Proposal of the Detail of Time Sync Automotive Profile

Japan
Automotive
Software
Platform
and
Architecture

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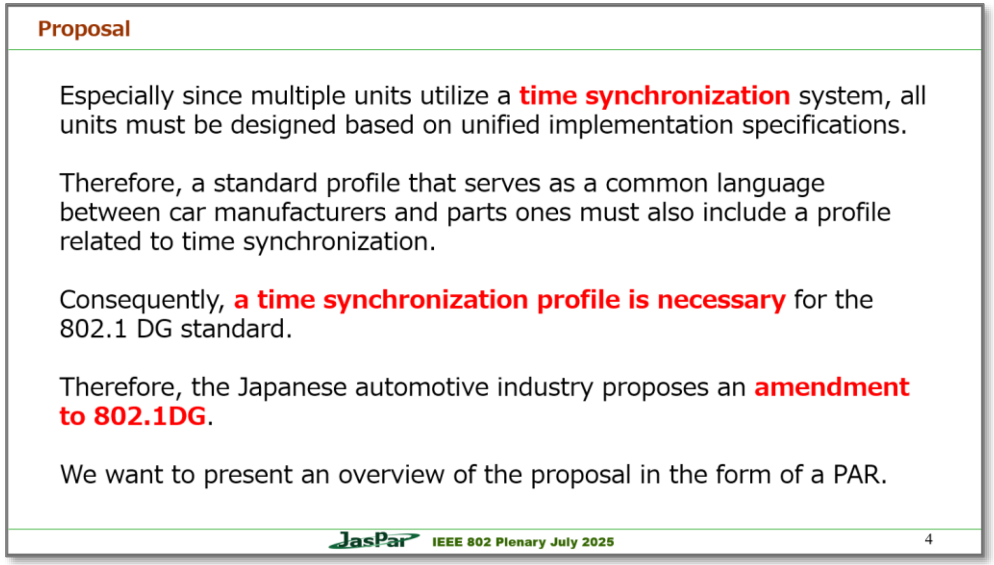
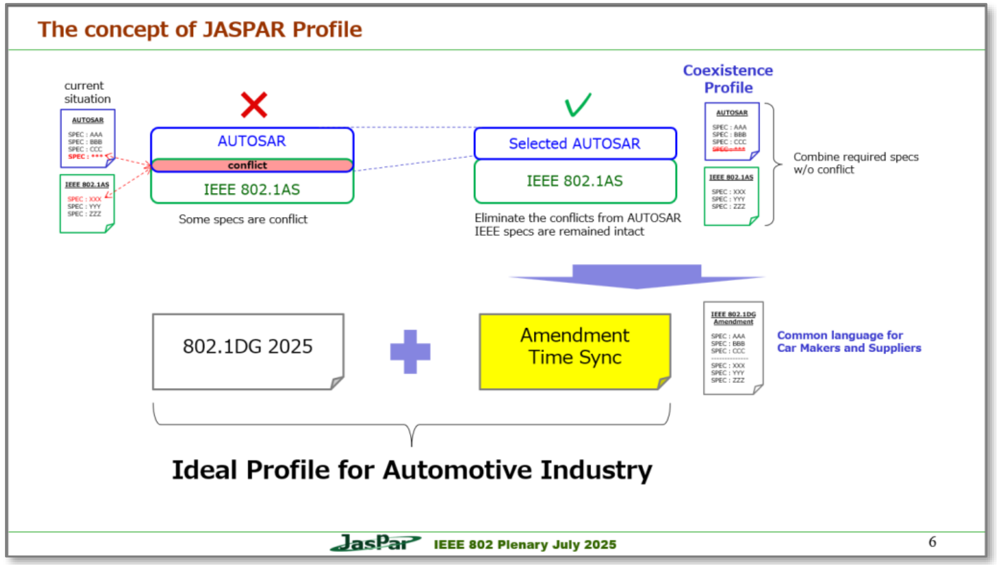
The Japanese automotive industry has proposed developing an in-vehicle time synchronization profile as an amendment to 802.1DG.





