffset, and timeSource are set to sysLeap61, sysLeap59, sysCurrentUtcOffsetValid, sysPtpTimescale, sysTimeTraceable, sysFrequencyTraceable, sysCurrentUtcOffset, and sysTimeSource, respectively.

d) Computes the ~~master~~timeTransmitterPriorityVector for each PTP Port.

e) Computes ~~master~~timeTransmitterStepsRemoved, which is equal to one of the following:

   1) messageStepsRemoved (see 10.3.10.9) for the PTP Port associated with the gmPriorityVector, incremented by 1, if the gmPriorityVector is not the systemPriorityVector, or

   2) 0 if the gmPriorityVector is the systemPriorityVector.

f) Assigns the PTP Port state for PTP Port j, and sets selectedState[j] equal to this PTP Port state, as follows, for j = 1, 2, ..., numberPorts:

   1) If the PTP Port is disabled (infoIs == Disabled), then selectedState[j] is set to DisabledPort.

   2) If asymmetryMeasurementMode is TRUE, then selectedState[j] is set to PassivePort, and updtInfo is set to FALSE.

   3) If announce receipt timeout, or sync receipt timeout with gmPresent set to TRUE, has occurred (infoIs = Aged), then selectedState[j] is set to ~~MasterPort~~TimeTransmitterPort, and updtInfo is set to TRUE.

   4) If the portPriorityVector was derived from another PTP Port on the PTP Instance or from the PTP Instance itself as the root (infoIs == Mine), then selectedState[j] is set to ~~MasterPort~~TimeTransmitterPort. In addition, updtInfo is set to TRUE if the portPriorityVector differs from the ~~master~~timeTransmitterPriorityVector or portStepsRemoved differs from ~~master~~timeTransmitterStepsRemoved.

   5) If the portPriorityVector was received in an Announce message, announce receipt timeout, or sync receipt timeout with gmPresent TRUE, has not occurred (infoIs == Received), and the gmPriorityVector is now derived from the portPriorityVector, then selectedState[j] is set to ~~SlavePort~~TimeReceiverPort, and updtInfo is set to FALSE. The per port global variable

receivedPathTrace, for this port, is copied to the per PTP Instance global array pathTrace, and, if it is not empty, thisClock is appended to pathTrace.

6) If the portPriorityVector was received in an Announce message, announce receipt timeout, or sync receipt timeout with gmPresent TRUE, has not occurred (infoIs == Received), the gmPriorityVector is not now derived from the portPriorityVector, the ~~master~~timeTransmitterPriorityVector is not better than the portPriorityVector, and the sourcePortIdentity component of the portPriorityVector *does not* reflect another PTP Port on the PTP Instance, then selectedState[j] is set to PassivePort, and updtInfo is set to FALSE.

7) If the portPriorityVector was received in an Announce message, announce receipt timeout, or sync receipt timeout with gmPresent TRUE, has not occurred (infoIs == Received), the gmPriorityVector is not now derived from the portPriorityVector, the ~~master~~timeTransmitterPriorityVector is not better than the portPriorityVector, and the sourcePortIdentity component of the portPriorityVector *does* reflect another PTP Port on the PTP Instance, then selectedState[j] set to PassivePort, and updtInfo is set to FALSE.

8) If the portPriorityVector was received in an Announce message, announce receipt timeout, or sync receipt timeout with gmPresent TRUE, has not occurred (infoIs == Received), the gmPriorityVector is not now derived from the portPriorityVector, and the ~~master~~timeTransmitterPriorityVector is better than the portPriorityVector, then selectedState[j]is set to ~~MasterPort~~TimeTransmitterPort, and updtInfo is set to TRUE.

g) Updates gmPresent as follows:

1) gmPresent is set to TRUE if the priority1 field of the rootSystemIdentity of the gmPriorityVector is less than 255.

2) gmPresent is set to FALSE if the priority1 field of the rootSystemIdentity of the gmPriorityVector is equal to 255.

h) Assigns the PTP Port state for PTP Port 0 (see 8.5.2.3), and sets selectedState[0] as follows:

1) if selectedState[j] is set to ~~SlavePort~~TimeReceiverPort for any PTP Port with portNumber j, j = 1, 2, ..., numberPorts, selectedState[0] is set to PassivePort.

2) if selectedState[j] is *not* set to ~~SlavePort~~TimeReceiverPort for any PTP Port with portNumber j, j = 1, 2, ..., numberPorts, selectedState[0] is set to ~~SlavePort~~TimeReceiverPort.

i) If the clockIdentity member of the systemIdentity (see 10.3.2) member of gmPriority (see 10.3.9.21) is equal to thisClock (see 10.2.4.22), i.e., if the current PTP Instance is the Grandmaster PTP Instance, the pathTrace array is set to contain the single element thisClock (see 10.2.4.22).

Change 10.3.13.3 as follows:

10.3.13.3 State diagram

The PortStateSelection state machine shall implement the function specified by the state diagram in Figure 10-15, the functions specified in 10.3.13.1, and the relevant global variables specified in 10.2.4, 10.2.5, 10.3.9, 10.3.10, and 11.2.13. This state machine is used only if externalPortConfigurationEnabled is FALSE (if this variable is TRUE, the PortStateSettingExt state machine is used instead). The state machine updates the gmPathPriority vector for each PTP Port of the PTP Instance, the gmPriorityVector for the PTP Instance, and the ~~master~~timeTransmitterPriorityVector for each PTP Port of the PTP Instance. The state machine determines the PTP Port state for each PTP Port and updates gmPresent.

10.3.14 PortAnnounceInformationExt state machine

Change 10.3.14.2 as follows:

10.3.14.2 State machine functions

10.3.14.2.1 rcvInfoExt (rcvdAnnouncePtr): Decodes the messagePriorityVector (see 10.3.4 and 10.3.5) and stepsRemoved 10.6.3.2.6) field from the Announce information pointed to by rcvdAnnouncePtr (see 10.3.10.13), and then stores the messagePriorityVector and stepsRemoved field value in messagePriorityPAIE and messageStepsRemoved, respectively. If a path trace TLV is present in the Announce message and the portState of the PTP Port is ~~SlavePort~~TimeReceiverPort, the pathSequence array field of the TLV is copied to the global array pathTrace, and thisClock is appended to pathTrace (i.e., is added to the end of the array).

10.3.15 PortStateSettingExt state machine

10.3.15.1 State machine variables

The following variables are used in the state diagram in Figure 10-17 (in 10.3.15.3):

Change 10.3.15.1.5 as follows:

10.3.15.1.1 portStateInd: An Enumeration2 that indicates the PTP Port state that has been set. The values are ~~MasterPort~~TimeTransmitterPort, ~~SlavePort~~TimeReceiverPort, and PassivePort.

10.3.15.2 State machine functions

Change 10.3.15.2.1 as follows:

10.3.15.2.1 resetStateTree(j): Sets selectedState[j] (see 10.2.4.20) to externalPortConfigurationPortDS.desiredState. Sets the pathTrace array (see 10.3.9.23) to contain the single element thisClock (see 10.2.4.22) if no PTP Port of the PTP Instance has the PTP Port state ~~SlavePort~~TimeReceiverPort.

Change 10.3.15.2.2 as follows:

10.3.15.2.2 updtPortState(j): Performs the following operations for PTP Port j (see 10.3.4 and 10.3.5 for details on the priority vectors):

a) Sets the per PTP Instance global variables leap61, leap59, currentUtcOffsetValid, ptpTimescale, timeTraceable, frequencyTraceable, currentUtcOffset, and timeSource as follows:

   1) If the PTP Port state of any PTP Port of this PTP Instance other than PTP Port 0 (see 8.5.2.3) is ~~SlavePort~~TimeReceiverPort, then leap61, leap59, currentUtcOffsetValid, ptpTimescale, timeTraceable, frequencyTraceable, currentUtcOffset, and timeSource are set to annLeap61, annLeap59, annCurrentUtcOffsetValid, annPtpTimescale, annTimeTraceable, annFrequencyTraceable, annCurrentUtcOffset, and annTimeSource, respectively, for that PTP Port.

2) If no PTP Port of this PTP Instance other than PTP Port 0 has the PTP Port state ~~SlavePort~~TimeReceiverPort, then leap61, leap59, currentUtcOffsetValid, ptpTimescale, timeTraceable, frequencyTraceable, currentUtcOffset, and timeSource are set to sysLeap61, sysLeap59, sysCurrentUtcOffsetValid, sysPtpTimescale, sysTimeTraceable, sysFrequencyTraceable, sysCurrentUtcOffset, and sysTimeSource, respectively.

b) Computes ~~master~~timeTransmitterStepsRemoved as follows:

1) If the PTP Port state of any PTP Port of this PTP Instance other than PTP Port 0 is ~~SlavePort~~TimeReceiverPort, then ~~master~~timeTransmitterStepsRemoved is set equal to portStepsRemoved for that PTP Port.

2) If no PTP Port of this PTP Instance other than PTP Port 0 has the PTP Port state ~~SlavePort~~TimeReceiverPort, then ~~master~~timeTransmitterStepsRemoved is set equal to 0.

c) Assigns the PTP Port state for PTP Port j, and sets selectedState[j] equal to this PTP Port state, as follows:

1) If disabledExt is TRUE, selectedState[j] is set to DisabledPort, else

2) If asymmetryMeasurementMode is TRUE, selectedState[j] is set to PassivePort, else

3) selectedState[j] is set to portStateInd.

d) Updates gmPresent as follows:

1) If the PTP Port state of any PTP Port of this PTP Instance other than PTP Port 0 is ~~SlavePort~~TimeReceiverPort and the priority1 field of the rootSystemIdentity of the messagePriorityPAIE of the ~~slave~~timeReceiver port is less than 255, gmPresent is set to TRUE, else

2) If the PTP Port state of any PTP Port of this PTP Instance other than PTP Port 0 is ~~SlavePort~~TimeReceiverPort and the priority1 field of the rootSystemIdentity of the messagePriorityPAIE of the ~~slave~~timeReceiver PTP Port is equal to 255, gmPresent is set to FALSE, else

3) If no PTP Port of this PTP Instance other than PTP Port 0 has the PTP Port state ~~SlavePort~~TimeReceiverPort, gmPresent is set to TRUE if priority1 for this PTP Instance is less than 255 and FALSE if priority1 for this PTP Instance is equal to 255.

e) Assigns the PTP Port state for PTP Port 0, and sets selectedState[0] as follows:

1) If selectedState[j] is set to ~~SlavePort~~TimeReceiverPort, selectedState[0] is set to PassivePort.

2) If selectedState[j] is *not* set to ~~SlavePort~~TimeReceiverPort and selectedState[k] is not equal to ~~SlavePort~~TimeReceiverPort for every k not equal to 0 or j, selectedState[0] is set to ~~SlavePort~~TimeReceiverPort.

f) Computes the gmPriorityVector as follows:

1) If selectedState[j] is set to ~~SlavePort~~TimeReceiverPort, the gmPriorityVector is set equal to messagePriorityPAIE for PTP Port j.

2) If selectedState[j] is *not* set to ~~SlavePort~~TimeReceiverPort and selectedState[k] is not equal to ~~SlavePort~~TimeReceiverPort for every k not equal to 0 or j, the gmPriorityVector is set equal to the systemPriorityVector.

g) Computes the ~~master~~timeTransmitterPriorityVector for PTP Port j.

h) If no PTP Port of this PTP Instance has the PTP Port state ~~SlavePort~~TimeReceiverPort, the pathTrace array is set to contain the single element thisClock (see 10.2.4.22).

Change 10.3.15.3 as follows:

10.3.15.3 State diagram

The PortStateSettingExt state machine shall implement the function specified by the state diagram in Figure 10-17, the local variables specified in 10.3.15.1, the functions specified in 10.3.15.2, and the relevant global variables specified in 10.2.4, 10.2.5, 10.3.9, 10.3.10, and 11.2.13. This state machine is used only if externalPortConfigurationEnabled is TRUE (if this variable is FALSE, the PortStateSelection state machine of 10.3.13.3 is used instead). A separate instance of this state machine runs on each PTP Port (unlike the PortStateSelection state machine, for which a single instance runs in the PTP Instance and performs operations on all the ports).

The state machine updates the gmPriorityVector for the PTP Instance and the ~~master~~timeTransmitterPriorityVector for each PTP Port of the PTP Instance. The state machine determines the PTP Port state for each PTP Port and updates gmPresent.

NOTE—It is possible to use the external port configuration mechanism to misconfigure the network, e.g., to produce a configuration where one or more PTP Instances have more than one ~~slave~~timeReceiver port. Detecting and correcting misconfiguations is outside the scope of this standard.

10.3.16 PortAnnounceTransmit state machine

10.3.16.2 State machine functions

Change 10.3.16.2.1 as follows:

10.3.16.2.1 txAnnounce (): Transmits Announce information to the MD entity of this PTP Port. The Announce information is set as follows:

a) The components of the messagePriorityVector are set to the values of the respective components of the ~~master~~timeTransmitterPriorityVector of this PTP Port.

b) The grandmasterIdentity, grandmasterClockQuality, grandmasterPriority1, and grandmasterPriority2 fields of the Announce message are set equal to the corresponding components of the messagePriorityVector.

c) The value of the stepsRemoved field of the Announce message is set equal to ~~master~~timeTransmitterStepsRemoved.

d) The Announce message flags leap61, leap59, currentUtcOffsetValid, ptpTimescale, timeTraceable, and frequencyTraceable, and the Announce message fields currentUtcOffset and timeSource, are set equal to the values of the global variables leap61, leap59, currentUtcOffsetValid, ptpTimescale, timeTraceable, frequencyTraceable, currentUtcOffset, and timeSource, respectively (see 10.3.9.4 through 10.3.9.11).

e) The sequenceId field of the Announce message is set in accordance with 10.5.7.

f) A path trace TLV (see 10.6.3.3) is constructed, with its pathSequence field (see 10.6.3.3.4) set equal to the pathTrace array (see 10.3.9.23). If appending the path trace TLV to the Announce message does not cause the media-dependent layer frame to exceed any respective maximum size, the path trace TLV is appended to the Announce message; otherwise, it is not appended. If the pathTrace array is empty, the path trace TLV is not appended. See 10.3.9.23 for a description of the path trace feature.

Change 10.3.16.3 as follows:

10.3.16.3 State diagram

The PortAnnounceTransmit state machine shall implement the function specified by the state diagram in Figure 10-18, the local variables specified in 10.3.16.1, the functions specified in 10.3.16.2, and the relevant global variables specified in 10.2.4, 10.2.5, 10.3.9, 10.3.10, and 11.2.13. The state machine transmits Announce information to the MD entity when an announce interval has elapsed, PTP Port states have been updated, and portPriority and portStepsRemoved information has been updated with newly determined ~~master~~timeTransmitterPriority and ~~master~~timeTransmitterStepsRemoved information.

Replace Figure 10-18 with the following figure:

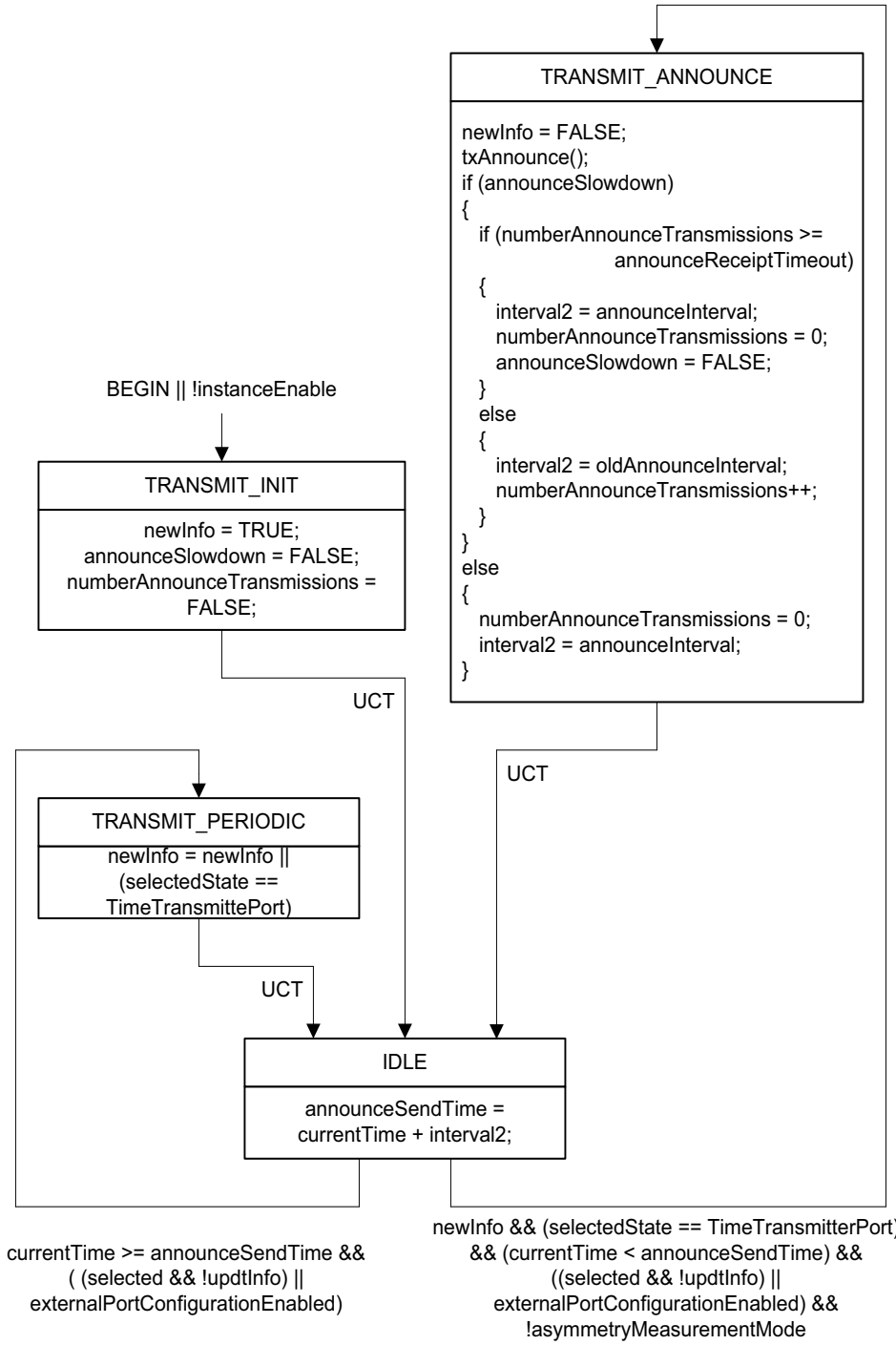

Figure 10-18—PortAnnounceTransmit state machine

NOTE—When the external port configuration option is used (i.e., externalPortConfigurationEnabled is TRUE; see 10.3.9.24) the values of the variables updtInfo and selected do not affect the operation of the PortAnnounceTransmit state machine because the term of the conditions in which they appear, i.e., (selected && !updtInfo) || externalPortConfiguartionEnabled, evaluates to TRUE when externalPortConfigurationEnabled is TRUE.

10.5 Message attributes

Change 10.5.2 as follows:

10.5.2 Message class

The Announce message is a general message, i.e., it is not timestamped. An Announce message provides status and characterization information of the PTP Instance that transmitted the message and the Grandmaster PTP Instance. This information is used by the receiving PTP Instance when executing the ~~BMCA~~BTCA.

The Signaling message is a general message, i.e., it is not timestamped. A Signaling message carries information, requests, and/or commands between PTP Instances, via one or more TLVs.

NOTE—In this standard, the Signaling message is used by a port of a PTP Instance to request that the port at the other end of the link send time-synchronization event messages, link delay measurement messages, or Announce messages at desired intervals; to indicate whether the port at the other end of the link should compute neighborRateRatio and/or meanLinkDelay; and to indicate whether a PTP Port can receive and correctly process one-step Syncs. The message interval request TLV is defined to carry this information (see 10.6.4.3). One usage of this functionality is to allow a time-aware system in power-saving mode to remain connected to a gPTP domain via the port on which the Signaling message is sent.

10.6 Message formats

Change 10.6.1 as follows:

10.6.1 General

The PTP messages Announce and Signaling each have a header, body, and, if present, a suffix that contains one or more TLVs (see 10.6.2, 10.6.3, and 10.6.4 of this standard and Clause 14 of IEEE Std 1588-2019). Reserved fields shall be transmitted with all bits of the field 0 and ignored by the receiver, unless otherwise specified. The data type of the field shall be the type indicated in brackets in the title of each subclause.

Subclause 10.6 defines the path trace TLV, which is carried by the Announce message (see 10.6.3.2.8), and the message interval request TLV, which is carried by the Signaling message (see 10.6.4.3).

PTP Management Messages are not used in this standard. They are specified in IEEE Std 1588-2019.

IEEE Std 1588-2019 specifies various optional features that have associated TLVs. These optional features, including the associated TLVs, may be supported by an implementation of this standard. IEEE Std 1588-2019 also specifies that certain TLVs are propagated by a Boundary Clock if they are attached to an Announce message and are not supported (see 14.2.2.2 and Table 52 of IEEE Std 1588-2019). These TLVs are listed in Table 10-6. The TLV Propagate requirement in IEEE Std 1588-2019 means that a Propagate TLV is propagated through a PTP Relay Instance (e.g., from an ingress PTP Port in the ~~Slave~~TimeReceiver state to an egress PTP Port in the ~~Master~~TimeTransmitter state, even when the TLV is unsupported by the PTP Relay Instance). If the corresponding optional feature is not supported by the PTP Relay Instance, the PTP Relay Instance shall propagate the TLV unchanged.

If a PTP Instance cannot parse a non-forwarding TLV, it shall ignore it and attempt to parse the next TLV (see 14.1 of IEEE Std 1588-2019).

NOTE—Any overhead specific to the respective medium is added to each message.

10.6.2 Header

10.6.2.2 Header field specifications

Change 10.6.2.2.8 as follows:

10.6.2.2.8 flags (Octet2)

The value of the bits of the array are defined in Table 10-9. For message types where the bit is not defined in Table 10-9, the value of the bit is set to FALSE.

Table 10-9—Values of flag bits

Octet	Bit	Message types	Name	Value
0	0	All	alternate~~Master~~TimeTransmitterFlag in Announce, Sync, Follow_Up, and Delay_Resp messages	Not used in this standard; transmitted as FALSE and ignored on reception
0	1	Sync, Pdelay_Resp	twoStepFlag	*For Sync messages:* a) For a one-step transmitting PTP Port (see 11.1.3 and 11.2.13.9), the value is FALSE. b) For a two-step transmitting PTP Port, the value is TRUE. *For Pdelay_Resp messages:* The value is transmitted as TRUE and ignored on reception.
0	2	All	unicastFlag	Not used in this standard; transmitted as FALSE and ignored on reception
0	3	All	Reserved	Not used by IEEE Std 1588-2019; reserved as FALSE and ignored on reception
0	4	All	Reserved	Not used by IEEE Std 1588-2019; reserved as FALSE and ignored on reception
0	5	All	PTP profileSpecific 1	Not used in this standard; transmitted as FALSE and ignored on reception
0	6	All	PTP profileSpecific 2	Not used in this standard; transmitted as FALSE and ignored on reception
0	7	All	Reserved	Not used in this standard; transmitted as FALSE and ignored on reception
1	0	Announce	leap61	The value of the global variable leap61 (see 10.3.9.4)
1	1	Announce	leap59	The value of the global variable leap59 (see 10.3.9.5)
1	2	Announce	currentUtcOffsetValid	The value of the global variable currentUtcOffsetValid (see 10.3.9.6)
1	3	Announce	ptpTimescale	The value of the global variable ptpTimescale (see 10.3.9.7)

Table 10-9—Values of flag bits *(continued)*

Octet	Bit	Message types	Name	Value
1	4	Announce	timeTraceable	The value of the global variable timeTraceable (see 10.3.9.8)
1	5	Announce	frequencyTraceable	The value of the global variable frequencyTraceable (see 10.3.9.9)
1	6	All	Reserved	Not used by IEEE Std 1588-2019; reserved as FALSE and ignored on reception
1	7	All	Reserved	Not used in this standard; reserved as FALSE and ignored on reception

10.6.3 Announce message

10.6.3.2 Announce message field specifications

Change 10.6.3.2.6 as follows:

10.6.3.2.6 stepsRemoved (UInteger16)

The value is the value of ~~master~~timeTransmitterStepsRemoved (see 10.3.9.3) for the PTP Instance that transmits the Announce message.

10.7 Protocol timing characterization

10.7.2 Message transmission intervals

Change 10.7.2.4 as follows:

10.7.2.4 Interval for providing synchronization information by ~~ClockMaster~~ClockTimeTransmitter entity

The clockMasterLogSyncInterval specifies the mean time interval between successive instants at which the ~~ClockMaster~~ClockTimeTransmitter entity provides time-synchronization information to the SiteSync entity. The value is less than or equal to the smallest currentLogSyncInterval (see 10.7.2.3) value for all the ports of the PTP Instance. The ~~clockMasterLogSyncInterval~~clockTimeTransmitterLogSyncInterval is an internal, per PTP Instance variable.

10.7.3 Timeouts

Change 10.7.3.1 as follows:

10.7.3.1 syncReceiptTimeout

The value of this attribute tells a ~~slave~~timeReceiver port the number of sync intervals to wait without receiving synchronization information, before assuming that the ~~master~~timeTransmitter is no longer transmitting synchronization information and that the ~~BMCA~~BTCA needs to be run, if appropriate. The

condition of the ~~slave~~timeReceiver port not receiving synchronization information for syncReceiptTimeout sync intervals is known as *sync receipt timeout.*

The default value shall be 3. The syncReceiptTimeout is a per-PTP Port attribute.

Change 10.7.3.2 as follows:

10.7.3.2 announceReceiptTimeout

The value of this attribute tells a ~~slave~~timeReceiver port the number of announce intervals to wait without receiving an Announce message, before assuming that the ~~master~~timeTransmitter is no longer transmitting Announce messages, and that the ~~BMCA~~BTCA needs to be run, if appropriate. The condition of the ~~slave~~timeReceiver port not receiving an Announce message for announceReceiptTimeout announce intervals is known as *announce receipt timeout.*

The default value shall be 3. The announceReceiptTimeout is a per-PTP Port attribute.

11. Media-dependent layer specification for full-duplex point-to-point links

11.1 Overview

11.1.3 Transport of time-synchronization information

Change the first paragraph in 11.1.3 as follows:

The transport of time-synchronization information by a PTP Instance, using Sync and Follow_Up (or just Sync) messages, is illustrated in Figure 11-2. The mechanism is mathematically equivalent to the mechanism described in IEEE Std 1588-2019 for a peer-to-peer Transparent Clock that is syntonized (see 10.1, 10.3, 11.1, and 11.4 of IEEE Std 1588-2019). However, the processes of transporting synchronization by a peer-to-peer Transparent Clock that is syntonized and by a Boundary Clock are mathematically and functionally equivalent. The main functional difference between the two types of clocks is that the Boundary Clock participates in best ~~master~~timeTransmitter selection and invokes the ~~BMCA~~BTCA, while the peer-to-peer Transparent Clock does not participate in best ~~master~~timeTransmitter selection and does not invoke the ~~BMCA~~BTCA (and implementations of the two types of clocks can be different).

Replace Figure 11-2 with the following figure:

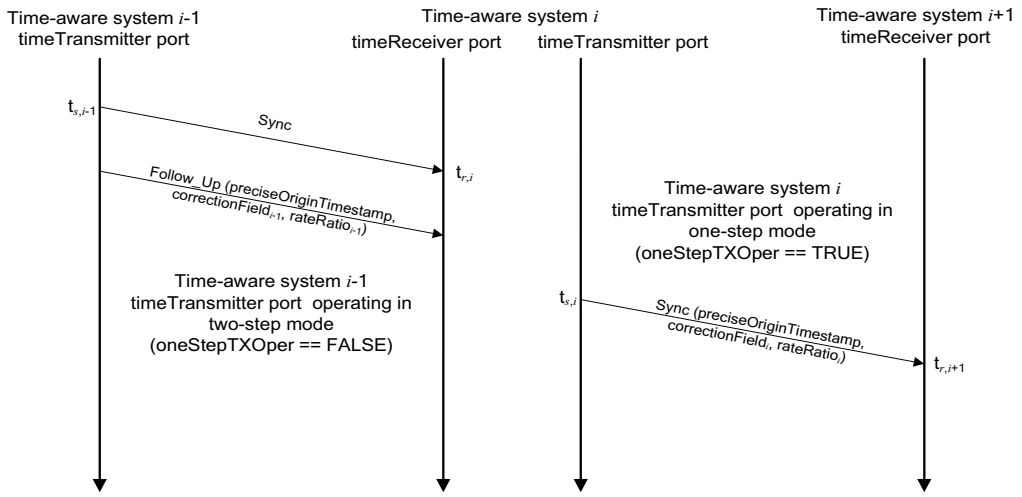

Figure 11-2—Transport of time-synchronization information

Change the NOTE in 11.1.3 as follows:

NOTE—The sending of time-synchronization information by the ~~master~~timeTransmitter ports of a PTP Instance might or might not be tightly synchronized with the receipt of time-synchronization information by the ~~slave~~timeReceiver port. If a ~~master~~timeTransmitter port has the same logMessageInterval as the ~~slave~~timeReceiver port, it will transmit timing event messages as soon as possible after the ~~slave~~timeReceiver port has received the corresponding timing event messages and the ~~master~~timeTransmitter port is operating in “syncLocked” mode (see 10.2.5.15). If a ~~master~~timeTransmitter port and ~~slave~~timeReceiver port have different logMessageInterval values, then the

~~master~~timeTransmitter port can send timing event messages without any synchronization with the ~~slave~~timeReceiver port.

11.1.4 Model of operation

Replace Figure 11-2 with the following figure:

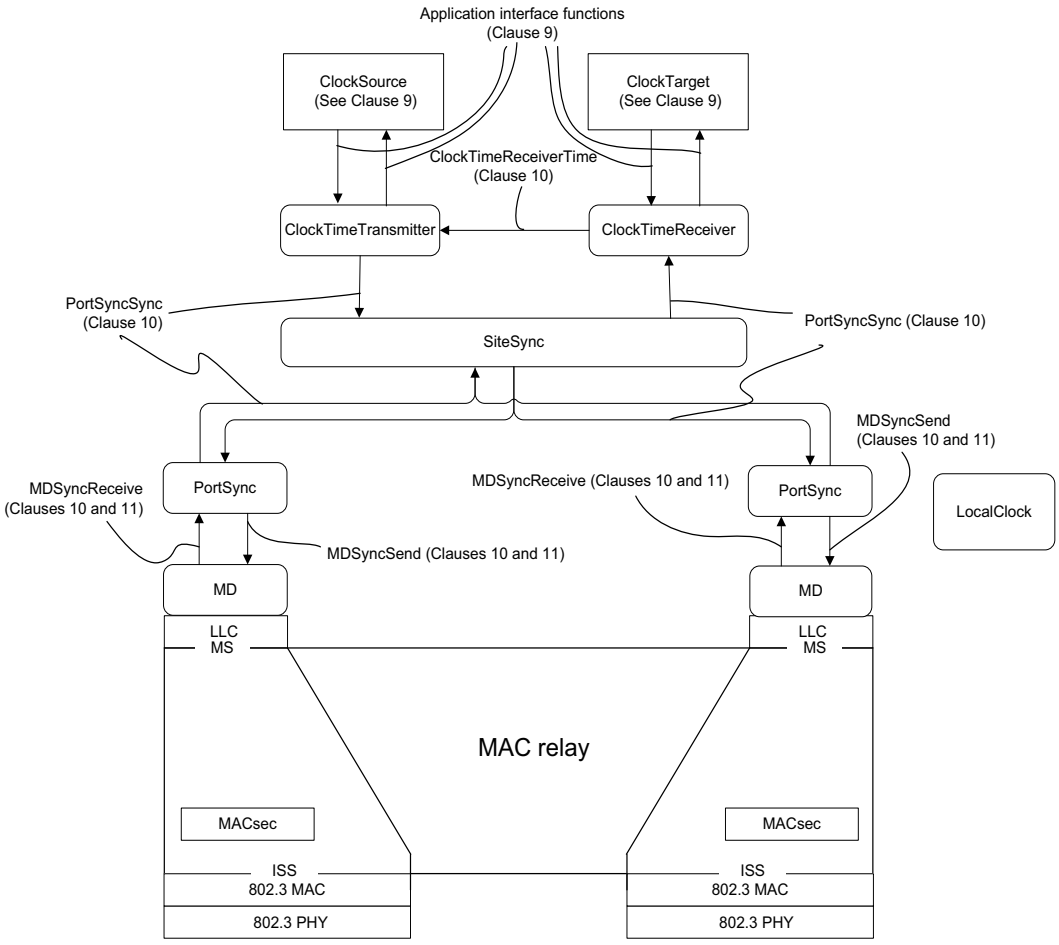

Figure 11-3—Model for a PTP Instance of a time-aware system with full-duplex point-to-point links

11.2 State machines for MD entity specific to full-duplex point-to-point links

11.2.5 Use of link aggregation

Change the second paragraph in 11.2.5 as follows:

Assuming that ptpPortEnabled is true for all the physical links (Aggregation Links) in a Link Aggregation Group and that all the physical links are connected to the same two systems, gPTP will measure the delay on each physical link, and the IEEE 802.1AS protocol will choose one of the physical links for transmitting time from the ~~master~~timeTransmitter clock.

11.3 Message attributes

11.3.2 Message types contained in each message class

11.3.2.1 Event message class

Change 11.3.2.1 a) as follows:

The event message class contains the following message types:

a) Sync: A Sync message contains time-synchronization information that originates at a ~~ClockMaster~~ClockTimeTransmitter entity. The appearance of a Sync message at the reference plane of the PTP Port corresponding to an MD entity is an event to which the LocalClock assigns a timestamp, the syncEventIngressTimestamp or syncEventEgressTimestamp, based on the time of the LocalClock. The syncEventIngressTimestamp and syncEventEgressTimestamp are measured relative to the timestamp measurement plane; the MD entity corrects them for ingress and egress latencies, respectively (see 8.4.3). The Sync message is followed by a Follow_Up message containing synchronization information that is based in part on the sum of the syncEventEgressTimestamp and any egressLatency (see 8.4.3).

11.4 Message formats

11.4.3 Sync message

11.4.3.2 Sync message field specifications if twoStep flag is FALSE

11.4.3.2.1 originTimestamp (Timestamp)

Change the first paragraph in 11.4.3.2.1 as follows:

The value of the originTimestamp field is the sourceTime of the ~~ClockMaster~~ClockTimeTransmitter entity of the Grandmaster PTP Instance, when the Sync message was sent by that Grandmaster PTP Instance, with any fractional nanoseconds truncated (see 10.2.9).

11.4.4 Follow_Up message

11.4.4.2 Follow_Up message field specifications

11.4.4.2.1 preciseOriginTimestamp (Timestamp)

Change the first paragraph in 11.4.4.2.1 as follows:

The value of the preciseOriginTimestamp field is the sourceTime of the ~~ClockMaster~~ClockTimeTransmitter entity of the Grandmaster PTP Instance, when the associated Sync message was sent by that Grandmaster PTP Instance, with any fractional nanoseconds truncated (see 10.2.9).

11.4.4.3 Follow_Up information TLV definition

11.4.4.3.7 gmTimeBaseIndicator (UInteger16)

Change NOTE in 11.4.4.3.7 as follows:

NOTE—The timeBaseIndicator is supplied by the ClockSource entity to the ~~ClockMaster~~ClockTimeTransmitter entity via the ClockSourceTime.invoke function (see 9.2.2.3).

12. Media-dependent layer specification for IEEE 802.11 links

12.1 Overview

12.1.1 General

Change first paragraph in 12.1.1 as follows:

Accurate synchronized time is distributed across a domain through time measurements between adjacent PTP Instances in a packet network. Time is communicated from the root of the clock spanning tree (i.e., the Grandmaster PTP Instance) to the leaves of the tree, by recursively propagating time from a leaf-facing "~~master~~timeTransmitter" port to some number of root-facing "~~slave~~timeReceiver" ports in PTP Instances at the next level of the tree through measurements made across the links connecting the PTP Instances. While the time semantics are consistent across the time-aware packet network, the method for communicating synchronized time from a ~~master~~timeTransmitter port to the immediate downstream link partner varies depending on the type of link interconnecting the two systems.

12.1.2 IEEE 802.11 Timing Measurement and Fine Timing Measurement procedures

Change 12.1.2.1 as follows:

12.1.2.1 General

IEEE Std 802.11-2016 defines a family of wireless measurements, including both "Timing Measurement" (TM) and "Fine Timing Measurement" (FTM), which captures timestamps of the transmit time and receive time of a round-trip message exchange between associated wireless local area network (WLAN) stations.

In contrast to the protocol defined for full-duplex point-to-point links, this clause does not define any new frames nor the transmission of any frames. Rather, it makes use of a MAC layer management entity (MLME) interface, which causes the IEEE 802.11 layer to not only take timestamps of measurement frames as they are transmitted and received, but to also *generate* and *consume* the measurement frames, all within the IEEE 802.11 MLME layer, and then to provide timestamp information from the MLME to this media-dependent layer through a set of well-defined service primitives. However, as an aid to the reader, the protocol and frames used by the IEEE 802.11 MLME for both Timing Measurement and Fine Timing Measurement are described briefly as follows and illustrated in Figure 12-1 and Figure 12-2, respectively.

Both Timing Measurement and Fine Timing Measurement are accomplished through a round-trip frame exchange. For Timing Measurement, the first frame of the round-trip measurement is generated by the ~~master~~timeTransmitter within the IEEE 802.11 MLME when the MLME-TIMINGMSMT.request primitive is invoked. For Fine Timing Measurement, an initial Fine Timing Measurement request frame is generated by the ~~slave~~timeReceiver within the IEEE 802.11 MLME when the MLME-FINETIMINGMSMTRQ.request primitive is invoked. After this frame is successfully received by the ~~master~~timeTransmitter, the first frame of the round-trip measurement is generated by the ~~master~~TimeTransmitter within the IEEE 802.11 MLME when the MLME-FINETIMINGMSMT.request primitive is invoked. As defined by IEEE Std 802.11-2016, upon receipt of the resulting Timing Measurement or Fine Timing Measurement frame, the ~~slave~~timeReceiver station transmits an IEEE 802.11 Ack control frame to the ~~master~~timeTransmitter station. Four timestamps are captured during this two-frame exchange, as follows:

a) t1 is when (in the ~~master~~timeTransmitter station's time base) the request frame is transmitted
b) t2 is when (in the ~~slave~~timeReceiver station's time base) the request frame is received
c) t3 is when (in the ~~slave~~timeReceiver station's time base) the Ack control frame is transmitted

d) t4 is when (in the ~~master~~timeTransmitter station's time base) the Ack control frame is received

When the ~~master~~timeTransmitter sends either a Fine Timing Measurement or a Timing Measurement frame, it passes the t1 and t4 timestamps (and other end-to-end synchronization information) and FollowUpInformation, from the previous measurement to the ~~slave~~timeReceiver. A pair of tokens is passed in each timing or Fine Timing Measurement frame, one to identify the current measurement and the other to allow the ~~slave~~timeReceiver to associate the timestamp information with the previous measurement

Replace Figure 12-1 with the following figure:.

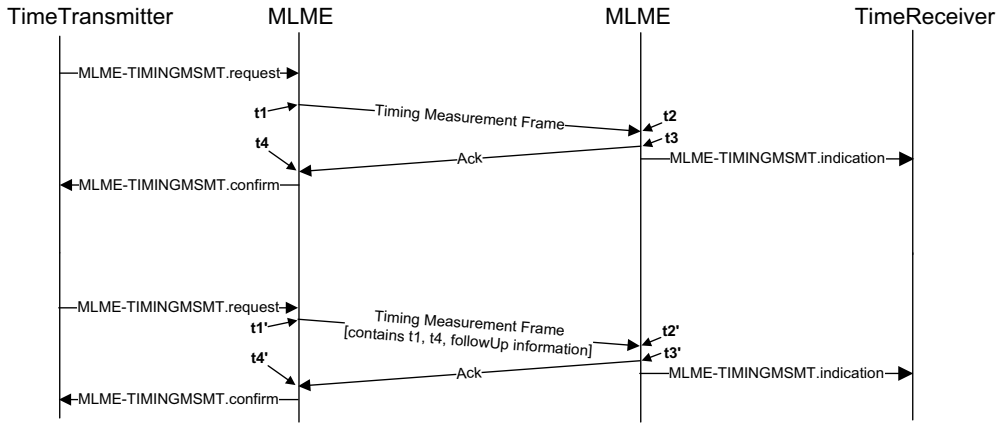

Figure 12-1—Timing measurement procedure for IEEE 802.11 links

NOTE 1—TM also can include a Timing Measurement Request Frame; however, this frame type is not used by this standard.

Replace Figure 12-2 with the following figure:.

