

PLCA Multidrop Latency, Jitter, and Scalability Enhancements

Call for Interest (CFI) Opening Report

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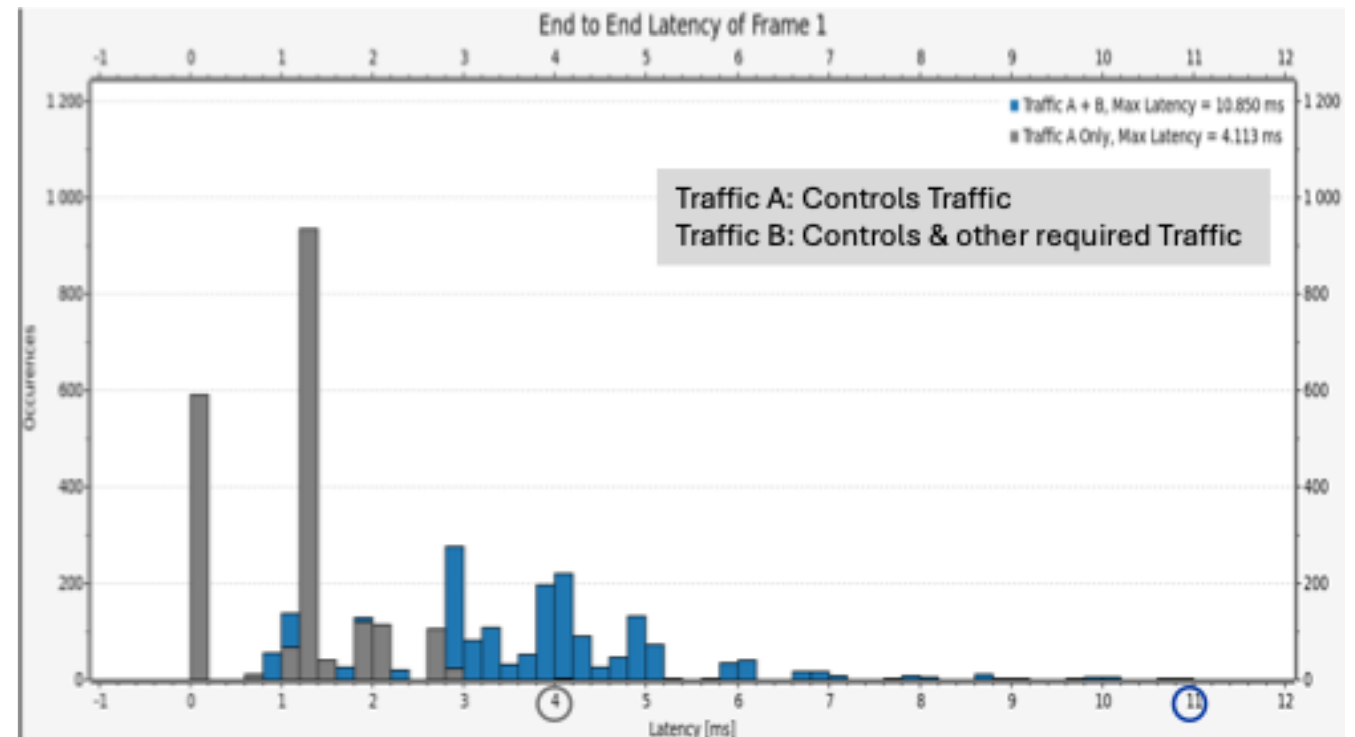
IEEE 802.3 July Plenary, Montreal, Quebec, Canada

Overview

- Ethernet Single Pair Multi-drop (SPMD) using Physical Layer Collision Avoidance (PLCA), or 10BASE-T1S/M, is widely deployed in current and next generation in-vehicle networks.
- System Integrators and builders (automotive OEMs) noted the derived worst case latency is too long for many of the controls (sensor → compute, compute → actuator) applications.
- Preparation and some consensus building through four NEA ad hoc calls from Oct 2025 through June 2026. (A big thanks to NEA!) The meeting materials could be found here:
 - https://www.ieee802.org/3/ad_hoc/ngrates/public/calls/index.html

Motivation

- PLCA in RS layer provides deterministic and bounded latency.
- Derived latency and latency variation (jitter) is too great to serve some automotive controls applications.
- We need to (and want to)
 - Reduced latency for some traffic at the cost of increased latency for others.
 - Preserve (within bounds) deterministic latency through add/move/changes.
 - e.g. brake actuation time should not depend on other traffic.



