# IEEE 802.3 DMLT Study Group Straw-man DRAFT PAR and 5C

## This version has no status in SG
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# 2.1 Project Title

IEEE Standard for Ethernet Amendment Specification and Management Parameters for the Distinguished Minimum Latency Traffic (DMLT).

Editors Note: Project Title may change in SG to better reflect this work.

Proposal 0: NC "Distinguished Minimum Latency Traffic in a Converged Traffic Environment "

Proposal 1: Title "Distinguished Minimum Latency Traffic" and cover "Converged Traffic Environment" in the scope.

Proposal 2: Title "Network Services in the Same Media"

Proposal 3: Title "Dual Traffic  <mumble> below the MAC Layer"

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# Other PAR Fields (1)

4.1 Type of Ballot: Individual

4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot:  4/2015

4.3 Projected Completion Date for Submittal to RevCom: 4/2016

5.1 Approximate number of people expected to be actively involved in the development of this project: 30

5.2 Scope:  <next slide>

5.3 Is the completion of this standard dependent upon the completion of another standard:  No.

5.4 Purpose:  This document will not include purpose clause

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# 5.2 Scope (a) & (b)

5.2.a. Scope of the complete standard: This standard defines Ethernet local area, access and metropolitan area networks. Ethernet is specified at selected speeds of operation; and uses a common media access control (MAC) specification and management information base (MIB). The Carrier Sense Multiple Access with Collision Detection (CSMA/CD) MAC protocol specifies shared medium (half duplex) operation, as well as full duplex operation. Speed specific Media Independent Interfaces (MIIs) provide an architectural and optional implementation interface to selected Physical Layer entities (PHY). The Physical Layer encodes frames for transmission and decodes received frames with the modulation specified for the speed of operation, transmission medium and supported link length. Other specified capabilities include: control and management protocols, and the provision of power over selected twisted pair PHY types.

5.2.b. Scope of the project: The scope of this project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add a support <span style="color:red">for distinguished, reduced-latency, traffic in a converged traffic environment over Ethernet. This will not require changes to the Clause 4/4a MAC.</span>

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# 5.5 Need for the Standard

- Adoption of Ethernet into new market areas, including but not limited to, in automotive, industrial automation, transportation (aircraft, railway and heavy trucks) has generated a need for distinguished, reduced-latency, traffic in a converged traffic environment in bridges and end-stations with Ethernet. IEEE Std 802.3 currently does not have support for distinguished, reduced-latency, traffic through its service layers.

- [Note: Add TBD text: "Distinguished, reduced-latency traffic is"... <mumble – insert a short definitive explanation >]

- IEEE P802.1Qbu specifies the distinguished traffic; therefore, depends upon the completion of this project.

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# Other PAR Fields (2)

5.6 Stakeholders for the Standard: Stakeholders identified to date includes but are not limited to: users and producers of systems and components for the automotive, industrial automation, transportation (aircraft and rail) industries, professional Audio Video industries.

6.1 Intellectual Property

> 6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No

> 6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

7.1 Are there other standards or projects with a similar scope?: No

7.2 Joint Development: No.

8.1 Additional Explanatory Notes (Item Number and Explanation) :

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# The 5 Critters
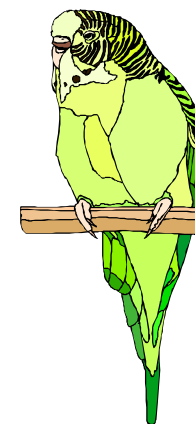
Broad Market Potential

Compatibility

Distinct Identity

Technical Feasibility

Economic Feasibility

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# 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)  Specific to automotive in-vehicle environment.
    Streaming, Data, Control, over single LAN segment that supports,
    infotainment, driver assist and diagnostics within various functional  LAN
    segments  within a vehicular network.  Control system requires lower-
    latency bridged network for this convergence.

    Specific to Industrial network environment.
    Low Latency Sampling Data, (closed loop) Control, data streaming (e.g.
    image processing) and data traffic.  Sampling data and closed loop control
    traffic have very demanding latency requirements,
    Data streaming (e.g. image processing) is less demanding than control, but
    higher than best effort.  Data traffic is not time-critical, but provides a
    constant source for interference traffic.

# Broad Market Potential (2)

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

b) Multiple vendors and numerous users

- At the Call for Interest, <n> individuals from <m> companies indicated they would support this project. These included automotive companies, automotive OEMs, silicon and cabling vendors, (among others)
  - In 2012 approximately 82 million cars and light trucks will be produced
  - 12 million premium segment cars and 45 million middle segment cars
  - The prediction for 2019 is 115 million total with 15 million premium and 60 million middle segment.

- Data presented indicates 100's of millions ports/year for Ethernet in automotive by 2018-22.

- The Industrial Automation solutions currently have about 100 million installed Ethernet nodes on the market, with a growth of about 43% per year. A transition from fieldbus communication networks to Ethernet is on the way and new applications in industrial automation are expected.   The number of industrial Ethernet ports sold worldwide is 24 million per year in 2010.   This is expected to grow to 40 million per year in 2014.]  Additional market served with this standards are medial control systems (e.g. MRI), and Energy (e.g. Power substation power controllers), and Avionics.

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# 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 Working Group. In order to demonstrate compatibility with this criterion, the Five Criteria statement must answer the following questions. Each standard in the IEEE 802 family of standards shall include a definition of managed objects that are compatible with systems management standards. Each standard in the IEEE 802 family of standards shall include a definition of managed objects that are compatible with systems management standards.

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 Working Group ensure that the resulting draft standard

- Compatibility with IEEE Std 802.3
- Conformance with the IEEE Std 802.3 MAC
- Managed object definitions compatible with SNMP
- This standard will conform to the above architectures, and specifically 802.1Q bridge framework for forwarding and receiving compatibility at the ISS (Internal Service Sub-layer) . This guarantees that 802.1Q bridges can be added to a network of bridges and end stations that implements this standard to increment the network functionality.
- 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.
- The proposed amendment will conform to the full-duplex operating mode of the IEEE 802.3 MAC
- 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 P802.3.1

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# 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 802.3 standard or approved project that provides lower-latency transmit and receive paths in converged traffic environment.

b) There is no IEEE 802.3 based solution that improves latency to be capable of less than one packet transmission time.

c) The proposed amendment to the existing IEEE 802.3 standard will be formatted as a collection of new clauses, making it easy for the reader to select the relevant specification.

d) There is no IEEE 802.3 based solution that provides this service.

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# 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 proven related technologies in many proprietary and segment-specific standards in providing similar technologies in production systems.

c)  The reliability of Ethernet components and systems can be projected in the target environments with a high degree of confidence.

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# 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. The proposed project may introduce new cost factors . 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 IT segment, will be consistent in this standard. In addition, this standard would help convergence of low-latency control application over time sensitive networking supported by AV Bridging and virtual LAN bridging that exist today, thereby helping to replace overlay LANs with parallel point-to-point links.

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 overlay LANs with parallel point-to-point links.

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