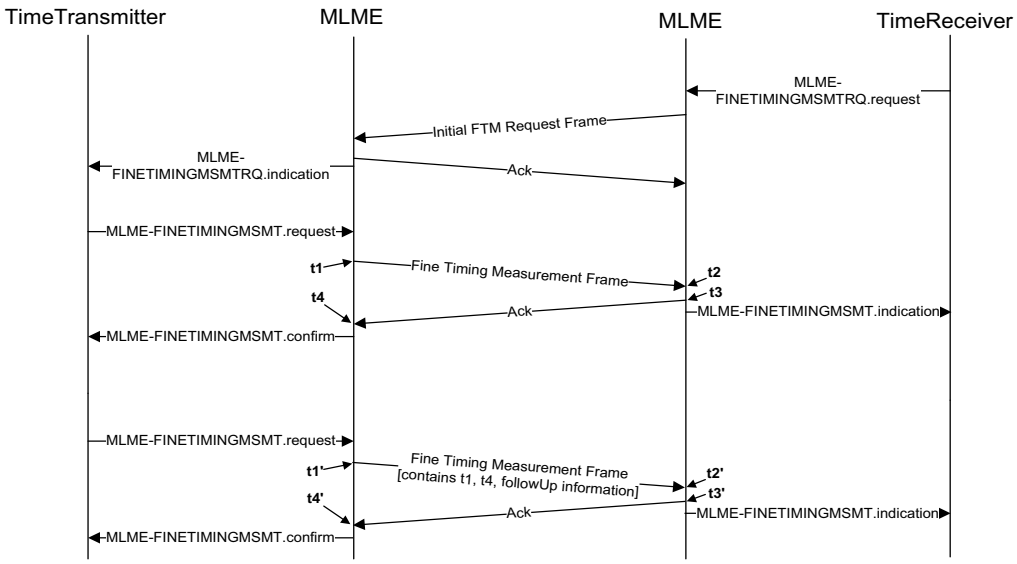

Figure 12-2—Fine Timing Measurement procedure for IEEE 802.11 links

Note that, unlike full-duplex point-to-point ports, IEEE 802.11 ports do not compute the link delay measurements in both directions since only a PTP Port in the ~~Slave~~TimeReceiver state makes use of that information. A PTP Port that transitions from the ~~Master~~TimeTransmitter state to the ~~Slave~~TimeReceiver state (e.g., due to selection of a new Grandmaster PTP Instance) can collect a number of link delay measurements and perform averaging or other filtering to achieve the desired accuracy.

NOTE 2—Fine Timing Measurement can be used for time synchronization as described in this standard; however, it can also be used for location services as defined in IEEE Std 802.11-2016. Since FTM supports only one configuration at a time, it is possible that setting that single configuration for time synchronization might disable its previous configuration for use by another application for location services or, conversely, an application that configures FTM for location services could disable this standard's use for time synchronization. Implementations that use FTM for time synchronization and other applications need to coordinate usage of the FTM protocol.

The ~~master~~timeTransmitter generates MLME-TIMINGMSMT.request primitives for Timing Measurement, as described in this standard, in a manner such that the requirements of 10.7.2.3 and 12.8 for the time synchronization message interval are satisfied. Timing measurement frames are then sent from the ~~master~~timeTransmitter to the ~~slave~~timeReceiver continuously and at a rate that satisfies the requirements of those two subclauses. It is not necessary for the ~~slave~~timeReceiver to continually request timing information from the ~~master~~timeTransmitter. In contrast, the ~~slave~~timeReceiver must request timing information from the ~~master~~timeTransmitter for Fine Timing Measurement. A Fine Timing Measurement frame carries timestamp information for a previous measurement. The ~~slave~~timeReceiver requests a burst of Fine Timing Measurement frames from the ~~master~~timeTransmitter. Figure 12-2 shows an example of a burst of Fine Timing Measurement frames (there are two frames in that example). The Fine Timing Measurement process is described in more detail in 12.1.2.2 and is illustrated in Figure 12-3. In that discussion, the focus is on the transmission of the frames. In the simplified example, service primitives are omitted from Figure 12-3.

Change 12.1.2.2 as follows:

12.1.2.2 Detailed description of Fine Timing Measurement (FTM)

Figure 12-3 is adapted from Figure 11-37 of IEEE Std 802.11-2016. Additional details on the FTM procedure are given in 11.24.6 of IEEE Std 802.11-2016. The example of this figure is for when the

initiating station (STA), i.e., the ~~slave~~timeReceiver, requests a single burst of three FTM frames from the responding STA, i.e., the ~~master~~timeTransmitter, as soon as possible. The ~~slave~~timeReceiver makes this request by sending an initial FTM Request to the ~~master~~timeTransmitter with respective parameters set to appropriate values. The FTM parameters that are relevant to time synchronization in this standard are described in 12.6, and all the FTM parameters are described in more detail in 9.4.2.168 of IEEE Std 802.11-2016. However, in the example here, the parameter ASAP is set to 1 to indicate to the ~~master~~timeTransmitter that the FTM frames are desired as soon as possible, and the Number of Bursts Exponent parameter is set to 0 to indicate a single burst. Figure 12-3 is a simplified view; the ~~slave~~timeReceiver causes the frame to be sent by invoking the MLME-FINETIMINGMSMTRQ.request primitive, which includes the FTM parameter values. The ~~master~~timeTransmitter sends an acknowledgment (Ack) frame to the ~~slave~~timeReceiver to indicate it received the initial FTM request. The ~~master~~timeTransmitter then sends an initial FTM frame at a time that is recommended to be no more than 10 ms later than the receipt of the initial FTM request. The initial FTM frame indicates to the ~~slave~~timeReceiver whether the ~~master~~timeTransmitter was able to grant the values of the FTM parameters that the ~~slave~~timeReceiver requested. If the requested parameters are granted, the procedure continues (Figure 12-3 illustrates this case). If the requested parameters are not granted, the ~~slave~~timeReceiver sends a new initial FTM request for a burst of two FTM frames. If the new request is granted, the procedure continues. If the new request is not granted, the ~~slave~~timeReceiver and ~~master~~timeTransmitter use TM if they both support TM. If, at this point, the ~~slave~~timeReceiver or the ~~master~~timeTransmitter, or both, do not support TM, the procedure terminates and asCapable is set to FALSE (see 12.4).

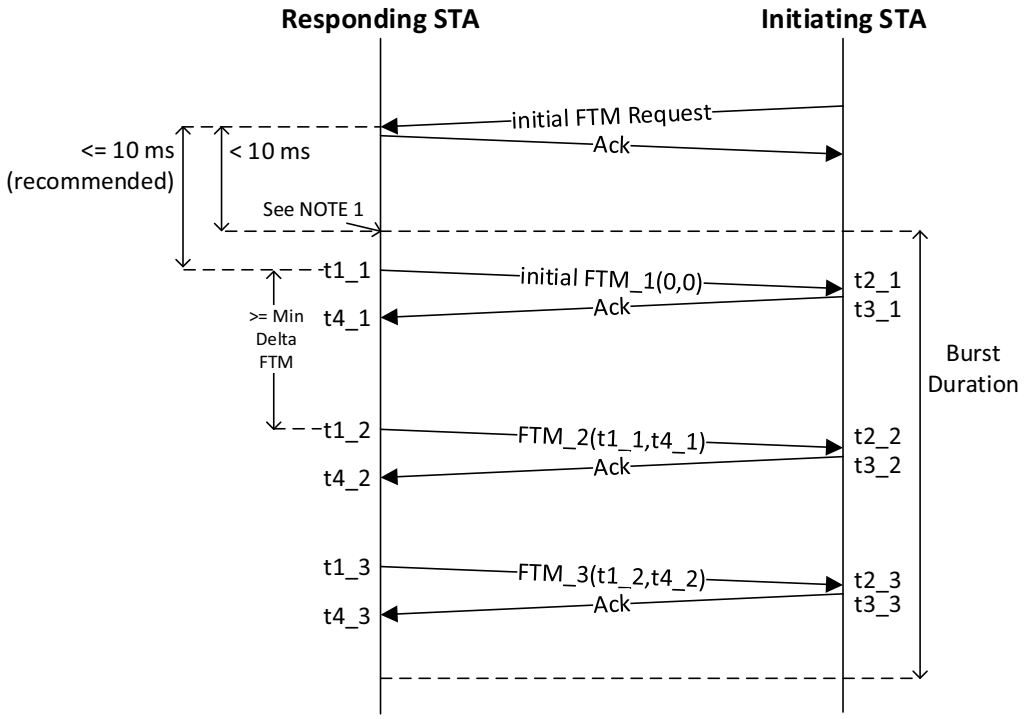

Figure 12-3—Illustration of Fine Timing Measurement burst

NOTE—IEEE Std 802.11-2016 allows various options in case the ~~master~~timeTransmitter does not grant the request. The above procedure is used in this subclause.

The initial FTM frame (initial FTM_1 in Figure 12-3) sent by the ~~master~~timeTransmitter is timestamped with the value t1_1 on transmission from the ~~master~~timeTransmitter and timestamped with the value t2_1 on receipt by the ~~slave~~timeReceiver. The initial FTM frame has fields that carry the t1 and t4 timestamps of the previous FTM frame and corresponding Ack; however, since this is the first FTM frame of the burst, these

fields are set to zero. The ~~slave~~timeReceiver responds to the ~~master~~timeTransmitter with an Ack, which is timestamped with the value t3_1 on transmission from the ~~slave~~timeReceiver and with the value t4_1 on receipt by the ~~master~~timeTransmitter.

The ~~master~~timeTransmitter sends the second FTM frame (FTM_2 in Figure 12-3) after a time interval since sending the initial FTM frame that is greater than or equal to the Min Delta FTM parameter that was requested by the ~~slave~~timeReceiver. This FTM frame is timestamped with t1_2 on transmission and t2_2 on reception. This FTM frame also carries the values of the timestamps t1_1 and t4_1 of the initial FTM frame and corresponding Ack. On receipt of the second FTM frame, the ~~slave~~timeReceiver sends an Ack frame to the ~~master~~timeTransmitter; this frame is timestamped with t3_2 on transmission and t4_2 on reception. Finally, the ~~master~~timeTransmitter sends the third FTM frame (FTM_3 in Figure 12-3) to the ~~slave~~timeReceiver, also at a time interval since sending FTM_2 that is greater than or equal to the Min Delta FTM parameter that was requested by the ~~slave~~timeReceiver. As with FTM_2, this frame is timestamped with t1_3 on transmission and t2_3 on reception. This FTM frame also carries the values of the timestamps t1_2 and t4_2 of the second FTM frame and corresponding Ack. On receipt of the third FTM frame, the ~~slave~~timeReceiver sends an Ack frame to the ~~master~~timeTransmitter; this frame is timestamped with t3_3 on transmission and t4_3 on reception.

On completion of the above exchanges of FTM frames and corresponding acknowledgments, the ~~slave~~timeReceiver knows the transmission and reception times for the initial FTM frame (t1_1, t2_1, t3_1, and t4_1) and second FTM frame (t1_2, t2_2, t3_2, and t4_2) and the reception time for the third FTM frame (t2_3) and transmission time for the corresponding Ack (t3_3). The ~~slave~~timeReceiver can use this information (along with FollowUpInformation contained in the VendorSpecific information element; see 12.7) to synchronize to the ~~master~~timeTransmitter. In this standard, timestamps for the minimum delay FTM frames are used. Specifically, the ~~slave~~timeReceiver computes the quantities D1 = t2_1 – t1_1, and D2 = t2_2 – t1_2, and uses the timestamps t1_*i* and t2_*i*, where *i* = 1 if D1 < D2 and *i* = 2 if D1 ≥ D2, to compute the respective members of the MDSyncReceive structure. The timestamps of FTM_3 and its corresponding Ack are not used; FTM_3 is used only to convey the timestamps of FTM_2 and its corresponding Ack.

If the ~~master~~timeTransmitter does not grant the parameters requested initially by the ~~slave~~timeReceiver, i.e., for a burst of three FTM frames, but it does grant the subsequent request for a burst of two FTM frames, the ~~slave~~timeReceiver has a full set of timestamps for only the initial FTM_1 frame. In this case, the ~~slave~~timeReceiver uses the timestamps t1_1, t2_1, t3_1, and t4_1 to compute the respective members of the MDSyncReceive structure.

With the above procedure for FTM, the ~~slave~~timeReceiver controls the rate at which time synchronization information is sent from the ~~master~~timeTransmitter. This is different from TM, full-duplex IEEE 802.3, IEEE 802.3 EPON, and CSN transports. In those cases, the sending of time synchronization information from the ~~master~~timeTransmitter to the ~~slave~~timeReceiver is controlled by the ~~master~~timeTransmitter; this is true for syncLocked (see 10.2.5.15) TRUE, in which case the information is sent as soon as it is received from further upstream, and syncLocked FALSE, in which case it is sent independently of information received from further upstream. For FTM, the ~~slave~~timeReceiver requests time synchronization information from the ~~master~~timeTransmitter at an average rate equal to the inverse of the current synchronization message interval currentLogSyncInterval (see 12.8 and 14.8.18). In addition, the actual intervals between successive requests by the ~~slave~~timeReceiver for time synchronization information meet the requirements of 10.7.2.3. Also, the value of syncLocked at the ~~master~~timeTransmitter port will not affect the sending of time synchronization information from the ~~master~~timeTransmitter to the ~~slave~~timeReceiver; the requests for time synchronization information from the ~~slave~~timeReceiver are asynchronous to the receipt of time synchronization information from upstream at the node that contains the ~~master~~timeTransmitter port.

Change 12.1.3 as follows:

12.1.3 Layering for IEEE 802.11 links

The *media-dependent* (MD) entity is tailored to the link technology and is responsible for translating the PortSync entity's media-independent actions to media-dependent PDUs or primitives as necessary for communicating synchronized time from the ~~master~~timeTransmitter port over the link to a single ~~slave~~timeReceiver port. For an IEEE 802.11 link, this one-to-one relationship between the MD entities of the ~~master~~timeTransmitter and ~~slave~~timeReceiver implies that if the one physical IEEE 802.11 port is associated with multiple stations, each association requires its own instantiation of the IEEE 802.1AS PortSync entity and MD entity. The MLME-TIMINGMSMT and MLME-FINETIMINGMSMT service primitives defined in IEEE Std 802.11-2016 are used to perform Timing Measurements and Fine Timing Measurements, respectively, between a ~~master~~timeTransmitter IEEE 802.11 station and associated IEEE 802.11 ~~slave~~timeReceiver stations. Figure 12-4 illustrates how the MD entity interacts with the higher and lower layers.

Replace Figure 12-4 with the following figure:.

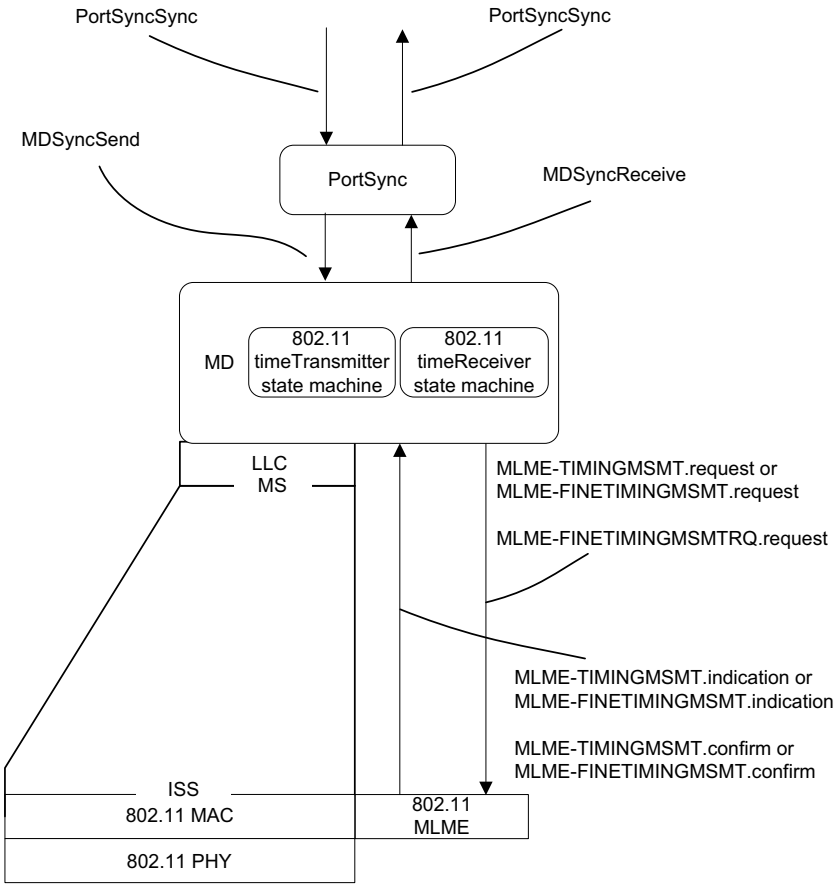

Figure 12-4—Media-dependent and lower entities in stations with IEEE 802.11 links

12.4 Determination of asCapable

Change 12.4 c) as follows:

c) At least one of the following conditions hold:

1) Bit 0 of tmFtmSupport is TRUE.
2) Bit 1 of tmFtmSupport is TRUE and, if the PTP Port is a ~~master~~timeTransmitter port, it can support (i.e., grant) the parameters requested by the ~~slave~~timeReceiver with either FTMs per burst equal to 3 or FTMs per burst equal to 2.
3) Bit 1 of tmFtmSupport is TRUE and, if the PTP Port is a ~~slave~~timeReceiver port, the ~~master~~timeTransmitter port at the other end of the link can support (i.e., grant) the parameters requested by the ~~slave~~timeReceiver with either FTMs per burst equal to 3 or FTMs per burst equal to 2.

12.5 State machines

Change the title of 12.5.1 as follows:

12.5.1 Media-dependent ~~master~~timeTransmitter state machines

Change 12.5.1.1 as follows:

12.5.1.1 Overview

The MD entity of an IEEE 802.11 port whose port state is ~~MasterPort~~TimeTransmitterPort (see Table 10-2) shall behave in a manner that is indistinguishable, relative to an observer external to a system, from a strict implementation of the ~~master~~timeTransmitter state machines in Figure 12-5 and Figure 12-6 (denoted as ~~master~~timeTransmitter state machine A and ~~master~~timeTransmitter state machine B, respectively, in 12.5.1.2), the local variables specified in 12.5.1.3, the functions specified in 12.5.1.4, the shared variables specified in 12.5.1.5, and the primitives defined in 12.5.1.6.

For Timing Measurement, ~~master~~timeTransmitter state machine A is responsible for initiating a time measurement whenever the PortSync entity requests it do so, as indicated by the rcvdMDSyncDot11~~Master~~TimeTransmitterA Boolean (see 12.5.1.3.8). ~~Master~~TimeTransmitter state machine A invokes the IEEE 802.11 MLME-TIMINGMSMT.request primitive and waits for the subsequent MLME-TIMINGMSMT.confirm primitive. It collects local timestamp information from the measurement (t1 and t4, provided by the confirm primitive) and includes the information in the subsequent request. See 8.4.3 for more information on timestamps. ~~Master~~TimeTransmitter state machine B is not used for Timing Measurement.

For Fine Timing Measurement, ~~master~~timeTransmitter state machine A receives and stores information from the PortSync entity. ~~Master~~TimeTransmitter state machine B receives the MLME-FINETIMINGMSMTRQ.indication caused by the initial FTM request from the ~~slave~~timeReceiver. It sets asCapable as specified in 12.4. It then generates successive MLME-FINETIMINGMSMT.request primitives to indicate to the ~~slave~~timeReceiver whether it can grant the requested parameters and also to cause information saved by ~~master~~timeTransmitter state machine A to be sent to the ~~slave~~timeReceiver. It receives MLME-FINETIMINGMSMT.confirm primitives caused by Acks received from the ~~slave~~timeReceiver. It collects local timestamp information from the current measurement (t1 and t4, provided by the confirm primitive) and includes the information in the subsequent MLME-FINETIMINGMSMT.request.

Change 12.5.1.2 as follows:

12.5.1.2 State diagrams

NOTE—In the computation of the burstDuration in ~~master~~timeTransmitter state machine B, the burst duration parameter from IEEE Std 802.11-2016 is converted to UScaledNs (i.e., units of 2^{-16} ns; see 6.4.3.2). The burst duration in UScaledNs (see 6.4.3.2) is related to the quantity A = initReqParamsDot11~~Master~~TimeTransmitterB.burstDuration–2 by:

$$\text{burst duration in UScaledNs} = 1000 \cdot (2^{16}) \cdot 250 \cdot 2^{A}$$

i.e., A is the logarithm to base 2 of the burst duration, in microseconds, divided by 250. Also, it is assumed that the burst duration starts when the initial FTM request is received. In actuality, the timer begins by the partial TSF timer value indicated in the initial FTM frame, which is slightly after the initial FTM request is received. . .

Replace Figure 12-5 with the following figure:

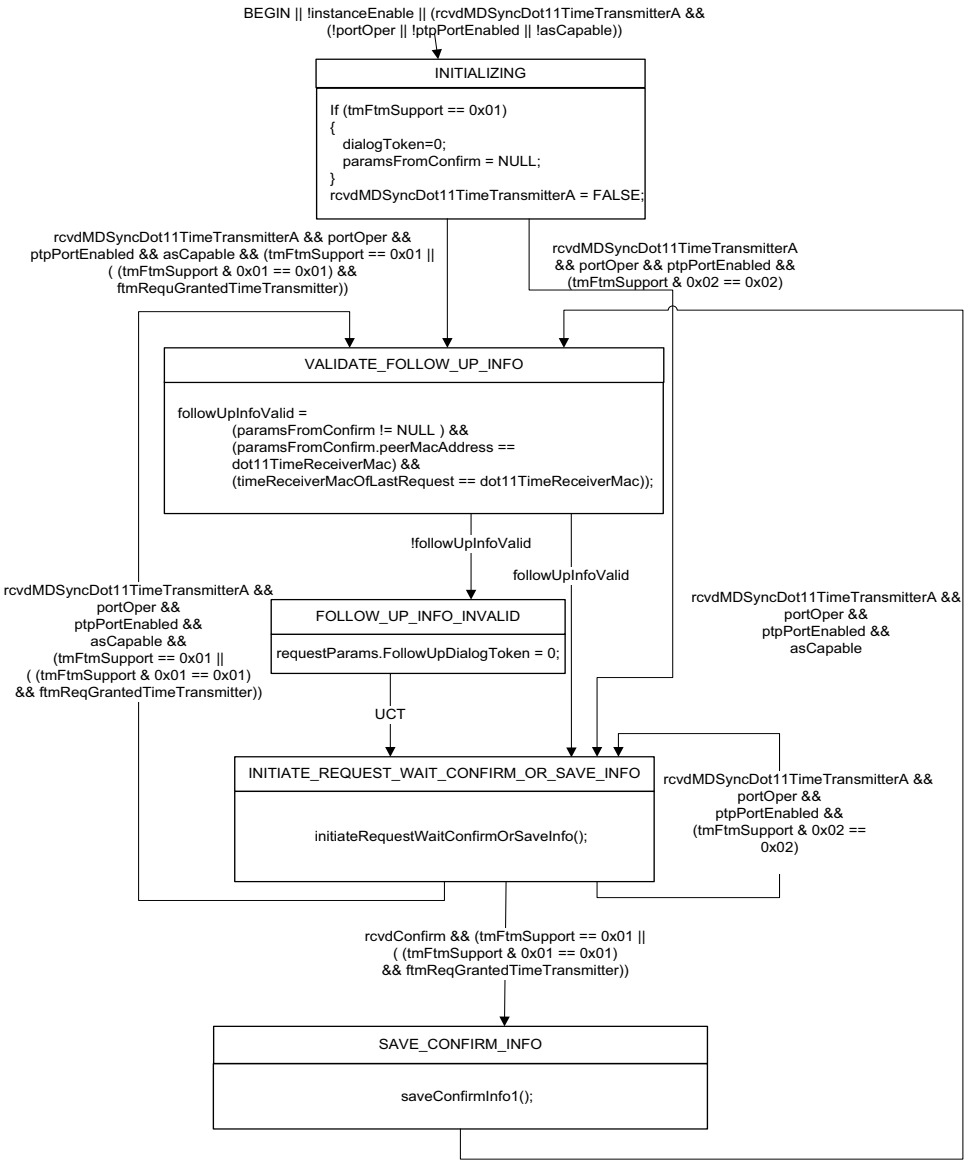

Figure 12-5—~~Master~~TimeTransmitter state machine A
(a) For TM, receives information from the PortSync entity and sends to ~~slave~~timeReceiver, and
(b) for FTM, receives and stores information from the PortSync entity

1 ***Replace Figure 12-6 with the following figure:***

2

3

4

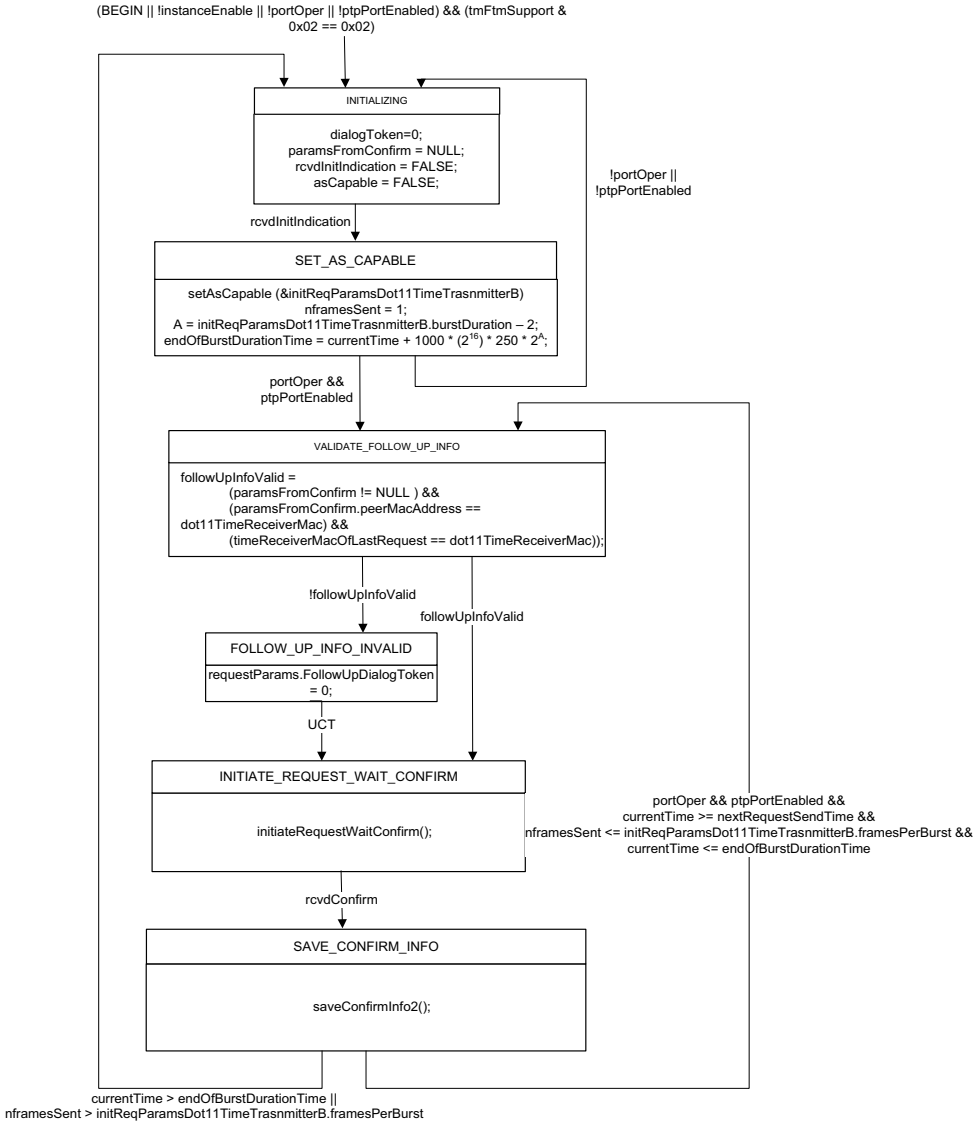

Figure 12-6—~~Master~~TimeTransmitter state machine B
(a) For TM, not invoked and
(b) for FTM, receives initial FTM request from ~~slave~~timeReceiver and sends information received from upstream to ~~slave~~timeReceiver in successive FTM frames

12.5.1.3 State machine local variables

Change 12.5.1.3.5 as follows:

12.5.1.3.5 dot11~~Slave~~TimeReceiverMac: The MAC address of the station associated with the current port.

Change 12.5.1.3.6 as follows:

12.5.1.3.6 ~~slave~~timeReceiverMacOfLastRequest: The MAC address of the station of the previous request, used to validate FollowUpInformation.

Change 12.5.1.3.8 as follows:

12.5.1.3.8 rcvdMDSyncDot11~~Master~~TimeTransmitterA: A Boolean variable that is set to TRUE when an MDSyncSend structure is provided by the PortSync entity.

Change 12.5.1.3.10 as follows:

12.5.1.3.10 nframesSent: An unsigned 8-bit integer used to count the number of frames sent by the ~~slave~~timeReceiver (the number of indications received is counted).

Change 12.5.1.3.12 as follows:

12.5.1.3.12 initReqParamsDot11~~Master~~TimeTransmitterB: A structure whose members contain the values of the fields of an MLME-FINETIMINGMSMTRQ.indication primitive.

Change 12.5.1.3.14 as follows:

12.5.1.3.14 nextRequestSendTime: A UScaledNs variable whose value is the expected time that the next MLME-FINETIMINGMSMTRQ.indication primitive, for the next request from the ~~slave~~timeReceiver, will be received.

12.5.1.4 State machine functions

Change 12.5.1.4.1 a) as follows:

12.5.1.4.1 setRequestParams(&requestParams, MDSyncSend): Assigns values to the parameters of the request primitive of either MLME-TIMINGMSMT or MLME-FINETIMINGMSMT (see 12.5.1.6) as follows:

a) Members of the FollowUpInformation member of the VendorSpecific information element, as defined in 12.7, are assigned as defined in 11.4.4 with the exception of the correctionField, which is assigned, for TM, by the function saveConfirmInfo1() in ~~Master~~TimeTransmitter state machine A (see Figure 12-5) and, for FTM, by the function saveConfirmInfo2() in ~~Master~~TimeTransmitter state machine B (see Figure 12-6).

Change 12.5.1.4.2 as follows:

12.5.1.4.2 setAsCapable (&initReqParamsDot11~~Master~~TimeTransmitterB): Determines the value of asCapable consistent with 12.4 and whether the ~~master~~timeTransmitter is able to grant the parameters requested by the ~~slave~~timeReceiver. This function is used only for FTM.

Change 12.5.1.4.3 as follows:

12.5.1.4.3 initiateRequestWaitConfirmOrSaveInfo(): This function is defined as indicated below. It is used in ~~Master~~TimeTransmitter state machine A. It is defined here so that the detailed code that it invokes does not need to be placed into the state machine diagram.

```
initiateRequestWaitConfirmOrSaveInfo()
{
        rcvdMDSyncDot11MasterTimeTransmitterA = FALSE;
```

```
                If (tmFtmSupport == 0x01)
                {
                        if ((++dialogToken % 256) == 0) dialogToken++;
                        requestParams.DialogToken=dialogToken;
                        requestParams.PeerMACAddress = dot11SlaveTimeReceiverMac;
                        setRequestParams(&requestParams, MDSyncSend);
                        MLME-TIMINGMSMT.request(requestParams);
                        requestParams.FollowUpDialogToken = 0;
                                                //In case no confirm is received
                        slavetimeReceiverMacOfLastRequest = dot11SlaveTimeReceiverMac;
                }
        }
```

Change the first paragraph of 12.5.1.4.4 as follows:

12.5.1.4.4 saveConfirmInfo1(): This function is defined as indicated below. It is used in MasterTimeTransmitter state machine A. It is defined here so that the detailed code that it invokes does not need to be placed into the state machine diagram.

Change 12.5.1.4.5 as follows:

12.5.1.4.5 initiateRequestWaitConfirm(): This function is defined as indicated below. It is used in MasterTimeTransmitter state machine B. It is defined here so that the detailed code that it invokes does not need to be placed into the state machine diagram.

```
        initiateRequestWaitConfirm()
        {
                If ((++dialogToken % 256) == 0) dialogToken++;
                If                                      (nframesSent                                    ==
initReqParamsDot11MasterTimeTransmitterB.framesPerBurst)
                        dialogToken = 0;

                requestParams.DialogToken=dialogToken;
                requestParams.PeerMACAddress = dot11SlaveTimeReceiverMac;
                setRequestParams(&requestParams, MDSyncSend);
                // In the following statement, MinDeltaFTM, which is in units of 100
                //     microseconds, is converted to UScaledNs (i.e., units of 2^-16 ns; see 6.3.3.2)
                nextRequestSendTime = currentTime +
                        initReqParamsDot11MasterTimeTransmitterB.MinDeltaFTM  *  (65536  x
10^5);
                MLME-FINETIMINGMSMT.request(requestParams);
                requestParams.FollowUpDialogToken = 0;    //In case no confirm is received
                slavetimeReceiverMacOfLastRequest = dot11SlaveTimeReceiverMac;
        }
```

Change the first paragraph of 12.5.1.4.6 as follows:

12.5.1.4.6 saveConfirmInfo2(): This function is defined as indicated below. It is used in MasterTimeTransmitter state machine B. It is defined here so that the detailed code that it invokes does not need to be placed into the state machine diagram.

12.5.1.5 Shared variables

Change 12.5.1.5.6 as follows:

12.5.1.5.6 ftmReqGranted~~Master~~TimeTransmitter: A Boolean whose value is TRUE if the ~~master~~timeTransmitter grants the current initial FTM request and FALSE otherwise.

Change the title of 12.5.1.6 as follows:

12.5.1.6 ~~Master~~TimeTransmitter primitives

Change 12.5.1.6.1 as follows:

12.5.1.6.1 MLME-TIMINGMSMT.request

The MLME-TIMINGMSMT.request primitive is used by a ~~master~~timeTransmitter station to initiate a Timing Measurement and also communicates timestamps t1 and t4 captured by the ~~master~~timeTransmitter during a previous measurement. The primitive and its parameters are specified in 6.3.57.2 of IEEE Std 802.11-2016.

Change 12.5.1.6.3 as follows:

12.5.1.6.3 MLME-FINETIMINGMSMT.request

The MLME-FINETIMINGMSMT request primitive is used by a ~~master~~timeTransmitter station to initiate a Fine Timing Measurement and also communicates timestamps t1 and t4 captured by the ~~master~~timeTransmitter during a previous measurement. The primitive and its parameters are specified in 6.3.58.2 of IEEE Std 802.11-2016.

Change 12.5.1.6.5 as follows:

12.5.1.6.5 MLME-FINETIMINGMSMTRQ.indication

The MLME-FINETIMINGMSMTRQ.indication primitive indicates to a ~~master~~timeTransmitter station that the ~~slave~~timeReceiver is requesting a burst of FTM frames with the indicated parameters. The primitive and its parameters are specified in 6.3.70.3 of IEEE Std 802.11-2016.

Change the title of 12.5.2 as follows:

12.5.2 Media-dependent ~~slave~~timeReceiver state machine

Change 12.5.2.1 as follows:

12.5.2.1 Overview

The MD entity of an IEEE 802.11 port whose PTP Port state is ~~SlavePort~~TimeReceiverPort or PassivePort (see 10.3.6) shall behave in a manner that is indistinguishable, relative to an observer external to a system, from a strict implementation of the ~~slave~~timeReceiver state machine in 12.5.2.2, the local variables specified in 12.5.2.3, the functions specified in 12.5.2.4, the shared variables specified in 12.5.2.5, and the primitives defined in 12.5.2.6.

The ~~slave~~timeReceiver state machine is responsible for collecting information from the Timing measurement or Fine Timing measurement indications, constructing an MDSyncReceive structure with the relevant information, and passing the structure to the PortSync entity for further processing. In order to do this, the state machine saves locally captured timestamps (i.e., t2 and t3) received in the indication and

associates them with the timestamps sent from the ~~master~~timeTransmitter port in a future indication (i.e., t1 and t4). In addition, for Fine Timing measurement, the ~~slave~~timeReceiver state machine is responsible for generating the MLME-FINETIMINGMSMTRQ.request primitive, which causes the initial FTM request frame to be sent to the ~~master~~timeTransmitter.

Change 12.5.2.2 as follows:

12.5.2.2 State diagram

Figure 12-7 presents the ~~slave~~timeReceiver state machine. While quantities are shown to be computed from information in consecutive indications, an implementation can choose to compute over longer intervals as long as the clock performance requirements of Annex B are met.

12.5.2.3 State machine local variables

Change 12.5.2.3.6 as follows:

12.5.2.3.6 nframesRcvd: An unsigned 8-bit integer used to count the number of frames received by the ~~master~~timeTransmitter in the burst (the number of indications received from the ~~master~~timeTransmitter are counted).

Change 12.5.2.3.7 as follows:

12.5.2.3.7 initReqParamsDot11~~Slave~~TimeReceiver: A structure whose members contain the values of the fields of an MLME-FINETIMINGMSMTRQ.indication primitive.

Change 12.5.2.3.8 as follows:

12.5.2.3.8 ftmsPerBurst: The value of the FTM parameter 'FTMs per burst' (see 12.6), i.e., the number of FTM frames in the burst granted by the ~~master~~timeTransmitter.

Change 12.5.2.3.9 as follows:

12.5.2.3.9 ftmReqGranted~~Slave~~TimeReceiver: A Boolean that is TRUE if the ~~master~~timeTransmitter has granted the respective request for a burst and FALSE otherwise.

Change 12.5.2.3.11 as follows:

12.5.2.3.11 D1, D2: Temporary local variables used to hold the values of delay computed for the first two FTM frames and corresponding Acks when the ~~master~~timeTransmitter grants the request for three FTM frames.

12.5.2.4 State machine functions

Change 12.5.2.4.1 as follows:

12.5.2.4.1 setMDSyncReceiveDot11~~Slave~~TimeReceiver(indParams): Creates an MDSyncReceive structure and returns the structure. All fields are assigned from FollowUpInformation (contained in the VendorSpecific information element) of indParams as in 11.2.14.2.1.

Replace Figure 12-7 with the following figure.

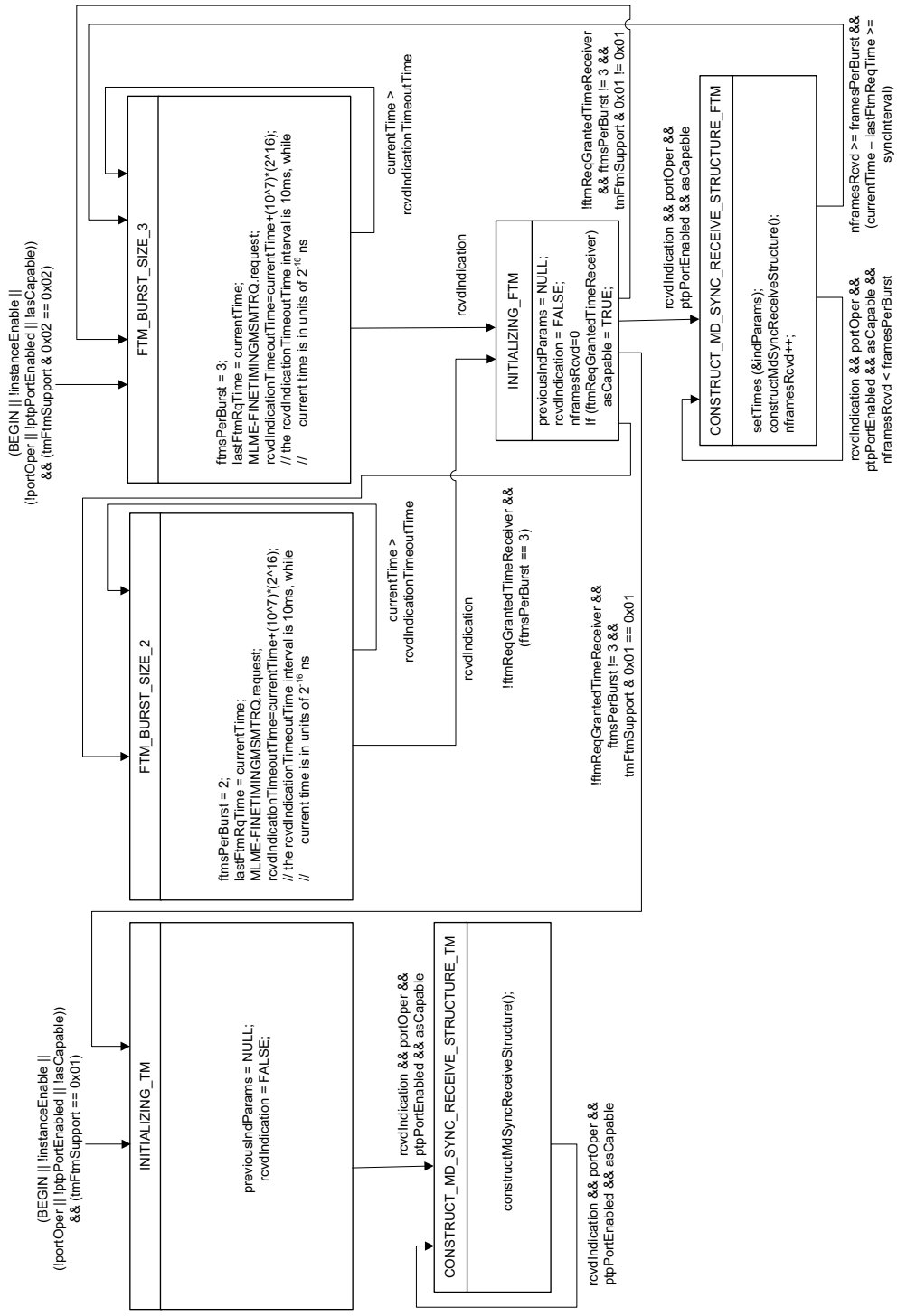

Figure 12-7—~~Slave~~TimeReceiver state machine

Change the first paragraph of 12.5.2.4.3 as follows:

12.5.2.4.3 setTimes (&indParams): extracts the timestamp values from the successive indParams structures returned by the multiple FTM frame exchanges of a burst, and places the correct times (corresponding to minimum delay frames and Acks) in the final indParams structure. This final indParams structure is then used in the function constructMdSyncReceiveStructure(). This procedure is needed when the ~~master~~timeTransmitter grants three FTM frames for the burst. If the ~~master~~timeTransmitter grants only two FTM frames for the burst, the timestamp values returned in the indication primitive of the second frame are used. The function setTimes is used in the ~~Slave~~TimeReceiver state machine and is defined here so that the detailed code that it invokes does not need to be placed into the state machine diagram.