Why Now?

- Since circa 2022, system integrators and builders (OEMs) engineer 10BASE-T1S/M network traffic to meet their respective system requirements in production bound systems. And they re-engineer the traffic with every major change,
- Multiple proprietary solutions have emerged to help address these needs.
- It's time to study this need and provide 802.3 based interoperable solution(s) upon successful completion of study group and subsequent task force.

Logistics

- A consensus building presentations will be given during the IEEE 802.3 July Plenary meeting.
 - Tuesday, July 14th, 2026, 7 pm (local, EDT), Kafka Lamartine - Level A, or for the remote attendees, find it on 802.3 meeting calendar, <https://www.ieee802.org/3/calendar.html>
- The vote to determine whether a Study Group will be formed will take place at the IEEE 802.3 WG Closing Plenary meeting.
 - Thursday, July 16th, 2026, late afternoon, almost the last agenda item.
- We welcome any additional discussion, questions, feedback, etc. And we would also like to add anyone who wishes to be added as a supporter (before the study group formation vote during the closing plenaray.
Contact us via yongkim@ieee.org or markus.Jochim@gm.com.

Supporters (...)

Amir BarNiv, Infineon
Ariel Lasry, Qualcomm
Brian Macfarlane, NXP
Christian Boiger, Infineon
Christoph Arndt, AUMOVIO
Dance Wu, Infineon
Daniel Hopf, AUMOVIO
David Bollati, C&S Group
Dieter Pröll, Siemens
Geet Modi, Texas Instruments
George Zimmerman, CME Consulting
Hiroshi Ono, ADI
Joe Triggs, ADI
Jörg Kock, NXP
Max Turner, Ethernovia
Natalie Wienckowski, IVN Solutions LLC
Shen Jack, Texas Instruments

Thomas Hogenmueller, Bosch
Thorsten Hoffleit, Renesas
Tim Baggett, Microchip
Tingting Zhang, Huawei
TJ. Houck, Infineon
Tobias Belitz, Renesas
William Lo, Axonne
Zhe Lou, Huawei
Zhu Yue, Yinwang Intelligent Tech.

Automotive OEMs (Users):

Amrit Gopal, Ford
Anton Schedl, BMW
Helge Zinner, Cariad / VW
Hideki Goto, Toyota
Karl Budweiser, BMW
Olaf Krieger, Cariad / VW
Steve DiBella, General Motors

Call For Interest

10BASE-T1-S multidrop are being widely adopted in automotive Ethernet applications across e.g., body, chassis, and powertrain control applications, whose functions span a broad range of latency and jitter requirements, from tightly bounded control loops to more timing-tolerant comfort and convenience functions.

The Physical Layer Collision Avoidance (PLCA) layer developed as a part of 802.3cg and refined in 802.3da provides a fair and equal access to stations on the mixing segment while providing bounded maximum access latency. The maximum access latency is not sufficiently bounded for many of the tightly bounded control loops. Likewise, the variable length of the PLCA cycle results in high jitter (lack of determinism) that such applications cannot tolerate. PLCA as defined today is cannot treat traffic differently based on latency and jitter requirements. Additionally, adding traffic to multidrop networks engineered to meet latency and jitter requirements can change the latency and jitter of existing traffic in ways that are difficult to predict resulting in scalability issues and the need to frequently reengineer networks.

Proprietary schemes are emerging in the market to address these needs.

This is a call for interest to initiate a Study Group to explore the market requirements for an interoperable solution and to develop a PAR and CSD for PLCA Multidrop Latency, Jitter, and Scalability Enhancements.

https://www.ieee802.org/3/cfi/request_0726_1.html