

“Distinguished minimum latency traffic
in a converged traffic environment”

DMLT

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IEEE 802.3 Ethernet Working Group

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Reflector and Web

- CFI information posted at page http://www.ieee802.org/3/cfi/request_1112_1.html with a link to the presentation - the presentation itself can be found at the link

http://www.ieee802.org/3/cfi/1112_1/CFI_01_1112.pdf.

- Study Group reflector

[**stds-802-3-DMLT@listserv.ieee.org**](mailto:stds-802-3-DMLT@listserv.ieee.org)

To subscribe to the DMLT-reflector, send an email to: ListServ@ieee.org with the following in the body of the message (do not include "<>"):

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- Study Group web page URL:

[**http://www.ieee802.org/3/DMLT/**](http://www.ieee802.org/3/DMLT/)

What SG DMLT did in between

- Met in York, UK, at Sept 02 and 03, 2013
- Joint meeting with 802.1/TSN and 802.3/DMLT at Tuesday, Sept 03, 2013
- Several presentations on PAR, 5C, objectives and a presentation on IET for EPON
- Continued to refine PAR, 5C and Objectives
- Conducted a motion on the PAR, 5C and Objectives unanimously approved (21/0/0). Adopted final SG versions of PAR, 5C and objectives
- Requested David Law, 802.3 WG chair to pre-submit the PAR and 5C (and objectives) to the 802.3 WG and 802 EC
- Conducted a Question/Answer session at Monday evening to avoid scheduling conflicts with other TF/SG sessions.

Draft PAR (P802.3br) title & scope

- SG DMLT proposes a PAR title:

IEEE Standard for Ethernet

Amendment Specification and Management
Parameters for

Interspersing Express Traffic.

- Scope:

- The scope of this project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add support for interspersing express traffic over a single physical link.

Draft PAR (P802.3br)

- **5.5 Need for the Project:**

- Adoption of Ethernet into new market areas such as automotive, industrial automation, transportation (aircraft, railway and heavy trucks) has generated a need to converge low latency and best effort traffic streams.
- Currently this functionality requires multiple networks with parallel links.
- IEEE Std 802.3 currently does not have support for interspersed express traffic.
- This project will allow the needs of IEEE P802.1Qbu to be met with a single physical link between bridges.

Broad Market Potential

A standards project authorized by IEEE 802 LMSC shall have a broad market potential.

Specifically, it shall have the potential for:

- a) Broad sets of applicability**
- b) Multiple vendors and numerous users**

- a) In an automotive environment, there is a need to support streaming, data, and control over single converged LAN segment. This capability supports lower-latency control traffic coexisting with infotainment, driver assist, and diagnostics traffic.

In an industrial environment, there is a need to support sensor data, closed loop control, Image streaming, and data over single converged LAN segment. This capability supports lower-latency control traffic coexisting with other traffic.

- b) At the Call for Interest, held in 2012 Nov Plenary, 23 individuals from 22 companies indicated they would support this project. These included automotive companies, automotive OEMs, silicon and cabling vendors.

Data presented indicates 100's of millions ports/year for Ethernet in automotive by 2018~2022.

40 million industrial Ethernet ports were sold worldwide in 2012. This is expected to grow to over 80 million ports per year in 2015. Potential additional markets served with this standard are medical control systems (e.g. MRI), energy automation (e.g. power substation controllers and protection equipment), automation of traffic systems, avionics and other critical infrastructure.

Compatibility

IEEE 802 LMSC defines a family of standards. All standards should be in conformance : IEEE Std 802, IEEE 802.1D, and IEEE 802.1Q. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with IEEE 802.1 WG. In order to demonstrate compatibility with this criterion, the Five Criteria statement must answer the following questions.

- a) Does the PAR mandate that the standard shall comply with IEEE Std 802, IEEE Std 802.1D and IEEE Std 802.1Q?
- b) If not, how will the WG ensure that the resulting draft standard is compliant, or if not, receives appropriate review from the IEEE 802.1 WG?
- c) Compatibility with IEEE Std 802.3
- d) Conformance with the IEEE Std 802.3 MAC
- e) Managed object definitions compatible with SNMP

- a) Yes
- b) Not applicable

This standard will conform to the above architectures, and specifically 802.1Q bridge framework for forwarding and receiving compatibility at the ISS (Internal Sub-layer Service) .