Change 12.5.2.4.4 as follows:

12.5.2.4.4 constructMdSyncReceiveStructure(): This function constructs the MDSyncReceive structure and is defined as indicated below. It is used in the ~~Slave~~TimeReceiver state machine. It is defined here so that the detailed code that it invokes does not need to be placed into the state machine diagram.

```
constructMdSyncReceiveStructure()
{
        if (tmFtmSupport == 0x01)
                MLME-TIMINGMSMT.indication(&indParams);
        else if (tmFtmSupport & 0x02 == 0x02)
        {
                MLME-FINETIMINGMSMT.indication(&indParams);
                nframesRcvd++;
                if (nframesRcvd == initReqParamsDot11~~Slave~~TimeReceiver.framesPerBurst) ||
                        (currentTime > endofBurstDurationTime)
                                RESTART=1;
        }

        if ((previousIndParams != NULL) &&
                (previousIndParams.PeerMacAddress == dot11~~Slave~~TimeReceiverMac) &&
                (indParams.FollowUpDialogToken != 0))
        {

                neighborRateRatio =
                        (indParams.T1-previousIndParams.T1) /
                        (indParams.T2-previousIndParams.T2);
                //NOTE: Other methods of computing neighborRateRatio
                                can be used.

                if (tmFtmSupport == 0x01)
                        K = 1;
                else if (tmFtmSupport & 0x02 == 0x02)
                        K = -3;
                //K = 1 for Timing Measurement and K = -3 for Fine Timing Measurement
                meanLinkDelay =
                        (((indParams.T4 - indParams.T1) -
                        neighborRateRatio * (indParams.T3 - indParams.T2)) /
                                        (2.0)) * (10^K);

                //NOTE: Other methods of computing meanLinkDelay
                                can be used.

                MDSyncReceive = setMDSyncReceiveDot11~~Slave~~TimeReceiver(indParams);
                MDSyncReceive.VendorSpecific.rateRatio +=
```

```
                                (neighborRateRatio – 1);
                        MDSyncReceive.VendorSpecific.upstreamTxTime =
                                indParams.T2* (2^16) *(10^K) -
                                meanLinkDelay*(2^16)/neighborRateRatio;
                        //NOTE: Actions performed with the timestampError
                                parameters of indParams are implementation independent.

                        passMDSyncReceiveToPortSync(&MDSyncReceive);
                }
                previousIndParams = indParams;
                rcvdIndication = FALSE;
        }
```

Change the title of 12.5.2.6 as follows:

12.5.2.6 ~~Slave~~TimeReceiver primitives

Change 12.5.2.6.1 as follows:

12.5.2.6.1 MLME-TIMINGMSMT.indication

The MLME-TIMINGMSMT.indication primitive is received by a ~~slave~~timeReceiver station as the natural result of the peer ~~master~~timeTransmitter station issuing the corresponding request primitive and carries the same parameters plus local timestamp information. The primitive and its parameters are specified in 6.3.57.4 of IEEE Std 802.11-2016.

Change 12.5.2.6.2 as follows:

12.5.2.6.2 MLME-FINETIMINGMSMT.indication

The MLME-FINETIMINGMSMT.indication primitive is received by a ~~slave~~timeReceiver station as the natural result of the peer ~~master~~timeTransmitter station issuing the corresponding request primitive and carries the same parameters plus local timestamp information. The primitive and its parameters are specified in 6.3.58.4 of IEEE Std 802.11-2016.

Change 12.5.2.6.3 as follows:

12.5.2.6.3 MLME-FINETIMINGMSMTRQ.request

The MLME-FINETIMINGMSMTRQ.request primitive is used by the ~~slave~~timeReceiver to request a burst of FTM frames from the ~~master~~timeTransmitter, with respective FTM parameters. The primitive and its parameters are specified in 6.3.70.2 of IEEE Std 802.11-2016.

12.6 FTM parameters

Change the second paragraph of 12.6 as follows:

The values of the FTM parameters given in Table 12-2 shall be used in the MLME-FINETIMINGMSMTRQ.request invoked by the ~~slave~~timeReceiver STA (i.e., in the initial FTM Request). The values for Burst Duration and Min Delta FTM given in Table 12-3 shall be used in the MLME-FINETIMINGMSMTRQ.request invoked by the ~~slave~~timeReceiver STA.

Change 12.6 Table 12-2 as follows:

Table 12-2—FTM parameters relevant to time-synchronization transport

Parameter	Value	Description
Number of Bursts Exponent	0	Log to base 2 of the number of bursts requested by the ~~slave~~timeReceiver (value of 0 indicates that one burst is requested)
Burst Duration	See Table 12-3	Duration of the burst of FTM frames and their corresponding Acks
Min Delta FTM	See Table 12-3	Minimum time between consecutive FTM frames
Partial TSF Timer	1	See 9.4.2.168 of IEEE Std 802.11-2016
Partial TSF Timer No Preference	Reserved in the initial FTM request	See 9.4.2.168 of IEEE Std 802.11-2016
ASAP	1	ASAP = 1 indicates that the ~~slave~~timeReceiver would like the ~~master~~timeTransmitter to respond as soon as possible
ASAP Capable	Reserved in the initial FTM request	See 9.4.2.168 of IEEE Std 802.11-2016
FTMs per burst	3 in the first initial FTM Request 2 in the first retry, if the first initial FTM Request is not granted	Desired number of FTM frames and corresponding Acks in the requested burst
Burst Period	Reserved when Number of Bursts Exponent is zero	See 9.4.2.168 of IEEE Std 802.11-2016

12.7 Format of VendorSpecific information element

Change the last paragraph of 12.7 as follows:

This mechanism shall be used to carry end-to-end link-independent timing information from the ~~master~~timeTransmitter port to the associated ~~slave~~timeReceiver port, including preciseOriginTimestamp, rateRatio, correctionField, and other fields of the Follow-Up message, as described in 12.5.1.4. For consistency, all of these fields are packed into the FollowUpInformation field using exactly the same format as used for full-duplex point-to-point links. In other words, the ~~master~~timeTransmitter state machine communicates an entire Follow_Up message [i.e., including all the fields of the common header (see 11.4.2 and 10.6.2), the preciseOriginTimestamp, and all the fields of the Follow_Up information TLV (see 11.4.4)] using this mechanism. The Type field, illustrated in Figure 12-8, identifies this use of the OUI or CID within the VendorSpecific information element. Table 12-4 lists values for the Type field.

12.8 Synchronization message interval

12.8.2 Synchronization message interval default value

Change NOTE 1 of 12.8.2 as follows:

NOTE 1—For TM, a ~~slave~~timeReceiver port that requests (using a Signaling message that contains a message interval request TLV; see 10.6.4 and 10.3.18) that the PTP Port at the other end of the attached link set its currentLogSyncInterval to a specific value can determine if the request was honored by examining the logMessageInterval field of a FollowUpInformation contained in the VendorSpecific information element of a subsequent MLME indication primitive.

13. Media-dependent layer specification for interface to IEEE 802.3 Ethernet passive optical network link

13.1 Overview

13.1.1 General

Change the second paragraph in 13.1.1 as follows:

A time-aware system may contain more than one OLT and/or ONU. Each PTP Instance of a time-aware system uses at most one ONU port, but may serve, i.e., provide timing to, more than one OLT port (i.e., each PTP Instance of a time-aware system is a clock ~~slave~~timeReceiver to at most one EPON link, but can be clock ~~master~~timeTransmitter to more than one EPON link). Two different PTP Instances of a time-aware system may use different ONU ports.

Change 13.1.2 as follows:

13.1.2 Description of the EPON timing process

The timing process in EPON relies on the 32-bit counters (see 64.2.2.2 and 77.2.2.2 of IEEE Std 802.3-2018) at both the OLT and the ONU. The 32-bit counter used by EPON is the LocalClock entity of the PTP Instance that uses the respective OLT or ONU. These counters increment every time_quantum, which is equal to 16 ns (see 64.2.2.1 and 77.2.2.1 of IEEE Std 802.3-2018). IEEE Std 802.3-2018 defines multipoint control protocol (MPCP), which is one of the protocols that enable MAC clients to communicate over a point-to-multipoint optical network. When either the clock ~~master~~timeTransmitter (OLT) or the clock ~~slave~~timeReceiver (ONU) transmits an MPCP data unit (MPCPDU), its counter value is mapped into the timestamp field. Clause 64 and Clause 77 of IEEE Std 802.3-2018 specify the EPON timing mechanism.

Change the title of 13.1.3 as follows:

13.1.3 Best ~~master~~timeTransmitter selection

Change 13.1.3.1 as follows:

13.1.3.1 General

An EPON link contains one OLT and the associated ONUs. The OLT is the clock ~~master~~timeTransmitter and the associated ONUs are clock ~~slave~~timeReceivers. The OLT initiates the time synchronization as a requester. The ONUs are the responders of the time synchronization. In other words, the invocation of the ~~BMCA~~BTCA results in the OLT having the PTP Port state ~~MasterPort~~TimeTransmitterPort and the ONU having the PTP Port state ~~SlavePort~~TimeReceiverPort (see 10.3.1.1 and Table 10-2), for all PTP Instances using these PTP Ports, regardless of the attributes of PTP Instances downstream from the ONU. This behavior is achieved using the acceptable ~~master~~timeTransmitter table feature defined in 17.5 of IEEE Std 1588-2019.

A PTP Instance that contains an ONU port shall maintain a configured table, the acceptable~~Master~~TimeTransmitterTable, and a per-PTP Port Boolean variable acceptable~~Master~~TimeTransmitterTableEnabled. The data type of acceptable~~Master~~TimeTransmitterTable is Acceptable~~Master~~TimeTransmitterTable (see 13.1.3.2).

Change 13.1.3.2 as follows:

13.1.3.2 Acceptable~~Master~~TimeTransmitterTable

The Acceptable~~Master~~TimeTransmitterTable type represents a table of Acceptable~~Master~~TimeTransmitter entries.

```
struct Acceptable~~Master~~TimeTransmitterTable{
        UInteger16 maxTableSize;
        UInteger16 actualTableSize;
        Acceptable~~Master~~TimeTransmitter[actualTableSize] acceptable~~Master~~TimeTransmitter;
}
```

The maxTableSize member is the maximum size of the Acceptable~~Master~~TimeTransmitterTable. The actualTableSizeMember is the actual size of the Acceptable~~Master~~TimeTransmitterTable. The Acceptable~~Master~~TimeTransmitter array contains a list of Acceptable~~Master~~TimeTransmitter PTP Ports. The value of maxTableSize is implementation specific. actualTableSize shall be less than or equal to maxTableSize.

An Acceptable~~Master~~TimeTransmitterTable is configurable and may contain a number of Acceptable~~Master~~TimeTransmitter entries up to maxTableSize.

Change 13.1.3.3 as follows:

13.1.3.3 Acceptable~~Master~~TimeTransmitter

The Acceptable~~Master~~TimeTransmitter type represents a PTP Port that can be considered, in the execution of the ~~BMCA~~BTCA, as a candidate for ~~master~~timeTransmitter.

```
struct Acceptable~~Master~~TimeTransmitter{
        PortIdentity acceptablePortIdentity;
        UInteger8 alternatePriority1;
}
```

The acceptablePortIdentity member is the PortIdentity of an acceptable ~~master~~timeTransmitter port. The alternatePriority1 member contains an alternate value for the priority1 attribute of the acceptable ~~master~~timeTransmitter port (see 13.1.3.4).

Change 13.1.3.4 as follows:

13.1.3.4 Acceptable ~~master~~timeTransmitter table feature

The acceptable ~~master~~timeTransmitter table feature shall modify the operation of the ~~BMCA~~BTCA (see 10.3) as follows:

a) If acceptable~~Master~~TimeTransmitterTableEnabled for a PTP Port is FALSE, the ~~BMCA~~BTCA operates as described in 10.3.

b) If acceptable~~Master~~TimeTransmitterTableEnabled for a PTP Port is TRUE, then the following apply:

   1) The function qualifyAnnounce() of the PortAnnounceReceive state machine (see 10.3.11.2.1) is replaced by the following:

qualifyAnnounce (rcvdAnnouncePtr): qualifies the received Announce message pointed to by rcvdAnnouncePtr as follows:

i) if the Announce message was sent by the current PTP Instance, i.e., if sourcePortIdentity.clockIdentity (see 10.6.2.2.11 and 8.5.2) is equal to thisClock (see 10.2.4.22), the Announce message is not qualified, and FALSE is returned;

ii) if the stepsRemoved field is greater than or equal to 255, the Announce message is not qualified, and FALSE is returned;

iii) if the sourcePortIdentity of the Announce message is not equal to the sourcePortIdentity of one of the entries of the acceptable~~Master~~TimeTransmitterTable, FALSE is returned;

iv) if a path trace TLV is present and one of the elements of the pathSequence array field of the path trace TLV is equal to thisClock (i.e., the clockIdentity of the current PTP Instance; see 10.2.4.22), the Announce message is not qualified, and FALSE is returned; otherwise, the Announce message is qualified, and TRUE is returned. If a path trace TLV is present, it is saved in the per port global variable receivedPathTrace. If a path trace TLV is not present, the per port global variable receivedPathTrace is set to the empty array.

2) If the alternatePriority1 member of the Acceptable~~Master~~TimeTransmitter array element that corresponds to the sourcePortIdentity of a received Announce message is 0, the alternatePriority1 member has no effect on the operation of the ~~BMCA~~BTCA.

3) If the alternatePriority1 member of the Acceptable~~Master~~TimeTransmitter array element that corresponds to the sourcePortIdentity of a received Announce message is greater than 0, the value of the grandmasterPriority1 field of the Announce message is replaced by the value of alternatePriority1 of this Acceptable~~Master~~TimeTransmitter array element for use in the invocation of the ~~BMCA~~BTCA.

Change 13.1.3.5 as follows:

13.1.3.5 Default configuration of acceptable ~~master~~timeTransmitter table feature

The default configuration of the acceptable ~~master~~timeTransmitter table feature for a PTP Instance that is attached to an IEEE 802.3 EPON link shall be as follows:

a) If the PTP Instance does not contain an ONU port, the default acceptable~~Master~~TimeTransmitterTable is empty, i.e., the member actualTableSize is 0 and there are no Acceptable~~Master~~TimeTransmitter array entries. The variable acceptable~~Master~~TimeTransmitterTableEnabled for each PTP Port is set to FALSE.

b) If the PTP Instance contains an ONU port, the default acceptable~~Master~~TimeTransmitterTable contains one element in the Acceptable~~Master~~TimeTransmitter array. The member actualTableSize is 1. The acceptablePortIdentity of that element is set equal to the portIdentity of the OLT port that the ONU port is attached to, and alternatePriority1 set equal to 244. The variable acceptable~~Master~~TimeTransmitterTableEnabled for each PTP Port is set to TRUE.

NOTE—These default settings ensure that, with the default priority1 values of 8.6.2.1, Table 8-1, used for all PTP Instances, the PTP Instance that contains the ONU port will consider Announce messages only from the OLT that the ONU port is attached to when invoking the ~~BMCA~~BTCA. The alternatePriority1 value of 244 ensures that the OLT will be considered better than the ONU in the sense of the ~~BMCA~~BTCA, which will cause the OLT port state to be set to ~~MasterPort~~TimeTransmitterPort and the ONU port state to be set to ~~SlavePort~~TimeReceiverPort. All other PTP Ports of this PTP Instance that are not disabled and for which asCapable is TRUE will have PTP Port states of either ~~MasterPort~~TimeTransmitterPort or PassivePort. If all PTP Instances downstream from the ONU have priority1 greater than 244, then the PTP Port at the other end of each link attached to each non-ONU port that is not disabled and for which asCapable is TRUE will have PTP Port states of either ~~SlavePort~~TimeReceiverPort or PassivePort; in this case, the downstream network portions will get their timing through the EPON. However, if a downstream PTP Instance has priority1 less than 244, or priority1 equal to 244 and is better than the Grandmaster PTP Instance information contained in the Announce message received by the ONU based on other attributes, then the portion of the network that is downstream of the ONU and includes that better PTP Instance will get its timing from that better downstream PTP

Instance. In this case, the endpoints of the link of that network portion attached to the PTP Instance that contains the ONU will both have PTP Port states of ~~MasterPort~~TimeTransmitterPort, and the PTP Ports at each end of the link will send Announce messages. However, the Announce messages sent by the downstream PTP Instance will be ignored by the PTP Instance that contains the ONU because the sourcePortIdentity of those Announce messages will not be contained in the acceptable~~Master~~TimeTransmitterTable. The Announce messages sent by the PTP Instance that contains the ONU will be used in the invocation of the ~~BMCA~~BTCA at the downstream PTP Instance; however, those Announce messages will not reflect the best ~~master~~timeTransmitter because one of the downstream PTP Instances is better.

Change 13.1.4 as follows:

13.1.4 Time synchronization in EPON

Transmission in the EPON downstream direction (from OLT to ONUs) utilizes time division multiplexing (TDM). In the upstream direction (from ONUs to OLT), time division multiple access (TDMA) is employed. Due to the frame queuing in TDMA, the downstream delay is different from the upstream delay. Asymmetric delay also occurs in the EPON physical layer due to upstream and downstream transmission using different wavelengths. The index of refraction is frequency dependent, which results in the upstream and downstream delays being asymmetric. The accurate time synchronization across the EPON links is operated as follows. It is assumed that the clock ~~master~~timeTransmitter (the OLT) has an accurate synchronized time. The clock ~~master~~timeTransmitter informs the clock ~~slave~~timeReceiver (the ONU) what the accurate synchronized time will be when the counter of the clock ~~slave~~timeReceiver reaches a certain value. The information transfer can be accomplished using the organization-specific slow protocol (OSSP) message (see Clause 57 of IEEE Std 802.3-2018).

Replace Figure 13-1 with the following figure:

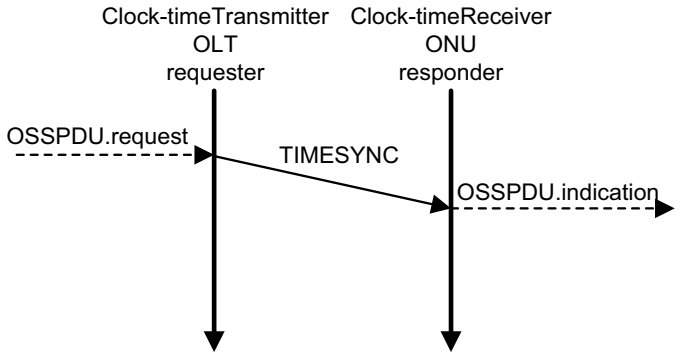

Figure 13-1—IEEE 802.3 EPON time-synchronization interfaces

The following reference process, illustrated schematically in Figure 13-1, will result in the clock ~~slave~~timeReceiver of an ONU being synchronized to the clock ~~master~~timeTransmitter of the OLT:

a) The clock ~~master~~timeTransmitter selects a value X of the local MPCP counter that is used as the timing reference. Any value can be chosen, provided it is relative to the current epoch of the MPCP counter.

b) The clock ~~master~~timeTransmitter calculates the $ToD_{X,i}$ based on $ToD_{X,o}$ using Equation (10-1).

$$ToD_{X,i} = ToD_{X,o} + RTT_i \times \frac{\text{ndown}}{(\text{nup} + \text{ndown})} \times \text{rateRatio} \quad (10\text{-}1)$$

where $ToD_{X,i}$ is the synchronized time when the MPCP counter at the clock ~~slave~~timeReceiver i reaches a value equal to the timestamp X minus the *onuLatencyFactor*; $ToD_{X,o}$ is the synchronized time when the MPCP counter at the clock ~~master~~timeTransmitter reaches a value equal to the timestamp X plus the *oltLatencyFactor*; RTT_i is the round-trip time measured by the clock ~~master~~timeTransmitter for clock ~~slave~~timeReceiver i, i.e., ONU i; nup is the effective refraction index of the light propagating in the upstream channel; ndown is the effective refraction index of the light propagating in the downstream channel; and rateRatio is the rateRatio member of the most recently received MDSyncSend structure. The *onuLatencyFactor* and *oltLatencyFactor* are given in Equation (10-2) and Equation (10-3), respectively. The impact of the worst-case variation in the transmission wavelength for the clock ~~master~~timeTransmitter and clock ~~slave~~timeReceiver transmitters is examined in appendix VII of ITU-T G.984.3, Amendment 2 (11/2009).

$$onuLatencyFactor = onuIngressLatency - (onuIngressLatency + onuEgressLatency) \times \frac{\text{ndown}}{(\text{nup} + \text{ndown})} \times \text{rateRatio} \quad (10\text{-}2)$$

$$oltLatencyFactor = oltEgressLatency - (oltIngressLatency + oltEgressLatency) \times \frac{\text{ndown}}{(\text{nup} + \text{ndown})} \times \text{rateRatio} \quad (10\text{-}3)$$

c) The clock ~~master~~timeTransmitter sends the pair of values (X, $ToD_{X,i}$) to clock ~~slave~~timeReceiver i via the downstream TIMESYNC message.

NOTE—After the clock ~~slave~~timeReceiver receives the downstream TIMESYNC message, it can compute the synchronized time, *ToD*, when the value of the local MPCP counter is equal to *S*; *ToD* is given by the following equation:

$$ToD = ToD_{X,i} + [(S - X) \bmod (2^{32})](16\text{ ns})(\text{rateRatio})$$

where (*A*) mod (*B*) is *A* modulo *B*.

The OSSP message is a general message (see 3.10), analogous to Follow_Up. Note that the preceding synchronized time values correspond to timestamps that are referenced to the MAC control sublayer. Both the clock ~~master~~timeTransmitter and clock ~~slave~~timeReceiver are responsible for compensating their processing delays (e.g., the ingressLatency and egressLatency, as described in 8.4.3). RTT_i is measured using MPCPDU timestamps, inserted into the frame structure as specified by 64.2.1.1 and 77.2.1.1 of IEEE Std 802.3-2018.

13.3 Message format

13.3.1 TIMESYNC message

13.3.1.2 TIMESYNC message field specifications

13.3.1.2.8 $ToD_{X,i}$ (Timestamp)

Change the first paragraph in 13.3.1.2.8 as follows:

$ToD_{X,i}$ is the synchronized time when the MPCP counter at the clock ~~slave~~timeReceiver i reaches a value equal to X minus the *onuLatencyFactor* (see 13.1.4). X is carried in the respective TIMESYNC message. Synchronization of the MPCP clock is described in detail in 64.2.1.1 and 77.2.1.1 in IEEE Std 802.3-2018, for 1G-EPON and 10G-EPON, respectively.

13.5 Layering for IEEE 802.3 EPON links

Replace Figure 13-2 with the following figure:

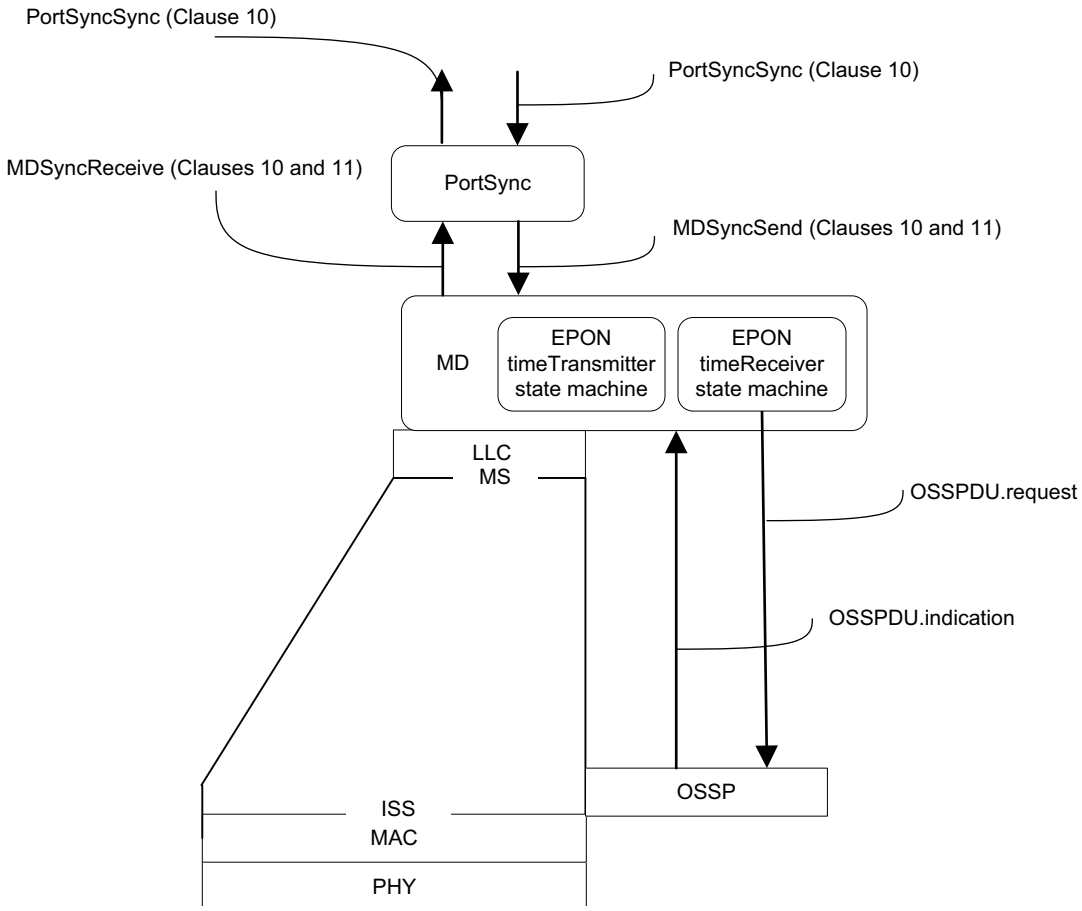

Figure 13-2—IEEE 802.3 EPON interface model

13.6 Service interface definitions

13.6.1 OSSPDU.request

Change 13.6.1.1 as follows:

13.6.1.1 General

This service interface primitive is generated periodically by the MD entity of the clock ~~master~~timeTransmitter every sync interval (see 10.7.2.1). It triggers transmission of a TIMESYNC message from the clock ~~master~~timeTransmitter to the clock ~~slave~~timeReceiver. The values of the parameters of the primitive are sent to the clock ~~slave~~timeReceiver via the TIMESYNC message.

13.6.1.2 OSSPDU.request parameters

Change 13.6.1.2.3 as follows:

13.6.1.2.3 $ToD_{X,i}$ (Timestamp)

$ToD_{X,i}$ is the synchronized time when the MPCP counter at the clock ~~slave~~timeReceiver i reaches a value equal to X minus the *onuLatencyFactor* (see 13.1.4). X is carried in the respective TIMESYNC message. Synchronization of the MPCP clock is described in detail in 64.2.1.1 and 77.2.1.1 in IEEE Std 802.3-2018, for 1G-EPON and 10G-EPON, respectively.

Change 13.6.1.3 as follows:

13.6.1.3 When generated

This primitive is generated by the clock ~~master~~timeTransmitter every $2^{\text{currentLogSyncInterval}}$ seconds when it is in the ~~MASTER~~TIME_TRANSMITTER state, as the first phase of synchronized time information transfer.

13.6.2 OSSPDU.indication

Change 13.6.2.1 as follows:

13.6.2.1 General

This service interface primitive is generated on receipt of a TIMESYNC message by the responder, and provides the values contained in the corresponding OSSPDU.request primitive to the clock ~~slave~~timeReceiver.

13.7 MD entity global variables

Change 13.7.1 as follows:

13.7.1 RTT_i: Is used only by the OLT MD entity. RTT_i is the RTT between the clock ~~master~~ timeTransmitter and clock ~~slave~~timeReceiver. The data type for RTT_i is UInteger32.

NOTE—RTT is measured and updated by the MPCP using the mechanism specified in IEEE Std 802.3-2018 and stored in RTT_i when measured and updated. RTT_i is not used by the ONU and is set to zero in an ONU MD entity.

13.8 State machines

13.8.1 Requester state machine

13.8.1.2 State machine variables

Change 13.8.1.2.6 as follows:

13.8.1.2.6 $ToD_{X,i}$: The synchronized time when the MPCP counter at the clock ~~slave~~timeReceiver i reaches a value equal to X (see 13.8.1.2.8) minus the *onuLatencyFactor* (see 13.1.4). The data type for $ToD_{X,i}$ is Timestamp.

Change 13.8.1.2.7 as follows:

13.8.1.2.7 $ToD_{X,o}$: The synchronized time when the MPCP counter at the clock ~~master~~timeTransmitter reaches a value equal to *X* (see 13.8.1.2.8) plus the *oltLatencyFactor* (see 13.1.4). The data type for $ToD_{X,o}$ is Timestamp.

14. Timing and synchronization management

14.1 General

14.1.1 Data set hierarchy

Change the list of* managed data set in *14.1.1 as follows:

The following hierarchy summarizes the managed data sets within a gPTP Node:

a) instanceList[]
   1) defaultDS
   2) currentDS
   3) parentDS
   4) timePropertiesDS
   5) pathTraceDS
   6) acceptable~~Master~~TimeTransmitterTableDS
   7) portList[]
      i) portDS
      ii) descriptionPortDS
      iii) portStatisticsDS
      iv) acceptable~~Master~~TimeTransmitterPortDS
      v) externalPortConfigurationPortDS
      vi) asymmetryMeasurementModeDS
      vii) commonServicesPortDS

b) commonServices
   1) commonMeanLinkDelayService
      i) cmldsDefaultDS
      ii) cmldsLinkPortList[]
         — cmldsLinkPortDS
         — cmldsLinkPortStatisticsDS
         — cmldsAsymmetryMeasurementModeDS
   2) Future common services can follow.

14.1.2 Data set descriptions

Change 14.1.2 f) and j) as follows:

f) The Acceptable ~~Master~~TimeTransmitter Table Parameter Data Set (acceptable~~Master~~TimeTransmitterTableDS in 14.1.1; see Table 14-6), which represents the acceptable ~~master~~timeTransmitter table used when an EPON port is used by a PTP Instance of a time-aware system.

j) The Acceptable ~~Master~~TimeTransmitter Port Parameter Data Set (acceptable~~Master~~TimeTransmitterPortDS in 14.1.1; see Table 14-13), which represents the capability to enable/disable the acceptable ~~master~~timeTransmitter table feature on a PTP Port.

Change NOTE in 14.1.2 as follows:

NOTE—portDS, descriptionPortDS, portStatisticsDS, and acceptable~~Master~~TimeTransmitterPortDS correspond to a logical PTP Port of a PTP Instance; a PTP Relay Instance or PTP End Instance physical port can contain one or more logical ports (see 8.5.1). For example, a PTP Relay Instance physical port can be connected to a full-duplex point-to-point link that contains one logical port. As another example, a PTP Relay Instance physical port can be connected to a CSN link that contains more than one logical port.

14.2 Default Parameter Data Set (defaultDS)

14.2.8 currentUtcOffset

Change the first paragraph in 14.2.8 as follows:

The value is the offset between TAI and UTC, relative to the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance. It is equal to the global variable sysCurrentUtcOffset (see 10.3.9.18). The value is in units of seconds.

14.2.9 currentUtcOffsetValid

Change the first paragraph in 14.2.9 as follows:

The value is TRUE if the currentUtcOffset, relative to the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance, is known to be correct. It is equal to the global variable sysCurrentUtcOffsetValid (see 10.3.9.14).

14.2.10 leap59

Change the first paragraph in 14.2.10 as follows:

A TRUE value indicates that the last minute of the current UTC day, relative to the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance, will contain 59 s. It is equal to the global variable sysLeap59 (see 10.3.9.13).

14.2.11 leap61

Change the first paragraph in 14.2.11 as follows:

A TRUE value indicates that the last minute of the current UTC day, relative to the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance, will contain 61 s. It is equal to the global variable sysLeap61 (see 10.3.9.12).

14.2.12 timeTraceable

Change the first paragraph in 14.2.12 as follows:

The value is set to TRUE if the timescale and the value of currentUtcOffset, relative to the ~~ClockMaster~~ClockTimeTransmitter entity of this PTP Instance, are traceable to a primary reference standard; otherwise the value is set to FALSE. It is equal to the global variable sysTimeTraceable (see 10.3.9.16).

14.2.13 frequencyTraceable

Change the first paragraph in 14.2.13 as follows:

The value is set to TRUE if the frequency determining the timescale of the ~~ClockMaster~~ClockTimeTransmitter Entity of this PTP Instance is traceable to a primary standard; otherwise the value is set to FALSE. It is equal to the global variable sysFrequencyTraceable (see 10.3.9.17).

Change 14.2.14 as follows:

14.2.14 ptpTimescale

The value is set to TRUE if the clock timescale of the ~~ClockMaster~~ClockTimeTransmitter Entity of this PTP Instance is PTP (see 8.2) and FALSE otherwise.

14.3 Current Parameter Data Set (currentDS)

Change 14.3.3 as follows:

14.3.3 offsetFrom~~Master~~TimeTransmitter

The value is an implementation-specific representation of the current value of the time difference between a ~~slave~~timeReceiver and the Grandmaster Clock, as computed by the ~~slave~~timeReceiver, and as specified in 10.2.10. The data type shall be TimeInterval. The default value is implementation specific.

Change 14.3.7 as follows:

14.3.7 gmChangeCount

This statistics counter tracks the number of times the Grandmaster PTP Instance has changed in a gPTP domain. This counter increments when the PortAnnounceInformation state machine enters the SUPERIOR_~~MASTER~~TIME_TRANSMITTER_PORT state or the INFERIOR_~~MASTER~~TIME_TRANSMITTER_OR_OTHER_PORT state (see 10.3.12 and Figure 10-14).

Change 14.3.8 as follows:

14.3.8 timeOfLastGmChangeEvent

This timestamp takes the value of sysUpTime (see IETF RFC 3418) when the most recent Grandmaster PTP Instance change occurred in a gPTP domain. This timestamp is updated when the PortAnnounceInformation state machine enters the SUPERIOR_~~MASTER~~TIME_TRANSMITTER_PORT state or the INFERIOR_~~MASTER~~TIME_TRANSMITTER_OR_OTHER_PORT state (see 10.3.12 and Figure 10-14).

Change 14.3.9 as follows:

14.3.9 timeOfLastGmPhaseChangeEvent

This timestamp takes the value of sysUpTime (see IETF RFC 3418) when the most recent change in Grandmaster Clock phase occurred due to a change of either the Grandmaster PTP Instance or the Grandmaster Clock time base. This timestamp is updated when one of the following occurs:

a) The PortAnnounceInformation state machine enters the SUPERIOR_~~MASTER~~TIME_TRANSMITTER_PORT state or the INFERIOR_~~MASTER~~TIME_TRANSMITTER_OR_OTHER_PORT state (see 10.3.12 and Figure 10-14), or

b) The gmTimebaseIndicator managed object (see 14.3.6) changes and the lastGmPhaseChange field of the most recently received Follow_Up information TLV is nonzero.

Change 14.3.10 as follows:

14.3.10 timeOfLastGmFreqChangeEvent

This timestamp takes the value of sysUpTime (see IETF RFC 3418) when the most recent change in Grandmaster Clock frequency occurred due to a change of either the Grandmaster PTP Instance or the Grandmaster Clock time base. This timestamp is updated when one of the following occurs:

a) The PortAnnounceInformation state machine enters the SUPERIOR_~~MASTER~~TIME_TRANSMITTER_PORT state or the INFERIOR_~~MASTER~~TIME_TRANSMITTER_OR_OTHER_PORT state (see 10.3.12 and Figure 10-14), or

b) The gmTimebaseIndicator managed object (see 14.3.6) changes, and the lastGmFreqChange field of the most recently received Follow_Up information TLV is nonzero.

Change 14.3.11 as follows:

14.3.11 currentDS table

There is one currentDS table per PTP Instance of a time-aware system, as detailed in Table 14-2.

Table 14-2—currentDS table

Name	Data type	Operations supported[a]	References
stepsRemoved	UInteger16	R	14.3.2
offsetFrom~~Master~~TimeTransmitter	TimeInterval	R	14.3.3
lastGmPhaseChange	ScaledNs	R	14.3.4
lastGmFreqChange	Float64	R	14.3.5
gmTimebaseIndicator	UInteger16	R	14.3.6
gmChangeCount	UInteger32	R	14.3.7
timeOfLastGmChangeEvent	UInteger32 (sysUp Time, IETF RFC 3418)	R	14.3.8
timeOfLastGmPhaseChangeEvent	UInteger32 (sysUp Time, IETF RFC 3418)	R	14.3.9
timeOfLastGmFreqChangeEvent	UInteger32 (sysUp Time, IETF RFC 3418)	R	14.3.10

[a] R = Read only access; RW = Read/write access.

14.4 Parent Parameter Data Set (parentDS)

14.4.2 parentPortIdentity

Change the second paragraph in 14.4.2 as follows:

If this PTP Instance is not the Grandmaster PTP Instance, the value is the portIdentity of the ~~Master~~TimeTransmitterPort (see Table 10-7) of the gPTP communication path attached to the single ~~slave~~timeReceiver port of this PTP Instance.

Change title of 14.7 as follows:

14.7 Acceptable ~~Master~~TimeTransmitter Table Parameter Data Set (acceptable~~Master~~TimeTransmitterTableDS)

Change 14.7.1 as follows:

14.7.1 General

The acceptable~~Master~~TimeTransmitterTableDS represents the acceptable ~~master~~timeTransmitter table used when an EPON port is used by a PTP Instance of a time-aware system.

Change 14.7.2 as follows:

14.7.2 maxTableSize

The value is the maximum size of the Acceptable~~Master~~TimeTransmitterTable. It is equal to the maxTableSize member of the Acceptable~~Master~~TimeTransmitterTable structure (see 13.1.3.2).

Change 14.7.3 as follows:

14.7.3 actualTableSize

The value is the actual size of the Acceptable~~Master~~TimeTransmitterTable. It is equal to the actualTableSize member of the Acceptable~~Master~~TimeTransmitterTable structure (see 13.1.3.2 and 13.1.3.5), i.e., the current number of elements in the acceptable ~~master~~timeTransmitter array. The actual table size is less than or equal to the maxTableSize.

Change 14.7.4 as follows:

14.7.4 acceptable~~Master~~TimeTransmitterArray

Each element of this array is an Acceptable~~Master~~TimeTransmitter structure (see 13.1.3.3 and 13.1.3.5).

Change 14.7.5 as follows:

14.7.5 acceptable~~Master~~TimeTransmitterTableDS table

There is one acceptable~~Master~~TimeTransmitterTableDS table per PTP Instance of a time-aware system, as detailed in Table 14-6.

Table 14-6—acceptable~~Master~~TimeTransmitterTableDS table

Name	Data type	Operations supported[a]	References
maxTableSize	UInteger16	R	14.7.2
actualTableSize	UInteger16	RW	14.7.3
acceptable~~Master~~TimeTransmitterArray	Acceptable~~Master~~TimeTransmitter[actualTableSize] (see 13.1.3.3)	RW	14.7.4

[a] R = Read only access; RW = Read/write access.

14.8 Port Parameter Data Set (portDS)

14.8.3 portState

Change Table 14-7 in 14.8.3 as follows:

Table 14-7—portState enumeration

State	Value
DisabledPort	3
~~MasterPort~~TimeTransmitterPort	6
PassivePort	7
~~SlavePort~~TimeReceiverPort	9
	All other values reserved
NOTE—The enumeration values are consistent with Table 20 in IEEE Std 1588-2019.	

14.8.8 meanLinkDelay

Change the first paragraph in14.8.8 as follows:

The value is equal to the value of the per-PTP Port global variable meanLinkDelay (see 10.2.5.8). It is an estimate of the current one-way propagation time on the link attached to this PTP Port, measured as specified for the respective medium (see 11.2.17, 12.5.2, and 16.4). The value is zero for PTP Ports attached to IEEE 802.3 EPON links and for the ~~master~~timeTransmitter port of an IEEE 802.11 link, because one-way propagation delay is not measured on the latter and not directly measured on the former. The data type shall be TimeInterval. The default value is zero.

Change 14.8.16 as follows:

14.8.16 announceReceiptTimeout

The value is the number of Announce message transmission intervals that a ~~slave~~timeReceiver port waits without receiving an Announce message before assuming that the ~~master~~timeTransmitter is no longer transmitting Announce messages and the ~~BMCA~~BTCA needs to be run, if appropriate (see 10.7.3.2).

Change 14.8.21 as follows:

14.8.21 syncReceiptTimeout

The value is the number of time-synchronization transmission intervals that a ~~slave~~timeReceiver port waits without receiving synchronization information before assuming that the ~~master~~timeTransmitter is no longer transmitting synchronization information and that the ~~BMCA~~BTCA needs to be run, if appropriate (see 10.7.3.1).

14.10 Port Parameter Statistics Data Set (portStatisticsDS)

Change 14.10.13 as follows:

14.10.13 txSyncCount

This counter increments every time synchronization information is transmitted, denoted by one of the following events:

— A transition to TRUE from FALSE of the rcvdMDSyncMDSS variable of the MDSyncSendSM state machine (see 11.2.15.1.1 and Figure 11-7) when in the INITIALIZING, SEND_FOLLOW_UP, or SET_CORRECTION_FIELD states; or
— The INITIATE_REQUEST_WAIT_CONFIRM_OR_SAVE_INFO state is entered in Figure 12-5 and TM is being used [i.e., (tmFtmSupport == 0x01 ||((tmFtmSupport & 0x01 == 0x01)&& ftmReqGranted~~Master~~TimeTransmitter)) in ~~master~~timeTransmitter state machine A of Figure 12-5]; or
— The INITIATE_REQUEST_WAIT_CONFIRM state is entered in Figure 12-6 (in this case FTM is being used).

