

Title: Liaison response to liaison statement “Towards a Solution to the VLAN Issue of gPTP”
From: IEEE 802.1 Working Group¹
For: Action
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Date: January 24, 2025

Dear Colleagues,

The IEEE 802.1 Working Group would like to thank the Japan Automotive Software Platform and Architecture (JASPAR) organization for the information provided in liaison statement “Towards a Solution to the VLAN Issue of gPTP” <https://www.ieee802.org/1/files/public/docs2024/dg-Nomura-JASPAR-gPTP-VLAN-issue-1124-v03.pdf>.

Our understanding is that solutions have been developed and deployed to provide multiple time domains for the Precision Time Protocol (PTP) and for the generalized Precision Time Protocol (gPTP) before the introduction of support for multiple time domains in IEEE Std 1588 and IEEE Std 802.1AS. In our understanding, some of these solutions use VLAN tags in gPTP Protocol Data Units (PDUs), e.g., to identify and distinguish different time domains and for other legacy reasons.

IEEE Std 1588 and IEEE Std 802.1AS have been and continue to be developed using the IEEE Standards Association’s consensus building process with the involvement of participants from multiple industries. As part of this development process, IEEE Std 1588 and IEEE Std 802.1AS have been equipped with the capability to support multiple time domains. In both standards, a time domain is identified by two numbers: a 12-bit sdoId (Standards Development Organization Identifier) and a distinct domain number in the range 0 through 127. The domain number and the sdoId are carried in the common header of all PTP messages.

We understand the potential for interoperability issues with implementations that provided support for multiple time domains before they were supported by IEEE Std 1588 and IEEE Std 802.1AS, while also understanding the reasons some segments of the Time-Sensitive Networking (TSN) ecosystem developed such support ahead of the IEEE standards. Ultimately however, a single standardized solution to a given problem is a goal of the standardization process as it facilitates interoperability and economies of scale. In contrast, multiple solutions can be detrimental to interoperability and limit economies of scale.

¹ This document solely represents the views of the IEEE 802.1 Working Group, and does not necessarily represent a position of IEEE, or the IEEE Standards Association, or IEEE 802.

With respect to the problem in the referenced liaison statement, we have carefully considered the implications of allowing VLAN-tagged gPTP PDUs in IEEE Std 802.1AS and believe it would do little to address interoperability issues in the automotive segment while at the same time limiting the long-term ability of the segment to take advantage of broad economies of scale. It would also create the potential for interoperability issues across all industries using IEEE Std 802.1AS (e.g., aerospace, industrial automation, professional audio-video, etc.).

The current situation is that the interoperability issue is in the automotive segment, between devices that only process untagged gPTP PDUs and are therefore compliant to IEEE Std 802.1AS and devices that transmit and receive VLAN-tagged gPTP PDUs and are therefore not compliant to IEEE Std 802.1AS. Allowing VLAN-tagged gPTP PDUs in IEEE Std 802.1AS would not alter this fact; it would merely allow both types of devices to claim compliance with IEEE Std 802.1AS. With or without IEEE Std 802.1AS support for VLAN-tagged gPTP PDUs, in the short term, system builders in the automotive segment will need to be aware of the solution their network is employing and plan accordingly.

We acknowledge JASPAR will maintain its current solution for multiple time domains for as long as makes commercial sense, while recognizing that it is not an IEEE Std 802.1AS solution. However, for the reasons cited above and out of concern for maintaining interoperability, we respectfully recommend migrating to using the domain number-based multi-domain solution developed across the IEEE 1588 and IEEE 802.1 Working Groups. This would enable greater economies of scale and put all concerned stakeholders on a sustainable evolution path. We welcome further discussion on this recommendation.

Please note that the IEEE 802 work is open and contribution driven. Participation is on an individual basis and technical discussion can be conducted based on individual contributions. The TSN Task Group of the IEEE 802.1 Working Group holds regular electronic meetings: details can be found at <https://1.ieee802.org/wg-calendar>.

Respectfully submitted,
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Chair, IEEE 802.1 Working Group