Proposed Draft ELLA Report on Amendment of IEEE Std 802

Rev 6: update 2022-05-05; revised schedule and added slides 21-25
Rev 5: update following March 2022 802 Plenary
Rev 4: reviewed by Nendica and updated throughout
Rev 3: update to proposed PAR content
Rev 2: update to support possibility of multiple amendment PARs
Rev 1: update of Slide 6 based on Nendica meeting 2021-12-23

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Background

- "[Draft] ELLA Report on Update of IEEE Std 802" (Rev. 8) [802.1-21-0076-08]
  - proposes multiple PARs to update IEEE Std 802
    - Maintenance Revision PAR to LMSC in March 2022
    - Amendment PAR(s) to LMSC in July 2022
  - covers details of the Revision PAR
    - Agreed by IEEE 802 EC 2022-03-18
    - NesCom recommendation, 2022-03-23
    - Approved (IEEE SASB) 2022-03-24
  - proposes a schedule of the Amendment PAR(s) but no details
- This contribution proposes the basis of an extension to the ELLA Report
  - Proposed for completion in September 2022

Amendment PAR Development Schedule

- ~~Schedule, to PAR approval~~
  - ~~15 March 2022 – 802.1 WG tasks Nendica to report on proposed content of amendment PAR~~
  - ~~May 2022: Technical Plenary - preview draft Nendica report~~
  - ~~May 2022 802.1 interim session – produce draft PAR(s) & CSD(s)~~
  - ~~May 2022: finalize report~~
  - ~~June 2022: 802.1 Chair pre-submits PAR(s)/CSD(s) to EC~~
  - ~~July 2022 – Comments due within 802 on PAR(s)/CSD(s)~~
  - ~~July 2022– 802.1 review of comments on PAR(s)/CSD(s)~~
  - ~~July 2022 – complete 802.1 comments response, final PAR(s)/CSD(s)~~
  - ~~July 2022 – deadline for 802.1 response to comments within 802~~
  - ~~July 2022 – 802 comments agreement at 802 EC meeting~~
  - ~~July 2022– confirm 802 agreement to forward NesCom~~
  - ~~July 2022: 802.1 Chair submits PAR to NesCom (deadline: Aug 11)~~
  - ~~Sept 21, 2022– NesCom recommendation decision~~
  - ~~Sept 22, 2022– SASB approval vote~~

Amendment PAR Development Schedule

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  - July 2022: Technical Plenary - preview draft Nendica report
  - Sept 2022 802.1 interim session – produce draft PAR(s) & CSD(s)
  - Sept 2022: finalize report
  - Oct 2022: 802.1 Chair pre-submits PAR(s)/CSD(s) to EC
  - Nov 2022 – Comments due within 802 on PAR(s)/CSD(s)
  - Nov 2022– 802.1 review of comments on PAR(s)/CSD(s)
  - Nov 2022 – complete 802.1 comments response, final PAR(s)/CSD(s)
  - Nov 2022 – deadline for 802.1 response to comments within 802
  - Nov 2022 – 802 comments agreement at 802 EC meeting
  - Nov 2022– confirm 802 agreement to forward NesCom
  - Oct 2022: 802.1 Chair submits PAR to NesCom (deadline: Oct 13)
  - Dec 2, 2022– NesCom recommendation decision
  - Dec 3, 2022– SASB approval vote

802.1 WG Motion on PAR to amend IEEE Std 802

- 802.1 WG Motion 2022-03-15 :
  - *802.1 authorizes pre-circulation to the July IEEE 802 Plenary Session of one or more PARs/CSDs to amend IEEE Std 802, as reviewed in the Maintenance Task Group, based on a Nendica report on the topic and considering information from the 802 Technical Plenary.*

Working Group Views

802.11 ARC comments on 802 project(s)

- *Prefer the IEEE Std 802 to not become inactive/reserved status*
- *Recommend having two parallel projects to ensure the deadline is met, while allowing technical discussion/updates*
  - *Suggest one project dedicated to only the maintenance roll-in of approved amendments. The project group/chair will need to work to limit discussions to issues that arise directly from the roll-in.*
  - *Suggest the second project can be for technical discussion of any topics of interest to commenters and members, on existing material to be updated or removed, new material to be considered/added, etc.*
    - *Recommend to include in this technical discussion the consideration of a specification of the LLC service, the LSAP, Link-layer connections, and the support of/mapping to the MSAP(s).*
- IEEE 802.11 Architecture Standing Committee, 2021-12-13
  - https://mentor.ieee.org/802.11/dcn/21/11-21-1993-03-0arc.pptx

Amendment PAR: Scope of Standard

- Compared to IEEE Std 802 revision PAR (draft):
- ~~This standard contains descriptions of the IEEE 802(R) standards published by the IEEE for frame-based data networks as well as a reference model (RM) for protocol standards. A specification for the identification of public, private, and standard protocols is included.~~
- This standard describes the IEEE 802® family of networking standards and specifies [or describes] the IEEE 802 architecture, including the IEEE 802 link layer service provided to the network layer along with details of addressing and protocol identification.

Amendment PAR(s): Scope of Project

- This project specifies [or describes] the IEEE 802 architecture, including the IEEE 802 link layer service provided to upper layers and the architecture of the logical link sublayer.