- c) As an amendment to IEEE Std 802.3, the proposed project will remain in conformance with the IEEE 802 Overview and Architecture, the bridging standards IEEE Std 802.1D and IEEE Std 802.1Q, including IEEE 802.Qbu when it is approved.
- d) The proposed amendment will conform to the full-duplex operating mode of the IEEE 802.3 MAC
- e) The project will include a protocol independent specification of managed objects with SNMP management capability to be provided in the future by an amendment to or revision of IEEE Std 802.3.1

Distinct Identity

Each IEEE 802 LMSC standard shall have a distinct identity. To achieve this, each authorized project shall be:

- a) Substantially different from other IEEE 802 standards
- b) One unique solution per problem (not two solutions to a problem)
- c) Easy for the document reader to select the relevant specification
- d) Substantially different from other IEEE 802.3 specifications/solutions.

- a) There is no existing 802 wireline standard or approved project that provides lower-latency transmit and receive paths for interspersed express traffic.
- b) There is no IEEE 802 wireline based solution that significantly improves latency to be as close to zero as practically achievable on a converged network.
- c) The proposed amendment to the existing IEEE 802.3 standard will include a new clause to specify the new capability, as well as amendments to existing clauses as necessary, making it easy for the reader to select the relevant specification.
- d) There is no IEEE 802.3 based solution that provides this service.

Technical Feasibility

For a project to be authorized, it shall be able to show its technical feasibility. At a minimum, the proposed project shall show:

- a) Demonstrated system feasibility.**
- b) Proven technology, reasonable testing.**
- c) Confidence in reliability.**

- a) The proposed project will build on the array of Ethernet component and system design experience, and the broad knowledge base of Ethernet network operation.
- b) System and component vendors have applied similar capabilities based on proprietary and segment-specific standards in production systems.
- c) The reliability of Ethernet components and systems can be projected in the target environments with a high degree of confidence.

Economic Feasibility

For a project to be authorized, it shall be able to show economic feasibility (so far as can reasonably be estimated) for its intended applications. At a minimum, the proposed project shall show:

- a) Known cost factors, reliable data.**
- b) Reasonable cost for performance.**
- c) Consideration of installation costs.**

- a) The cost factors for Ethernet components and systems are well known. It is expected that this standard would add small and contained incremental cost to Ethernet bridge and end station implementations.
- b) Reasonable cost for performance, widely accepted today in the IT segment, will be consistent in this standard. In addition, this standard will enable convergence of low-latency control application over Time Sensitive Networking (802.1 TSN TG) and virtual LAN (802.1Q) bridging, thereby avoiding the need for parallel LANs .
- c) Installation cost is expected to be not different than installation cost of existing Ethernet bridges and end stations. Installation cost is expected to be lower compared to installation cost of parallel LANs.

Objectives (1) – Approved in SG

1. Preserve the IEEE 802.3 Ethernet frame format at the MAC.
2. Preserve minimum and maximum MAC frame size of the current IEEE 802.3 standard.
3. Use the Clause 4/Annex 4A MAC without alteration.
4. Require no changes to PHYs.
5. Support full duplex operation only.
6. Preserve MAC/PLS service interface.
7. Do not degrade Mean Time to False Packet Acceptance (MTTFPA) at the MAC Service Interface.
8. The latency to initiate the transmission of an express frame shall be less than two times the minimum packet size plus IPG.

Objectives (2) – Approved in SG

9. Assure that both ends of the link support Interspersing Express Traffic (IET) mode before enabling it.
10. Provide a primitive at the MAC client service interface to inhibit the transmission of non-express frames.
11. Provide two MAC client service interfaces at each end of the IET link, as the means to distinguish between the express and the non-express frames.
12. Minimum IET frame size shall be greater than or equal to 64 bytes.
13. IET frames will be constructed such that they will not be recognized as valid MAC frames by a non-IET-capable device.

Goals for the week

- Meet Tuesday, Wednesday 9:00 am – 6:00pm and Thursday morning (if needed)
- SG DMLT approved 13 objectives.
- Produce responses to questions on PAR and 5C by Wednesday at 5pm
- Request Task Force status from 802.3 WG at closing plenary
- Request SG extension
- Plan for next meeting

THANK YOU

for your attention