Change title of 14.11 as follows:

14.11 Acceptable ~~Master~~TimeTransmitter Port Parameter Data Set (acceptable~~Master~~TimeTransmitterPortDS)

Change 14.11.1 as follows:

14.11.1 General

The acceptable~~Master~~TimeTransmitterPortDS represents the capability to enable/disable the acceptable ~~master~~timeTransmitter table feature on a PTP Port. For the single PTP Port of a PTP End Instance and for each PTP Port of a PTP Relay Instance, this data set contains the single member acceptable~~Master~~TimeTransmitterTableEnabled, which is used to enable/disable the Acceptable ~~Master~~TimeTransmitter Table Feature. The number of such data sets is the same as the value of defaultDS.numberPorts.

Change 14.11.2 as follows:

14.11.2 acceptable~~Master~~TimeTransmitterTableEnabled

The value is equal to the value of the Boolean acceptable~~Master~~TimeTransmitterTableEnabled (see 13.1.3.2 and 13.1.3.5).

Change 14.11.3 as follows:

14.11.3 acceptable~~Master~~TimeTransmitterPortDS table

There is one acceptable~~Master~~TimeTransmitterPortDS table per PTP Port, per PTP Instance of a time-aware system as detailed in Table 14-13.

Table 14-13—acceptable~~Master~~TimeTransmitterPortDS table

Name	Data type	Operations supported[a]	References
acceptable~~Master~~TimeTransmitterTableEnabled	Boolean	RW	14.11.2

[a] R = Read only access; RW = Read/write access.

14.16 Common Mean Link Delay Service Link Port Parameter Data Set (cmldsLinkPortDS)

14.16.6 meanLinkDelay

Change the first paragraph of 14.16.6 as follows:

The value is equal to the value of the per-port global variable meanLinkDelay (see 10.2.5.8). It is an estimate of the current one-way propagation time on the link attached to this Link Port, measured as specified for the respective medium (see 11.2.17, 12.5.2, and 16.4). The value is zero for Link Ports attached to IEEE 802.3 EPON links and for the ~~master~~timeTransmitter port of an IEEE 802.11 link because one-way propagation delay is not measured on the latter and not directly measured on the former. The data type shall be TimeInterval. The default value is zero.

15. Managed object definitions

Change 15.2 as follows:

15.2 Structure of the MIB

The IEEE 802.1AS MIB provides objects to configure and manage the IEEE 802.1AS timing and synchronization for time-sensitive applications.

The MIB contains a set of textual conventions and is additionally subdivided into the following subtrees, each of which is organized as a set of related objects:

a) The Default Parameter Data Set (defaultDS) represents the native capabilities of a PTP Instance.

b) The Current Parameter Data Set (currentDS) represents topological position of a local PTP Instance relative to the Grandmaster PTP Instance.

c) The Parent Parameter Data Set (parentDS) represents capabilities of the upstream PTP Instance toward the Grandmaster PTP Instance, as measured at a local PTP Instance.

d) The Time Properties Parameter Data Set (timePropertiesDS) represents capabilities of the Grandmaster PTP Instance, as measured at a local PTP Instance.

e) The Path Trace Parameter Data Set (pathTraceDS) represents the current path trace information (see 10.3.9.23) available at the PTP Instance.

f) The Acceptable ~~Master~~TimeTransmitter Table Parameter Data Set (acceptable~~Master~~TimeTransmitterTableDS) represents the acceptable ~~master~~timeTransmitter table used when the media-dependent PTP Port type of EPON is present in a PTP Instance.

g) The Port Parameter Data Set (portDS) represents time-aware capabilities at a given PTP Port, as a set of augmentation to the interface table entry (ifEntry).

h) The Description Port Parameter Data Set (descriptionPortDS) contains the profileIdentifier for this PTP profile as specified in F.2.

i) The Port Parameter Statistics Data Set (portStatisticsDS) represents statistics and counters associated with time-aware capabilities at a given PTP Relay Instance or PTP End Instance port.

j) The Acceptable ~~Master~~TimeTransmitter Port Parameter Data Set (acceptable~~Master~~TimeTransmitterPortDS) represents the capability to enable/disable the acceptable ~~master~~timeTransmitter table feature on a PTP Port.

k) The External Port Configuration Port Parameter Data Set (externalPortConfigurationPortDS) is used with the external port configuration option to indicate the desired state of a PTP Port.

l) The Asymmetry Measurement Mode Parameter Data Set (asymmetryMeasurementModeDS) represents the capability to enable/disable the Asymmetry Compensation Measurement Procedure on a port (see Annex G) and is used instead of the cmldsAsymmetryMeasurementModeDS when CMLDS is not used and there is a single gPTP domain.

m) The Common Services Port Parameter Data Set (commonServicesPortDS) enables a PTP Port of a PTP Instance to determine which port of the respective common service corresponds to that PTP Port.

n) The Common Mean Link Delay Service Default Parameter Data Set (cmldsDefaultDS) describes the per-time-aware-system attributes of the Common Mean Link Delay Service.

o) The Common Mean Link Delay Service Link Port Parameter Data Set (cmldsLinkPortDS) represents time-aware Link Port capabilities for the Common Mean Link Delay Service of a time-aware system.

p) The Common Mean Link Delay Service Link Port Parameter Statistics Data Set (cmldsLinkPortStatisticsDS) represents statistics and counters associated with Link Port capabilities at a given time-aware system.

q) The Common Mean Link Delay Service Asymmetry Measurement Mode Parameter Data Set (cmldsAsymmetryMeasurementModeDS) represents the capability to enable/disable the Asymmetry Compensation Measurement Procedure on a Link Port (see Annex G).

Table 15-1 shows the structure of the MIB and the relationship of the MIB objects to the above data sets.

Table 15-1—IEEE8021-AS-~~V2~~V3 MIB structure and object cross reference

MIB table	MIB object	Reference
ieee8021As~~V2~~V3DefaultDS		defaultDS table (Table 14-1)
	ieee8021As~~V2~~V3DefaultDSClockIdentity	14.2.2
	ieee8021As~~V2~~V3DefaultDSNumberPorts	14.2.3
	ieee8021As~~V2~~V3DefaultDSClockQualityClockClass	14.2.4.2
	ieee8021As~~V2~~V3DefaultDSClockQualityClockAccuracy	14.2.4.3
	ieee8021As~~V2~~V3DefaultDSClockQualityOffsetScaledLogVariance	14.2.4.4
	ieee8021As~~V2~~V3DefaultDSPriority1	14.2.5
	ieee8021As~~V2~~V3DefaultDSPriority2	14.2.6
	ieee8021As~~V2~~V3DefaultDSGmCapable	14.2.7
	ieee8021As~~V2~~V3DefaultDSCurrentUtcOffset	14.2.8
	ieee8021As~~V2~~V3DefaultDSCurrentUtcOffsetValid	14.2.9
	ieee8021As~~V2~~V3DefaultDSLeap59	14.2.10
	ieee8021As~~V2~~V3DefaultDSLeap61	14.2.11
	ieee8021As~~V2~~V3DefaultDSTimeTraceable	14.2.12
	ieee8021As~~V2~~V3DefaultDSFrequencyTraceable	14.2.13
	ieee8021As~~V2~~V3DefaultDSPtpTimescale	14.2.14
	ieee8021As~~V2~~V3DefaultDSTimeSource	14.2.15
	ieee8021As~~V2~~V3DefaultDSDomainNumber	14.2.16
	ieee8021As~~V2~~V3DefaultDSSdoId	14.2.17
	ieee8021As~~V2~~V3DefaultDSExternalPortConfigurationEnabled	14.2.18
	ieee8021As~~V2~~V3DefaultDSInstanceEnable	14.2.19
ieee8021As~~V2~~V3CurrentDS		currentDS table (Table 14-2)
	ieee8021As~~V2~~V3CurrentDSStepsRemoved	14.3.2
	ieee8021As~~V2~~V3CurrentDSOffsetFrom~~Master~~TimeTransmitter	14.3.3
	ieee8021As~~V2~~V3CurrentDSLastGmPhaseChange	14.3.4
	ieee8021As~~V2~~V3CurrentDSLastGmFreqChange	14.3.5

Table 15-1—IEEE8021-AS-~~V2~~V3 MIB structure and object cross reference *(continued)*

MIB table	MIB object	Reference
	ieee8021As~~V2~~V3CurrentDSGmTimebaseIndicator	14.3.6
	ieee8021As~~V2~~V3CurrentDSGmChangeCount	14.3.7
	ieee8021As~~V2~~V3CurrentDSTimeOfLastGmChangeEvent	14.3.8
	ieee8021As~~V2~~V3CurrentDSTimeOfLastGmPhaseChangeEvent	14.3.9
	ieee8021As~~V2~~V3CurrentDSTimeOfLastGmFreqChangeEvent	14.3.10
ieee8021As~~V2~~V3ParentDS		parentDS table (Table 14-3)
	ieee8021As~~V2~~V3ParentDSParentClockIdentity	14.4.2
	ieee8021As~~V2~~V3ParentDSParentPortNumber	14.4.2
	ieee8021As~~V2~~V3ParentDSCumulativeRateRatio	14.4.3
	ieee8021As~~V2~~V3ParentDSGrandmasterIdentity	14.4.4
	ieee8021As~~V2~~V3ParentDSGrandmasterClockQualityclockClass	14.4.5.2
	ieee8021As~~V2~~V3ParentDSGrandmasterClockQualityclockAccuracy	14.4.5.3
	ieee8021As~~V2~~V3ParentDSGrandmasterClockQualityoffsetScaledLogVar	14.4.5.4
	ieee8021As~~V2~~V3ParentDSGrandmasterPriority1	14.4.6
	ieee8021As~~V2~~V3ParentDSGrandmasterPriority2	14.4.7
ieee8021As~~V2~~V3TimePropertiesDS		timePropertiesDS table (Table 14-4)
	ieee8021As~~V2~~V3TimePropertiesDSCurrentUtcOffset	14.5.2
	ieee8021As~~V2~~V3TimePropertiesDSCurrentUtcOffsetValid	14.5.3
	ieee8021As~~V2~~V3TimePropertiesDSLeap59	14.5.4
	ieee8021As~~V2~~V3TimePropertiesDSLeap61	14.5.5
	ieee8021As~~V2~~V3TimePropertiesDSTimeTraceable	14.5.6
	ieee8021As~~V2~~V3TimePropertiesDSFrequencyTraceable	14.5.7
	ieee8021As~~V2~~V3TimePropertiesDSPtpTimescale	14.5.8
	ieee8021As~~V2~~V3TimePropertiesDSTimeSource	14.5.9
ieee8021As~~V2~~V3PathTraceDS		pathTraceDS table (Table 14-5)
	ieee8021As~~V2~~V3PathTraceDSEnable	14.6.3
ieee8021As~~V2~~V3PathTraceDSArray		pathTraceDS table (Table 14-5)
	ieee8021As~~V2~~V3PathTraceDSArrayList	14.6.2
ieee8021As~~V2~~V3Acceptable~~Master~~TimeTransmitterTableDS		acceptable~~Master~~TimeTransmitterTableDS table (Table 14-6)
	ieee8021As~~V2~~V3Acceptable~~Master~~TimeTransmitterTableDSMaxTableSize	14.7.2

Table 15-1—IEEE8021-AS-~~V2~~V3 MIB structure and object cross reference *(continued)*

MIB table	MIB object	Reference
	ieee8021As~~V2~~V3Acceptable~~Master~~TimeTransmitterTableDSActualTableSize	14.7.3
ieee8021As~~V2~~V3Acceptable~~Master~~TimeTransmitterTableDSArray		acceptable~~Master~~TimeTransmitterTableDS table (Table 14-6)
	ieee8021As~~V2~~V3Acceptable~~Master~~TimeTransmitterTableDSArrayPortIdentity	14.7.4
	ieee8021As~~V2~~V3Acceptable~~Master~~TTTableDSArrayAlternatePriority1	14.7.4
ieee8021As~~V2~~V3PortDS		portDS table (Table 14-10)
	ieee8021As~~V2~~V3PortDSClockIdentity	14.8.2
	ieee8021As~~V2~~V3PortDSPortNumber	14.8.2
	ieee8021As~~V2~~V3PortDSPortState	14.8.3
	ieee8021As~~V2~~V3PortDSPtpPortEnabled	14.8.4
	ieee8021As~~V2~~V3PortDSdelayMechanism	14.8.5
	ieee8021As~~V2~~V3PortDSIsMeasuringDelay	14.8.6
	ieee8021As~~V2~~V3PortDSAsCapable	14.8.7
	ieee8021As~~V2~~V3PortDSMeanLinkDelay	14.8.8
	ieee8021As~~V2~~V3PortDSMeanLinkDelayThresh	14.8.9
	ieee8021As~~V2~~V3PortDSDelayAsym	14.8.10
	ieee8021As~~V2~~V3PortDSNbrRateRatio	14.8.11
	ieee8021As~~V2~~V3PortDSInitialLogAnnounceInterval	14.8.12
	ieee8021As~~V2~~V3PortDSCurrentLogAnnounceInterval	14.8.13
	ieee8021As~~V2~~V3PortDSUseMgtSettableLogAnnounceInterval	14.8.14
	ieee8021As~~V2~~V3PortDSMgtSettableLogAnnounceInterval	14.8.15
	ieee8021As~~V2~~V3PortDSAnnounceReceiptTimeout	14.8.16
	ieee8021As~~V2~~V3PortDSInitialLogSyncInterval	14.8.17
	ieee8021As~~V2~~V3PortDSCurrentLogSyncInterval	14.8.18
	ieee8021As~~V2~~V3PortDSUseMgtSettableLogSyncInterval	14.8.19
	ieee8021As~~V2~~V3PortDSMgtSettableLogSyncInterval	14.8.20
	ieee8021As~~V2~~V3PortDSSyncReceiptTimeout	14.8.21
	ieee8021As~~V2~~V3PortDSSyncReceiptTimeoutTimeInterval	14.8.22
	ieee8021As~~V2~~V3PortDSInitialLogPdelayReqInterval	14.8.23
	ieee8021As~~V2~~V3PortDSCurrentLogPdelayReqInterval	14.8.24
	ieee8021As~~V2~~V3PortDSUseMgtSettableLogPdelayReqInterval	14.8.25
	ieee8021As~~V2~~V3PortDSMgtSettableLogPdelayReqInterval	14.8.26

Table 15-1—IEEE8021-AS-~~V2~~V3 MIB structure and object cross reference *(continued)*

MIB table	MIB object	Reference
	ieee8021As~~V2~~V3PortDSInitialLogGptpCapableMessageInterval	14.8.27
	ieee8021As~~V2~~V3PortDSCurrentLogGptpCapableMessageInterval	14.8.28
	ieee8021As~~V2~~V3PortDSUseMgtSettableLogGptpCapableMessageInterval	14.8.29
	ieee8021As~~V2~~V3PortDSMgtSettableLogGptpCapableMessageInterval	14.8.30
	ieee8021As~~V2~~V3PortDSInitialComputeNbrRateRatio	14.8.31
	ieee8021As~~V2~~V3PortDSCurrentComputeNbrRateRatio	14.8.32
	ieee8021As~~V2~~V3PortDSUseMgtSettableComputeNbrRateRatio	14.8.33
	ieee8021As~~V2~~V3PortDSMgtSettableComputeNbrRateRatio	14.8.34
	ieee8021As~~V2~~V3PortDSInitialComputeMeanLinkDelay	14.8.35
	ieee8021As~~V2~~V3PortDSCurrentComputeMeanLinkDelay	14.8.36
	ieee8021As~~V2~~V3PortDSUseMgtSettableComputeMeanLinkDelay	14.8.37
	ieee8021As~~V2~~V3PortDSMgtSettableComputeMeanLinkDelay	14.8.38
	ieee8021As~~V2~~V3PortDSAllowedLostRsp	14.8.39
	ieee8021As~~V2~~V3PortDSAllowedFaults	14.8.40
	ieee8021As~~V2~~V3PortDSGPtpCapableReceiptTimeout	14.8.41
	ieee8021As~~V2~~V3PortDSVersionNumber	14.8.42
	ieee8021As~~V2~~V3PortDSNup	14.8.43
	ieee8021As~~V2~~V3PortDSNdown	14.8.44
	ieee8021As~~V2~~V3PortDSOneStepTxOper	14.8.45
	ieee8021As~~V2~~V3PortDSOneStepReceive	14.8.46
	ieee8021As~~V2~~V3PortDSOneStepTransmit	14.8.47
	ieee8021As~~V2~~V3PortDSInitialOneStepTxOper	14.8.48
	ieee8021As~~V2~~V3PortDSCurrentOneStepTxOper	14.8.49
	ieee8021As~~V2~~V3PortDSUseMgtSettableOneStepTxOper	14.8.50
	ieee8021As~~V2~~V3PortDSMgtSettableOneStepTxOper	14.8.51
	ieee8021As~~V2~~V3PortDSSyncLocked	14.8.52
	ieee8021As~~V2~~V3PortDSPdelayTruncTST1	14.8.53
	ieee8021As~~V2~~V3PortDSPdelayTruncTST2	14.8.53
	ieee8021As~~V2~~V3PortDSPdelayTruncTST3	14.8.53
	ieee8021As~~V2~~V3PortDSPdelayTruncTST4	14.8.53
	ieee8021As~~V2~~V3PortDSMinorVersionNumber	14.8.54

Table 15-1—IEEE8021-AS-~~V2~~V3 MIB structure and object cross reference *(continued)*

MIB table	MIB object	Reference
ieee8021As~~V2~~V3DescriptionPortDS		descriptionPortDS table (Table 14-11)
	ieee8021As~~V2~~V3DescriptionPortDSProfileIdentifier	14.9.2
ieee8021As~~V2~~V3PortStatDS		portStatisticsDS table (Table 14-12)
	ieee8021As~~V2~~V3PortStatRxSyncCount	14.10.2
	ieee8021As~~V2~~V3PortStatRxOneStepSyncCount	14.10.3
	ieee8021As~~V2~~V3PortStatRxFollowUpCount	14.10.4
	ieee8021As~~V2~~V3PortStatRxPdelayRequestCount	14.10.5
	ieee8021As~~V2~~V3PortStatRxPdelayRspCount	14.10.6
	ieee8021As~~V2~~V3PortStatRxPdelayRspFollowUpCount	14.10.7
	ieee8021As~~V2~~V3PortStatRxAnnounceCount	14.10.8
	ieee8021As~~V2~~V3PortStatRxPtpPacketDiscardCount	14.10.9
	ieee8021As~~V2~~V3PortStatSyncReceiptTimeoutCount	14.10.10
	ieee8021As~~V2~~V3PortStatAnnounceReceiptTimeoutCount	14.10.11
	ieee8021As~~V2~~V3PortStatPdelayAllowedLostRspExceededCount	14.10.12
	ieee8021As~~V2~~V3PortStatTxSyncCount	14.10.13
	ieee8021As~~V2~~V3PortStatTxOneStepSyncCount	14.10.14
	ieee8021As~~V2~~V3PortStatTxFollowUpCount	14.10.15
	ieee8021As~~V2~~V3PortStatTxPdelayRequestCount	14.10.16
	ieee8021As~~V2~~V3PortStatTxPdelayRspCount	14.10.17
	ieee8021As~~V2~~V3PortStatTxPdelayRspFollowUpCount	14.10.18
	ieee8021As~~V2~~V3PortStatTxAnnounceCount	14.10.19
ieee8021As~~V2~~V3Acceptable~~Master~~TimeTransmitterPortDS		acceptable~~Master~~TimeTransmitterTableDS table (Table 14-13)
	ieee8021As~~V2~~V3Acceptable~~Master~~TTPortDSAcceptable~~Master~~TTTableEnabled	14.11.2
ieee8021As~~V2~~V3ExternalPortConfigurationPortDS		externalPortConfigurationPortDS table (Table 14-14)
	ieee8021As~~V2~~V3ExternalPortConfigurationPortDSDesiredState	14.12.2
ieee8021As~~V2~~V3AsymMeasurementModeDS		asymmetryMeasurementModeDS table (Table 14-15)
	ieee8021As~~V2~~V3AsymMeasurementModeDSAsymMeasurementMode	14.13.2
ieee8021As~~V2~~V3CommonServicesPortDS		commonServicesPortDS table (Table 14-16)

Table 15-1—IEEE8021-AS-~~V2~~V3 MIB structure and object cross reference *(continued)*

MIB table	MIB object	Reference
	ieee8021As~~V2~~V3CommonServicesPortDSCmldsLinkPortPortNumber	14.14.2
ieee8021As~~V2~~V3CommonMeanLinkDelayServiceDefaultDS		cmldsDefaultDS table (Table 14-17)
	ieee8021As~~V2~~V3CmldsDefaultDSClockIdentity	14.15.2
	ieee8021As~~V2~~V3CmldsDefaultDSNumberLinkPorts	14.15.3
ieee8021As~~V2~~V3CommonMeanLinkDelayServiceLinkPortDS		cmldsLinkPortDS table (Table 14-18)
	ieee8021As~~V2~~V3CmldsLinkPortDSClockIdentity	14.16.16
	ieee8021As~~V2~~V3CmldsLinkPortDSPortNumber	14.16.16
	ieee8021As~~V2~~V3CmldsLinkPortDSCmldsLinkPortEnabled	14.16.17
	ieee8021As~~V2~~V3CmldsLinkPortDSIsMeasuringDelay	14.16.18
	ieee8021As~~V2~~V3CmldsLinkPortDSAsCapableAcrossDomains	14.16.19
	ieee8021As~~V2~~V3CmldsLinkPortDSMeanLinkDelay	14.16.6
	ieee8021As~~V2~~V3CmldsLinkPortDSMeanLinkDelayThresh	14.16.7
	ieee8021As~~V2~~V3CmldsLinkPortDSDelayAsym	14.16.8
	ieee8021As~~V2~~V3CmldsLinkPortDSNbrRateRatio	14.16.9
	ieee8021As~~V2~~V3CmldsLinkPortDSInitialLogPdelayReqInterval	14.16.10
	ieee8021As~~V2~~V3CmldsLinkPortDSCurrentLogPdelayReqInterval	14.16.11
	ieee8021As~~V2~~V3CmldsLinkPortDSUseMgtSettableLogPdelayReqInterval	14.16.12
	ieee8021As~~V2~~V3CmldsLinkPortDSMgtSettableLogPdelayReqInterval	14.16.13
	ieee8021As~~V2~~V3CmldsLinkPortDSInitialComputeNbrRateRatio	14.16.14
	ieee8021As~~V2~~V3CmldsLinkPortDSCurrentComputeNbrRateRatio	14.16.15
	ieee8021As~~V2~~V3CmldsLinkPortDSUseMgtSettableComputeNbrRateRatio	14.16.16
	ieee8021As~~V2~~V3CmldsLinkPortDSMgtSettableComputeNbrRateRatio	14.16.17
	ieee8021As~~V2~~V3CmldsLinkPortDSInitialComputeMeanLinkDelay	14.16.18
	ieee8021As~~V2~~V3CmldsLinkPortDSCurrentComputeMeanLinkDelay	14.16.19
	ieee8021As~~V2~~V3CmldsLinkPortDSUseMgtSettableComputeMeanLinkDelay	14.16.20
	ieee8021As~~V2~~V3CmldsLinkPortDSMgtSettableComputeMeanLinkDelay	14.16.21
	ieee8021As~~V2~~V3CmldsLinkPortDSAllowedLostRsp	14.16.22
	ieee8021As~~V2~~V3CmldsLinkPortDSAllowedFaults	14.16.23

Table 15-1—IEEE8021-AS-~~V2~~V3 MIB structure and object cross reference *(continued)*

MIB table	MIB object	Reference
	ieee8021As~~V2~~V3CmldsLinkPortDSVersionNumber	14.16.24
	ieee8021As~~V2~~V3CmldsLinkPortDSPdelayTruncTST1	14.16.25
	ieee8021As~~V2~~V3CmldsLinkPortDSPdelayTruncTST2	14.16.25
	ieee8021As~~V2~~V3CmldsLinkPortDSPdelayTruncTST3	14.16.25
	ieee8021As~~V2~~V3CmldsLinkPortDSPdelayTruncTST4	14.16.25
	ieee8021As~~V2~~V3CmldsLinkPortDSMinorVersionNumber	14.16.26
ieee8021As~~V2~~V3CommonMeanLinkDelayServiceLinkPortStatDS		cmldsLinkPortStatisticsDS table (Table 14-19)
	ieee8021As~~V2~~V3CmldsLinkPortStatDSRxPdelayRequestCount	14.17.2
	ieee8021As~~V2~~V3CmldsLinkPortStatDSRxPdelayRspCount	14.17.3
	ieee8021As~~V2~~V3CmldsLinkPortStatDSRxPdelayRspFollowUpCount	14.17.4
	ieee8021As~~V2~~V3CmldsLinkPortStatDSRxPtpPacketDiscardCount	14.17.5
	ieee8021As~~V2~~V3CmldsLinkPortStatDSPdelayAllowedLostRspExceededCount	14.17.6
	ieee8021As~~V2~~V3CmldsLinkPortStatDSTxPdelayRequestCount	14.17.7
	ieee8021As~~V2~~V3CmldsLinkPortStatDSTxPdelayRspCount	14.17.8
	ieee8021As~~V2~~V3CmldsLinkPortStatDSTxPdelayRspFollowUpCount	14.17.9
ieee8021As~~V2~~V3CommonMeanLinkDelayServiceAsymMeasurementModeDS		cmldsAsymmetryMeasurementModeDS table (Table 14-20)
	ieee8021As~~V2~~V3CmldsAsymMeasurementModeDSAsymMeasurementMode	14.18.2

Change 15.3 as follows:

15.3 Relationship to MIB in IEEE Std 802.1AS-2011

The version 1 MIB module (IEEE8021-AS MIB) that was published in IEEE Std 802.1AS-2011 has been superseded by the version 2 MIB module (IEEE8021-AS-V2 MIB) specified in 15.6 of IEEE Std 802.1AS-2020. Version 3 MIB module (IEEE8021-AS-V3 MIB) specified in the current standard remains unchanged from IEEE8021-AS-V2 MIB except updating terminology.~~,~~ IEEE Std 802.1AS-2019. Support of the version 3~~2~~ module is a requirement for conformance to the required or optional capabilities (Clause 5) in the current standard. ~~The version 2 MIB module reflects changes in indexation of the MIB objects for optional support of multiple PTP Instances (i.e., multiple domains), as discussed in 14.1.~~

For an implementation that supports a single PTP Instance, version 1, ~~and~~ version 2, ~~and~~ Version 3 implementations can successfully co-exist and interoperate.

15.4 Security considerations

Change fourth paragraph of 15.4 as follows:

A number of management objects defined in the IEEE8021-AS-V3~~2~~ MIB module have a MAX-ACCESS clause of read-write and/or read-create. Such objects might be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

Change* of the following writable objects in *15.4 as follows:

ieee8021AsV2DefaultDSPriority1
ieee8021AsV2DefaultDSPriority2
ieee8021AsV2PortDSPtpPortEnabled
ieee8021AsV2PortDSDelayAsymmetry

Change last paragraph of 15.4 as follows:

Unintended access to any of the readable tables or variables in the IEEE8021-AS-V3~~2~~ MIB alerts the reader that timing synchronization in gPTP domain is configured, and on which values timing parameters are configured, and which system is current Grandmaster PTP Instance. This information can suggest to an attacker what applications are being run, and thus suggest application-specific attacks, or can enable the attacker to detect whether their attacks are being successful. It is thus important to control even GET access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP.

Change 15.5 as follows:

15.5 Textual conventions defined in this MIB

The following textual conventions are defined in this MIB:

a) Ieee8021As~~V2~~V3ClockIdentity. IEEE 802 MAC address represented in “canonical” order defined by IEEE Std 802-2014, 64-bit Network Unique Identifier (NUI-64) as described in IEEE Std 802c-2017.
b) Ieee8021As~~V2~~V3GPtpProfileIdentifier. Profile identifier (see 14.9.2).
c) Ieee8021As~~V2~~V3ClockClassValue. Clock class value (see 8.6.2.2).
d) Ieee8021As~~V2~~V3ClockAccuracyValue. Clock accuracy value (see 8.6.2.3).
e) Ieee8021As~~V2~~V3TimeSourceValue. Source of time used by Grandmaster PTP Instance (see 8.6.2.7).
f) Ieee8021AS~~V2~~V3PtpTimeInterval. Time intervals in units of 2^{-16} ns (see 6.4.3.3).
g) Ieee8021AS~~V2~~V3PtpPortIdentity. Identifies a port of a PTP Instance (see 6.4.3.7).
h) Ieee8021AS~~V2~~V3ScaledNs. Represents signed values of time and time interval in units of 2^{-16} ns (see 6.4.3.1).
i) Ieee8021AS~~V2~~V3UScaledNs. Represents unsigned values of time and time interval in units of 2^{-16} ns (see 6.4.3.2).
j) Ieee8021AS~~V2~~V3PTPInstanceIdentifier. Entity of a single time-aware system that executes gPTP in one gPTP domain (see 7.2.1 and 8.1).

k) Ieee8021AS~~V2~~V3Timestamp. Value of Ieee8021ASV2Timestamp is equal to the remainder obtained upon dividing the respective timestamp, expressed in units of 2^{-16} ns, by 2^{48}) (see 14.8.53).

15.6 IEEE 802.1AS MIB module[4,5]

In the following MIB modules definitions, if any discrepancy between the DESCRIPTION text and the corresponding definition in any other part of this standard occurs, the definitions outside this subclause take precedence.

Replace version 2 MIB module (IEEE8021-AS-V2 MIB) with version 3 MIB module (IEEE8021-AS-V3 MIB) as follows:

[4] Copyright release for MIBs: Users of this standard may freely reproduce the MIBs contained in this subclause so that they can be used for their intended purpose.