In response to the previous comments, we will provide a report on **the specific profile contents**.

Things you should know about in-vehicle systems

Before discussing profiles,
let's first examine some issues specific to automotive contexts.

- In-vehicle networks are relatively small compared to enterprise networks. They consist of dozens of Electric Control Units（ECUs） that handle various vehicle functions.

- Reusing the same ECU across different vehicle models helps improve development efficiency. To do this, the interfaces between ECUs must be built **using standard technology**.

- The economy is crucial for offering vehicles at reasonable prices, so **unnecessary features are eliminated** as much as possible.

- For safety reasons, once a configuration is designed, it is generally not altered because even minor modifications require re-establishing safety verification. Therefore, when introducing new technology, it must be **carefully designed before deployment**.

Summary of the JASPAR profile

Items	AS-2025 or 2026	AS-2020	AUTOSAR R23-11	**JASPAR Automotive Profile**	IEEE Conformity
BMCA	Option	Option	No	**Do Not Use**	✓
Announce Message	P802.1ASeb	Yes	No	**Do Not Use**	✓
Signaling Message	Yes	Yes	No	**Do Not Use**	✓
Pdelay Measurement	Yes	Yes	Option	**Yes**	✓
Sync Format	2steps or 1step	2steps or 1step	2steps	**2steps**	✓
Multiple Domains	Yes	Yes	Yes, but Proprietary	**One domain**	✓
VLAN	No	No	Option (Yes)	**No**	✓
10BASE-T1S	P802.1ASds	N/A	N/A	**T.B.D.***	✓
Hot Standby	P802.1ASed	N/A	N/A	**T.B.D.***	✓
Destination Address	01-80-C2-00-00-0E	←	01-80-C2-00-00-0*	**01-80-C2-00-00-0E**	✓
IEEE standard TLV	Yes	Yes	No	**Yes**	✓
AUTOSAR Sub TLV	N/A	N/A	Proprietary	**No**	✓

* Currently, this item is to be determined, but we never violate the IEEE Compliant

Concepts Specific to In-Vehicle Systems

Items	Concepts of Automotive Profile
BMCA	To ensure safety and reliability of Automotive systems, automatic configuration by the protocol is risky, so the Best Master Clock Selection, Port Roles, etc. are designed by the designer without BMCA protocol.
Announce Message	For the above reasons, Announce Message is no longer necessary.
Signaling Message	To ensure safety and reliability in-vehicle systems do not change parameters and therefore do not use signaling message.
Pdelay Measurement	Implemented according to the IEEE 802.1AS protocol, but in-vehicle network is so small that not measuring pDelay does not have much impact on accuracy. Therefore, in some cases it may not be used.
Sync Format	Implemented according to the IEEE 802.1AS protocol, but uses only two steps to avoid complexity in automotive systems.

Concepts Specific to In-Vehicle Systems

Items	Concepts of Automotive Profile
Multiple Domains	Implemented according to the IEEE 802.1AS protocol, but in-vehicle systems only use one domain to avoid complexity in automotive systems
VLAN	VLANs are specifically prohibited by IEEE 802.1AS, so they are not used in automotive systems
10BASE-T1S	Currently, this item is to be determined, but we never violate the IEEE Compliant
Hot Standby	Currently, this item is to be determined, but we never violate the IEEE Compliant
Destination Address	Implemented according to the IEEE 802.1AS protocol
IEEE standard TLV	Implemented according to the IEEE 802.1AS protocol
AUTOSAR Sub TLV	We never use proprietary specifications

Schedule

- Next Action Items towards the next plenary in March
  → Presenting a Draft of Amendment from Japan

- Tentative plan

‘26 Mar	‘26 May	～	‘27 Mar	‘28 Mar	‘29 July
PAR&CSD Approved Editor: T.B.D.	JASPAR launch 1st Draft	Comment Resolution	TSN TG ballot	802.1 Ballot	PAR Expire

<u>This plan is only our idea, so we’re looking for expert advice.</u>