

# Towards a Solution to the VLAN Issue of gPTP



***Japan  
Automotive  
Software  
Platform  
and  
Architecture***

**11<sup>th</sup> November 2024**

**Takumi Nomura, JASPAR, Honda  
Yoshihiro Ito, JASPAR, Nagoya Institute of Technology  
Hideki Goto, JASPAR, Toyota  
Hisaki Iwai, JASPAR, Bosch**

**Martin Lunt, Autosar, Bosch**

**Pinglei Wang, Autosar, Mercedes-Benz**

# A situation we should share.

## [Background & Facts]

- 802.1AS prohibits the use of VLANs.
- 802.1DG does not specify the profile regarding time synchronization.
- AUTOSAR permits VLANs as an option.
- Whatever the standard, there will be products that perform time synchronization over VLANs.

## [Situation to be resolved]

- Mixing the above can cause problems.
- It is too late to eliminate VLAN from the automotive industry.
- There are no guidelines for handling VLAN in time synchronization.

**As SDV is gaining attention and TSN is becoming inevitable, Time Synchronization must be available and easy for OEMs.**

# We have a good precedent.

When we first proposed making “Announce Message” optional, we were criticized.[\*]

**Background**

JASPAR has already shown the differences in the profiles between AUTOSAR and IEEE P802.1DG from the neutral viewpoint and the problems caused by them. (2022 July and November plenary)

Based on the above discussion, we present a concrete amendment to be added to the draft. Moreover, we will also show one of the problems if the differences still need to be resolved.

Item	802.1AS	P802.1DG	AUTOSAR
Use of BMCA	Yes	Not used	Not used
Use of Announce message	Yes	Yes	Not used
Use of Signaling message	Yes	Undefined	Not used
Use of Pdelay message	Yes	Yes	Measurement is optional
Sync message format	2-Step/1-Step	2-Step	2-Step
Multiple time domains	Yes	Yes	Yes (non-Std.)
Use of VLAN and priority	Not used	Undefined	Optional

IEEE 802.1DG, March, 2023 Plenary 2

**The problems cannot be overlooked for OEMs**

While AUTOSAR specification CANNOT use Announce Message, OEMs are urged to select one bridge specification among AUTOSAR or 802.1DG. ⇒ OEMs choose only AUTOSAR if the 802.1DG bridge is not off the shelf.

When profiles of AUTOSAR and 802.1DG are mixed in the same system, the below problem occurs for example. ⇒ OEMs have no choice but to unite into AUTOSAR. (This means 802.1DG will be prohibited.)

Announce Message is not propagated since the AUTOSAR-based Tsync bridge does not support it. Even if 802.1DG makes Announce Message mandatory, it will be ignored by the AUTOSAR-based bridge. The feature which 802.1DG wanted can not be achieved.

Because of the AUTOSAR-based bridge, the 802.1DG compliance slave never receives Announce Message. The behavior after receiving Sync Message without Announce Message in advance is not investigated.

When Sync Message is received, AUTOSAR based Slave will work properly.

IEEE 802.1DG, March, 2023 Plenary 4

## P802.1ASeb – Optional Use of Announce

[Contents \[hide\]](#)

[Current Status](#)  
[Archive](#)  
[Contributions](#)

This amendment provides additions and modifications to enable the Announce message functionality to be optional on new implementations, while maintaining the ability for implementations to support backward compatibility, interoperability, and full conformance with IEEE Std 1588™-2019. Protocols, procedures, and managed objects are updated if and as required to reflect the availability and use of Announce. This amendment also includes technical and editorial corrections in the description of existing IEEE Std 802.1AS functionality.

Thanks to Don Pannel,  
“Optional Use of Announce” was allowed.



The optional use of VLAN can also be discussed.

[\*] dg-Nomura-JASPAR-Use-Cases-0314-v05, 06, 07

# Conclusion

---

The purpose of this presentation is to make people aware of the existence of the problem.

For OEM engineers, this VLAN issue of gPTP is a **trap**.

I would like to ask for your open-mindedness in helping to solve the problem so that TSN can be used without worries.

AUTOSAR and JASPAR support the harmonization of the specifications. If necessary, we will make an additional presentation in March Plenary.

# The history of VLANs in AVB

**Audio Video Bridging (AVB) Assumptions**  
IEEE 802.1 AVB Plenary  
July 2008 – Denver, CO (*annotated Sept 2008 – Seoul, Korea*)  
Green Text = Agreed to at a Plenary (was Blue)  
Blue Text = Newly Agreed to (was Red at last Face 2 Face)  
Black Text = Not Decided  
Changes Marked with Red from last version

Don Pannell & *Michael Johas Teener*  
Marvell & *Broadcom*  
[dpannell@marvell.com](mailto:dpannell@marvell.com) & [mikejt@broadcom.com](mailto:mikejt@broadcom.com)

September 17, 2008 IEEE 802.1 AVB 1

Around 2008, it was decided that VLAN TAG would be used **except for only PTP frames** in the AVB Assumptions.

## AVB Frame Format

- 802.1 Q Tagging
  - All AVB Streams will be Q Tagged *(BA)*
    - Talkers that are not VLAN aware must use a VID of 0x000 in these frames
    - Bridges transmitting to Listeners must not strip the Q Tag on AVB classes or other traffic of the same VLAN
  - All PTP frames (for 802.1AS) will NOT be Q Tagged *(AS)*
  - All SRP frames (for 802.1Qat) will be Q Tagged *(Qat)*
  - All Q Tagged frames must be single Tagged at a Talker and a Listener
- VLANs
  - The VID is a VLAN and not a Stream Identifier
  - Stream Identifiers must be unique per VID
- Ether types
  - The Ether type of a frame is not a Stream Identifier
- Priorities *(BA)*
  - AVB Class A Streams will use a default Q Tag priority of 5 (PCP)
  - AVB Class B Streams will use a default Q Tag priority of 4 (PCP)

This assumption is for AVB, not TSN.

Automotive use cases such as SDV have not been considered at the time.

Now that TSN use cases are becoming diverse, this assumption should be reconsidered unless there is an acceptable reason for automotive industry.