[5] An ASCII version of this MIB module can be obtained from the IEEE 802.1 website at https://www.ieee802.org/1/pages/MIBS.html.

```
IEEE8021-AS-V3-MIB DEFINITIONS ::= BEGIN
-- ============================================================
-- MIB for support of 802.1AS Timing and Synchronization in
-- IEEE 802.1Q Bridged Local Area Networks
-- ============================================================

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, Unsigned32, Integer32, Counter32
        FROM SNMPv2-SMI              -- [RFC2578]
    TEXTUAL-CONVENTION, TruthValue, RowStatus, TimeStamp
        FROM SNMPv2-TC               -- [RFC2579]
    MODULE-COMPLIANCE, OBJECT-GROUP  -- [RFC2580]
        FROM SNMPv2-CONF
      SnmpAdminString
            FROM SNMP-FRAMEWORK-MIB      -- [RFC3411]
    InterfaceIndexOrZero
        FROM IF-MIB                  -- [RFC2863]
    Float64TC
        FROM FLOAT-TC-MIB            -- [RFC6340]
    IEEE8021BridgePortNumber
        FROM IEEE8021-TC-MIB
    ;

ieee8021AsV3TimeSyncMib MODULE-IDENTITY
    LAST-UPDATED "202301180000Z" -- January 18, 2023
    ORGANIZATION "IEEE 802.1 Working Group"
    CONTACT-INFO
                "WG-URL: http://ieee802.org/1/
                WG-EMail: stds-802-1-l@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
        "The Management Information Base module for
         IEEE 802.1AS time-synchronization protocol."

    REVISION    "202301180000Z" -- January 18, 2023
    DESCRIPTION
        "This MIB module remains unchanged from
             IEEE8021-AS-V2-MIB except updating the terminology.

         Published as part of IEEE Std 802.1ASdr-2023
         Copyright (C) IEEE (2023).
         This version of this MIB module is part of IEEE Std
         802.1ASdr-2023; see the standard itself for full legal
         notices."

  ::= { iso(1) org(3) ieee(111)
         standards-association-numbers-series-standards (2)
```

```
         lan-man-stds (802) ieee802dot1 (1) ieee802dot1mibs (1) 40 }

ieee8021AsV3MIBObjects    OBJECT IDENTIFIER ::= {ieee8021AsV3TimeSyncMib 1}
ieee8021AsV3Conformance   OBJECT IDENTIFIER ::= {ieee8021AsV3TimeSyncMib 2}

-- ============================================================
-- Textual Conventions
-- ============================================================

Ieee8021AsV3ClockIdentity ::= TEXTUAL-CONVENTION
    DISPLAY-HINT
        "1x:"
    STATUS current
    DESCRIPTION
        "The Ieee8021AsV3ClockIdentity type identifies a PTP Instance.
         The clockIdentity attribute shall be as specified in
         IEEE Std 1588-2019."
    REFERENCE    "6.4.3.6, 8.5.2.2 and IEEE Std 1588-2019 7.5.2.2"
    SYNTAX OCTET STRING (SIZE (8))

Ieee8021AsV3GPtpProfileIdentifier ::= TEXTUAL-CONVENTION
    DISPLAY-HINT
        "1x:"
    STATUS current
    DESCRIPTION
        "The Ieee8021AsV3GPtpProfileIdentifier attribute is the
         profileIdentifier for this PTP profile."
    REFERENCE    "14.9.2, F.1 "
    SYNTAX OCTET STRING (SIZE (6))

Ieee8021AsV3ClockClassValue ::= TEXTUAL-CONVENTION
    STATUS       current
    DESCRIPTION
        "The Ieee8021AsV3ClockClassValue attribute denotes the traceability
        of the synchronized time distributed by a ClockTimeTransmitter when
it is
         the Grandmaster PTP Instance.
         A more detailed description of clockClass can be found in
         IEEE Std 1588-2019."
    REFERENCE    "8.6.2.2 and IEEE Std 1588-2019 7.6.2.5"
    SYNTAX     INTEGER {
        primarySync(6),
        primarySyncLost(7),
        applicationSpecificSync(13),
        applicationSpecficSyncLost(14),
        primarySyncAlternativeA(52),
        applicationSpecificAlternativeA(58),
        primarySyncAlternativeB(187),
        applicationSpecficAlternativeB(193),
        defaultClock(248),
        timeReceiverOnlyClock(255)
        }

Ieee8021AsV3ClockAccuracyValue ::= TEXTUAL-CONVENTION
    STATUS       current
    DESCRIPTION
```

```
        "The Ieee8021AsV3ClockAccuracyValue attribute indicates the
         expected time accuracy of a ClockTimeTransmitter.
         A more detailed description of clockAccuracy can be found in
         IEEE Std 1588-2019."
    REFERENCE    "8.6.2.3 and IEEE Std 1588-2019 7.6.2.6"
    SYNTAX     INTEGER {
        timeAccurateTo25ns(32),
        timeAccurateTo100ns(33),
        timeAccurateTo250ns(34),
        timeAccurateTo1us(35),
        timeAccurateTo2dot5us(36),
        timeAccurateTo10us(37),
        timeAccurateTo25us(38),
        timeAccurateTo100us(39),
        timeAccurateTo250us(40),
        timeAccurateTo1ms(41),
        timeAccurateTo2dot5ms(42),
        timeAccurateTo10ms(43),
        timeAccurateTo25ms(44),
        timeAccurateTo100ms(45),
        timeAccurateTo250ms(46),
        timeAccurateTo1s(47),
        timeAccurateTo10s(48),
        timeAccurateToGT10s(49),
        timeAccurateToUnknown(254)
        }

Ieee8021AsV3TimeSourceValue ::= TEXTUAL-CONVENTION
    STATUS       current
    DESCRIPTION
        "The Ieee8021AsV3TimeSourceValue is an information only
         attribute indicating the type of source of time used by a
         ClockTimeTransmitter. The value is not used in the selection of the
         Grandmaster PTP Instance. The values of TimeSource are
         given below and are specified in Table 8-2. These represent
         categories. For example, the GPS entry includes not only the
         GPS system of the U.S. Department of Defense but the European
         Galileo system and other present and future GNSSs.

         In the absence of a default value set by a user of this standard,
         the default value of timeSource shall be INTERNAL_OSCILLATOR.

         A more detailed description of timeSource can be found in
         IEEE Std 1588-2019.

         The following interpretation is placed on the value:
            0x10:  Atomic Clock,
            0x20:  GPS,
            0x30:  Terrestrial Radio,
            0x40:  PTP,
            0x50:  NTP,
            0x60:  Hand Set,
            0x90:  Other,
            0xA0:  Internal Oscillator "
    REFERENCE  "8.6.2.7, 8-2 and IEEE Std 1588-2019 7.6.2.8"
    SYNTAX      INTEGER {
```

```
            atomicClock(16),
            gps(32),
            terrestrialRadio(48),
            ptp(64),
            ntp(80),
            handSet(96),
            other(144),
            internalOscillator(160)
           }

Ieee8021ASV3PtpTimeInterval ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
        "The Ieee8021ASV3PtpTimeInterval type represents time intervals
         in units of 2^-16 ns. Positive or negative time
         intervals outside the maximum range of this data type shall
         be encoded as the largest positive and negative values of
         the data type respectively.
         For example: 2.5 ns is expressed as:
         (hex) 0x0000 0000 0002 8000"
    REFERENCE "6.4.3.3"
SYNTAX OCTET STRING (SIZE (8))

Ieee8021ASV3PtpPortIdentity ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
        "The Ieee8021ASV3PtpPortIdentity type identifies a port of a
         PTP Instance.
         The first 8 octets within this value specifies the
         ClockIdentity.
         The last 2 octets within this value specifies the port number."
    REFERENCE   "6.4.3.7"
SYNTAX OCTET STRING (SIZE (10))

Ieee8021ASV3ScaledNs ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
        "The Ieee8021ASV3ScaledNs type represents signed values of
         time and time interval in units of 2^-16 ns.
         Positive or negative values of time or time interval outside the
         maximum range of this data type are encoded as the largest
         positive or negative value of the data type, respectively.
         For example: -2.5 ns is expressed as:
         (hex) 0xFFFF FFFF FFFF FFFD 8000"
    REFERENCE   "6.4.3.1"
SYNTAX OCTET STRING (SIZE (12))

Ieee8021ASV3UScaledNs ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
        "The Ieee8021ASV3UScaledNs type represents unsigned values of
         time and time interval in units of 2^-16 ns.
         Positive or negative values of time or time interval outside
         the maximum range of this data type are encoded as the largest
         positive or negative value of the data type, respectively.
         For example: 2.5 ns is expressed as:
```

```
         (hex) 0x0000 0000 0000 0000 0002 8000"
    REFERENCE   "6.4.3.2"
SYNTAX OCTET STRING (SIZE (12))

Ieee8021ASV3PTPInstanceIdentifier ::= TEXTUAL-CONVENTION
DISPLAY-HINT "d"
STATUS current
DESCRIPTION
        "The entity of a single time-aware system that executes gPTP in
         one gPTP domain is called a PTP Instance. A time-aware system
         can contain multiple PTP Instances, which are each associated
         with a different gPTP domain. There are two types of
         PTP Instances, a PTP End Instance and a PTP Relay Instance."
    REFERENCE   "7.2.1"
SYNTAX Unsigned32

Ieee8021ASV3Timestamp ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
        "The value of Ieee8021ASV3Timestamp is equal to the remainder
         obtained upon dividing the respective timestamp, expressed
         in units of 2^-16 ns, by 2^48)."
    REFERENCE   "14.8.53, 14.16.25 and Table 14-9"
SYNTAX OCTET STRING (SIZE (6))

-- ================================================================
-- subtrees in the IEEE8021-AS-MIB
--
-- System Time-Aware Parameters/Capabilities for each instance of
-- gPTP domain. ieee8021AsV3InstanceListIndex that is of
-- ieee8021AsV3DomainIdentificationNumber object-type is used as Index.
--
-- ================================================================

-- ================================================================
-- The PTP Instance set is used to allow for dynamic creation and
-- deletion of PTP Instances and logical ports implementations that
-- support dynamic create/delete of devices.
-- ================================================================

ieee8021AsV3PtpInstanceTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3PtpInstanceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table is used to allow for dynamic creation and deletion
         of PTP Instances and logical ports implementations that support
         dynamic create/delete of devices."
    REFERENCE   "14.1"
    ::= { ieee8021AsV3MIBObjects 1 }

ieee8021AsV3PtpInstanceEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3PtpInstanceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
        "An entry that specifies a PTP Instance."
    INDEX { ieee8021AsV3PtpInstance }
    ::= { ieee8021AsV3PtpInstanceTable 1 }

Ieee8021AsV3PtpInstanceEntry ::=
  SEQUENCE {
    ieee8021AsV3PtpInstance           Ieee8021ASV3PTPInstanceIdentifier,
    ieee8021AsV3PtpInstanceName       SnmpAdminString,
    ieee8021AsV3PtpInstanceRowStatus  RowStatus
  }

ieee8021AsV3PtpInstance OBJECT-TYPE
    SYNTAX Ieee8021ASV3PTPInstanceIdentifier
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The entity of a single time-aware system that executes gPTP in
         one gPTP domain is called a PTP Instance. A time-aware system can
         contain multiple PTP Instances, which are each associated with
         a different gPTP domain. There are two types of PTP Instances,
         a PTP End Instance and a PTP Relay Instance."
    REFERENCE "7.2.1"
    ::= { ieee8021AsV3PtpInstanceEntry 1 }

ieee8021AsV3PtpInstanceName OBJECT-TYPE
    SYNTAX SnmpAdminString
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
    "Name for identification of a PTP Instance."
    DEFVAL { "" }
    ::= { ieee8021AsV3PtpInstanceEntry 2 }

ieee8021AsV3PtpInstanceRowStatus OBJECT-TYPE
    SYNTAX RowStatus
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "This attribute is used to create and delete PTP Instances."
    REFERENCE "14.1"
    ::= { ieee8021AsV3PtpInstanceEntry 3 }

-- ================================================================
-- The Default data set represents native time capability of a time-
-- aware system and is consistent with respective IEEE 1588 data set.
-- ================================================================

ieee8021AsV3DefaultDSTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3DefaultDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Default Parameter Data Set represents the native capabilities
         of a PTP Instance, i.e., a PTP Relay Instance or a
         PTP End Instance."
    REFERENCE   "14.2"
```

```
    ::= { ieee8021AsV3MIBObjects 2 }

ieee8021AsV3DefaultDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3DefaultDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Default Data Set contains the profile Identifier for
         this instance of gPTP domain."
    INDEX { ieee8021AsV3PtpInstance }
    ::= { ieee8021AsV3DefaultDSTable 1 }

Ieee8021AsV3DefaultDSEntry ::=
  SEQUENCE {
    ieee8021AsV3DefaultDSClockIdentity          Ieee8021AsV3ClockIdentity,
    ieee8021AsV3DefaultDSNumberPorts            Unsigned32,
    ieee8021AsV3DefaultDSClockQualityClockClass Ieee8021AsV3ClockClassValue,
    ieee8021AsV3DefaultDSClockQualityClockAccuracy
Ieee8021AsV3ClockAccuracyValue,
    ieee8021AsV3DefaultDSClockQualityOffsetScaledLogVariance Unsigned32,
    ieee8021AsV3DefaultDSPriority1              Unsigned32,
    ieee8021AsV3DefaultDSPriority2              Unsigned32,
    ieee8021AsV3DefaultDSGmCapable              TruthValue,
    ieee8021AsV3DefaultDSCurrentUtcOffset       Integer32,
    ieee8021AsV3DefaultDSCurrentUtcOffsetValid  TruthValue,
    ieee8021AsV3DefaultDSLeap59                 TruthValue,
    ieee8021AsV3DefaultDSLeap61                 TruthValue,
    ieee8021AsV3DefaultDSTimeTraceable          TruthValue,
    ieee8021AsV3DefaultDSFrequencyTraceable     TruthValue,
    ieee8021AsV3DefaultDSPtpTimescale           TruthValue,
    ieee8021AsV3DefaultDSTimeSource             Ieee8021AsV3TimeSourceValue,
    ieee8021AsV3DefaultDSDomainNumber           Unsigned32,
    ieee8021AsV3DefaultDSSdoId                  Unsigned32,
    ieee8021AsV3DefaultDSExternalPortConfigurationEnabled TruthValue,
    ieee8021AsV3DefaultDSInstanceEnable         TruthValue
    }

ieee8021AsV3DefaultDSClockIdentity OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockIdentity
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the clockIdentity of the PTP Instance.
         The clockIdentity attribute shall be as specified in
         IEEE Std 1588-2019."
    REFERENCE   "14.2.2 and IEEE Std 1588-2019 7.5.2.2"
    ::= { ieee8021AsV3DefaultDSEntry 1 }


ieee8021AsV3DefaultDSNumberPorts OBJECT-TYPE
    SYNTAX      Unsigned32(1..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of ports of the PTP Instance. For an end
         station the value is 1."
```

```
    REFERENCE   "14.2.3"
    ::= { ieee8021AsV3DefaultDSEntry 2 }


ieee8021AsV3DefaultDSClockQualityClockClass OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockClassValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the clockClass of the PTP Instance, which
         implements the clockClass specifications of 8.6.2.2."
    REFERENCE   "14.2.4.2"
    ::= { ieee8021AsV3DefaultDSEntry 3 }


ieee8021AsV3DefaultDSClockQualityClockAccuracy OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockAccuracyValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the clockAccuracy of the PTP Instance, which
         implements the clockAccuracy specifications of 8.6.2.3."
    REFERENCE   "14.2.4.3"
    ::= { ieee8021AsV3DefaultDSEntry 4 }


ieee8021AsV3DefaultDSClockQualityOffsetScaledLogVariance OBJECT-TYPE
    SYNTAX      Unsigned32(0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the offsetScaledLogVariance of the PTP Instance,
         which implements the offsetScaledLogVariance specifications
         of 8.6.2.4."
    REFERENCE   "14.2.4.4"
    ::= { ieee8021AsV3DefaultDSEntry 5 }

ieee8021AsV3DefaultDSPriority1 OBJECT-TYPE
    SYNTAX      Unsigned32(0..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the priority1 attribute of the PTP Instance."
    REFERENCE   "14.2.5"
    ::= { ieee8021AsV3DefaultDSEntry 6 }


ieee8021AsV3DefaultDSPriority2 OBJECT-TYPE
    SYNTAX      Unsigned32(0..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the priority2 attribute of the PTP Instance."
    REFERENCE   "14.2.5"
    DEFVAL { 248 }
    ::= { ieee8021AsV3DefaultDSEntry 7 }
```

```
ieee8021AsV3DefaultDSGmCapable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is TRUE (1) if the PTP Instance is capable of being a
         Grandmaster PTP Instance, and FALSE (2) if the PTP Instance is
         not capable of being a Grandmaster PTP Instance."
    REFERENCE   "14.2.7"
    ::= { ieee8021AsV3DefaultDSEntry 8 }


ieee8021AsV3DefaultDSCurrentUtcOffset OBJECT-TYPE
    SYNTAX      Integer32(-32768..32767)
    UNITS       "seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the offset between TAI and UTC, relative to
         the ClockTimeTransmitter entity of this PTP Instance. It is equal
         to the global variable sysCurrentUtcOffset.
         The value is in units of seconds.

         The default value is selected as follows:
             a)The value is the value obtained from a primary
               reference if the value is known at the time of
               initialization, else
             b)The value is the current IERS defined value of
               TAI - UTC (see IERS Bulletin C) when the PTP Instance
               is designed.currentUtcOffsetValid"
    REFERENCE   "14.2.8"
    ::= { ieee8021AsV3DefaultDSEntry 9 }


ieee8021AsV3DefaultDSCurrentUtcOffsetValid OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The default value is TRUE (1) if the value of
         ieee8021AsV3DefaultDSCurrentUtcOffset is known to be
         correct, otherwise it is set to FALSE (2)."
    REFERENCE   "14.2.9"
    ::= { ieee8021AsV3DefaultDSEntry 10 }


ieee8021AsV3DefaultDSLeap59 OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A TRUE (1) value indicates that the last minute of the
         current UTC day, relative to the ClockTimeTransmitter entity of
         this PTP Instance, will contain 59 s. It is equal to the
```

```
         global variable sysLeap59.

         The value is selected as follows:
            a)The value is obtained from a primary reference if
              known at the time of initialization, else
            b)The value is set to FALSE (2)."
    REFERENCE   "14.2.10"
    ::= { ieee8021AsV3DefaultDSEntry 11 }


ieee8021AsV3DefaultDSLeap61 OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A TRUE (1) value indicates that the last minute of the
         current UTC day, relative to the ClockTimeTransmitter entity of
         this PTP Instance, will contain 61 s. It is equal to the global
         variable sysLeap61.

         The value is selected as follows:
             a)The value is obtained from a primary reference if
               known at the time of initialization, else
             b)The value is set to FALSE (2)."
    REFERENCE   "14.2.11"
    ::= { ieee8021AsV3DefaultDSEntry 12 }


ieee8021AsV3DefaultDSTimeTraceable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is set to TRUE (1) if the timescale and the value
         of currentUtcOffset, relative to the ClockTimeTransmitter entity of
         this PTP Instance, are traceable to a primary reference
         standard; otherwise the value is set to FALSE (2).
         It is equal to the global variable sysTimeTraceable.

         The value is selected as follows:
            a)If the time and the value of currentUtcOffset are
              traceable to a primary reference standard at the time of
              initialization, the value is set to TRUE (1), else
            b)The value is set to FALSE (2)."
    REFERENCE   "14.2.12"
    ::= { ieee8021AsV3DefaultDSEntry 13 }


ieee8021AsV3DefaultDSFrequencyTraceable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is set to TRUE (1) if the frequency determining the
         timescale of the ClockTimeTransmitter Entity of this PTP Instance is
         traceable to a primary standard; otherwise the value is set
```

```
         to FALSE (2). It is equal to the global variable
         sysFrequencyTraceable.

         The value is selected as follows:
            a)If the frequency is traceable to a primary reference
              standard at the time of initialization the value is set
              to TRUE (1), else
            b)The value is set to FALSE (2)."
    REFERENCE   "14.2.13"
    ::= { ieee8021AsV3DefaultDSEntry 14 }

ieee8021AsV3DefaultDSPtpTimescale OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is set to TRUE (1) if the clock timescale of the
         ClockTimeTransmitter Entity of this PTP Instance is PTP and
         FALSE (2) otherwise."
    REFERENCE   "14.2.14"
    ::= { ieee8021AsV3DefaultDSEntry 15 }

ieee8021AsV3DefaultDSTimeSource OBJECT-TYPE
    SYNTAX      Ieee8021AsV3TimeSourceValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the source of time used by the
         Grandmaster PTP Instance clock."
    REFERENCE   "14.2.15"
    ::= { ieee8021AsV3DefaultDSEntry 16 }

ieee8021AsV3DefaultDSDomainNumber OBJECT-TYPE
    SYNTAX      Unsigned32(0..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the domain number of the gPTP domain for this
         instance of gPTP supported by the time-aware system."
    REFERENCE   "14.2.16"
    ::= { ieee8021AsV3DefaultDSEntry 17 }

ieee8021AsV3DefaultDSSdoId OBJECT-TYPE
    SYNTAX      Unsigned32(0..4095)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the sdoId of the gPTP domain for this instance
         of gPTP supported by the time-aware system.
         For compatibility with IEEE Std 1588, the range of the
         managed object is limited to 12 bits; in addition, only the
         single value 0x100 is specified in this standard for the
         gPTP domain of a PTP Instance."
    REFERENCE   "14.2.17"
    ::= { ieee8021AsV3DefaultDSEntry 18 }
```

```
ieee8021AsV3DefaultDSExternalPortConfigurationEnabled OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the externalPortConfigurationEnabled attribute
         of the PTP Instance."
    REFERENCE   "14.2.18"
    ::= { ieee8021AsV3DefaultDSEntry 19 }

ieee8021AsV3DefaultDSInstanceEnable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the instanceEnable attribute of the PTP Instance."
    REFERENCE   "14.2.19"
    ::= { ieee8021AsV3DefaultDSEntry 20 }

-- ================================================================
-- The Current data set represents this system's topological location
-- relative to the known Grandmaster PTP Instance.
-- This data set is consistent with respective IEEE 1588 data set.
-- ================================================================

ieee8021AsV3CurrentDSTable      OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3CurrentDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Current Parameter Data Set represents the position of a local
        system and other information, relative to the
        Grandmaster PTP Instance."
    REFERENCE   "14.3"
    ::= { ieee8021AsV3MIBObjects 3 }

ieee8021AsV3CurrentDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3CurrentDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Current Data Set for a specific PTP Instance."
    INDEX { ieee8021AsV3PtpInstance }
    ::= { ieee8021AsV3CurrentDSTable 1 }

Ieee8021AsV3CurrentDSEntry ::=
  SEQUENCE {
    ieee8021AsV3CurrentDSStepsRemoved                   Unsigned32,
    ieee8021AsV3CurrentDSOffsetFromTimeTransmitter
Ieee8021ASV3PtpTimeInterval,
    ieee8021AsV3CurrentDSLastGmPhaseChange             Ieee8021ASV3ScaledNs,
    ieee8021AsV3CurrentDSLastGmFreqChange               Float64TC,
    ieee8021AsV3CurrentDSGmTimebaseIndicator            Unsigned32,
    ieee8021AsV3CurrentDSGmChangeCount                  Counter32,
    ieee8021AsV3CurrentDSTimeOfLastGmChangeEvent        TimeStamp,
    ieee8021AsV3CurrentDSTimeOfLastGmPhaseChangeEvent   TimeStamp,
```

```
    ieee8021AsV3CurrentDSTimeOfLastGmFreqChangeEvent    TimeStamp
    }

ieee8021AsV3CurrentDSStepsRemoved OBJECT-TYPE
    SYNTAX      Unsigned32(0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the number of gPTP communication paths
         traversed between this PTP Instance and the
         Grandmaster PTP Instance, as specified in 10.3.3."
    REFERENCE   "14.3.2"
    ::= { ieee8021AsV3CurrentDSEntry 1 }


ieee8021AsV3CurrentDSOffsetFromTimeTransmitter OBJECT-TYPE
    SYNTAX      Ieee8021ASV3PtpTimeInterval
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is an implementation-specific representation of
         the current value of the time difference between a timeReceiver
         and the Grandmaster Clock, as computed by the timeReceiver, and
         as specified in 10.2.10."
    REFERENCE   "14.3.3"
    ::= { ieee8021AsV3CurrentDSEntry 2 }

ieee8021AsV3CurrentDSLastGmPhaseChange OBJECT-TYPE
    SYNTAX      Ieee8021ASV3ScaledNs
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the phase change that occurred on the most
         recent change in either Grandmaster PTP Instance or
         gmTimeBaseIndicator."
    REFERENCE   "14.3.4"
    ::= { ieee8021AsV3CurrentDSEntry 3 }

ieee8021AsV3CurrentDSLastGmFreqChange OBJECT-TYPE
    SYNTAX      Float64TC
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the frequency change that occurred on the most
         recent change in either Grandmaster PTP Instance or
         gmTimeBaseIndicator."
    REFERENCE   "14.3.5"
    ::= { ieee8021AsV3CurrentDSEntry 4 }

ieee8021AsV3CurrentDSGmTimebaseIndicator OBJECT-TYPE
    SYNTAX      Unsigned32(0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the value of timeBaseIndicator of the
         current Grandmaster PTP Instance."
```

```
    REFERENCE   "14.3.6"
    ::= { ieee8021AsV3CurrentDSEntry 5 }

ieee8021AsV3CurrentDSGmChangeCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This statistics counter tracks the number of times the
         Grandmaster PTP Instance has changed in a gPTP domain.
         This counter increments when the PortAnnounceInformation
         state machine enters the SUPERIOR_MASTER_PORT state or
         the INFERIOR_MASTER_OR_OTHER_PORT state."
    REFERENCE   "14.3.7"
    ::= { ieee8021AsV3CurrentDSEntry 6 }

ieee8021AsV3CurrentDSTimeOfLastGmChangeEvent OBJECT-TYPE
    SYNTAX      TimeStamp
    UNITS       "0.01 seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This timestamp takes the value of sysUpTime (see RFC3418) when
         the most recent Grandmaster PTP Instance change occurred in
         a gPTP domain.
         This timestamp is updated when the PortAnnounceInformation
         state machine enters the SUPERIOR_MASTER_PORT state or the
         INFERIOR_MASTER_OR_OTHER_PORT state."
    REFERENCE   "14.3.8"
    ::= { ieee8021AsV3CurrentDSEntry 7 }


ieee8021AsV3CurrentDSTimeOfLastGmPhaseChangeEvent OBJECT-TYPE
    SYNTAX      TimeStamp
    UNITS       "0.01 seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This timestamp takes the value of sysUpTime (see RFC3418)
         when the most recent change in Grandmaster Clock phase
         occurred, due to a change of either the
         Grandmaster PTP Instance or the Grandmaster Clock
         time base. This timestamp is updated when one of the
         following occurs:
            a)The PortAnnounceInformation state machine enters the
              SUPERIOR_MASTER_PORT state or the
              INFERIOR_MASTER_OR_OTHER_PORT state, or
            b)The gmTimebaseIndicator managed object changes and the
              lastGmPhaseChange field of the most recently received
              Follow_Up information TLV is nonzero."
    REFERENCE   "14.3.9"
    ::= { ieee8021AsV3CurrentDSEntry 8 }

ieee8021AsV3CurrentDSTimeOfLastGmFreqChangeEvent OBJECT-TYPE
    SYNTAX      TimeStamp
    UNITS       "0.01 seconds"
```

```
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This timestamp takes the value of sysUpTime (see RFC3418)
         when the most recent change in Grandmaster Clock frequency
         occurred, due to a change of either the Grandmaster PTP
         Instance or the Grandmaster Clock time base. This timestamp
         is updated when one of the following occurs:
            a)The PortAnnounceInformation state machine enters the
              SUPERIOR_MASTER_PORT state or the
              INFERIOR_MASTER_OR_OTHER_PORT state, or
            b)The gmTimebaseIndicator managed object changes and the
              lastGmFreqChange field of the most recently received
              Follow_Up information TLV is nonzero."
    REFERENCE   "14.3.10"
    ::= { ieee8021AsV3CurrentDSEntry 9 }

-- ================================================================
-- The Parent data set represents the upstream (toward
-- Grandmaster PTP Instance) system's timing parameters as measured
-- at this system.
-- This data set is consistent with the respective IEEE 1588 data set.
-- ================================================================
ieee8021AsV3ParentDSTable     OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3ParentDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Parent Parameter Data Set represents capabilities of the
         upstream system, toward the Grandmaster PTP Instance, as
         measured at a local system."
    REFERENCE   "14.4"
    ::= { ieee8021AsV3MIBObjects 4 }

ieee8021AsV3ParentDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ParentDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Parent Data Set for a specific PTP Instance."
    INDEX { ieee8021AsV3PtpInstance }
    ::= { ieee8021AsV3ParentDSTable 1 }

Ieee8021AsV3ParentDSEntry ::=
  SEQUENCE {
    ieee8021AsV3ParentDSParentClockIdentity     Ieee8021AsV3ClockIdentity,
    ieee8021AsV3ParentDSParentPortNumber        Unsigned32,
    ieee8021AsV3ParentDSCumulativeRateRatio      Integer32,
    ieee8021AsV3ParentDSGrandmasterIdentity     Ieee8021AsV3ClockIdentity,
    ieee8021AsV3ParentDSGrandmasterClockQualityclockClass
                                                Ieee8021AsV3ClockClassValue,
    ieee8021AsV3ParentDSGrandmasterClockQualityclockAccuracy
                                               Ieee8021AsV3ClockAccuracyValue,
    ieee8021AsV3ParentDSGrandmasterClockQualityoffsetScaledLogVar
                                                Unsigned32,
    ieee8021AsV3ParentDSGrandmasterPriority1    Unsigned32,
```

```
    ieee8021AsV3ParentDSGrandmasterPriority2    Unsigned32
    }

ieee8021AsV3ParentDSParentClockIdentity OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockIdentity
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the first of the parentPortIdentity attribute
         for this instance of gPTP domain, which is a set made of
         Ieee8021AsV3ClockIdentity and portNumber."
    REFERENCE   "14.4.2"
    ::= { ieee8021AsV3ParentDSEntry 1 }

ieee8021AsV3ParentDSParentPortNumber OBJECT-TYPE
    SYNTAX      Unsigned32(0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the second of the parentPortIdentity attribute
         for this instance of gPTP domain, which is a set made of
         Ieee8021AsV3ClockIdentity and portNumber."
    REFERENCE   "14.4.2"
    ::= { ieee8021AsV3ParentDSEntry 2 }

ieee8021AsV3ParentDSCumulativeRateRatio OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is an estimate of the ratio of the frequency of
         the Grandmaster Clock to the frequency of the LocalClock
         entity of this PTP Instance.
         CumulativeRateRatio is expressed as the fractional
         frequency offset multiplied by 2^41, i.e., the quantity
         (rateRatio - 1.0)(2^41), where rateRatio is computed by
         the PortSyncSyncReceive state machine."
    REFERENCE   "14.4.3"
   ::= { ieee8021AsV3ParentDSEntry 3 }

ieee8021AsV3ParentDSGrandmasterIdentity OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockIdentity
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the clockIdentity attribute of the
         Grandmaster PTP Instance."
    REFERENCE   "14.4.4"
    ::= { ieee8021AsV3ParentDSEntry 4 }

ieee8021AsV3ParentDSGrandmasterClockQualityclockClass OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockClassValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the clockClass of the Grandmaster PTP Instance."
```

```
    REFERENCE   "14.4.5.2"
    ::= { ieee8021AsV3ParentDSEntry 5 }

ieee8021AsV3ParentDSGrandmasterClockQualityclockAccuracy OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockAccuracyValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the clockAccuracy of the Grandmaster PTP Instance."
    REFERENCE   "14.4.5.3"
    ::= { ieee8021AsV3ParentDSEntry 6 }

ieee8021AsV3ParentDSGrandmasterClockQualityoffsetScaledLogVar
                OBJECT-TYPE
    SYNTAX      Unsigned32(0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the offsetScaledLogVariance of the
         Grandmaster PTP Instance."
    REFERENCE   "14.4.5.4"
    ::= { ieee8021AsV3ParentDSEntry 7 }

ieee8021AsV3ParentDSGrandmasterPriority1 OBJECT-TYPE
    SYNTAX      Unsigned32(0..255)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the priority1 attribute of the
         Grandmaster PTP Instance."
    REFERENCE   "14.4.6"
    ::= { ieee8021AsV3ParentDSEntry 8 }

ieee8021AsV3ParentDSGrandmasterPriority2 OBJECT-TYPE
    SYNTAX      Unsigned32(0..255)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the priority2 attribute of the
         Grandmaster PTP Instance."
    REFERENCE   "14.4.7"
    ::= { ieee8021AsV3ParentDSEntry 9 }

-- ================================================================
-- TimePropertiesDS represents the Grandmaster PTP Instance's
-- parameters, as measured at this system and are derived from
-- IEEE 802.1AS protocol.
-- This data set is consistent with respective IEEE 1588 data set.
-- ================================================================
ieee8021AsV3TimePropertiesDSTable    OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3TimePropertiesDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Time Properties Parameter Data Set represents capabilities of
         the Grandmaster PTP Instance, as measured at a local system"
```

```
    REFERENCE   "14.5"
      ::= { ieee8021AsV3MIBObjects 5 }

ieee8021AsV3TimePropertiesDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3TimePropertiesDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Time Properties Data Set contains the profile Identifier for
         this instance of gPTP domain."
    INDEX { ieee8021AsV3PtpInstance }
    ::= { ieee8021AsV3TimePropertiesDSTable 1 }

Ieee8021AsV3TimePropertiesDSEntry ::=
  SEQUENCE {
    ieee8021AsV3TimePropertiesDSCurrentUtcOffset      Integer32,
    ieee8021AsV3TimePropertiesDSCurrentUtcOffsetValid TruthValue,
    ieee8021AsV3TimePropertiesDSLeap59                TruthValue,
    ieee8021AsV3TimePropertiesDSLeap61                TruthValue,
    ieee8021AsV3TimePropertiesDSTimeTraceable         TruthValue,
    ieee8021AsV3TimePropertiesDSFrequencyTraceable    TruthValue,
    ieee8021AsV3TimePropertiesDSPtpTimescale          TruthValue,
    ieee8021AsV3TimePropertiesDSTimeSource
Ieee8021AsV3TimeSourceValue
    }

ieee8021AsV3TimePropertiesDSCurrentUtcOffset OBJECT-TYPE
    SYNTAX      Integer32(-32768..32767)
    UNITS       "seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is currentUtcOffset for the current
         Grandmaster PTP Instance. It is equal to the value  of
         the global variable currentUtcOffset. The value is in
         units of seconds."
    REFERENCE   "14.5.2"
    ::= { ieee8021AsV3TimePropertiesDSEntry 1 }

ieee8021AsV3TimePropertiesDSCurrentUtcOffsetValid OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is currentUtcOffsetValid for the current
         Grandmaster PTP Instance. It is equal to the global
         variable currentUtcOffsetValid."
    REFERENCE   "14.5.3"
    ::= { ieee8021AsV3TimePropertiesDSEntry 2 }

ieee8021AsV3TimePropertiesDSLeap59 OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is leap59 for the current Grandmaster PTP Instance.
```

```
         It is equal to the global variable leap59."
    REFERENCE   "14.5.4"
    ::= { ieee8021AsV3TimePropertiesDSEntry 3 }

ieee8021AsV3TimePropertiesDSLeap61 OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is leap61 for the current Grandmaster PTP Instance.
         It is equal to the global variable leap61."
    REFERENCE   "14.5.5"
    ::= { ieee8021AsV3TimePropertiesDSEntry 4 }

ieee8021AsV3TimePropertiesDSTimeTraceable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is timeTraceable for the current
         Grandmaster PTP Instance. It is equal to the global
         variable timeTraceable."
    REFERENCE   "14.5.6"
    ::= { ieee8021AsV3TimePropertiesDSEntry 5 }

ieee8021AsV3TimePropertiesDSFrequencyTraceable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is frequencyTraceable for the current
         Grandmaster PTP Instance. It is equal to the global
         variable frequencyTraceable."
    REFERENCE   "14.5.7"
    ::= { ieee8021AsV3TimePropertiesDSEntry 6 }

ieee8021AsV3TimePropertiesDSPtpTimescale OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is ptpTimescale for the current
         Grandmaster PTP Instance."
    REFERENCE   "14.5.8"
    ::= { ieee8021AsV3TimePropertiesDSEntry 7 }

ieee8021AsV3TimePropertiesDSTimeSource OBJECT-TYPE
    SYNTAX      Ieee8021AsV3TimeSourceValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is timeSource for the current
         Grandmaster PTP Instance. It is equal to the global
         variable timeSource"
    REFERENCE   "14.5.9"
    ::= { ieee8021AsV3TimePropertiesDSEntry 8 }
```

```
1
2 -- ============================================================
3 -- The Path Trace Parameter Data set represents the current path
4 -- trace information available at the PTP Instance.
5 -- ============================================================
6
7 ieee8021AsV3PathTraceDSTable    OBJECT-TYPE
8     SYNTAX      SEQUENCE OF Ieee8021AsV3PathTraceDSEntry
9     MAX-ACCESS  not-accessible
10    STATUS      current
11    DESCRIPTION
12        "The pathTraceDS represents the current path trace information
13         available at the PTP Instance."
14    REFERENCE   "14.6"
15    ::= { ieee8021AsV3MIBObjects 6 }
16
17 ieee8021AsV3PathTraceDSEntry   OBJECT-TYPE
18    SYNTAX      Ieee8021AsV3PathTraceDSEntry
19    MAX-ACCESS  not-accessible
20    STATUS      current
21    DESCRIPTION
22        "Path Trace Data Set for a specific PTP Instance."
23    INDEX { ieee8021AsV3PtpInstance }
24    ::= { ieee8021AsV3PathTraceDSTable 1 }
25
26 Ieee8021AsV3PathTraceDSEntry ::=
27 SEQUENCE {
28    ieee8021AsV3PathTraceDSEnable                    TruthValue
29    }
30
31 ieee8021AsV3PathTraceDSEnable OBJECT-TYPE
32    SYNTAX      TruthValue
33    MAX-ACCESS  read-only
34    STATUS      current
35    DESCRIPTION
36        "The value is TRUE.
37         NOTE: This member is included for compatibility with
38         IEEE Std 1588. In IEEE Std 1588, the path trace mechanism
39         is optional, and the pathTraceDS.enable member is
40         configurable (its value in IEEE Std 1588 is TRUE (1) or
41         FALSE (2), depending on whether the path trace mechanism is
42         operational or not operational, respectively. However, the
43         pathTrace mechanism is mandatory in this standard, and the
44         value of enable is always TRUE (1)."
45    REFERENCE   "14.6.3"
46    ::= { ieee8021AsV3PathTraceDSEntry 2 }
47
48 ieee8021AsV3PathTraceDSArrayTable    OBJECT-TYPE
49    SYNTAX      SEQUENCE OF Ieee8021AsV3PathTraceDSArrayEntry
50    MAX-ACCESS  not-accessible
51    STATUS      current
52    DESCRIPTION
53        "This object contains an array of ClockIdentity values contained
54         in the pathTrace array, which represents the current path trace
55         information, and which is carried in the path trace TLV per
56         PTP Instance."
```

```
    REFERENCE   "14.6.2"
    ::= { ieee8021AsV3MIBObjects 7 }

ieee8021AsV3PathTraceDSArrayEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3PathTraceDSArrayEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Path Trace Data Set Table Array for a specific PTP Instance."
    INDEX { ieee8021AsV3PtpInstance, ieee8021AsV3PathTraceDSArrayIndex }
    ::= { ieee8021AsV3PathTraceDSArrayTable 1 }

Ieee8021AsV3PathTraceDSArrayEntry ::=
  SEQUENCE {
    ieee8021AsV3PathTraceDSArrayIndex  Unsigned32,
    ieee8021AsV3PathTraceDSArrayList      Ieee8021AsV3ClockIdentity
    }

ieee8021AsV3PathTraceDSArrayIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..179)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Index of the Path Trace Data Set Array."
    REFERENCE   "10.3.9.23"
    ::= { ieee8021AsV3PathTraceDSArrayEntry 1 }

ieee8021AsV3PathTraceDSArrayList OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockIdentity
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the array of ClockIdentity values contained
         in the pathTrace array, which represents the current
         path trace information, and which is carried in the path
         trace TLV."
    REFERENCE   "14.6.2"
    ::= { ieee8021AsV3PathTraceDSArrayEntry 2 }


-- ****************************************************************
-- The Acceptable TimeTransmitter Table Parameter Data Set represents the
-- acceptable timeTransmitter table used when an EPON port is used by a PTP
-- Instance of a time-aware system.
-- ****************************************************************

ieee8021AsV3AcceptableTimeTransmitterTableDSTable    OBJECT-TYPE
    SYNTAX     SEQUENCE OF Ieee8021AsV3AcceptableTimeTransmitterTableDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The acceptableTimeTransmitterTableDS represents the acceptable
timeTransmitter
         table used when an EPON port is used by a PTP Instance of a
         time-aware system."
    REFERENCE   "14.7"
```

```
::= { ieee8021AsV3MIBObjects 8 }

ieee8021AsV3AcceptableTimeTransmitterTableDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3AcceptableTimeTransmitterTableDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Acceptable TimeTransmitter Table Data Set represents the acceptable
timeTransmitter
         table used when an EPON port is used by a PTP Instance of a
         time-aware system."
    INDEX { ieee8021AsV3PtpInstance }
    ::= { ieee8021AsV3AcceptableTimeTransmitterTableDSTable 1 }

Ieee8021AsV3AcceptableTimeTransmitterTableDSEntry ::=
  SEQUENCE {
              ieee8021AsV3AcceptableTimeTransmitterTableDSMaxTableSize
Unsigned32,
             ieee8021AsV3AcceptableTimeTransmitterTableDSActualTableSize
Unsigned32
    }

ieee8021AsV3AcceptableTimeTransmitterTableDSMaxTableSize  OBJECT-TYPE
    SYNTAX      Unsigned32(0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the maximum size of the AcceptableTimeTransmitterTable.
         It is equal to the maxTableSize member of the
         AcceptableTimeTransmitterTable structure."
    REFERENCE   "14.7.2"
    ::= { ieee8021AsV3AcceptableTimeTransmitterTableDSEntry 1 }

ieee8021AsV3AcceptableTimeTransmitterTableDSActualTableSize  OBJECT-TYPE
    SYNTAX      Unsigned32(0..65535)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the actual size of the AcceptableTimeTransmitterTable.
         It is equal to the actualTableSize member of the
         AcceptableTimeTransmitterTable structure, i.e., the current number
         of elements in the acceptable timeTransmitter array. The actual
         table size is less than or equal to the max table size."
    REFERENCE   "14.7.3"
    ::= { ieee8021AsV3AcceptableTimeTransmitterTableDSEntry 2 }

ieee8021AsV3AcceptableTimeTransmitterTableDSArrayTable    OBJECT-TYPE
    SYNTAX      SEQUENCE OF
Ieee8021AsV3AcceptableTimeTransmitterTableDSArrayEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The acceptableTimeTransmitterTableDS represents the acceptable
timeTransmitter table
         used when an EPON port is used by a PTP Instance of a time-aware
         system."
```

```
    REFERENCE   "14.7"
::= { ieee8021AsV3MIBObjects 9 }

ieee8021AsV3AcceptableTimeTransmitterTableDSArrayEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3AcceptableTimeTransmitterTableDSArrayEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "Each element of this array is an AcceptableTimeTransmitter structure
per
         PTP Instance."
    INDEX { ieee8021AsV3PtpInstance,
ieee8021AsV3AcceptableTimeTransmitterTableDSArrayIndex }
    ::= { ieee8021AsV3AcceptableTimeTransmitterTableDSArrayTable 1 }

Ieee8021AsV3AcceptableTimeTransmitterTableDSArrayEntry ::=
  SEQUENCE {
    ieee8021AsV3AcceptableTimeTransmitterTableDSArrayIndex
Unsigned32,
    ieee8021AsV3AcceptableTimeTransmitterTableDSArrayPortIdentity
Ieee8021ASV3PtpPortIdentity,
    ieee8021AsV3AcceptableTTTableDSArrayAlternatePriority1       Unsigned32
    }

ieee8021AsV3AcceptableTimeTransmitterTableDSArrayIndex  OBJECT-TYPE
    SYNTAX      Unsigned32(0..65535)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Index of the Acceptable TimeTransmitter Table Data Set Array."
    REFERENCE   "14.7.4"
    ::= { ieee8021AsV3AcceptableTimeTransmitterTableDSArrayEntry 1 }

ieee8021AsV3AcceptableTimeTransmitterTableDSArrayPortIdentity  OBJECT-TYPE
    SYNTAX      Ieee8021ASV3PtpPortIdentity
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The acceptablePortIdentity member is the PortIdentity of
         an acceptable timeTransmitter port."
    REFERENCE   "14.7.4"
    ::= { ieee8021AsV3AcceptableTimeTransmitterTableDSArrayEntry 2 }

ieee8021AsV3AcceptableTTTableDSArrayAlternatePriority1  OBJECT-TYPE
    SYNTAX      Unsigned32(0..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The alternatePriority1 member contains an alternate value
        for the priority1 attribute of the acceptable timeTransmitter port."
    REFERENCE   "14.7.4"
    ::= { ieee8021AsV3AcceptableTimeTransmitterTableDSArrayEntry 3 }

-- ============================================================
-- The Port Parameter Data Set (portDS) represents PTP Port
-- time-aware capabilities for a PTP Instance of a time-aware
```

```
-- system.
-- ============================================================
ieee8021AsV3PortDSTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3PortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "For the single PTP Port of a PTP End Instance and for each
         PTP Port of a PTP Relay Instance , the portDS is maintained
         as the basis for making protocol decisions and providing
         values for message fields.
         The number of such data sets is the same as the value of
         defaultDS.numberPorts."
    REFERENCE   "14.8"
    ::= { ieee8021AsV3MIBObjects 10 }

ieee8021AsV3PortDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3PortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A list of objects pertaining to a PTP Port of a PTP Instance."
    INDEX { ieee8021AsV3PtpInstance,
            ieee8021AsV3PortDSIndex }
    ::= { ieee8021AsV3PortDSTable 1 }

Ieee8021AsV3PortDSEntry ::=
     SEQUENCE {
         ieee8021AsV3BridgeBasePort          IEEE8021BridgePortNumber,
         ieee8021AsV3PortDSIndex         InterfaceIndexOrZero,
         ieee8021AsV3PortDSClockIdentity
Ieee8021AsV3ClockIdentity,
         ieee8021AsV3PortDSPortNumber                  Unsigned32,
         ieee8021AsV3PortDSPortState                    INTEGER,
         ieee8021AsV3PortDSPtpPortEnabled              TruthValue,
         ieee8021AsV3PortDSDelayMechanism              INTEGER,
         ieee8021AsV3PortDSIsMeasuringDelay             TruthValue,
         ieee8021AsV3PortDSAsCapable                    TruthValue,
         ieee8021AsV3PortDSMeanLinkDelay
Ieee8021ASV3PtpTimeInterval,
         ieee8021AsV3PortDSMeanLinkDelayThresh
Ieee8021ASV3PtpTimeInterval,
         ieee8021AsV3PortDSDelayAsym
Ieee8021ASV3PtpTimeInterval,
         ieee8021AsV3PortDSNbrRateRatio            Integer32,
         ieee8021AsV3PortDSInitialLogAnnounceInterval   Integer32,
         ieee8021AsV3PortDSCurrentLogAnnounceInterval   Integer32,
         ieee8021AsV3PortDSUseMgtSettableLogAnnounceInterval    TruthValue,
         ieee8021AsV3PortDSMgtSettableLogAnnounceInterval       Integer32,
         ieee8021AsV3PortDSAnnounceReceiptTimeout       Unsigned32,
         ieee8021AsV3PortDSInitialLogSyncInterval       Integer32,
         ieee8021AsV3PortDSCurrentLogSyncInterval       Integer32,
         ieee8021AsV3PortDSUseMgtSettableLogSyncInterval        TruthValue,
         ieee8021AsV3PortDSMgtSettableLogSyncInterval           Integer32,
         ieee8021AsV3PortDSSyncReceiptTimeout           Unsigned32,
```

```
        ieee8021AsV3PortDSSyncReceiptTimeoutTimeInterval
Ieee8021ASV3UScaledNs,
        ieee8021AsV3PortDSInitialLogPdelayReqInterval Integer32,
        ieee8021AsV3PortDSCurrentLogPdelayReqInterval Integer32,
        ieee8021AsV3PortDSUseMgtSettableLogPdelayReqInterval    TruthValue,
        ieee8021AsV3PortDSMgtSettableLogPdelayReqInterval       Integer32,
        ieee8021AsV3PortDSInitialLogGptpCapableMessageInterval
Integer32,
        ieee8021AsV3PortDSCurrentLogGptpCapableMessageInterval
Integer32,
        ieee8021AsV3PortDSUseMgtSettableLogGptpCapableMessageInterval
TruthValue,
        ieee8021AsV3PortDSMgtSettableLogGptpCapableMessageInterval
Integer32,
        ieee8021AsV3PortDSInitialComputeNbrRateRatio     TruthValue,
        ieee8021AsV3PortDSCurrentComputeNbrRateRatio     TruthValue,
        ieee8021AsV3PortDSUseMgtSettableComputeNbrRateRatio     TruthValue,
        ieee8021AsV3PortDSMgtSettableComputeNbrRateRatio     TruthValue,
        ieee8021AsV3PortDSInitialComputeMeanLinkDelay     TruthValue,
        ieee8021AsV3PortDSCurrentComputeMeanLinkDelay     TruthValue,
        ieee8021AsV3PortDSUseMgtSettableComputeMeanLinkDelay     TruthValue,
        ieee8021AsV3PortDSMgtSettableComputeMeanLinkDelay     TruthValue,
        ieee8021AsV3PortDSAllowedLostRsp        Unsigned32,
        ieee8021AsV3PortDSAllowedFaults              Unsigned32,
        ieee8021AsV3PortDSGPtpCapableReceiptTimeout     Unsigned32,
        ieee8021AsV3PortDSVersionNumber              Unsigned32,
        ieee8021AsV3PortDSNup                       Float64TC,
        ieee8021AsV3PortDSNdown                     Float64TC,
        ieee8021AsV3PortDSOneStepTxOper              TruthValue,
        ieee8021AsV3PortDSOneStepReceive             TruthValue,
        ieee8021AsV3PortDSOneStepTransmit            TruthValue,
        ieee8021AsV3PortDSInitialOneStepTxOper       TruthValue,
        ieee8021AsV3PortDSCurrentOneStepTxOper       TruthValue,
        ieee8021AsV3PortDSUseMgtSettableOneStepTxOper         TruthValue,
        ieee8021AsV3PortDSMgtSettableOneStepTxOper            TruthValue,
        ieee8021AsV3PortDSSyncLocked                 TruthValue,
        ieee8021AsV3PortDSPdelayTruncTST1           Ieee8021ASV3Timestamp,
        ieee8021AsV3PortDSPdelayTruncTST2           Ieee8021ASV3Timestamp,
        ieee8021AsV3PortDSPdelayTruncTST3           Ieee8021ASV3Timestamp,
        ieee8021AsV3PortDSPdelayTruncTST4           Ieee8021ASV3Timestamp,
        ieee8021AsV3PortDSMinorVersionNumber         Unsigned32
    }

ieee8021AsV3BridgeBasePort OBJECT-TYPE
    SYNTAX      IEEE8021BridgePortNumber
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object identifies the bridge port number of the port for
         which this entry contains bridge management information.
         For end stations, this port number shall be (1)."
    ::= { ieee8021AsV3PortDSEntry 1 }

ieee8021AsV3PortDSIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
    DESCRIPTION
        "This object identifies the gPTP interface group within
         the system for which this entry contains information. It
         is the value of the instance of the IfIndex object,
         defined in the IF-MIB, for the gPTP interface group
         corresponding to this port, or the value 0 if the port
         has not been bound to an underlying frame source and
         sink.

         For a given media port of a Bridge or an end station,
         there can be one or more PTP Port, and depends whether
         a media port supports point to point link (e.g. IEEE
         802.3 Ethernet) or point to multi-point (e.g. CSN, IEEE
         802.3 EPON) links on the media port."
    ::= { ieee8021AsV3PortDSEntry 2 }

ieee8021AsV3PortDSClockIdentity OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockIdentity
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the first of the portIdentity attribute
         of the local port, which is a set made of
         Ieee8021AsV3ClockIdentity and portNumber."
    REFERENCE   "14.8.2"
    ::= { ieee8021AsV3PortDSEntry 3 }


ieee8021AsV3PortDSPortNumber OBJECT-TYPE
    SYNTAX      Unsigned32(0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the second of the portIdentity attribute
         of the local port, which is a set made of
         Ieee8021AsV3ClockIdentity and portNumber."
    REFERENCE   "14.8.2"
    ::= { ieee8021AsV3PortDSEntry 4 }

ieee8021AsV3PortDSPortState OBJECT-TYPE
    SYNTAX      INTEGER {
            disabledPort(3),
            timeTransmitterPort(6),
            passivePort(7),
            timeReceiverPort(9)
           }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the value of the PTP Port state of this
         PTP Port (see Table 10-2) and is taken from the enumeration
         in Table 14-7. It is equal to the value of the global
         variable selectedState."
    REFERENCE   "14.8.3"
    ::= { ieee8021AsV3PortDSEntry 5 }
```

```
ieee8021AsV3PortDSPtpPortEnabled OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the Boolean ptpPortEnabled.
         Setting this managed object causes the Boolean ptpPortEnabled
         to have the same value."
    REFERENCE   "14.8.4"
    ::= { ieee8021AsV3PortDSEntry 6 }

ieee8021AsV3PortDSDelayMechanism OBJECT-TYPE
    SYNTAX      INTEGER {
            p2p(2),
            commonp2p(3),
            special(4)
           }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value indicates the mechanism for measuring mean
         propagation delay and neighbor rate ratio on the link
         attached to this PTP Port, and is taken from the enumeration
         in Table 14-8. If the domain number is not 0, portDS.delay
         mechanism must not be P2P."
    REFERENCE   "14.8.5"
    ::= { ieee8021AsV3PortDSEntry 7 }

ieee8021AsV3PortDSIsMeasuringDelay OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the Boolean isMeasuringDelay."
    REFERENCE   "14.8.6"
    ::= { ieee8021AsV3PortDSEntry 8 }


ieee8021AsV3PortDSAsCapable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the Boolean asCapable."
    REFERENCE   "14.8.7"
    ::= { ieee8021AsV3PortDSEntry 9 }

ieee8021AsV3PortDSMeanLinkDelay OBJECT-TYPE
    SYNTAX      Ieee8021ASV3PtpTimeInterval
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-PTP Port global
         variable meanLinkDelay. It is an estimate of the current
         one-way propagation time on the link attached to this
```

```
         PTP Port, measured as specified for the respective medium.
         The value is zero for PTP Port attached to IEEE 802.3
         EPON links and for the timeTransmitter port of an IEEE 802.11 link,
         because one-way propagation delay is not measured on the
         latter and not directly measured on the former.
         NOTE: The underlying per-PTP Port, global variable
         meanLinkDelay is of type UScaledNS, which is a 96-Bit value.
         meanLinkDelay values that are larger than the maximum value
         that can be represented by the TimeInterval data type, i.e.,
         0xFFFF FFFF FFFF FFFF (where the units are 2 sup -16 ns), used
         for this managed object are set to this largest value."
    REFERENCE   "14.8.8"
    ::= { ieee8021AsV3PortDSEntry 10 }


ieee8021AsV3PortDSMeanLinkDelayThresh OBJECT-TYPE
    SYNTAX      Ieee8021ASV3PtpTimeInterval
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-PTP Port global
         variable meanLinkDelayThresh. It is the propagation time
         threshold above which a PTP Port is considered not capable of
         participating in the IEEE 802.1AS protocol.
         Setting this managed object causes the per PTP Port global
         variable meanLinkDelayThresh to have the same value.
         NOTE: The underlying per-PTP Port, global variable
         meanLinkDelayThresh is of type UScaledNS, which is a 96-Bit
         value. meanLinkDelayThresh values that are larger than the
         maximum value that can be represented by the TimeInterval
         data type, i.e., 0xFFFF FFFF FFFF FFFF (where the units are
         2 sup -16 ns), used for this managed object are set to this
         largest value."
    REFERENCE   "14.8.9"
    ::= { ieee8021AsV3PortDSEntry 11 }

ieee8021AsV3PortDSDelayAsym OBJECT-TYPE
    SYNTAX      Ieee8021ASV3PtpTimeInterval
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the asymmetry in the propagation delay on
         the link attached to this PTP Port relative to the
         Grandmaster Clock time base, as defined in 10.2.5.9 and
         8.3. If propagation delay asymmetry is not modeled, then
         delayAsymmetry is 0.
         NOTE: The underlying per-port global variable delayAsymmetry
         is of type ScaledNS, which is a 96-Bit value.
         delayAsymmetry values that are larger than the maximum value
         that can be represented by the TimeInterval data type, i.e.,
         0x7FFF FFFF FFFF FFFF, (where the units are 2 sup -16 ns),
         used for this managed object are set to this largest value.
         delayAsymmetry values that are less than the minimum value
         that can be represented by the TimeInterval data type, i.e.,
         0x8000 0000 0000 0001 written in twos complement form (where
        the units are 2 sup -16 ns), used for this managed object are
```

```
        set to this smallest value."
    REFERENCE   "14.8.10 and 8.3"
    ::= { ieee8021AsV3PortDSEntry 12 }

ieee8021AsV3PortDSNbrRateRatio OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is an estimate of the ratio of the frequency of
         the LocalClock entity of the PTP Instance at the other end
         of the link attached to this PTP Port, to the frequency of
         the LocalClock entity of this PTP Instance. neighborRateRatio
         is expressed as the fractional frequency offset multiplied
         by 2^41, i.e., the quantity (neighborRateRatio -1.0)(2^41)."
    REFERENCE   "14.8.11"
    ::= { ieee8021AsV3PortDSEntry 13 }


ieee8021AsV3PortDSInitialLogAnnounceInterval OBJECT-TYPE
    SYNTAX      Integer32(-128..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "If useMgtSettableLogAnnounceInterval is FALSE (2), the
         value is the logarithm to base 2 of the announce interval
         used when (a) the PTP Port is initialized, or (b) a message
         interval request TLV is received with the logAnnounceInterval
         field set to 126."
    REFERENCE   "14.8.12"
    DEFVAL { 0 }
    ::= { ieee8021AsV3PortDSEntry 14 }

ieee8021AsV3PortDSCurrentLogAnnounceInterval OBJECT-TYPE
    SYNTAX      Integer32(-128..127)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the logarithm to the base 2 of the
         current announce interval."
    REFERENCE   "14.8.13"
    ::= { ieee8021AsV3PortDSEntry 15 }

ieee8021AsV3PortDSUseMgtSettableLogAnnounceInterval OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The managed object is a Boolean that determines the
         source of the announce interval. If the value is TRUE (1),
         the value of currentLogAnnounceInterval is set equal to the
         value of mgtSettableLogAnnounceInterval. If the value is
         FALSE (2), the value of currentLogAnnounceInterval is
         determined by the AnnounceIntervalSetting state machine. The
         default value of useMgtSettableLogAnnounceInterval is
         FALSE (2) for domain 0 and TRUE (1) for domains other than
```

```
         domain 0."
    REFERENCE   "14.8.14"
    ::= { ieee8021AsV3PortDSEntry 16 }

ieee8021AsV3PortDSMgtSettableLogAnnounceInterval OBJECT-TYPE
    SYNTAX      Integer32(-128..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the logarithm to base 2 of the announce interval
         used if useMgtSettableLogAnnounceInterval is TRUE (1).
         The value is not used if useMgtSettableLogAnnounceInterval is
         FALSE (2)."
    REFERENCE   "14.8.15"
    ::= { ieee8021AsV3PortDSEntry 17 }

ieee8021AsV3PortDSAnnounceReceiptTimeout OBJECT-TYPE
    SYNTAX      Unsigned32(0..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the number of Announce message transmission
         intervals that a timeReceiver port waits without receiving an
         Announce message, before assuming that the timeTransmitter is no
         longer transmitting Announce messages and the BTCA needs
         to be run, if appropriate."
    REFERENCE   "14.8.16"
    DEFVAL { 3 }
    ::= { ieee8021AsV3PortDSEntry 18 }


ieee8021AsV3PortDSInitialLogSyncInterval OBJECT-TYPE
    SYNTAX      Integer32(-128..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "If useMgtSettableLogSyncInterval is FALSE (2), the
         value is the logarithm to base 2 of the sync interval used
         when (a) the PTP Port is initialized, or (b) a message
         interval request TLV is received with the logTimeSyncInterval
         field set to 126."
    REFERENCE   "14.8.17"
    ::= { ieee8021AsV3PortDSEntry 19 }

ieee8021AsV3PortDSCurrentLogSyncInterval OBJECT-TYPE
    SYNTAX      Integer32(-128..127)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the logarithm to the base 2 of the current
         time-synchronization transmission interval."
    REFERENCE   "14.8.18"
    ::= { ieee8021AsV3PortDSEntry 20 }

ieee8021AsV3PortDSUseMgtSettableLogSyncInterval OBJECT-TYPE
    SYNTAX      TruthValue
```

```
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The managed object is a Boolean that determines the source
         of the sync interval. If the value is TRUE (1), the value
         of currentLogSyncInterval is set equal to the value of
         mgtSettableLogSyncInterval. If the value of the managed
         object is FALSE (2), the value of currentLogSyncInterval is
         determined by the SyncIntervalSetting state machine. The
         default value of useMgtSettableLogSyncInterval is FALSE (2)
         for domain 0 and TRUE (1) for domains other than domain 0."
    REFERENCE   "14.8.19"
    ::= { ieee8021AsV3PortDSEntry 21 }

ieee8021AsV3PortDSMgtSettableLogSyncInterval OBJECT-TYPE
    SYNTAX      Integer32(-128..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the logarithm to base 2 of the sync interval
         if useMgtSettableLogSyncInterval is TRUE (1). The value is
         not used if useMgtSettableLogSyncInterval is FALSE (2)."
    REFERENCE   "14.8.20"
    ::= { ieee8021AsV3PortDSEntry 22 }

ieee8021AsV3PortDSSyncReceiptTimeout OBJECT-TYPE
    SYNTAX      Unsigned32(0..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the number of time-synchronization transmission
         intervals that a timeReceiver port waits without receiving
         synchronization information, before assuming that the
timeTransmitter
         is no longer transmitting synchronization information and
         that the BTCA needs to be run, if appropriate."
    REFERENCE   "14.8.21"
    DEFVAL { 3 }
    ::= { ieee8021AsV3PortDSEntry 23 }


ieee8021AsV3PortDSSyncReceiptTimeoutTimeInterval OBJECT-TYPE
    SYNTAX      Ieee8021ASV3UScaledNs
    UNITS       "2**-16 ns"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-PTP Port global
         variable syncReceiptTimeoutTimeInterval. It is the time
         interval after which sync receipt timeout occurs if
         time-synchronization information has not been received during
         the interval."
    REFERENCE   "14.8.22"
    ::= { ieee8021AsV3PortDSEntry 24 }

ieee8021AsV3PortDSInitialLogPdelayReqInterval OBJECT-TYPE
```

```
    SYNTAX      Integer32(-128..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that
         use the peer-to-peer delay mechanism to measure path delay,
         the value is the logarithm to base 2 of the Pdelay_Req
         message transmission interval used when (a) the PTP Port is
         initialized, or (b) a message interval request TLV is
         received with the logLinkDelayInterval field set to 126.
         For all other media, the value is 127."
    REFERENCE   "14.8.23"
    ::= { ieee8021AsV3PortDSEntry 25 }

ieee8021AsV3PortDSCurrentLogPdelayReqInterval OBJECT-TYPE
    SYNTAX      Integer32(-128..127)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that
         use the peer-to-peer delay mechanism to measure path delay,
         the value is the logarithm to the base 2 of the current
         Pdelay_Req message transmission interval.
         For all other media, the value is 127."
    REFERENCE   "14.8.24"
    ::= { ieee8021AsV3PortDSEntry 26 }

ieee8021AsV3PortDSUseMgtSettableLogPdelayReqInterval OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The managed object is a Boolean that determines the source
         of the mean time interval between successive Pdelay_Req
         messages. If the value is TRUE (1), the value of
         currentLogPdelayReqInterval is set equal to the value of
         mgtSettableLogPdelayReqInterval. If the value of the managed
         object is FALSE (2), the value of currentLogPdelayReqInterval
         is determined by the LinkDelayIntervalSetting state machine.
         The default value of useMgtSettableLogPdelayReqInterval is
         FALSE (2)."
    REFERENCE   "14.8.25"
    DEFVAL { false }
    ::= { ieee8021AsV3PortDSEntry 27 }

ieee8021AsV3PortDSMgtSettableLogPdelayReqInterval OBJECT-TYPE
    SYNTAX      Integer32 (-128..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the logarithm to base 2 of the mean time
         interval between successive Pdelay_Req messages if
         useMgtSettableLogPdelayReqInterval is TRUE (1). The
         value is not used if useMgtSettableLogPdelayReqInterval
         is FALSE (2)."
    REFERENCE   "14.8.26"
```

```
    ::= { ieee8021AsV3PortDSEntry 28 }

ieee8021AsV3PortDSInitialLogGptpCapableMessageInterval OBJECT-TYPE
    SYNTAX      Integer32 (-128..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the logarithm to base 2 of the gPTP capable
         message interval used when (a) the PTP Port is initialized,
         or (b) a gPtpCapableMessage interval request TLV is received
         with the logGptpCapableMessageInterval field set to 126."
    REFERENCE   "14.8.27"
    ::= { ieee8021AsV3PortDSEntry 29 }

ieee8021AsV3PortDSCurrentLogGptpCapableMessageInterval OBJECT-TYPE
    SYNTAX      Integer32 (-128..127)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the logarithm to the base 2 of the current
         gPTP capable message interval."
    REFERENCE   "14.8.28"
    ::= { ieee8021AsV3PortDSEntry 30 }

ieee8021AsV3PortDSUseMgtSettableLogGptpCapableMessageInterval OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The managed object is a Boolean that determines the source
         of the gPTP capable message interval. If the value is
         TRUE (1), the value of currentLogGptpCapableMessageInterval
         is set equal to the value of
         mgtSettableLogGptpCapableMessageInterval. If the value of
         the managed object is FALSE (2), the value of
         currentLogGptpCapableMessageInterval is determined by the
         GptpCapableMessageIntervalSetting state machine.
         The default value of
         useMgtSettableLogGptpCapableMessageInterval is FALSE (2)."
    REFERENCE   "14.8.29"
    DEFVAL { false }
    ::= { ieee8021AsV3PortDSEntry 31 }

ieee8021AsV3PortDSMgtSettableLogGptpCapableMessageInterval OBJECT-TYPE
    SYNTAX      Integer32 (-128..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the logarithm to base 2 of the
         gPtpCapableMessageInterval if
         useMgtSettableLogGptpCapableMessageInterval is TRUE (1).
         The value is not used if
         useMgtSettableLogGptpCapableMessageInterval is FALSE (2)."
    REFERENCE   "14.8.30"
    ::= { ieee8021AsV3PortDSEntry 32 }

