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Part 1AS: Timing and synchronization for time-sensitive applications in bridged local area networks

AMENDMENT 3: Hot standby and clock drift error reduction

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseaux locaux et métropolitains —

Partie 1AS: Temporisation et synchronisation pour les applications sensibles au temps des réseaux locaux pontés

AMENDEMENT 3: Secours immédiat et réduction d'erreur de dérive d'horloge

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IEEE Std 802.1ASdr™-2024,
and IEEE Std 802.1ASdn™-2024)

IEEE Standard for
Local and Metropolitan Area Networks—

Timing and Synchronization for Time-Sensitive Applications

Amendment 3: Hot Standby and Clock Drift Error Reduction

Developed by the

LAN/MAN Standards Committee
of the
IEEE Computer Society

Approved 26 September 2024

IEEE SA Standards Board

Abstract: This amendment to IEEE Std 802.1AS™-2020 specifies hot standby and addresses errors and omissions in the description of existing functionality.

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

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Introduction

This introduction is not part of IEEE Std 802.1ASdm-2024, IEEE Standard for Local and Metropolitan Area Networks—Timing and Synchronization for Time-Sensitive Applications—Amendment 3: Hot Standby and Clock Drift Error Reduction.

The first edition of IEEE Std 802.1AS was published in 2011. A first corrigendum, IEEE Std 802.1AS™-2011/Cor 1-2013, provided technical and editorial corrections. A second corrigendum, IEEE Std 802.1AS™-2011/Cor 2-2015 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/Cor 1-2021, provides technical and editorial corrections.

This amendment to IEEE Std 802.1AS-2020 specifies hot standby and addresses errors and omissions in the description of existing functionality. Hot standby guards against the failure of a single Grandmaster PTP Instance or the failure of communication from that Grandmaster PTP Instance to a Clock Target.

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Timing and Synchronization for Time-Sensitive Applications

Amendment 3: Hot Standby and Clock Drift Error Reduction

(This amendment is based on IEEE Std 802.1AS™-2020 as amended by IEEE Std 802.1AS™-2020/Cor 1-2021, IEEE Std 802.1ASdr-2024, and IEEE Std 802.1ASdn-2024.)

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.[6]

[6] 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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3. Definitions

Insert 3.3a after 3.3 "clock", as follows:

3.3a default: The value of an implementation parameter or capability selection, in the absence of an overriding profile standard requirement or explicit configuration.

Insert 3.6a after 3.6 "end station", as follows:

3.6a epoch: The origin of a timescale.

Change 3.14 as follows:

3.14 Grandmaster PTP Instance: A PTP Instance containing the Grandmaster Clock.

NOTE—None of the PTP Ports of a Grandmaster PTP Instance is in the TimeReceiverPort state.

Insert 3.20a after 3.20 "primary reference", as follows:

3.20a profile standard: A standard specifying the capabilities, options, and parameter values of one or more base standards for use in a specific target environment or application.

Insert 3.27a after 3.27 "residence time", as follows:

3.27a sdoId: An attribute that is the primary mechanism for providing isolation of PTP Instances operating under a PTP profile specified by one Qualified Standards Development Organization (QSDO) from PTP Instances operating under a PTP profile specified by a different QSDO (see 7.1.3 and 7.1.4 of IEEE Std 1588-2019).

Insert 3.32a after 3.32 "time-aware system", as follows:

3.32a timescale: A measure of elapsed time since an epoch.

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