Towards a Solution to the VLAN Issue of gPTP



Japan
Automotive
Software
Platform
and
Architecture

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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]

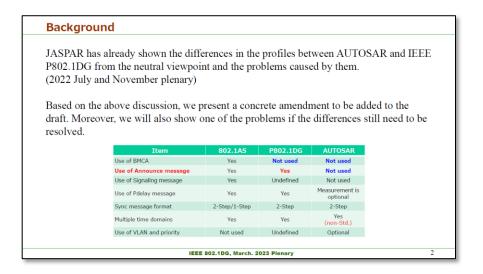
- Mixing the above can cause problems.
- It is too late to eliminate VLAN form the automotive industry.
- There are no guidelines for handling VLAN in time synchronization.

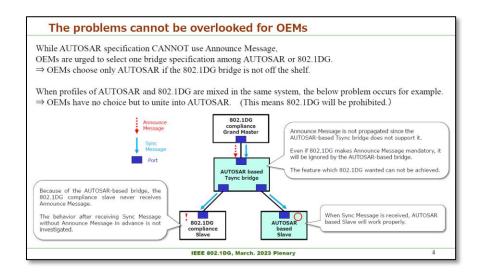
As SDV is gaining attention and TSN is becoming inevitable, Time Synchronization must be available and easy for OEMs.



We have a good precedent.

When we first proposed making "Announce Message" optional, we were criticized.[*]





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

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Marvell & Broadcom

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September 17, 2008 IEEE 802.1 AVB

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 MB 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)

September 17, 2008

IEEE 802.1 AVB

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.