```

```
ieee8021AsV3PortDSInitialComputeNbrRateRatio OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "If useMgtSettableComputeNeighborRateRatio is FALSE (2),
         then for full-duplex IEEE 802.3 media and for CSN media that
         use the peer-to-peer delay mechanism to measure path delay,
         the value is the initial value of computeNeighborRateRatio."
    REFERENCE   "14.8.31"
    ::= { ieee8021AsV3PortDSEntry 33 }

ieee8021AsV3PortDSCurrentComputeNbrRateRatio OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that
         use the peer-to-peer delay mechanism to measure path delay,
         the value is the current value of computeNeighborRateRatio."
    REFERENCE   "14.8.32"
    ::= { ieee8021AsV3PortDSEntry 34 }

ieee8021AsV3PortDSUseMgtSettableComputeNbrRateRatio OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The managed object is a Boolean that determines the source
         of the value of computeNeighborRateRatio. If the value is
         TRUE (1), the value of computeNeighborRateRatio is set equal
         to the value of mgtSettableComputeNeighborRateRatio. If the
         value of the managed object is FALSE (2), the value of
         currentComputeNeighborRateRatio is determined by the
         LinkDelayIntervalSetting state machine.
         The default value of useMgtSettableComputeNbrRateRatio is
         FALSE (2)."
    REFERENCE   "14.8.33"
    DEFVAL { false }
    ::= { ieee8021AsV3PortDSEntry 35 }

ieee8021AsV3PortDSMgtSettableComputeNbrRateRatio OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "ComputeNeighborRateRatio is configured to this value if
         useMgtSettableComputeNeighborRateRatio is TRUE (1). The
         value is not used if useMgtSettableComputeNeighborRateRatio
         is FALSE (2)."
    REFERENCE   "14.8.34"
    ::= { ieee8021AsV3PortDSEntry 36 }

ieee8021AsV3PortDSInitialComputeMeanLinkDelay OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
```

```
    STATUS      current
    DESCRIPTION
        "If useMgtSettableComputeMeanLinkDelay is FALSE (2) then,
         for full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay,
         the value is the initial value of computeMeanLinkDelay."
    REFERENCE   "14.8.35"
    ::= { ieee8021AsV3PortDSEntry 37 }

ieee8021AsV3PortDSCurrentComputeMeanLinkDelay OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that
         use the peer-to-peer delay mechanism to measure path delay,
         the value is the current value of computeMeanLinkDelay."
    REFERENCE   "14.8.36"
    ::= { ieee8021AsV3PortDSEntry 38 }

ieee8021AsV3PortDSUseMgtSettableComputeMeanLinkDelay OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The managed object is a Boolean that determines the source
         of the value of computeMeanLinkDelay. If the value is
         TRUE (1), the value of computeMeanLinkDelay is set equal to
         the value of mgtSettableComputeMeanLinkDelay. If the value
         of the managed object is FALSE (2), the value of
         currentComputeMeanLinkDelay is determined by the
         LinkDelayIntervalSetting state machine.
         The default value of useMgtSettableComputeMeanLinkDelay
         is FALSE (2)."
    REFERENCE   "14.8.37"
    DEFVAL { false }
    ::= { ieee8021AsV3PortDSEntry 39 }

ieee8021AsV3PortDSMgtSettableComputeMeanLinkDelay OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "ComputeMeanLinkDelay is configured to this value if
         useMgtSettableComputeMeanLinkDelay is TRUE (1). The
         value is not used if useMgtSettableComputeMeanLinkDelay
         is FALSE (2)."
    REFERENCE   "14.8.38"
    ::= { ieee8021AsV3PortDSEntry 40 }

ieee8021AsV3PortDSAllowedLostRsp OBJECT-TYPE
    SYNTAX      Unsigned32(1..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-PTP Port global
```

```
         variable allowedLostResponses. It is the number of Pdelay_Req
         messages without valid responses above which a PTP Port
         is considered to be not exchanging peer delay messages with
         its neighbor.
         Setting this managed object causes the  per-PTP Port global
         variable allowedLostResponses to have the same value."
    REFERENCE   "14.8.39 and 11.5.3"
    DEFVAL { 9 }
    ::= { ieee8021AsV3PortDSEntry 41 }

ieee8021AsV3PortDSAllowedFaults OBJECT-TYPE
    SYNTAX      Unsigned32(1..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-PTP-Port global
         variable allowedFaults. It is the number of faults above
         which asCapable is set to FALSE (1), i.e., a PTP Port is
         considered not capable of interoperating with its
         neighbor via the IEEE 802.1AS protocol.
         Setting this managed object causes the per-PTP Port global
         variable allowedFaults to have the same value."
    REFERENCE   "14.8.40"
    DEFVAL { 9 }
    ::= { ieee8021AsV3PortDSEntry 42 }

ieee8021AsV3PortDSGPtpCapableReceiptTimeout OBJECT-TYPE
    SYNTAX      Unsigned32(1..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the number of transmission intervals that a
         PTP Port waits without receiving the gPTP capable TLV, before
         assuming that the neighbor PTP Port is no longer invoking
         the gPTP protocol."
    REFERENCE   "14.8.41"
    DEFVAL { 9 }
    ::= { ieee8021AsV3PortDSEntry 43 }

ieee8021AsV3PortDSVersionNumber OBJECT-TYPE
    SYNTAX      Unsigned32(0..16)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This value is set to versionPTP as specified in 10.6.2.2.4."
    REFERENCE   "14.8.42"
    ::= { ieee8021AsV3PortDSEntry 44 }

ieee8021AsV3PortDSNup OBJECT-TYPE
    SYNTAX      Float64TC
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "For an OLT port of an IEEE 802.3 EPON link, the value is
         the effective index of refraction for the EPON upstream
         wavelength light of the optical path. The default value is
```

```
         1.46770 for 1 Gb/s upstream links, and 1.46773 for
         10 Gb/s upstream links.
         For all other PTP Ports, the value is 0."
    REFERENCE   "14.8.43"
    ::= { ieee8021AsV3PortDSEntry 45 }

ieee8021AsV3PortDSNdown OBJECT-TYPE
    SYNTAX      Float64TC
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "For an OLT port of an IEEE 802.3 EPON link, the value is
         the effective index of refraction for the EPON downstream
         wavelength light of the optical path. The default value is
         1.46805 for 1 Gb/s downstream links, and 1.46851 for
         10 Gb/s downstream links.
         For all other PTP Ports, the value is 0."
    REFERENCE   "14.8.44"
    ::= { ieee8021AsV3PortDSEntry 46 }

ieee8021AsV3PortDSOneStepTxOper OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-PTP Port global
         variable oneStepTxOper. Its value is TRUE (1) if the
         PTP Port is sending one-step Sync messages, and FALSE (2)
         if the PTP Port is sending two-step Sync and Follow-Up
         messages."
    REFERENCE   "14.8.45"
    ::= { ieee8021AsV3PortDSEntry 47 }

ieee8021AsV3PortDSOneStepReceive OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-PTP Port global
         variable oneStepReceive. Its value is TRUE (1) if the
         PTP Port is capable of receiving and processing one-step
         Sync messages."
    REFERENCE   "14.8.46"
    ::= { ieee8021AsV3PortDSEntry 48 }

ieee8021AsV3PortDSOneStepTransmit OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-PTP Port global
         variable oneStepTransmit. Its value is TRUE (1) if the
         PTP Port is capable of transmitting one-step Sync messages."
    REFERENCE   "14.8.47"
    ::= { ieee8021AsV3PortDSEntry 49 }
```

```
ieee8021AsV3PortDSInitialOneStepTxOper OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "If useMgtSettableOneStepTxOper is FALSE (2), the value is
         used to initialize currentOneStepTxOper when the PTP Port is
         initialized. If useMgtSettableOneStepTxOper is TRUE (1),
         the value of initialOneStepTxOper is not used."
    REFERENCE   "14.8.48"
    DEFVAL { false }
    ::= { ieee8021AsV3PortDSEntry 50 }

ieee8021AsV3PortDSCurrentOneStepTxOper OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is TRUE (1) if it is desired, either via
         management or via a received Signaling message, that the
         PTP Port transmit one-step Sync messages. The value is
         FALSE (2) if it is not desired, either via management or via
         a received Signaling message, that the PTP Port transmit
         one-step  Sync messages.
         NOTE: The PTP Port will send one-step Sync messages only if
         currentOneStepTxOper and oneStepTransmit are both TRUE (1)."
    REFERENCE   "14.8.49"
    ::= { ieee8021AsV3PortDSEntry 51 }

ieee8021AsV3PortDSUseMgtSettableOneStepTxOper OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The managed object is a Boolean that determines the source
         of currentOneStepTxOper. If the value is TRUE (1), the
         value of currentOneStepTxOper is set equal to the value of
         mgtSettableOneStepTxOper. If the value is FALSE (2), the
         value of currentOneStepTxOper is determined by the
         OneStepTxOperSetting state machine.
         The default value of useMgtSettableOneStepTxOper is TRUE (1)."
    REFERENCE   "14.8.50"
    DEFVAL     { true }
    ::= { ieee8021AsV3PortDSEntry 52 }

ieee8021AsV3PortDSMgtSettableOneStepTxOper OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "If useMgtSettableOneStepTxOper is TRUE (1),
         currentOneStepTxOper is set equal to the value of
         mgtSettableOneStepTxOper. The value of mgtSettableOneStepTxOper
         is not used if useMgtSettableOneStepTxOper is FALSE (2).
         The default value of mgtSettableOneStepTxOper is FALSE (2)
         for domains other than domain 0."
```

```
    REFERENCE   "14.8.51"
    ::= { ieee8021AsV3PortDSEntry 53 }

ieee8021AsV3PortDSSyncLocked OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-PTP Port global
         variable syncLocked. Its value is TRUE (1) if the PTP Port
         will transmit a Sync as soon as possible after the timeReceiver
         PTP Port receives a Sync."
    REFERENCE   "14.8.52"
    ::= { ieee8021AsV3PortDSEntry 54 }

ieee8021AsV3PortDSPdelayTruncTST1 OBJECT-TYPE
    SYNTAX      Ieee8021ASV3Timestamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay, the
         first value, T1, of the four elements of this array is as
         described in Table 14-9. For all other media, the values are
         zero. This object corresponds to the timestamp t1 in
         Figure 11-1, and expressed in units of 2^-16 ns (i.e., the
         value of this array element is equal to the remainder obtained
         upon dividing the respective timestamp , expressed in units
         of 2^-16 ns, by 2^48).
         At any given time, the timestamp values stored in the T1, T2,
         T3, T4 PdelayTruncTS are for the same, and most recently
         completed, peer delay message exchange."
    REFERENCE   "14.8.53"
    ::= { ieee8021AsV3PortDSEntry 55 }

ieee8021AsV3PortDSPdelayTruncTST2 OBJECT-TYPE
    SYNTAX      Ieee8021ASV3Timestamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay, the
         second value, T2, of the four elements of this array is as
         described in Table 14-9. For all other media, the values are
         zero. This object corresponds to the timestamp t2 in
         Figure 11-1, and expressed in units of 2^-16 ns (i.e., the
         value of this array element is equal to the remainder obtained
         upon dividing the respective timestamp , expressed in units
         of 2^-16 ns, by 2^48).
         At any given time, the timestamp values stored in the T1, T2,
         T3, T4 PdelayTruncTS are for the same, and most recently
         completed, peer delay message exchange."
    REFERENCE   "14.8.53"
    ::= { ieee8021AsV3PortDSEntry 56 }

ieee8021AsV3PortDSPdelayTruncTST3 OBJECT-TYPE
```

```
    SYNTAX      Ieee8021ASV3Timestamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay, the
         third value, T3, of the four elements of this array is as
         described in Table 14-9. For all other media, the values are
         zero. This object corresponds to the timestamp t3 in
         Figure 11-1, and expressed in units of 2^-16 ns (i.e., the
         value of this array element is equal to the remainder obtained
         upon dividing the respective timestamp , expressed in units
         of 2^-16 ns, by 2^48).
         At any given time, the timestamp values stored in the T1, T2,
         T3, T4 PdelayTruncTS are for the same, and most recently
         completed, peer delay message exchange."
    REFERENCE   "14.8.53"
    ::= { ieee8021AsV3PortDSEntry 57 }

ieee8021AsV3PortDSPdelayTruncTST4 OBJECT-TYPE
    SYNTAX      Ieee8021ASV3Timestamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay, the
         fourth value, T4, of the four elements of this array is as
         described in Table 14-9. For all other media, the values are
         zero. This object corresponds to the timestamp t4 in
         Figure 11-1, and expressed in units of 2^-16 ns (i.e., the
         value of this array element is equal to the remainder obtained
         upon dividing the respective timestamp , expressed in units
         of 2^-16 ns, by 2^48).
         At any given time, the timestamp values stored in the T1, T2,
         T3, T4 PdelayTruncTS are for the same, and most recently
         completed, peer delay message exchange."
    REFERENCE   "14.8.53"
    ::= { ieee8021AsV3PortDSEntry 58 }

ieee8021AsV3PortDSMinorVersionNumber OBJECT-TYPE
    SYNTAX      Unsigned32 (0..15)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This value is set to minorVersionPTP as specified in 10.6.2.2.3."
    REFERENCE   "14.8.54"
    ::= { ieee8021AsV3PortDSEntry 59 }

-- ============================================================
-- The Description Port Parameter Data Set contains the
-- profileIdentifier for this PTP profile, as specified in
-- Annex F.1.
-- ============================================================

ieee8021AsV3DescriptionPortDSTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3DescriptionPortDSEntry
```

```
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The descriptionPortDS contains the profileIdentifier for
         this PTP profile, as specified in Annex F.1."
    REFERENCE   "14.9"
    ::= { ieee8021AsV3MIBObjects 11 }

ieee8021AsV3DescriptionPortDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3DescriptionPortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The descriptionPortDS contains the profileIdentifier for
         this PTP profile"
    INDEX { ieee8021AsV3PtpInstance,
            ieee8021AsV3DescriptionPortDSAsIndex }
    ::= { ieee8021AsV3DescriptionPortDSTable 1 }

Ieee8021AsV3DescriptionPortDSEntry ::=
     SEQUENCE {
         ieee8021AsV3DescriptionPortDSAsIndex
                                             InterfaceIndexOrZero,
         ieee8021AsV3DescriptionPortDSProfileIdentifier
                                         Ieee8021AsV3GPtpProfileIdentifier }

ieee8021AsV3DescriptionPortDSAsIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object identifies the gPTP interface group within
         the system for which this entry contains information. It
         is the value of the instance of the IfIndex object,
         defined in the IF-MIB, for the gPTP interface group
         corresponding to this port, or the value 0 if the port
         has not been bound to an underlying frame source and
         sink.

         For a given media port of a Bridge or an end station,
         there can be one or more PTP Port, and depends whether
         a media port supports point to point link (e.g. IEEE
         802.3 Ethernet) or point to multi-point (e.g. CSN, IEEE
         802.3 EPON) links on the media port."
    REFERENCE   "IEEE Std 802.1AS Description Port Parameter DS Group
                 PTP Port Index"
    ::= { ieee8021AsV3DescriptionPortDSEntry 1 }

ieee8021AsV3DescriptionPortDSProfileIdentifier OBJECT-TYPE
    SYNTAX      Ieee8021AsV3GPtpProfileIdentifier
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the profileIdentifier for this PTP profile."
    REFERENCE   "14.9.2 and F.1"
    ::= { ieee8021AsV3DescriptionPortDSEntry 2 }
```

```
-- ============================================================
-- The Port Parameter Statistics Data Set provides counters
-- associated with PTP Port capabilities at a given PTP Instance.
-- ============================================================

ieee8021AsV3PortStatDSTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3PortStatDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The portStatisticsDS provides counters associated with PTP Port
         capabilities at a given PTP Instance."
    REFERENCE   "14.10"
    ::= { ieee8021AsV3MIBObjects 12 }

ieee8021AsV3PortStatDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3PortStatDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Port Statistics Data Set provides counters associated with
         PTP Port capabilities at a given PTP Instance."
    INDEX { ieee8021AsV3PtpInstance,
            ieee8021AsV3PortDSIndex }
    ::= { ieee8021AsV3PortStatDSTable 1 }

Ieee8021AsV3PortStatDSEntry ::=
     SEQUENCE {
         ieee8021AsV3PortStatRxSyncCount               Counter32,
         ieee8021AsV3PortStatRxOneStepSyncCount        Counter32,
         ieee8021AsV3PortStatRxFollowUpCount           Counter32,
         ieee8021AsV3PortStatRxPdelayRequestCount      Counter32,
         ieee8021AsV3PortStatRxPdelayRspCount     Counter32,
         ieee8021AsV3PortStatRxPdelayRspFollowUpCount  Counter32,
         ieee8021AsV3PortStatRxAnnounceCount           Counter32,
         ieee8021AsV3PortStatRxPtpPacketDiscardCount   Counter32,
         ieee8021AsV3PortStatSyncReceiptTimeoutCount    Counter32,
         ieee8021AsV3PortStatAnnounceReceiptTimeoutCount   Counter32,
         ieee8021AsV3PortStatPdelayAllowedLostRspExceededCount Counter32,
         ieee8021AsV3PortStatTxSyncCount               Counter32,
         ieee8021AsV3PortStatTxOneStepSyncCount        Counter32,
         ieee8021AsV3PortStatTxFollowUpCount           Counter32,
         ieee8021AsV3PortStatTxPdelayRequestCount      Counter32,
         ieee8021AsV3PortStatTxPdelayRspCount     Counter32,
         ieee8021AsV3PortStatTxPdelayRspFollowUpCount Counter32,
         ieee8021AsV3PortStatTxAnnounceCount           Counter32
      }

ieee8021AsV3PortStatRxSyncCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time synchronization
         information is received."
```

```
    REFERENCE   "14.10.2"
    ::= { ieee8021AsV3PortStatDSEntry 1 }

ieee8021AsV3PortStatRxOneStepSyncCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a one-step Sync
         message is received."
    REFERENCE   "14.10.3"
    ::= { ieee8021AsV3PortStatDSEntry 2 }

ieee8021AsV3PortStatRxFollowUpCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Follow_Up message
         is received."
    REFERENCE   "14.10.4"
    ::= { ieee8021AsV3PortStatDSEntry 3 }

ieee8021AsV3PortStatRxPdelayRequestCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Req message
         is received."
    REFERENCE   "14.10.5"
    ::= { ieee8021AsV3PortStatDSEntry 4 }

ieee8021AsV3PortStatRxPdelayRspCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Resp message
         is received."
    REFERENCE   "14.10.6"
    ::= { ieee8021AsV3PortStatDSEntry 5 }

ieee8021AsV3PortStatRxPdelayRspFollowUpCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Resp_Follow_Up
         message is received."
    REFERENCE   "14.10.7"
    ::= { ieee8021AsV3PortStatDSEntry 6 }

ieee8021AsV3PortStatRxAnnounceCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
```

```
    STATUS      current
    DESCRIPTION
        "A counter that increments every time an Announce message
         is received."
    REFERENCE   "14.10.8"
    ::= { ieee8021AsV3PortStatDSEntry 7 }

ieee8021AsV3PortStatRxPtpPacketDiscardCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a PTP message of the
         respective PTP Instance is discarded."
    REFERENCE   "14.10.9"
    ::= { ieee8021AsV3PortStatDSEntry 8 }

ieee8021AsV3PortStatSyncReceiptTimeoutCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time sync receipt timeout
         occurs."
    REFERENCE   "14.10.10"
    ::= { ieee8021AsV3PortStatDSEntry 9 }

ieee8021AsV3PortStatAnnounceReceiptTimeoutCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time announce receipt timeout
         occurs."
    REFERENCE   "14.10.11"
    ::= { ieee8021AsV3PortStatDSEntry 10 }

ieee8021AsV3PortStatPdelayAllowedLostRspExceededCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time the value of the
         variable lostResponses exceeds the value of the variable
         allowedLostResponses."
    REFERENCE   "14.10.12"
    ::= { ieee8021AsV3PortStatDSEntry 11 }

ieee8021AsV3PortStatTxSyncCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time synchronization
         information is transmitted."
    REFERENCE   "14.10.13"
```

```
    ::= { ieee8021AsV3PortStatDSEntry 12 }

ieee8021AsV3PortStatTxOneStepSyncCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a one-step Sync
         message is transmitted."
    REFERENCE   "14.10.14"
    ::= { ieee8021AsV3PortStatDSEntry 13 }

ieee8021AsV3PortStatTxFollowUpCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Follow_Up message
         is transmitted."
    REFERENCE   "14.10.15"
    ::= { ieee8021AsV3PortStatDSEntry 14 }

ieee8021AsV3PortStatTxPdelayRequestCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Req message
         is transmitted."
    REFERENCE   "14.10.16"
    ::= { ieee8021AsV3PortStatDSEntry 15 }

ieee8021AsV3PortStatTxPdelayRspCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Resp message
         is transmitted."
    REFERENCE   "14.10.17"
    ::= { ieee8021AsV3PortStatDSEntry 16 }

ieee8021AsV3PortStatTxPdelayRspFollowUpCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a
         Pdelay_Resp_Follow_Up message is transmitted."
    REFERENCE   "14.10.18"
    ::= { ieee8021AsV3PortStatDSEntry 17 }

ieee8021AsV3PortStatTxAnnounceCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
```

```
    DESCRIPTION
        "A counter that increments every time an Announce message is
         transmitted."
    REFERENCE   "14.10.19"
    ::= { ieee8021AsV3PortStatDSEntry 18 }

-- ============================================================
-- The Acceptable TimeTransmitter Port Parameter Data Ser represents the
-- capability to enable/disable the acceptable timeTransmitter table
-- feature on a PTP Port.
-- ============================================================

ieee8021AsV3AcceptableTimeTransmitterPortDSTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3AcceptableTimeTransmitterPortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "For the single PTP Port of a PTP End Instance and for each
         PTP Port of a PTP Relay Instance, the
acceptableTimeTransmitterPortDS
         contains the single member acceptableTimeTransmitterTableEnabled,
which
         is used to enable/disable the Acceptable TimeTransmitter Table
Feature.
         The number of such data sets is the same as the value of
         defaultDS.numberPorts."
    REFERENCE   "14.11"
    ::= { ieee8021AsV3MIBObjects 13 }

ieee8021AsV3AcceptableTimeTransmitterPortDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3AcceptableTimeTransmitterPortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Acceptable TimeTransmitter Port Data Set represents the
capability
         to enable/disable the acceptable timeTransmitter table feature on a
         PTP Port.
         For the single PTP Port of a PTP End Instance and for each
         PTP Port of a PTP Relay Instance, the
acceptableTimeTransmitterPortDS
         contains the single member acceptableTimeTransmitterTableEnabled,
which
         is used to enable/disable the Acceptable TimeTransmitter Table
Feature.
         The number of such data sets is the same as the value of
         defaultDS.numberPorts."
    INDEX { ieee8021AsV3PtpInstance,
            ieee8021AsV3AcceptableTimeTransmitterPortDSAsIndex }
    ::= { ieee8021AsV3AcceptableTimeTransmitterPortDSTable 1 }

Ieee8021AsV3AcceptableTimeTransmitterPortDSEntry ::=
  SEQUENCE {
      ieee8021AsV3AcceptableTimeTransmitterPortDSAsIndex
InterfaceIndexOrZero,
```

```
      ieee8021AsV3AcceptableTTPortDSAcceptableTTTableEnabled
TruthValue
      }

ieee8021AsV3AcceptableTimeTransmitterPortDSAsIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An index to identify an entry in the Acceptable TimeTransmitter
         Port Table Data Set."
    REFERENCE   "14.11"
    ::= { ieee8021AsV3AcceptableTimeTransmitterPortDSEntry 1 }

ieee8021AsV3AcceptableTTPortDSAcceptableTTTableEnabled OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the Boolean
         acceptableTimeTransmitterTableEnabled."
    REFERENCE   "14.11.2"
    ::= { ieee8021AsV3AcceptableTimeTransmitterPortDSEntry 2 }

-- ============================================================
-- The External Port Configuration Port Data Set is used with
-- the external port configuration option to indicate the
-- desired state for the PTP Port.
-- ============================================================
ieee8021AsV3ExternalPortConfigurationPortDSTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3ExternalPortConfigurationPortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The externalPortConfigurationPortDS contains the single member
         desiredState, which indicates the desired state for the PTP Port.
         The number of such data sets is the same as the value of
         defaultDS.numberPorts."
    REFERENCE   "14.12"
    ::= { ieee8021AsV3MIBObjects 14 }

ieee8021AsV3ExternalPortConfigurationPortDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ExternalPortConfigurationPortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The externalPortConfigurationPortDS contains the single member
         desiredState, which indicates the desired state for the PTP Port.
         The number of such data sets is the same as the value of
         defaultDS.numberPorts."
    INDEX { ieee8021AsV3PtpInstance,
            ieee8021AsV3ExternalPortConfigurationPortDSAsIndex }
    ::= { ieee8021AsV3ExternalPortConfigurationPortDSTable 1 }

Ieee8021AsV3ExternalPortConfigurationPortDSEntry ::=
  SEQUENCE {
```

```
      ieee8021AsV3ExternalPortConfigurationPortDSAsIndex
InterfaceIndexOrZero,
      ieee8021AsV3ExternalPortConfigurationPortDSDesiredState         INTEGER
      }

ieee8021AsV3ExternalPortConfigurationPortDSAsIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An index to identify an entry in the External Port
         Configuration Port Table Data Set."
    REFERENCE   "14.12"
    ::= { ieee8021AsV3ExternalPortConfigurationPortDSEntry 1 }

ieee8021AsV3ExternalPortConfigurationPortDSDesiredState OBJECT-TYPE
    SYNTAX           INTEGER {
            disabledPort(3),
            timeTransmitterPort(6),
            passivePort(7),
            timeReceiverPort(9)
           }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "When the value of defaultDS.externalPortConfigurationEnabled
         is TRUE (1), the value of
         externalPortConfigurationPortDS.desiredState is the desired
         state of the PTP Port. This member sets the value of the
         variable portStateInd. When a new value is written to the
         member by management, the variable rcvdPortStateInd is set
         to TRUE (1)."
    REFERENCE   "14.12.2"
    ::= { ieee8021AsV3ExternalPortConfigurationPortDSEntry 2 }

-- ============================================================
-- Asymmetry Measurement Mode Parameter Data Set
-- to enable/disable the feature on a PTP Port.
-- ============================================================

ieee8021AsV3AsymMeasurementModeDSTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3AsymMeasurementModeDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The asymmetryMeasurementModeDS represents the capability to
         enable/disable the Asymmetry Compensation Measurement Procedure
         on a PTP Port (see Annex G). This data set is used instead of
         the cmldsAsymmetryMeasurementModeDS, when only domain 0 is
         present and CMLDS is not used."
    REFERENCE   "14.13"
    ::= { ieee8021AsV3MIBObjects 15 }

ieee8021AsV3AsymMeasurementModeDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3AsymMeasurementModeDSEntry
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
    DESCRIPTION
        "The asymmetryMeasurementModeDS represents the capability to
         enable/disable the Asymmetry Compensation Measurement Procedure
         on a PTP Port (see Annex G). This data set is used instead of
         the cmldsAsymmetryMeasurementModeDS, when only domain 0 is
         present and CMLDS is not used. "
    INDEX { ieee8021AsV3PtpInstance,
            ieee8021AsV3AsymMeasurementModeDSAsIndex }
    ::= { ieee8021AsV3AsymMeasurementModeDSTable 1 }

Ieee8021AsV3AsymMeasurementModeDSEntry ::=
     SEQUENCE {
         ieee8021AsV3AsymMeasurementModeDSAsIndex      InterfaceIndexOrZero,
         ieee8021AsV3AsymMeasurementModeDSAsymMeasurementMode
TruthValue
      }

ieee8021AsV3AsymMeasurementModeDSAsIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An index to identify an entry in the Asymmetry Measurement
         Mode Data Set."
    REFERENCE   "14.13"
    ::= { ieee8021AsV3AsymMeasurementModeDSEntry 1 }

ieee8021AsV3AsymMeasurementModeDSAsymMeasurementMode OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the Boolean
         asymmetryMeasurementMode. For full-duplex IEEE 802.3
         media, the value is TRUE (1) if an asymmetry measurement
         is being performed for the link attached to this PTP Port,
         and FALSE (2) otherwise. For all other media, the value
         shall be FALSE (2). Setting this managed object causes the
         Boolean  asymmetryMeasurementMode to have the same value.
         NOTE: If an asymmetry measurement is being performed for a
         link, asymmetryMeasurementMode must be TRUE (1) for the
         PTP Ports at each end of the link."
    REFERENCE   "14.13.2"
    ::= { ieee8021AsV3AsymMeasurementModeDSEntry 2 }

-- ============================================================
-- The Common Services Port Parameter Data Set enables a
-- PTP Port of a PTP Instance to determine which port of the
-- respective common service corresponds to that PTP Port.
-- ============================================================
ieee8021AsV3CommonServicesPortDSTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AsV3CommonServicesPortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
        "At present, the only common service specified is the CMLDS, and
         the only member of the commonServicesPortDS is the
         cmldsLinkPortPortNumber. This member contains the port number
         of the CMLDS Link Port that corresponds to this PTP Port."
    REFERENCE   "14.14"
    ::= { ieee8021AsV3MIBObjects 16 }

ieee8021AsV3CommonServicesPortDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3CommonServicesPortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "At present, the only common service specified is the CMLDS, and
        the only member of the commonServicesPortDS is the
        cmldsLinkPortPortNumber. This member contains the port number
        of the CMLDS Link Port that
         corresponds to this PTP Port."
    INDEX { ieee8021AsV3PtpInstance,
            ieee8021AsV3CommonServicesPortDSAsIndex }
    ::= { ieee8021AsV3CommonServicesPortDSTable 1 }

Ieee8021AsV3CommonServicesPortDSEntry ::=
  SEQUENCE {
      ieee8021AsV3CommonServicesPortDSAsIndex    InterfaceIndexOrZero,
      ieee8021AsV3CommonServicesPortDSCmldsLinkPortPortNumber
Unsigned32
      }

ieee8021AsV3CommonServicesPortDSAsIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An index to identify an entry in the Common Services Port
         Data Set."
    REFERENCE   "14.14"
    ::= { ieee8021AsV3CommonServicesPortDSEntry 1 }

ieee8021AsV3CommonServicesPortDSCmldsLinkPortPortNumber OBJECT-TYPE
    SYNTAX          Unsigned32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the portNumber attribute of the
         cmldsLinkPortDS.portIdentity of the Link Port that
         corresponds to this PTP Port."
    REFERENCE   "14.14.2"
    ::= { ieee8021AsV3CommonServicesPortDSEntry 2 }

-- ============================================================
-- The Common Mean Link Delay Service Default Parameter Data Set
-- describes the per-time-aware-system attributes of the Common
-- Mean Link Delay Service.
-- ============================================================

ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSTable   OBJECT-TYPE
```

```
    SYNTAX      SEQUENCE OF
Ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The cmldsDefaultDS describes the per-time-aware-system attributes
         of the Common Mean Link Delay Service."
    REFERENCE   "14.15"
    ::= { ieee8021AsV3MIBObjects 17 }

ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The cmldsDefaultDS describes the per-time-aware-system attributes
         of the Common Mean Link Delay Service."
    INDEX { ieee8021AsV3CmldsDefaultDSAsIndex }
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSTable 1 }

Ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSEntry ::=
   SEQUENCE {
      ieee8021AsV3CmldsDefaultDSAsIndex  InterfaceIndexOrZero,
      ieee8021AsV3CmldsDefaultDSClockIdentity   Ieee8021AsV3ClockIdentity,
      ieee8021AsV3CmldsDefaultDSNumberLinkPorts Unsigned32
      }


ieee8021AsV3CmldsDefaultDSAsIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An index to identify an entry in the Common Mean Link
         Delay Default Data Set."
    REFERENCE   "14.15"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSEntry 1 }

ieee8021AsV3CmldsDefaultDSClockIdentity OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockIdentity
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the clockIdentity that will be used to
         identify the Common Mean Link Delay Service."
    REFERENCE   "14.15.2"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSEntry 2 }

ieee8021AsV3CmldsDefaultDSNumberLinkPorts OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the number of Link Ports of the time-aware
         system on which the Common Mean Link Delay Service is
         implemented. For an end station the value is 1."
```

```
    REFERENCE   "14.15.3"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSEntry 3 }

-- ============================================================
-- The Common Mean Link Delay Service Link Port Parameter Data Set
-- represents time-aware Link Port capabilities for the Common Mean
-- Link Delay Service of a Link Port of a time-aware system.
-- ============================================================

ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSTable   OBJECT-TYPE
    SYNTAX      SEQUENCE OF
Ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "For every Link Port of the Common Mean Link Delay Service of a
         time-aware system, the cmldsLinkPortDS is maintained as the
         basis for making protocol decisions and providing values for
         message fields. The number of such data sets is the same as
         the value of cmldsDefaultDS.numberLinkPorts."
    REFERENCE   "14.16"
    ::= { ieee8021AsV3MIBObjects 18 }

ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "For every Link Port of the Common Mean Link Delay Service of a
         time-aware system, the cmldsLinkPortDS is maintained as the
         basis for making protocol decisions and providing values for
         message fields. The number of such data sets is the same as
         the value of cmldsDefaultDS.numberLinkPorts."
    INDEX { ieee8021AsV3BridgeBasePort,
            ieee8021AsV3CmldsLinkPortDSAsIndex }
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSTable 1 }

Ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry ::=
   SEQUENCE {
     ieee8021AsV3CmldsLinkPortDSAsIndex     InterfaceIndexOrZero,
     ieee8021AsV3CmldsLinkPortDSClockIdentity
Ieee8021AsV3ClockIdentity,
     ieee8021AsV3CmldsLinkPortDSPortNumber             Unsigned32,
     ieee8021AsV3CmldsLinkPortDSCmldsLinkPortEnabled   TruthValue,
     ieee8021AsV3CmldsLinkPortDSIsMeasuringDelay       TruthValue,
     ieee8021AsV3CmldsLinkPortDSAsCapableAcrossDomains TruthValue,
     ieee8021AsV3CmldsLinkPortDSMeanLinkDelay
Ieee8021ASV3PtpTimeInterval,
     ieee8021AsV3CmldsLinkPortDSMeanLinkDelayThresh
Ieee8021ASV3PtpTimeInterval,
     ieee8021AsV3CmldsLinkPortDSDelayAsym
Ieee8021ASV3PtpTimeInterval,
     ieee8021AsV3CmldsLinkPortDSNbrRateRatio      Integer32,
     ieee8021AsV3CmldsLinkPortDSInitialLogPdelayReqInterval Integer32,
     ieee8021AsV3CmldsLinkPortDSCurrentLogPdelayReqInterval Integer32,
```

```
    ieee8021AsV3CmldsLinkPortDSUseMgtSettableLogPdelayReqInterval
TruthValue,
    ieee8021AsV3CmldsLinkPortDSMgtSettableLogPdelayReqInterval
Integer32,
    ieee8021AsV3CmldsLinkPortDSInitialComputeNbrRateRatio     TruthValue,
    ieee8021AsV3CmldsLinkPortDSCurrentComputeNbrRateRatio     TruthValue,
    ieee8021AsV3CmldsLinkPortDSUseMgtSettableComputeNbrRateRatio
TruthValue,
    ieee8021AsV3CmldsLinkPortDSMgtSettableComputeNbrRateRatio
TruthValue,
    ieee8021AsV3CmldsLinkPortDSInitialComputeMeanLinkDelay     TruthValue,
    ieee8021AsV3CmldsLinkPortDSCurrentComputeMeanLinkDelay     TruthValue,
    ieee8021AsV3CmldsLinkPortDSUseMgtSettableComputeMeanLinkDelay
TruthValue,
    ieee8021AsV3CmldsLinkPortDSMgtSettableComputeMeanLinkDelay
TruthValue,
    ieee8021AsV3CmldsLinkPortDSAllowedLostRsp   Unsigned32,
    ieee8021AsV3CmldsLinkPortDSAllowedFaults          Unsigned32,
    ieee8021AsV3CmldsLinkPortDSVersionNumber          Unsigned32,
    ieee8021AsV3CmldsLinkPortDSPdelayTruncTST1 Ieee8021ASV3Timestamp,
    ieee8021AsV3CmldsLinkPortDSPdelayTruncTST2 Ieee8021ASV3Timestamp,
    ieee8021AsV3CmldsLinkPortDSPdelayTruncTST3 Ieee8021ASV3Timestamp,
    ieee8021AsV3CmldsLinkPortDSPdelayTruncTST4 Ieee8021ASV3Timestamp,
    ieee8021AsV3CmldsLinkPortDSMinorVersionNumber     Unsigned32
     }

ieee8021AsV3CmldsLinkPortDSAsIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An index to identify an entry in the Comon Mean Link
         Delay Link Port Data Set."
    REFERENCE   "14.16"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 1 }

ieee8021AsV3CmldsLinkPortDSClockIdentity OBJECT-TYPE
    SYNTAX      Ieee8021AsV3ClockIdentity
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the first of the portIdentity attribute
         of the local port, which is a set made of
         Ieee8021AsV3ClockIdentity and portNumber."
    REFERENCE   "14.16.2"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 2 }

ieee8021AsV3CmldsLinkPortDSPortNumber OBJECT-TYPE
    SYNTAX      Unsigned32(0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is the second of the portIdentity attribute
         of the local port, which is a set made of
         Ieee8021AsV3ClockIdentity and portNumber."
    REFERENCE   "14.16.2"
```

```
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 3 }

ieee8021AsV3CmldsLinkPortDSCmldsLinkPortEnabled
 OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the Boolean
         cmldsLinkPortEnabled."
    REFERENCE   "14.16.3"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 4 }

ieee8021AsV3CmldsLinkPortDSIsMeasuringDelay
 OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the Boolean
         isMeasuringDelay."
    REFERENCE   "14.16.4"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 5 }

ieee8021AsV3CmldsLinkPortDSAsCapableAcrossDomains
 OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the Boolean
         asCapableAcrossDomains."
    REFERENCE   "14.16.5"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 6 }

ieee8021AsV3CmldsLinkPortDSMeanLinkDelay
 OBJECT-TYPE
    SYNTAX      Ieee8021ASV3PtpTimeInterval
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-port global
         variable meanLinkDelay. It is an estimate of the current
         one-way propagation time on the link attached to this Link
         Port, measured as specified for the respective medium. The
         value is zero for Link Ports attached to IEEE 802.3 EPON
         links and for the timeTransmitter port of an IEEE 802.11 link,
         because one-way propagation delay is not measured on the
         latter and not directly measured on the former.
         NOTE: The underlying per-port global variable meanLinkDelay is
         of type UScaledNS, which is a 96-Bit value. meanLinkDelay
         values that are larger than the maximum value that can be
         represented by the TimeInterval data type, i.e.,
         0xFFFF FFFF FFFF FFFF (where the units are 2 sup -16 ns), used
         for this managed object are set to this largest value."
    REFERENCE   "14.16.6"
```

```
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 7 }

ieee8021AsV3CmldsLinkPortDSMeanLinkDelayThresh
 OBJECT-TYPE
    SYNTAX      Ieee8021ASV3PtpTimeInterval
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-Link-Port global
         variable meanLinkDelayThresh. It is the propagation time
         threshold above which a Link Port (and therefore any PTP Ports
         that use the CMLDS on this Link Port) is considered not
         capable of participating in the IEEE 802.1AS protocol.
         Setting this managed object causes the per-Link-Port global
         variable meanLinkDelayThresh to have the same value.
         NOTE: The underlying per-port global variable
         meanLinkDelayThresh is of type UScaledNS, which is a 96-Bit
         value. meanLinkDelayThresh values that are larger than the
         maximum value that can be represented by the TimeInterval
         data type, i.e., 0xFFFF FFFF FFFF FFFF (where the units are
         2 sup -16 ns), used for this managed object are set to this
         largest value."
    REFERENCE   "14.16.7"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 8 }

ieee8021AsV3CmldsLinkPortDSDelayAsym
 OBJECT-TYPE
    SYNTAX      Ieee8021ASV3PtpTimeInterval
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the asymmetry in the propagation delay on the
         link attached to this Link Port relative to the local clock.
         If propagation delay asymmetry is not modeled, then
         delayAsymmetry is 0.
         NOTE: The underlying per-port global variable delayAsymmetry
         is of type ScaledNS, which is a 96-Bit value.
         delayAsymmetry values that are larger than the maximum value
         that can be represented by the TimeInterval data type, i.e.,
         0x7FFF FFFF FFFF FFFF, (where the units are 2 sup -16 ns),
         used for this managed object are set to this largest value.
         delayAsymmetry values that are less than the minimum value
         that can be represented by the TimeInterval data type, i.e.,
         0x8000 0000 0000 0001 written in twos complement form (where
        the units are 2 sup -16 ns), used for this managed object are
        set to this smallest value."
    REFERENCE   "14.16.8"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 9 }

ieee8021AsV3CmldsLinkPortDSNbrRateRatio
 OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value is an estimate of the ratio of the frequency of the
```

```
         LocalClock entity of the time-aware system at the other end
         of the link attached to this Link Port, to the frequency of
         the LocalClock entity of this time-aware system.
         neighborRateRatio is expressed as the fractional frequency
         offset multiplied by 2^41, i.e., the quantity
         (neighborRateRatio -1.0)(2^41)."
    REFERENCE   "14.16.9"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 10 }

ieee8021AsV3CmldsLinkPortDSInitialLogPdelayReqInterval OBJECT-TYPE
    SYNTAX      Integer32(-128..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "If useMgtSettableLogPdelayReqInterval is FALSE (2) then,
         for full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay, the
         value is the logarithm to base 2 of the Pdelay_Req message
         transmission interval used when (a) the Link Port is
         initialized, or (b) a message interval request TLV is
         received with the logLinkDelayInterval field set to 126.
         For all other media, the value is 127."
    REFERENCE   "14.16.10"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 11 }

ieee8021AsV3CmldsLinkPortDSCurrentLogPdelayReqInterval OBJECT-TYPE
    SYNTAX      Integer32(-128..127)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay,
         the value is the logarithm to the base 2 of the current
         Pdelay_Req message transmission interval.
         For all other media, the value is 127."
    REFERENCE   "14.16.11"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 12 }

ieee8021AsV3CmldsLinkPortDSUseMgtSettableLogPdelayReqInterval OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The managed object is a Boolean that determines the source
         of the sync interval and mean time interval between
         successive Pdelay_Req messages. If the value is TRUE (1),
         the value of currentLogPdelayReqInterval is set equal to
         the value of mgtSettableLogPdelayReqInterval. If the value
         of the managed object is FALSE (2), the value of
         currentLogPdelayReqInterval is determined by the
         LinkDelayIntervalSetting state machine."
    REFERENCE   "14.16.12"
    DEFVAL { false }
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 13 }

ieee8021AsV3CmldsLinkPortDSMgtSettableLogPdelayReqInterval OBJECT-TYPE
```

```
    SYNTAX      Integer32 (-128..127)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is the logarithm to base 2 of the mean time
         interval between successive Pdelay_Req messages if
         useMgtSettableLogPdelayReqInterval is TRUE (1). The
         value is not used if useMgtSettableLogPdelayReqInterval
         is FALSE (2)."
    REFERENCE   "14.16.13"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 14 }

ieee8021AsV3CmldsLinkPortDSInitialComputeNbrRateRatio OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "If useMgtSettableComputeNeighborRateRatio is FALSE (2),
         then for full-duplex IEEE 802.3 media and for CSN media
         that use the peer-to-peer delay mechanism to measure path
         delay, the value is the initial value of
         computeNeighborRateRatio.
         For all other media, the value is TRUE."
    REFERENCE   "14.16.14"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 15 }

ieee8021AsV3CmldsLinkPortDSCurrentComputeNbrRateRatio OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay,
         the value is the current value of computeNeighborRateRatio.
         For all other media, the value is TRUE (1)."
    REFERENCE   "14.16.15"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 16 }

ieee8021AsV3CmldsLinkPortDSUseMgtSettableComputeNbrRateRatio OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The managed object is a Boolean that determines the source
         of the value of computeNeighborRateRatio. If the value is
         TRUE (1), the value of computeNeighborRateRatio is set equal
         to the value of mgtSettablecomputeNeighborRateRatio. If
         the value of the managed object is FALSE (2), the
         value of currentComputeNeighborRateRatio is determined by
         the LinkDelayIntervalSetting state machine."
    REFERENCE   "14.16.16"
    DEFVAL { false }
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 17 }

ieee8021AsV3CmldsLinkPortDSMgtSettableComputeNbrRateRatio OBJECT-TYPE
    SYNTAX      TruthValue
```

```
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "computeNeighborRateRatio is configured to this value if
         useMgtSettableComputeNeighborRateRatio is TRUE (1). The
         value is not used if useMgtSettableComputeNeighborRateRatio
         is FALSE (2)."
    REFERENCE   "14.16.17"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 18 }

ieee8021AsV3CmldsLinkPortDSInitialComputeMeanLinkDelay OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "If useMgtSettableComputeMeanLinkDelay is FALSE (2) then,
         for full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay,
         the value is the initial value of computeMeanLinkDelay.
         For all other media, the value is TRUE (1)."
    REFERENCE   "14.16.18"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 19 }

ieee8021AsV3CmldsLinkPortDSCurrentComputeMeanLinkDelay OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that
         use the peer-to-peer delay mechanism to measure path delay,
         the value is the current value of computeMeanLinkDelay.
         For all other media, the value is TRUE."
    REFERENCE   "14.16.19"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 20 }

ieee8021AsV3CmldsLinkPortDSUseMgtSettableComputeMeanLinkDelay OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The managed object is a Boolean that determines the source
         of the value of computeMeanLinkDelay. If the value is
         TRUE (1), the value of computeMeanLinkDelay is set equal
         to the value of mgtSettableComputeMeanLinkDelay. If the
         value of the managed object is FALSE (2), the value of
         currentComputeMeanLinkDelay is determined by the
         LinkDelayIntervalSetting state machine."
    REFERENCE   "14.16.20"
    DEFVAL { false }
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 21 }

ieee8021AsV3CmldsLinkPortDSMgtSettableComputeMeanLinkDelay OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
```

```
        "computeMeanLinkDelay is configured to this value if
         useMgtSettableComputeMeanLinkDelay is TRUE (1). The value
         is not used if useMgtSettableComputeMeanLinkDelay is
         FALSE (2)."
    REFERENCE   "14.16.21"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 22 }

ieee8021AsV3CmldsLinkPortDSAllowedLostRsp
 OBJECT-TYPE
    SYNTAX      Unsigned32(1..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-Link-Port
         global variable allowedLostResponses. It is the number
         of Pdelay_Req messages without valid responses
         above which a Link Port is considered to be not
         exchanging peer delay messages with its neighbor.
         Setting this managed object causes the per-Link-Port global
         variable allowedLostResponses to have the same value."
    REFERENCE   "14.16.22"
    DEFVAL { 9 }
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 23 }


ieee8021AsV3CmldsLinkPortDSAllowedFaults OBJECT-TYPE
    SYNTAX      Unsigned32(1..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the per-Link-Port global
         variable allowedFaults. It is the number of faults above
         which asCapableAcrossDomains is set to FALSE (2), i.e., a
         Link Port is considered not capable of interoperating
         with its neighbor via the IEEE 802.1AS protocol.
         Setting this managed object causes the per-Link-Port global
         variable allowedFaults to have the same value."
    REFERENCE   "14.16.23"
    DEFVAL { 9 }
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 24 }

ieee8021AsV3CmldsLinkPortDSVersionNumber OBJECT-TYPE
    SYNTAX      Unsigned32(0..15)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This value is set to versionPTP as specified in 10.6.2.2.4."
    REFERENCE   "14.16.24"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 25 }

ieee8021AsV3CmldsLinkPortDSPdelayTruncTST1
 OBJECT-TYPE
    SYNTAX      Ieee8021ASV3Timestamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```
        "For full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay, the
         first value, T1, of the four elements of this array is as
         described in Table 14-9. For all other media, the values are
         zero. This object corresponds to the timestamp t1 modulo 2^32
         in Figure 11-1, and expressed in units of 2^-16 ns (i.e., the
         value of this array element is equal to the remainder obtained
         upon dividing the respective timestamp, expressed in units
         of 2^-16 ns, by 2^48).
         At any given time, the timestamp values stored in the T1, T2,
         T3, T4 PdelayTruncTS are for the same, and most recently
         completed, peer delay message exchange.
         NOTE: This managed object is used with the asymmetry
         measurement compensation procedure, which is based on
         line-swapping."
    REFERENCE   "14.16.25"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 26 }

ieee8021AsV3CmldsLinkPortDSPdelayTruncTST2
 OBJECT-TYPE
    SYNTAX      Ieee8021ASV3Timestamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay, the
         second value, T2, of the four elements of this array is as
         described in Table 14-9. For all other media, the values are
         zero. This object corresponds to the timestamp t1 modulo 2^32
         in Figure 11-1, and expressed in units of 2^-16 ns (i.e., the
         value of this array element is equal to the remainder obtained
         upon dividing the respective timestamp, expressed in units
         of 2^-16 ns, by 2^48).
         At any given time, the timestamp values stored in the T1, T2,
         T3, T4 PdelayTruncTS are for the same, and most recently
         completed, peer delay message exchange.
         NOTE: This managed object is used with the asymmetry
         measurement compensation procedure, which is based on
         line-swapping."
    REFERENCE   "14.16.25"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 27 }

ieee8021AsV3CmldsLinkPortDSPdelayTruncTST3
 OBJECT-TYPE
    SYNTAX      Ieee8021ASV3Timestamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay, the
         third value, T3, of the four elements of this array is as
         described in Table 14-9. For all other media, the values are
         zero. This object corresponds to the timestamp t1 modulo 2^32
         in Figure 11-1, and expressed in units of 2^-16 ns (i.e., the
         value of this array element is equal to the remainder obtained
         upon dividing the respective timestamp, expressed in units
```

```
         of 2^-16 ns, by 2^48).
         At any given time, the timestamp values stored in the T1, T2,
         T3, T4 PdelayTruncTS are for the same, and most recently
         completed, peer delay message exchange.
         NOTE: This managed object is used with the asymmetry
         measurement compensation procedure, which is based on
         line-swapping."
    REFERENCE   "14.16.25"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 28 }

ieee8021AsV3CmldsLinkPortDSPdelayTruncTST4
 OBJECT-TYPE
    SYNTAX      Ieee8021ASV3Timestamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "For full-duplex IEEE 802.3 media and for CSN media that use
         the peer-to-peer delay mechanism to measure path delay, the
         fourth value, T4, of the four elements of this array is as
         described in Table 14-9. For all other media, the values are
         zero. This object corresponds to the timestamp t1 modulo 2^32
         in Figure 11-1, and expressed in units of 2^-16 ns (i.e., the
         value of this array element is equal to the remainder obtained
         upon dividing the respective timestamp, expressed in units
         of 2^-16 ns, by 2^48).
         At any given time, the timestamp values stored in the T1, T2,
         T3, T4 PdelayTruncTS are for the same, and most recently
         completed, peer delay message exchange.
         NOTE: This managed object is used with the asymmetry
         measurement compensation procedure, which is based on
         line-swapping."
    REFERENCE   "14.16.25"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 29 }

ieee8021AsV3CmldsLinkPortDSMinorVersionNumber OBJECT-TYPE
    SYNTAX      Unsigned32 (0..15)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This value is set to minorVersionPTP as specified in
         10.6.2.2.3."
    REFERENCE   "14.16.26"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSEntry 30 }

-- ============================================================
-- The Common Mean Link Delay Service Link Port Parameter
-- Statistics Data Set provides counters associated with Link
-- Port capabilities at a given time-aware system.
-- ============================================================

ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSTable  OBJECT-TYPE
    SYNTAX      SEQUENCE OF
Ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
        "For every Link Port of the Common Mean Link Delay Service of a
         time-aware system, the following cmldsLinkPortStatisticsDS
         provides counters. The number of such statistics sets is the
         same as the value of cmldsDefaultDS.numberLinkPorts."
    REFERENCE   "14.17"
    ::= { ieee8021AsV3MIBObjects 19 }

ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry   OBJECT-TYPE
    SYNTAX      Ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "For every Link Port of the Common Mean Link Delay Service of a
         time-aware system, the following cmldsLinkPortStatisticsDS
         provides counters. The number of such statistics sets is the
         same as the value of cmldsDefaultDS.numberLinkPorts."
    INDEX { ieee8021AsV3BridgeBasePort,
            ieee8021AsV3CmldsLinkPortStatDSIndex }
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSTable 1 }

Ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry ::=
  SEQUENCE {
    ieee8021AsV3CmldsLinkPortStatDSIndex           InterfaceIndexOrZero,
    ieee8021AsV3CmldsLinkPortStatDSRxPdelayRequestCount           Counter32,
    ieee8021AsV3CmldsLinkPortStatDSRxPdelayRspCount           Counter32,
    ieee8021AsV3CmldsLinkPortStatDSRxPdelayRspFollowUpCount   Counter32,
    ieee8021AsV3CmldsLinkPortStatDSRxPtpPacketDiscardCount        Counter32,
    ieee8021AsV3CmldsLinkPortStatDSPdelayAllowedLostRspExceededCount
Counter32,
    ieee8021AsV3CmldsLinkPortStatDSTxPdelayRequestCount           Counter32,
    ieee8021AsV3CmldsLinkPortStatDSTxPdelayRspCount           Counter32,
    ieee8021AsV3CmldsLinkPortStatDSTxPdelayRspFollowUpCount   Counter32
      }

ieee8021AsV3CmldsLinkPortStatDSIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An index to identify an entry in the Common Mean Link
         Port Statistics Data Set."
    REFERENCE   "14.17"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry 1 }

ieee8021AsV3CmldsLinkPortStatDSRxPdelayRequestCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Req message is
         received."
    REFERENCE   "14.17.2"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry 2 }

ieee8021AsV3CmldsLinkPortStatDSRxPdelayRspCount OBJECT-TYPE
    SYNTAX      Counter32
```

```
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Resp message is
         received."
    REFERENCE   "14.17.3"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry 3 }

ieee8021AsV3CmldsLinkPortStatDSRxPdelayRspFollowUpCount OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Resp_Follow_Up
         message is received."
    REFERENCE   "14.17.4"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry 4 }

ieee8021AsV3CmldsLinkPortStatDSRxPtpPacketDiscardCount
 OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a PTP message of the
         Common Mean Link Delay Service is discarded, caused by the
         occurrence of any of the conditions given in 14.17.5."
    REFERENCE   "14.17.5"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry 5 }

ieee8021AsV3CmldsLinkPortStatDSPdelayAllowedLostRspExceededCount
 OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time the value of the variable
         lostResponses exceeds the value of the variable
         allowedLostResponses, in the RESET state of the
         MDPdelayReq state machine."
    REFERENCE   "14.17.6"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry 6 }

ieee8021AsV3CmldsLinkPortStatDSTxPdelayRequestCount
 OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Req message is
         transmitted."
    REFERENCE   "14.17.7"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry 7 }

ieee8021AsV3CmldsLinkPortStatDSTxPdelayRspCount
 OBJECT-TYPE
```

```
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Resp message is
         transmitted."
    REFERENCE   "14.17.8"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry 8 }

ieee8021AsV3CmldsLinkPortStatDSTxPdelayRspFollowUpCount
 OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "A counter that increments every time a Pdelay_Resp_Follow_Up
         message is transmitted."
    REFERENCE   "14.17.9"
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSEntry 9 }

-- ============================================================
-- The Common Mean Link Delay Service Asymmetry Measurement Mode
-- Parameter Data Set represents the capability to enable/disable
-- the Asymmetry Compensation Measurement Procedure on a Link Port
-- (see Annex G).
-- ============================================================

ieee8021AsV3CommonMeanLinkDelayServiceAsymMeasurementModeDSTable   OBJECT-
TYPE
    SYNTAX      SEQUENCE OF
Ieee8021AsV3CommonMeanLinkDelayServiceAsymMeasurementModeDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Common Mean Link Delay Service Asymmetry Measurement Mode
         Parameter Data Set represents the capability to enable/disable
         the Asymmetry Compensation Measurement Procedure on a Link Port
         (see Annex G)."
    REFERENCE   "14.18"
    ::= { ieee8021AsV3MIBObjects 20 }

ieee8021AsV3CommonMeanLinkDelayServiceAsymMeasurementModeDSEntry   OBJECT-
TYPE
    SYNTAX
Ieee8021AsV3CommonMeanLinkDelayServiceAsymMeasurementModeDSEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table uses
         ieee8021AsV3CmldsAsymmetryMeasurementModeDSAsIndex,
         and corresponds to

ieee8021AsV3CommonMeanLinkDelayServiceAsymmetryMeasurementModeDSTable
         entry."
    INDEX { ieee8021AsV3BridgeBasePort,
            ieee8021AsV3CmldsAsymMeasurementModeDSAsIndex }
```

```
    ::= { ieee8021AsV3CommonMeanLinkDelayServiceAsymMeasurementModeDSTable 1
}

Ieee8021AsV3CommonMeanLinkDelayServiceAsymMeasurementModeDSEntry ::=
     SEQUENCE {
 ieee8021AsV3CmldsAsymMeasurementModeDSAsIndex InterfaceIndexOrZero,
 ieee8021AsV3CmldsAsymMeasurementModeDSAsymMeasurementMode    TruthValue
      }

ieee8021AsV3CmldsAsymMeasurementModeDSAsIndex OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object identifies the gPTP interface group within
         the system for which this entry contains information. It
         is the value of the instance of the IfIndex object,
         defined in the IF-MIB, for the gPTP interface group
         corresponding to this port, or the value 0 if the port
         has not been bound to an underlying frame source and
         sink.

         For a given media port of a Bridge or an end station,
         there can be one or more PTP Port, and depends whether
         a media port supports point to point link (e.g. IEEE
         802.3 Ethernet) or point to multi-point (e.g. CSN, IEEE
         802.3 EPON) links on the media port."
    REFERENCE   "IEEE Std 802.1AS
CommonMeanLinkDelaySvcAsymMeasurementModeParamDS Group PTP Port Index"
  ::= { ieee8021AsV3CommonMeanLinkDelayServiceAsymMeasurementModeDSEntry 1 }

ieee8021AsV3CmldsAsymMeasurementModeDSAsymMeasurementMode
    OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value is equal to the value of the Boolean
         asymmetryMeasurementMode(see G.3). For full-duplex
         IEEE 802.3 media, the value is TRUE (1) if an asymmetry
          measurement is being performed for the link attached to
         this Link Port, and FALSE (2) otherwise. For all other
         media, the value shall be FALSE (2) (see 10.2.4.2).
         Setting this managed object causes the Boolean
         allowedFaults to have the same value.
         NOTE: If an asymmetry measurement is being performed
         for a link, asymmetryMeasurementMode must be TRUE (1)
         for the Link Ports at each end of the link.
         There is one Common Mean Link Delay Service Asymmetry
         Measurement Mode Parameter Data Set Table for all PTP
         Instances, per Link Port."
    REFERENCE   "14.18.2"
  ::= { ieee8021AsV3CommonMeanLinkDelayServiceAsymMeasurementModeDSEntry 2 }

-- ****************************************************************
-- IEEE 802.1ASV3 MIB - Conformance Information
```

```
-- ****************************************************************
ieee8021AsV3Groups          OBJECT IDENTIFIER ::= { ieee8021AsV3Conformance
1 }
ieee8021AsV3Compliances     OBJECT IDENTIFIER ::= { ieee8021AsV3Conformance
2 }

-- ================================================================
-- units of conformance
-- ================================================================

ieee8021AsV3PtpInstanceGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3PtpInstanceName,
        ieee8021AsV3PtpInstanceRowStatus
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information for dynamic
         creation and deletion of PTP Instances and logical ports."
    ::= { ieee8021AsV3Groups 1 }

ieee8021AsV3DefaultDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3DefaultDSClockIdentity,
        ieee8021AsV3DefaultDSNumberPorts,
        ieee8021AsV3DefaultDSClockQualityClockClass,
        ieee8021AsV3DefaultDSClockQualityClockAccuracy,
        ieee8021AsV3DefaultDSClockQualityOffsetScaledLogVariance,
        ieee8021AsV3DefaultDSPriority1,
        ieee8021AsV3DefaultDSPriority2,
        ieee8021AsV3DefaultDSGmCapable,
        ieee8021AsV3DefaultDSCurrentUtcOffset,
        ieee8021AsV3DefaultDSCurrentUtcOffsetValid,
        ieee8021AsV3DefaultDSLeap59,
        ieee8021AsV3DefaultDSLeap61,
        ieee8021AsV3DefaultDSTimeTraceable,
        ieee8021AsV3DefaultDSFrequencyTraceable,
        ieee8021AsV3DefaultDSPtpTimescale,
        ieee8021AsV3DefaultDSTimeSource,
        ieee8021AsV3DefaultDSDomainNumber,
        ieee8021AsV3DefaultDSSdoId,
        ieee8021AsV3DefaultDSExternalPortConfigurationEnabled,
        ieee8021AsV3DefaultDSInstanceEnable
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the Default
         Parameter Data Set representing the native capabilities of a
         PTP Instance, i.e., a PTP Relay Instance or a PTP End Instance."
    ::= { ieee8021AsV3Groups 2 }

ieee8021AsV3CurrentDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3CurrentDSStepsRemoved,
        ieee8021AsV3CurrentDSOffsetFromTimeTransmitter,
        ieee8021AsV3CurrentDSLastGmPhaseChange,
```

```
        ieee8021AsV3CurrentDSLastGmFreqChange,
        ieee8021AsV3CurrentDSGmTimebaseIndicator,
        ieee8021AsV3CurrentDSGmChangeCount,
        ieee8021AsV3CurrentDSTimeOfLastGmChangeEvent,
        ieee8021AsV3CurrentDSTimeOfLastGmPhaseChangeEvent,
        ieee8021AsV3CurrentDSTimeOfLastGmFreqChangeEvent
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the Current
         Parameter Data Set representing the position of a local system
         and other information, relative to the Grandmaster PTP Instance."
    ::= { ieee8021AsV3Groups 3 }

ieee8021AsV3ParentDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3ParentDSParentClockIdentity,
        ieee8021AsV3ParentDSParentPortNumber,
        ieee8021AsV3ParentDSCumulativeRateRatio,
        ieee8021AsV3ParentDSGrandmasterIdentity,
        ieee8021AsV3ParentDSGrandmasterClockQualityclockClass,
        ieee8021AsV3ParentDSGrandmasterClockQualityclockAccuracy,
        ieee8021AsV3ParentDSGrandmasterClockQualityoffsetScaledLogVar,
        ieee8021AsV3ParentDSGrandmasterPriority1,
        ieee8021AsV3ParentDSGrandmasterPriority2
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the Parent
         Parameter Data Set representing capabilities of the upstream
         system, toward the Grandmaster PTP Instance, as measured at
         a local system."
    ::= { ieee8021AsV3Groups 4 }

ieee8021AsV3TimePropertiesDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3TimePropertiesDSCurrentUtcOffset,
        ieee8021AsV3TimePropertiesDSCurrentUtcOffsetValid,
        ieee8021AsV3TimePropertiesDSLeap59,
        ieee8021AsV3TimePropertiesDSLeap61,
        ieee8021AsV3TimePropertiesDSTimeTraceable,
        ieee8021AsV3TimePropertiesDSFrequencyTraceable,
        ieee8021AsV3TimePropertiesDSPtpTimescale,
        ieee8021AsV3TimePropertiesDSTimeSource
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the Time
         Properties Parameter Data Set representing capabilities of
         the Grandmaster PTP Instance, as measured at a local system."
    ::= { ieee8021AsV3Groups 5 }

ieee8021AsV3PathTraceDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3PathTraceDSEnable
    }
```

```
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the Path Trace
         Data Set representing the current path trace information
         available at the PTP Instance."
    ::= { ieee8021AsV3Groups 6 }

ieee8021AsV3PathTraceDSArrayTableGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3PathTraceDSArrayList
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information of an array of
         ClockIdentity values contained in the pathTrace array,
         representing the current path trace information, and which is
         carried in the path trace TLV per PTP Instance."
    ::= { ieee8021AsV3Groups 7 }

ieee8021AsV3AcceptableTimeTransmitterTableDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3AcceptableTimeTransmitterTableDSMaxTableSize,
        ieee8021AsV3AcceptableTimeTransmitterTableDSActualTableSize
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the
         Acceptable TimeTransmitter Table Data Set representing the
acceptable
         timeTransmitter table used when an EPON port is used by a PTP
Instance
         of a time-aware system."
    ::= { ieee8021AsV3Groups 8 }

ieee8021AsV3AcceptableTimeTransmitterTableDSArrayGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3AcceptableTimeTransmitterTableDSArrayPortIdentity,
        ieee8021AsV3AcceptableTTTableDSArrayAlternatePriority1
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the
         Acceptable TimeTransmitter Table Array Data Set representing the
         acceptable timeTransmitter table used when an EPON port is used by a
         PTP Instance of a time-aware system."
    ::= { ieee8021AsV3Groups 9 }

ieee8021AsV3PortDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3PortDSClockIdentity,
        ieee8021AsV3PortDSPortNumber,
        ieee8021AsV3PortDSPortState,
        ieee8021AsV3PortDSPtpPortEnabled,
        ieee8021AsV3PortDSDelayMechanism,
        ieee8021AsV3PortDSIsMeasuringDelay,
        ieee8021AsV3PortDSAsCapable,
```

```
        ieee8021AsV3PortDSMeanLinkDelay,
        ieee8021AsV3PortDSMeanLinkDelayThresh,
        ieee8021AsV3PortDSDelayAsym,
        ieee8021AsV3PortDSNbrRateRatio,
        ieee8021AsV3PortDSInitialLogAnnounceInterval,
        ieee8021AsV3PortDSCurrentLogAnnounceInterval,
        ieee8021AsV3PortDSUseMgtSettableLogAnnounceInterval,
        ieee8021AsV3PortDSMgtSettableLogAnnounceInterval,
        ieee8021AsV3PortDSAnnounceReceiptTimeout,
        ieee8021AsV3PortDSInitialLogSyncInterval,
        ieee8021AsV3PortDSCurrentLogSyncInterval,
        ieee8021AsV3PortDSUseMgtSettableLogSyncInterval,
        ieee8021AsV3PortDSMgtSettableLogSyncInterval,
        ieee8021AsV3PortDSSyncReceiptTimeout,
        ieee8021AsV3PortDSSyncReceiptTimeoutTimeInterval,
        ieee8021AsV3PortDSInitialLogPdelayReqInterval,
        ieee8021AsV3PortDSCurrentLogPdelayReqInterval,
        ieee8021AsV3PortDSUseMgtSettableLogPdelayReqInterval,
        ieee8021AsV3PortDSMgtSettableLogPdelayReqInterval,
        ieee8021AsV3PortDSInitialLogGptpCapableMessageInterval,
        ieee8021AsV3PortDSCurrentLogGptpCapableMessageInterval,
        ieee8021AsV3PortDSUseMgtSettableLogGptpCapableMessageInterval,
        ieee8021AsV3PortDSMgtSettableLogGptpCapableMessageInterval,
        ieee8021AsV3PortDSInitialComputeNbrRateRatio,
        ieee8021AsV3PortDSCurrentComputeNbrRateRatio,
        ieee8021AsV3PortDSUseMgtSettableComputeNbrRateRatio,
        ieee8021AsV3PortDSMgtSettableComputeNbrRateRatio,
        ieee8021AsV3PortDSInitialComputeMeanLinkDelay,
        ieee8021AsV3PortDSCurrentComputeMeanLinkDelay,
        ieee8021AsV3PortDSUseMgtSettableComputeMeanLinkDelay,
        ieee8021AsV3PortDSMgtSettableComputeMeanLinkDelay,
        ieee8021AsV3PortDSAllowedLostRsp,
        ieee8021AsV3PortDSAllowedFaults,
        ieee8021AsV3PortDSGPtpCapableReceiptTimeout,
        ieee8021AsV3PortDSVersionNumber,
        ieee8021AsV3PortDSNup,
        ieee8021AsV3PortDSNdown,
        ieee8021AsV3PortDSOneStepTxOper,
        ieee8021AsV3PortDSOneStepReceive,
        ieee8021AsV3PortDSOneStepTransmit,
        ieee8021AsV3PortDSInitialOneStepTxOper,
        ieee8021AsV3PortDSCurrentOneStepTxOper,
        ieee8021AsV3PortDSUseMgtSettableOneStepTxOper,
        ieee8021AsV3PortDSMgtSettableOneStepTxOper,
        ieee8021AsV3PortDSSyncLocked,
        ieee8021AsV3PortDSPdelayTruncTST1,
        ieee8021AsV3PortDSPdelayTruncTST2,
        ieee8021AsV3PortDSPdelayTruncTST3,
        ieee8021AsV3PortDSPdelayTruncTST4,
        ieee8021AsV3PortDSMinorVersionNumber
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on PTP Port
         related variables in a time-aware Bridge or for a time-aware
         end station."
```

```
    ::= { ieee8021AsV3Groups 10 }

ieee8021AsV3DescriptionPortDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3DescriptionPortDSProfileIdentifier
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the
         Description Port Data Set containing the profileIdentifier for
         this PTP profile, as specified in Annex F.1."
    ::= { ieee8021AsV3Groups 11 }

ieee8021AsV3PortStatIfGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3PortStatRxSyncCount,
        ieee8021AsV3PortStatRxOneStepSyncCount,
        ieee8021AsV3PortStatRxFollowUpCount,
        ieee8021AsV3PortStatRxPdelayRequestCount,
        ieee8021AsV3PortStatRxPdelayRspCount,
        ieee8021AsV3PortStatRxPdelayRspFollowUpCount,
        ieee8021AsV3PortStatRxAnnounceCount,
        ieee8021AsV3PortStatRxPtpPacketDiscardCount,
        ieee8021AsV3PortStatSyncReceiptTimeoutCount,
        ieee8021AsV3PortStatAnnounceReceiptTimeoutCount,
        ieee8021AsV3PortStatPdelayAllowedLostRspExceededCount,
        ieee8021AsV3PortStatTxSyncCount,
        ieee8021AsV3PortStatTxOneStepSyncCount,
        ieee8021AsV3PortStatTxFollowUpCount,
        ieee8021AsV3PortStatTxPdelayRequestCount,
        ieee8021AsV3PortStatTxPdelayRspCount,
        ieee8021AsV3PortStatTxPdelayRspFollowUpCount,
        ieee8021AsV3PortStatTxAnnounceCount
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the Port
         Statistics Data Set provideing counters associated with PTP Port
         capabilities at a given PTP Instance."
    ::= { ieee8021AsV3Groups 12 }

ieee8021AsV3AcceptableTimeTransmitterPortDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3AcceptableTTPortDSAcceptableTTTableEnabled
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information for the single
         PTP Port of a PTP End Instance and for each PTP Port of a
         PTP Relay Instance."
    ::= { ieee8021AsV3Groups 13 }

ieee8021AsV3ExternalPortConfigurationPortDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3ExternalPortConfigurationPortDSDesiredState
    }
```

```
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the
         External Port Configuration Port Data Set containing the
         single member desiredState, which indicates the desired state
         for the PTP Port."
    ::= { ieee8021AsV3Groups 14 }

ieee8021AsV3AsymmMeasurementModeDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3AsymmMeasurementModeDSAsymmMeasurementMode
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the
         Asymmetry Measurement Mode Data Set representing the capability
         to enable/disable the Asymmetry Compensation Measurement
         Procedure on a Link Port (see Annex G)."
    ::= { ieee8021AsV3Groups 15 }

ieee8021AsV3CommonServicesPortDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3CommonServicesPortDSCmldsLinkPortPortNumber
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the
         Common Services Port Data Set."
    ::= { ieee8021AsV3Groups 16 }

ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3CmldsDefaultDSClockIdentity,
        ieee8021AsV3CmldsDefaultDSNumberLinkPorts
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the
         CMLDs Default Data Set describing the per-time-aware-system
         attributes of the Common Mean Link Delay Service."
    ::= { ieee8021AsV3Groups 17 }

ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3CmldsLinkPortDSClockIdentity,
        ieee8021AsV3CmldsLinkPortDSPortNumber,
        ieee8021AsV3CmldsLinkPortDSCmldsLinkPortEnabled,
        ieee8021AsV3CmldsLinkPortDSIsMeasuringDelay,
        ieee8021AsV3CmldsLinkPortDSAsCapableAcrossDomains,
        ieee8021AsV3CmldsLinkPortDSMeanLinkDelay,
        ieee8021AsV3CmldsLinkPortDSMeanLinkDelayThresh,
        ieee8021AsV3CmldsLinkPortDSDelayAsym,
        ieee8021AsV3CmldsLinkPortDSNbrRateRatio,
        ieee8021AsV3CmldsLinkPortDSInitialLogPdelayReqInterval,
        ieee8021AsV3CmldsLinkPortDSCurrentLogPdelayReqInterval,
        ieee8021AsV3CmldsLinkPortDSUseMgtSettableLogPdelayReqInterval,
```

```
        ieee8021AsV3CmldsLinkPortDSMgtSettableLogPdelayReqInterval,
        ieee8021AsV3CmldsLinkPortDSInitialComputeNbrRateRatio,
        ieee8021AsV3CmldsLinkPortDSCurrentComputeNbrRateRatio,
        ieee8021AsV3CmldsLinkPortDSUseMgtSettableComputeNbrRateRatio,
        ieee8021AsV3CmldsLinkPortDSMgtSettableComputeNbrRateRatio,
        ieee8021AsV3CmldsLinkPortDSInitialComputeMeanLinkDelay,
        ieee8021AsV3CmldsLinkPortDSCurrentComputeMeanLinkDelay,
        ieee8021AsV3CmldsLinkPortDSUseMgtSettableComputeMeanLinkDelay,
        ieee8021AsV3CmldsLinkPortDSMgtSettableComputeMeanLinkDelay,
        ieee8021AsV3CmldsLinkPortDSAllowedLostRsp,
        ieee8021AsV3CmldsLinkPortDSAllowedFaults,
        ieee8021AsV3CmldsLinkPortDSVersionNumber,
        ieee8021AsV3CmldsLinkPortDSPdelayTruncTST1,
        ieee8021AsV3CmldsLinkPortDSPdelayTruncTST2,
        ieee8021AsV3CmldsLinkPortDSPdelayTruncTST3,
        ieee8021AsV3CmldsLinkPortDSPdelayTruncTST4,
        ieee8021AsV3CmldsLinkPortDSMinorVersionNumber
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information for every
         Link Port of the Common Mean Link Delay Service of a
         time-aware system."
    ::= { ieee8021AsV3Groups 18 }

ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSGroup OBJECT-GROUP
    OBJECTS {
        ieee8021AsV3CmldsLinkPortStatDSRxPdelayRequestCount,
        ieee8021AsV3CmldsLinkPortStatDSRxPdelayRspCount,
        ieee8021AsV3CmldsLinkPortStatDSRxPdelayRspFollowUpCount,
        ieee8021AsV3CmldsLinkPortStatDSRxPtpPacketDiscardCount,
        ieee8021AsV3CmldsLinkPortStatDSPdelayAllowedLostRspExceededCount,
        ieee8021AsV3CmldsLinkPortStatDSTxPdelayRequestCount,
        ieee8021AsV3CmldsLinkPortStatDSTxPdelayRspCount,
        ieee8021AsV3CmldsLinkPortStatDSTxPdelayRspFollowUpCount
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information for every
         Link Port Statistics of the Common Mean Link Delay Service of a
         time-aware system."
    ::= { ieee8021AsV3Groups 19 }

ieee8021AsV3CommonMeanLinkDelayServiceAsymMeasurementModeDSGroup OBJECT-
GROUP
    OBJECTS {
        ieee8021AsV3CmldsAsymMeasurementModeDSAsymMeasurementMode
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing information on the
         Common Mean Link Delay Service Asymmetry Measurement Mode
         Parameter Data Set representing the capability to enable/disable
         the Asymmetry Compensation Measurement Procedure on a Link Port
         (see Annex G)."
    ::= { ieee8021AsV3Groups 20 }
```

```
-- ============================================================
-- compliance statements
-- ============================================================

ieee8021AsV3Compliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement for devices supporting
         IEEE Std 802.1AS-2020."

    MODULE -- this module

    GROUP ieee8021AsV3PtpInstanceGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3DefaultDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3CurrentDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3ParentDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3TimePropertiesDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3PathTraceDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3PathTraceDSArrayTableGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3AcceptableTimeTransmitterTableDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3AcceptableTimeTransmitterTableDSArrayGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3PortDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3DescriptionPortDSGroup
    DESCRIPTION
        "Implementation of this group is optional."
```

```
    GROUP ieee8021AsV3PortStatIfGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3AcceptableTimeTransmitterPortDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3ExternalPortConfigurationPortDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3AsymMeasurementModeDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3CommonServicesPortDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3CommonMeanLinkDelayServiceDefaultDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3CommonMeanLinkDelayServiceLinkPortDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3CommonMeanLinkDelayServiceLinkPortStatDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    GROUP ieee8021AsV3CommonMeanLinkDelayServiceAsymMeasurementModeDSGroup
    DESCRIPTION
        "Implementation of this group is optional."

    ::= { ieee8021AsV3Compliances 1 }

END
```

16. Media-dependent layer specification for CSN

16.1 Overview

Change the first paragraph of 16.1 as follows:

Accurate synchronized time is distributed throughout a gPTP domain through time measurements between adjacent PTP Relay Instances or PTP End Instrances in a packet network. Time is communicated from the root of the clock spanning tree (i.e., the Grandmaster PTP Instance) toward the leaves of the tree (i.e., from leaf-facing "~~master~~timeTransmitter" ports to root-facing "~~slave~~timeReceiver" ports) through measurements made across the links connecting the PTP Instances. While the semantics of time transfer are consistent across the time-aware packet network, the method for communicating synchronized time from a ~~master~~timeTransmitter port to its immediate downstream link partner varies depending on the type of link interconnecting the two PTP Instances.

16.5 Synchronization messages

16.5.3 Synchronization message propagation on a CSN with network reference clock

16.5.3.3 CSN egress node

Change the third paragraph of 16.5.3.3 as follows:

The CSN egress port also modifies the Clock~~Slave~~TimeReceiverSync state machine (see 10.2.13) to get the upstreamTxTime, meanLinkDelay, neighborRateRatio, and delayAsymmetry values from the respective fields of the CSN TLV in the Follow_Up message (or Sync message in the one-step case) received from the CSN ingress node.

16.6 Specific CSN requirements

16.6.2 MoCA-specific behavior

Change the fourth paragraph of 16.6.2 as follows:

The MoCA port whose PTP Port state is ~~MasterPort~~TimeTransmitterPort propagates the Sync and Follow_Up messages (or only the Sync message in the one-step case) as described in 16.5.3. The CSN TLV values of the Follow_Up message sent over the MoCA network are computed using the LocalClock, i.e., the MoCA CTC.

Annex A

(normative)

Protocol Implementation Conformance Statement (PICS) proforma[6]

Change A.5 as follows:

A.5 Major capabilities

Item	Feature	Status	References	Support
DOM0	Does the time-aware system support a PTP Instance with domain number 0, in accordance with the requirements of 8.1?	M	item a) of 5.4, 8.1	Yes [ ]
DOMADD	Does the time-aware system support one or more PTP Instances with domain number in the range 1 to 127?	O	item f) of 5.4.2, 8.1	Yes [ ] No [ ]
MINTA	Does the PTP Instance support at least one PTP Port with minimal requirements?	M	10.2.13, item c) of 5.4, A.7	Yes [ ]
BT~~M~~C	Does the PTP Instance implement the best ~~master~~timeTransmitter clock algorithm?	M	10.2.13, item f) of 5.4, 10.3, A.9	Yes [ ]
SIG	Does the PTP Instance transmit Signaling messages?	O	10.2.13, item e) of 5.4.2, 10.6.4, A.8	Yes [ ] No [ ]
GMCAP	Is the PTP Instance capable of acting as a Grandmaster PTP Instance?	O	10.2.13, item c) of 5.4.2, 10.1.3, A.10	Yes [ ] No [ ]
BRDG	Does the PTP Instance act as a PTP Relay Instance on two or more PTP Ports?	O	item d) of 5.4.2, 5.4.3	Yes [ ] No [ ]
~~MIMSTR~~MITT	Does the PTP Instance support media-independent ~~master~~timeTransmitter functionality on at least one PTP Port?	GMCAP or BRDG:M	item b) of 5.4.2, A.11	Yes [ ] N/A [ ]
MIPERF	Does the PTP Instance support the performance requirements?	M	10.2.13, item j) of 5.4, A.12	Yes [ ]
EXT	Does the PTP Instance support external port configuration?	O	item g) of 5.4.2, A.21	Yes [ ] No [ ]
MDFDPP	Does the PTP Instance support media-dependent full-duplex point-to-point functionality on one or more PTP Ports?	O.1	5.5, Clause 11, A.6, A.13	Yes [ ] No [ ]
MDDOT11	Does the PTP Instance support media-dependent IEEE 802.11 link functionality on one or more PTP Ports?	O.1	5.6, Clause 12, A.6, A.14	Yes [ ] No [ ]

[6] *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.

A.5 Major capabilities *(continued)*

Item	Feature	Status	References	Support
MDEPON	Does the PTP Instance support IEEE 802.3 Passive Optical Networking (EPON)?	O.1	5.7, Clause 13, A.6, A.15	Yes [ ] No [ ]
MDGHN	Does the PTP Instance support media-dependent ITU-T G.hn functionality on one or more PTP Ports?	O.1	item b) of 5.8, 16.6.3, A.18	Yes [ ] No [ ]
MDMOCA	Does the PTP Instance support media-dependent MoCA functionality on one or more PTP Ports?	O.1	item b) of 5.8, 16.6.2, A.17	Yes [ ] No [ ]
MDCSN	Does the PTP Instance support media-dependent CSN functionality on one or more PTP Ports?	MDGHN or MDMOCA:M	5.8, Clause 16, A.6, A.16	Yes [ ] No [ ]
MGT	Is management of the PTP Instance supported?	O	item j) of 5.4.2, Clause 14	Yes [ ] No [ ]
RMGT	Is a remote management protocol supported?	MGT: O	item k) of 5.4.2, A.19	Yes [ ] No [ ]
APPL	Does the PTP Instance support one or more of the application interfaces?	O	item i) of 5.4.2, Clause 9, A.20	Yes [ ] No [ ]

1 ***Change A.7 as follows:***

A.7 Minimal time-aware system

Item	Feature	Status	References	Support
MINTA-1	Do all PTP Instances of the device implement the functionality specified by the SiteSyncSync state machine in Figure 10-3 in compliance with the requirements of 10.2.7?	M	item g) of 5.4, 10.2.7	Yes [ ]
MINTA-2	Do all PTP Instances of the device implement the functionality specified by the PortSyncSyncReceive state machine in Figure 10-4 on each PTP Port in compliance with the requirements of 10.2.8?	M	item d) of 5.4	Yes [ ]
MINTA-3	Do all PTP Instances of the device implement the functionality specified by the Clock~~Slave~~TimeReceiverSync state machine in Figure 10-9 in compliance with the requirements of 10.2.13?	M	10.2.13, item e) of 5.4	Yes [ ]
MINTA-4	For all PTP Instances of the device, does the PTP Port sending a Signaling message that contains a message interval request TLV adjust its syncReceiptTimeoutTimeInterval of this PTP Instance in compliance with the requirements of 10.6.4.3.7 and Table 10-16?	SIG:M	10.6.4.3.7	Yes [ ] N/A [ ]

A.7 Minimal time-aware system *(continued)*

Item	Feature	Status	References	Support
MINTA-5	Is the clockIdentity constructed in compliance with the requirements of 8.5.2.2?	M	8.5.2.2	Yes [ ]
MINTA-6	Is the domain number for all transmitted messages in the range 0 through 127, in compliance with the requirements of 8.1?	M	8.1	Yes [ ]
MINTA-7	Is the majorSdoId 0x1 and the minorSdoId 0x0 for all transmitted gPTP domain messages?	M	8.1	Yes [ ]
MINTA-8	Is the domain number for at least one of the gPTP domains supported by the time-aware system, in compliance with the requirements of 8.1?	M	8.1	Yes [ ]
MINTA-9	Is the IEEE 802.1AS time of domain 0 measured relative to the PTP epoch in compliance with the requirements of 8.2.2?	M	8.2.2	Yes [ ]
MINTA-10	If path delay asymmetry is modeled by this PTP Instance does it comply with the requirements of 8.3?	O	8.3	Yes [ ] No [ ]
MINTA-11	Do all derived data types that are transmitted in IEEE 802.1AS messages and headers comply with 6.4.4?	M	6.4.4	Yes [ ]
MINTA-12	Is the granularity of the local clock 40 ns or better in compliance with the requirements of B.1.2?	M	B.1.2	Yes [ ]
MINTA-13	Is the frequency of the local clock relative to TAI ± 100 ppm in compliance with the requirements of B.1.1?	M	B.1.1	Yes [ ]
MINTA-14	Does the PTP Instance ignore non-propagating TLVs of Announce and Signaling messages that it cannot parse, and attempt to parse the next TLV, in compliance with the requirements of 10.6.1?	M	10.6.1	Yes [ ]
MINTA-15	Does the PTP Instance support the state machines related to signaling gPTP capability?	M	item h) of 5.4, 10.4	Yes [ ]
MINTA-16	For receive of all messages and for transmit of all messages except Announce and Signaling, does the PTP Instance support the message requirements?	M	item i) of 5.4.1 , 10.5, 10.6, 10.7	Yes [ ]
MINTA-17	Does the PTP Instance support the gPTP requirements specified in Clause 8, including the PTP Instance attributes?	M	item a) of 5.4, Clause 8, 8.6.2	Yes [ ]

A.7 Minimal time-aware system *(continued)*

Item	Feature	Status	References	Support
MINTA-18	Does the PTP Instance support the requirements for time-synchronization state machines?	M	item b) of 5.4	Yes [ ]
MINTA-19	Does the PTP Instance implement the path trace TLV (i.e., process this TLV when received in an Announce message, and attach this TLV to a transmitted Announce message unless the TLV would cause the maximum frame size to be exceeded)?	M	10.3.11, 10.3.13, 10.3.14, 10.3.16	Yes [ ]
MINTA-20	Does the PTP Instance forward TLVs as required?	M	10.6.1	Yes [ ]

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2 ***Change A.9 as follows:***

A.9 Best ~~master~~timeTransmitter clock

Item	Feature	Status	References	Support
BT~~M~~C-1	Does the PTP Instance implement the functionality specified by the PortAnnounceReceive state machine in Figure 10-13 on each PTP Port in compliance with the requirements of 10.3.11?	M	10.3.11	Yes [ ]
BT~~M~~C-2	Does the PTP Instance implement the functionality specified by the PortAnnounceInformation state machine in Figure 10-14 on each PTP Port in compliance with the requirements of 10.3.12?	M	10.3.12	Yes [ ]
BT~~M~~C-3	Does the PTP Instance implement the functionality specified by the PortStateSelection state machine in Figure 10-15 on each PTP Port in compliance with the requirements of 10.3.13? NOTE—There is one instance of the PortStateSelection state machine for the PTP Instance, for each gPTP domain. Some of the PortStateSelection state machine computations are performed for each PTP Port, and some of the computations are performed for the PTP Instance as a whole (and all the computations are performed for each gPTP domain).	M	10.3.13	Yes [ ]

A.9 Best ~~master~~timeTransmitter clock *(continued)*

Item	Feature	Status	References	Support
BT~~M~~C-4	If the value of clockA's SystemIdentity is less than that of clockB, is clockA selected as Grandmaster PTP Instance in compliance with the requirements of 10.3.2?	M	10.3.2	Yes [ ]
BT~~M~~C-5	Does the value of priority1 comply with the requirements of 8.6.2.1?	M	8.6.2.1	Yes [ ]
BT~~M~~C-6	Does the value of clockClass comply with the requirements of 8.6.2.2?	M	8.6.2.2	Yes [ ]
BT~~M~~C-7	Does the value of priority2 comply with the requirements of 8.6.2.5?	M	8.6.2.5	Yes [ ]
BT~~M~~C-8	Does the value of clockAccuracy comply with requirements of 8.6.2.3?	M	8.6.2.3	Yes [ ]
BT~~M~~C-9	Does the value of offsetScaledVariance comply with the requirements of 8.6.2.4?	M	8.6.2.4	Yes [ ]
BT~~M~~C-10	Does the value of timeSource comply with requirements of 8.6.2.7 and Table 8-2?	M	8.6.2.7	Yes [ ]
BT~~M~~C-11	Is the PTP Port number equal to 1 in compliance with the requirements of 8.5.2.3?	~BRDG:M	8.5.2.3	Yes [ ] N/A [ ]
BT~~M~~C-12	Are the PTP Ports numbered 1 through N for each of N PTP Ports in compliance with the requirements of 8.5.2.3?	M	8.5.2.3	Yes [ ]
BT~~M~~C-13	Does the clockIdentity field comply with the requirements of 8.5.2.2?	M	8.5.2.2	Yes [ ]
BT~~M~~C-14	When no grandmaster-capable PTP Instance is available does the behavior of the PTP Instance comply with the requirements of 10.2.13.2, i.e., the clock~~Slave~~TimeReceiverTime should be provided by the local clock?	M	10.2.13.2	Yes [ ]
BT~~M~~C-15	Does the value of announceReceiptTimeout comply with the requirements of 10.7.3.2?	M	10.7.3.2	Yes [ ]
BT~~M~~C-16	Does the ~~SlavePort~~TimeReceiverPort remove the PTP Port from the BT~~M~~C selection after announceReceiptTimeout expires in compliance with the requirements of 10.7.3.2?	M	10.7.3.2	Yes [ ]
BT~~M~~C-17	Does the value of syncReceiptTimeout comply with the requirements of 10.7.3.1?	M	10.7.3.1	Yes [ ]
BT~~M~~C-18	Does the ~~SlavePort~~TimeReceiverPort remove the PTP Port from the BT~~M~~C selection after syncReceiptTimeout expires in compliance with 10.7.3.1?	M	10.7.3.1	Yes [ ]

A.9 Best ~~master~~timeTransmitter clock *(continued)*

Item	Feature	Status	References	Support
BT~~M~~C-19	Does the PTP Port sending a message interval request Signaling message adjust its announceReceiptTimeoutTimeInterval in compliance with the requirements of 10.6.4.3.8 and Table 10-17?	SIG:M	10.6.4.3.8	Yes [ ]
BT~~M~~C-20	If the PTP Instance implements the ClockSourceTime interface, does the value of lastGmPhaseChange comply with the requirements of 9.2.2 and 6.4.3.3?	O	9.2.2	Yes [ ] No [ ]
BT~~M~~C-21	Does the transmitted timing information comply with the requirements of 10.3.1, including specifications for externalPortConfigurationEnabled value of false?	GMCAP:M	10.3.1	Yes [ ] N/A [ ]
BT~~M~~C-22	Does the PTP Instance implement ~~BMCA~~BTCA requirements that are not listed in the preceding BT~~M~~C rows?	M	10.3.2, 10.3.3 10.3.4, 10.3.5, 10.3.6, 10.3.8, 10.3.10	Yes [ ]

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3 ***Change A.10 as follows:***

A.10 Grandmaster-capable PTP Instance

Item	Feature	Status	References	Support
	If GMCAP not supported, mark N/A.			N/A [ ]
GMCAP-1	Does the PTP Instance implement the functionality specified by the ClockTimeTransmitterSyncSend state machine in compliance with the requirements of 10.2.9 and Figure 10-5?	GMCAP:M	10.2.9	Yes [ ]
GMCAP-2	Does the PTP Instance implement the functionality specified by the ClockTimeTransmitterSyncOffset state machine in compliance with the requirements of 10.2.10 and Figure 10-6?	GMCAP:M	10.2.10	Yes [ ]
GMCAP-3	Does the device implement the functionality specified by the ClockTimeTransmitterSyncReceive state machine in compliance with the requirements of 10.2.11 and Figure 10-7?	GMCAP:M	10.2.11	Yes [ ]

Change A.11 as follows:

A.11 Media-independent ~~master~~timeTransmitter

Item	Feature	Status	References	Support
	If ~~MIMSTR~~MITT not supported, mark N/A.			N/A [ ]
~~MIMSTR~~MITT-1	Does the PTP Instance implement the functionality of the AnnounceIntervalSetting state machine in compliance with the requirements of 10.3.17 and Figure 10-19 on each PTP Port?	~~MIMSTR~~MITT:M	10.3.17	Yes [ ]
~~MIMSTR~~MITT-2	Does the PTP Instance implement the functionality of the PortSyncSyncSend state machine in compliance with the requirements of 10.2.9 and Figure 10-8 on each PTP Port?	~~MIMSTR~~MITT:M	10.2.9	Yes [ ]
~~MIMSTR~~MITT-3	Does the PTP Instance implement the functionality of the PortAnnounceTransmit state machine in compliance with the requirements of 10.3.16 and Figure 10-18 on each PTP Port?	~~MIMSTR~~MITT:M	10.3.16	Yes [ ]
~~MIMSTR~~MITT-4	Does the destination MAC address of all Announce messages equal 01:80:C2:00:00:0E?	~~MIMSTR~~MITT:M	10.5.3	Yes [ ]
~~MIMSTR~~MITT-5	Does the EtherType of all Announce messages equal 88-F7?	~~MIMSTR~~MITT:M	10.5.4	Yes [ ]
~~MIMSTR~~MITT-6	Do the sequence numbers of Announce messages comply with the requirements of 10.5.7?	~~MIMSTR~~MITT:M	10.5.7	Yes [ ]
~~MIMSTR~~MITT-7	Does the Announce message header comply with 10.6.2?	~~MIMSTR~~MITT:M	10.6.2	Yes [ ]
~~MIMSTR~~MITT-8	Does the Announce message body comply with the requirements in 10.6.3.1 and Table 10-11?	~~MIMSTR~~MITT:M	10.6.3.1	Yes [ ]
~~MIMSTR~~MITT-9	Are all Announce message reserved fields equal to 0?	~~MIMSTR~~MITT:M	10.6.1	Yes [ ]
~~MIMSTR~~MITT-10	If it is not otherwise specified, is the logAnnounceInterval equal to zero or within the allowed range?	~~MIMSTR~~MITT:M	10.7.2.1	Yes [ ]
~~MIMSTR~~MITT-11	Does the value of currentUtcOffset comply with the requirements of 8.2.3?	~~MIMSTR~~MITT:M	8.2.3	Yes [ ]
~~MIMSTR~~MITT-12	Do the values of the leap59, leap61, and currentUtcOffsetValid flags comply with the requirements of 10.3.8?	~~MIMSTR~~MITT:M	10.3.8	Yes [ ]

A.11 Media-independent ~~master~~timeTransmitter *(continued)*

Item	Feature	Status	References	Support
~~MIMSTR~~MITT-13	Does this PTP Instance ensure that messages that traverse it or originate from it are not transmitted with VLAN tags in complaince with the requirements of 11.3.3?	~~MIMSTR~~MITT:M	11.3.3	Yes [ ]
~~MIMSTR~~MITT-14	Is the computation of cumulative rateRatio in accordance with 10.2.8.3?	~~MIMSTR~~MITT:M	10.2.8.3	Yes [ ] N/A [ ]
~~MIMSTR~~MITT-15	For transmit of the Announce message, does the PTP Instance support the message requirements?	~~MIMSTR~~MITT:M	10.5, 10.6, 10.7	Yes [ ]

1

2 ***Change A.13 as follows:***

A.13 Media-dependent, full-duplex point-to-point link

Item	Feature	Status	References	Support
MDFDPP-1	Does this PTP Port implement the functionality of the MDSyncReceiveSM state machine in compliance with the requirements of 11.2.14 and Figure 11-6?	MDFDPP:M	11.2.14	Yes [ ]
MDFDPP-2	Does this PTP Port implement the functionality of the MDSyncSendSM state machine in compliance with the requirements of 11.2.15 and Figure 11-7?	~~MIMSTR~~MITT and MDFDPP:M	11.2.15	Yes [ ]
MDFDPP-3	Does this port implement the functionality of the MDPdelayRequest state machine in compliance with the requirements of 11.2.19 and Figure 11-9?	MDFDPP:M	11.2.19	Yes [ ]
MDFDPP-4	Does this port implement the functionality of the MDPdelayResponse state machine in compliance with the requirements of 11.2.20 and Figure 11-10?	MDFDPP:M	11.2.20	Yes [ ]
MDFDPP-5	Does this PTP Port implement the functionality of the SyncIntervalSetting state machine in compliance with the requirements of 10.3.18 and Figure 10-20?	MDFDPP:M	10.3.18, item c) of 5.5, 10.3.18	Yes [ ]
MDFDPP-6	Does this port implement the functionality of the LinkDelayIntervalSetting state machine in compliance with the requirements of 11.2.21 and Figure 11-11?	MDFDPP:M	11.2.21	Yes [ ]
MDFDPP-7	Does this PTP Port timestamp Sync messages on ingress with respect to the LocalClock in compliance with 11.3.2.1 and 11.3.9?	MDFDPP:M	11.3.2.1	Yes [ ]

A.13 Media-dependent, full-duplex point-to-point link *(continued)*

Item	Feature	Status	References	Support
MDFDPP-8	Does this PTP Port timestamp Sync messages on egress with respect to the LocalClock in compliance with the requirements of 11.3.2.1 and 11.3.9?	~~MIMSTR~~MITT and MDFDPP:M	11.3.2.1	Yes [ ]
MDFDPP-9	Does this port timestamp Pdelay_Req messages on ingress and egress with respect to the LocalClock in compliance with the requirements of 11.3.2.1 and 11.3.9?	MDFDPP:M	11.3.2.1	Yes [ ]
MDFDPP-10	Does this port timestamp Pdelay_Resp messages on ingress and egress with respect to the LocalClock in compliance with the requirements of 11.3.2.1 and 11.3.9?	MDFDPP:M	11.3.2.1	Yes [ ]
MDFDPP-11	Are all IEEE 802.1AS messages on this port sent without a Q-tag in compliance with the requirements of 11.3.3?	MDFDPP:M	11.3.3	Yes [ ]
MDFDPP-12	Do all media-dependent messages transmitted on this port use a destination MAC address taken from Table 11-3 in compliance with the requirements of 11.3.4 [01-80-C2-00-00-0E]?	MDFDPP:M	11.3.4	Yes [ ]
MDFDPP-13	Do all media-dependent messages transmitted on this port use a source MAC address that is assigned to that port in compliance with the requirements of 11.3.4?	MDFDPP:M	11.3.4	Yes [ ]
MDFDPP-14	Do all media-dependent message tranmitted on this port us an EtherType specified in Table 11-4 [88-F7]?	MDFDPP:M	11.3.5	Yes [ ]
MDFDPP-15	Does the header of all the media-dependent messages on this port comply with the requirements of 11.4.2 and Table 10-7?	MDFDPP:M	11.4.2	Yes [ ] N/A [ ]
MDFDPP-16	Does the body of Sync messages sent on this PTP Port comply with the requirements of 11.4.3, Table 11-8, and Table 11-9?	MDFDPP:M	11.4.3	Yes [ ]
MDFDPP-17	Does the body of Follow_Up messages sent on this PTP Port comply with the requirements of 11.4.4, 6.4.3.3 (lastGmPhaseChange), and Table 11-10?	MDFDPP:M	11.4.4, 6.4.3.3	Yes [ ]
MDFDPP-18	Does the body of Pdelay_Req messages sent on this port comply with the requirements of 11.4.5 and Table 11-12?	MDFDPP:M	11.4.5	Yes [ ]
MDFDPP-19	Does the body of Pdelay_Resp messages sent on this port comply with the requirements of 11.4.6 and Table 11-13?	MDFDPP:M	11.4.6	Yes [ ]
MDFDPP-20	Does the body of Pdelay_Resp_Follow_Up messages sent on this port comply with the requirements of 11.4.7 and Table 11-14?	MDFDPP:M	11.4.7	Yes [ ]

A.13 Media-dependent, full-duplex point-to-point link *(continued)*

Item	Feature	Status	References	Support
MDFDPP-21	Are all reserved fields in media-dependent messages sent on this port set to 0 in compliance with the requirements of 11.4.1?	MDFDPP:M	11.4.1	Yes [ ]
MDFDPP-22	Do the Sync message sequence numbers comply with the requirements of 11.3.8?	~~MIMSTR~~MITT and MDFDPP:M	11.3.8	Yes [ ] N/A [ ]
MDFDPP-23	Do the Pdelay_Req message sequence numbers comply with the requirements of 11.3.8?	MDFDPP:M	11.3.8	Yes [ ]
MDFDPP-24	Does the Pdelay mean request transmission interval comply with the requirements of 11.5.2.2?	MDFDPP:M	11.5.2.2	Yes [ ]
MDFDPP-25	Does the Sync mean transmission interval comply with the requirements of 11.5.2.3?	MDFDPP:M	11.5.2.3	Yes [ ]
MDFDPP-26	Does the full-duplex point-to-point media-dependent layer set the asCapable global variable in the media-independent PortSync entity in compliance with the requirements of 11.2.2?	MDFDPP:M	11.2.2	Yes [ ]
MDFDPP-27	Does the device's use of flow control comply with the requirements of 11.2.3 and 11.2.4?	MDFDPP:M	11.2.3, 11.2.4	Yes [ ]
MDFDPP-28	Does the PTP Instance or CMLDS consider the PTP Port or Link Port, respectively, to not be exchanging Pdelay messages when a valid response is not received in compliance with the requirements of 11.5.3?	MDFDPP:M	11.5.3	Yes [ ]
MDFDPP-29	Does the PTP Instance ignore TLVs, of PTP messages, that it cannot parse and attempt to parse the next TLV, in compliance with the requirements of 11.4.1?	MDFDPP:M	11.4.1	Yes [ ]
MDFDPP-30	Does the time-aware system initialize meanLinkDelayThresh as specified in 11.2.2?	MDFDPP:M	11.2.2	Yes [ ]
MDFDPP-31	Does this port of the time-aware system support asymmetry measurement mode (see Annex G for informative description)?	MDFDPP:O	14.13, 14.18, 10.2.5, 10.2.8, 10.3.12, 10.3.13, 10.3.15, 10.3.16, 11.2.14, 11.2.15, 11.2.20	Yes [ ] No [ ]
MDFDPP-32	Does this PTP Port support one-step receive?	MDFDPP:O	11.2.14	Yes [ ] No [ ]
MDFDPP-33	Does this PTP Port support one-step transmit?	MDFDPP:O	11.2.15	Yes [ ] No [ ]

A.13 Media-dependent, full-duplex point-to-point link *(continued)*

Item	Feature	Status	References	Support
MDFDPP-34	Does this PTP Port implement the functionality of the OneStepTxOperSetting state machine in compliance with the requirements of 11.4, 11.2.16, and Figure 11-8?	MDFDPP:O	11.4, 11.2.16	Yes [ ] No [ ]
MDFDPP-35	Does this port support propagation delay averaging?	MDFDPP:O	11.2.19.3.4	Yes [ ] No [ ]
MDFDPP-36	If the time-aware system implements more than one domain, does the time-aware system provide CMLDS?	MDFDPP:M	11.2.17.1	Yes [ ]
MDFDPP-37	If the time-aware system implements only one domain, does the time-aware system provide CMLDS?	MDFDPP:O	11.2.17.2	Yes [ ] No [ ]

Change A.14 as follows:

A.14 Media-dependent IEEE 802.11 link

Item	Feature	Status	References	Support
MDDOT11-1	Does the IEEE 802.11 MAC implement the ~~master~~timeTransmitter port functionality in compliance with the requirements of 12.5.1?	MDDOT11 and ~~MIMSTR~~MITT: M	item d) of 5.6, 12.5.1	Yes [ ]
MDDOT11-2	Does the IEEE 802.11 MAC implement the ~~slave~~timeReceiver port functionality in compliance with the requirements of 12.5.2?	MDDOT11:M	item a), item b), and item d) of 5.6, 12.5.2	Yes [ ]
MDDOT11-3	Does the IEEE 802.11 MAC determine the value of asCapable in compliance with the requirements of 12.4?	MDDOT11:M	12.4	Yes [ ]
MDDOT11-4	Does the IEEE 802.11 MAC determine the value of mean time interval between synchronization messages in compliance with the requirements of 12.8?	MDDOT11 and ~~MIMSTR~~MITT: M	12.8	Yes [ ]
MDDOT11-5	Does the IEEE 802.11 MAC support the use of the VendorSpecific information element of 12.7 to carry end-to-end link-independent timing information?	MDDOT11:M	12.7	Yes [ ]
MDDOT11-6	Does the IEEE 802.11 MAC implement Fine Timing Measurement as a ~~master~~timeTransmitter port?	MDDOT11-1:O	item c) and item e) of 5.6, 12.5.1	Yes [ ] No [ ]
MDDOT11-7	Does the IEEE 802.11 MAC implement Fine Timing Measurement as a ~~slave~~timeReceiver port?	MDDOT11-2:O	item c) and item e) of 5.6, 12.5.2	Yes [ ] No [ ]

Change A.15 as follows:

A.15 Media-dependent IEEE 802.3 EPON link

Item	Feature	Status	References	Support
MDEPON-1	Does the TIMESYNC message format comply with the requirements of 13.3 and Table 13-1?	MDEPON:M	13.3	Yes [ ]
MDEPON-2	Does the PTP Instance implement the functionality specified by the requester state machine in compliance with the requirements of 13.8.1 and Figure 13-3?	MDEPON and ~~MIMSTR~~MITT:M	13.8.1.4	Yes [ ]
MDEPON-3	Does the PTP Instance implement the functionality specified by the responder state machine in compliance with the requirements of 13.8.2 and Figure 13-4?	MDEPON:M	13.8.2.4	Yes [ ]
MDEPON-4	Does the TIMESYNC message transmission interval comply with the requirements of 13.9.1 and 13.9.2?	MDEPON:M	13.9.1, 13.9.2	Yes [ ]
MDEPON-5	Does the implementation of best ~~master~~timeTransmitter selection comply with the requirements of 13.1.3?	MDEPON:M	13.1.3	Yes [ ]
MDEPON-6	Does the determination of the value of asCapable comply with the requirements of 13.4?	MDEPON:M	13.4	Yes [ ]

Change A.16 as follows:

A.16 Media-dependent CSN link

Item	Feature	Status	References	Support
MDCSN-1	Does the PTP Instance implement the functionality of the MDSyncSendSM state machine in compliance with 11.2.15?	MDCSN and ~~MIMSTR~~MITT:M	11.2.15	Yes [ ]
MDCSN-2	Does the PTP Instance implement the functionality of the MDSyncReceiveSM state machine in compliance with 11.2.14?	MDCSN:M	11.2.14	Yes [ ]
MDCSN-3	Does the PTP Instance calculate path delay in compliance with the requirement of 16.4?	MDCSN:M	16.4.1, 16.4.2, 16.4.3	Yes [ ]
MDCSN-4	Does the PTP Instance propagate synchronized time in compliance with the requirements of 16.5?	MDCSN:M	16.5.2, 16.5.3	Yes [ ]
MDCSN-5	Does the PTP Instance act as Grandmaster PTP Instance in compliance with the requirements of 16.7?	GMCAP and MDCSN:M	16.7	Yes [ ]
MDCSN-6	Does the PTP Instance comply with the performance requirements of 16.8?	GMCAP and MDCSN:M	16.8	Yes [ ]

Annex F

(informative)

PTP profile included in this standard

F.4 PTP options

Change F.4 a), b), and k) as follows:

a) The ~~BMCA~~BTCA of this standard is the default ~~BMCA~~BTCA according to the specifications of 9.3 of IEEE Std 1588-2019.

b) The following options of 17.7 of IEEE Std 1588-2019 are invoked:

1) The FAULTY state is not used.

2) The UNCALIBRATED state is not used.

3) The LISTENING state is not used

4) The PRE_~~MASTER~~TIME_TRANSMITTER state, and PRE_~~MASTER~~TIME_TRANSMITTER qualification are not used.

5) The foreign ~~master~~timeTransmitter feature is not used.

k) The acceptable ~~master~~timeTransmitter table feature of IEEE Std 1588-2019 is used with IEEE 802.3 EPON links to ensure that the OLT is ~~master~~timeTransmitter and ONUs are ~~slave~~timeReceivers.

Annex G

(informative)

The asymmetry compensation measurement procedure based on line-swapping

G.2 Pre-conditions for measurement

Change G.2 a) as follows:

a) The measurement environment, including the testing nodes (i.e., the time-aware systems at the endpoint of the link whose asymmetry is being compensated) and related nodes (i.e., nodes in the paths between the testing nodes and the Grandmaster PTP Instance), should enable gPTP and the ~~BMCA~~BTCA so that the test can be made for each link without changing the configuration.

G.3 Measurement procedure

Replace Figure G-1 with the following figure:

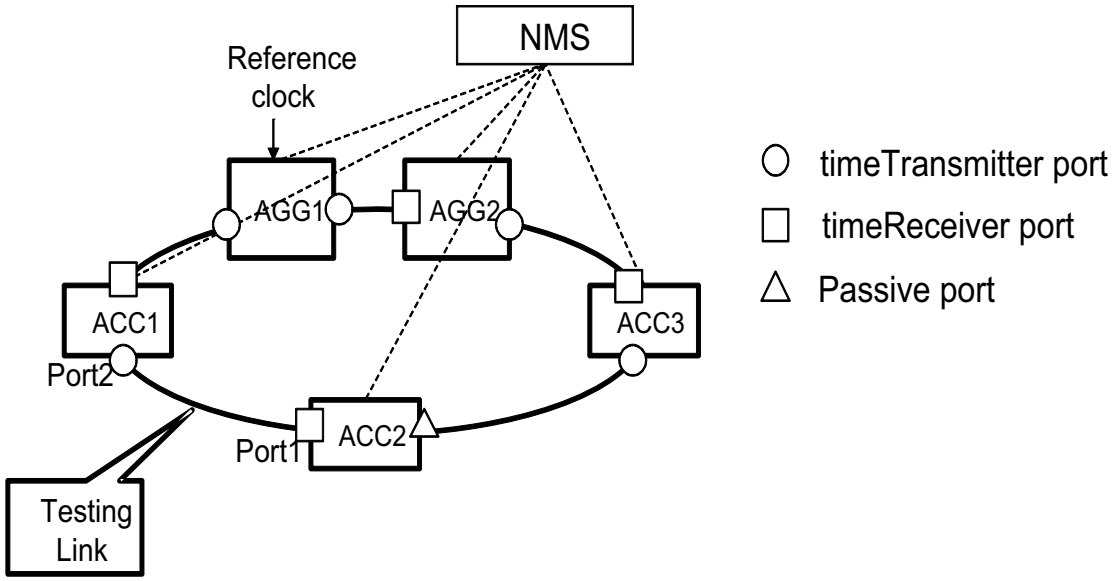

Figure G-1—Asymmetry compensation measurement procedure

Change G.3 a) as follows:

a) The NMS puts Port1 of ACC2 and Port2 of ACC1 into asymmetry measurement mode through the MIB (i.e., by setting the managed object asymmetryMeasurementMode for each port to TRUE). These two ports will not affect the PTP calculations of either node when the ports are in asymmetry measurement mode. If synchronization flowed over the link connecting these ports prior to their being put into asymmetry measurement node, the ~~BMCA~~BTCA will result in a reconfiguration of the synchronization spanning tree so that both ACC1 and ACC2 remain synchronized.