Amendment PAR: Purpose

- Compared to IEEE Std 802-2014:
- This standard serves as the foundation for the family of IEEE 802 standards ~~published by IEEE for local area networks (LANs), metropolitan area networks (MANs), personal area networks (PANs), regional area networks (RANs), etc.~~ by providing a common IEEE 802 link layer service supporting compatibility of underlying networks.

Amendment PAR(s): Need

- The project fulfils the need for a unified view of the service provided to upper layer protocols at the interface to the IEEE 802 network, independent of the specific medium access method, and serves as a basis for enhanced capabilities of that service.

PAR Proposed Update: Stakeholders

- Client users of link layer services. Standards developers within the IEEE 802 LAN/MAN Standards Committee. Manufacturers, distributors, and users of products and services that conform to the ~~LAN, MAN, and PAN~~ standards developed by IEEE 802.

PAR Proposed Update: additional

- TITLE: ~~IEEE~~ Standard for Local and Metropolitan Area Networks: Overview and Architecture
- *Approximate number of people expected to be actively involved in the development of this project: 30*
- *Is the completion of this standard dependent upon the completion of another standard?* Yes, IEEE Std 802
- *Are there other standards or projects with a similar scope?* No
- *Is it the intent to develop this document jointly with another organization?* No
- Expected Date for Initial SA Ballot: Nov 2024
- Projected Submittal to RevCom: Nov 2025

Proposed CSD: 14.1.1

- 14.1.1 Managed objects
  - Describe the plan for developing a definition of managed objects. The plan shall specify one of the following:
  - a) The definitions will be part of this project.
  - b) The definitions will be part of a different project and provide the plan for that project or anticipated future project.
  - c) The definitions will not be developed and explain why such definitions are not needed.
    - (a) Definitions include YANG Data Model for EtherTypes incorporated per P802f.

Proposed CSD: 14.1.2

- 14.1.2 Coexistence
  - A Working Group proposing a wireless project shall prepare a Coexistence Assessment (CA) document unless it is not applicable.
  - a) Will the Working Group create a CA document as part of the Working Group balloting process as described in Clause 13? (yes/no)
    - no
  - b) If not, explain why the CA document is not applicable.
    - Per Clause 13, the CA document applies to wireless Working Groups and shall address coexistence with all relevant active IEEE 802 LMSC wireless standards specifying devices for unlicensed operation. This document is not anticipated to alter wireless coexistence behavior.

Proposed CSD: Criteria #1

- 14.2.2 Broad market potential
  - Each proposed IEEE 802 LMSC standard shall have broad market potential. At a minimum, address the following areas: a) Broad sets of applicability. b) Multiple vendors and numerous users.
    - The revised standard would continue to support devices, from multiple vendors and for multiple users, that are compatible with pre-existing IEEE 802 standards and broadly applicable.

Proposed CSD: Criteria #2

- 14.2.2 Compatibility
  - Each proposed IEEE 802 LMSC standard should be in conformance with IEEE Std 802, IEEE 802.1AC, and IEEE 802.1Q. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with IEEE 802.1 Working Group prior to submitting a PAR to the IEEE 802 LMSC.
  - a) Will the proposed standard comply with IEEE Std 802, IEEE Std 802.1AC and IEEE Std 802.1Q?
    - Yes, although IEEE Std 802.1AC and IEEE Std 802.1Q may evolve to align with the architecture
  - b) If the answer to a) is no, supply the response from the IEEE 802.1 Working Group.
  - The review and response is not required if the proposed standard is an amendment or revision to an existing standard for which it has been previously determined that compliance with the above IEEE 802 standards is not possible. In this case, the CSD statement shall state that this is the case.

Proposed CSD: Criteria #3

- 14.2.3 Distinct Identity
  - Each proposed IEEE 802 LMSC standard shall provide evidence of a distinct identity. Identify standards and standards projects with similar scopes and for each one describe why the proposed project is substantially different.
    - No other standard specifies the IEEE 802 architecture. Some aspects of the IEEE 802 link layer service are specified in IEEE/ISO 802.2-1989 (Inactive-Withdrawn).

Proposed CSD: Criteria #4

- 14.2.4 Technical Feasibility
  - Each proposed IEEE 802 LMSC standard shall provide evidence that the project is technically feasible within the time frame of the project. At a minimum, address the following items to demonstrate technical feasibility: a) Demonstrated system feasibility. b) Proven similar technology via testing, modeling, simulation, etc.
    - The IEEE 802 architecture will significantly draw from existing IEEE 802 standards and existing implementations.

Proposed CSD: Criteria #5

- 14.2.5 Economic Feasibility
  - Each proposed IEEE 802 LMSC standard shall provide evidence of economic feasibility. Demonstrate, as far as can reasonably be estimated, the economic feasibility of the proposed project for its intended applications. Among the areas that may be addressed in the cost for performance analysis are the following: a) Known cost factors. b) Balanced costs. c) Consideration of installation costs. d) Consideration of operational costs (e.g., energy consumption). e) Other areas, as appropriate.
    - The specification of the IEEE architecture is not expected to entail new costs for implementations.

Further details to be added

- Summary of aspects missing from current IEEE 802 Architecture documentation
- Potential benefits enabled by additional architectural details
- Impact of new and evolving technologies on architecture
- Architectural optimization in specific network environments
- …

High-level issues having arisen

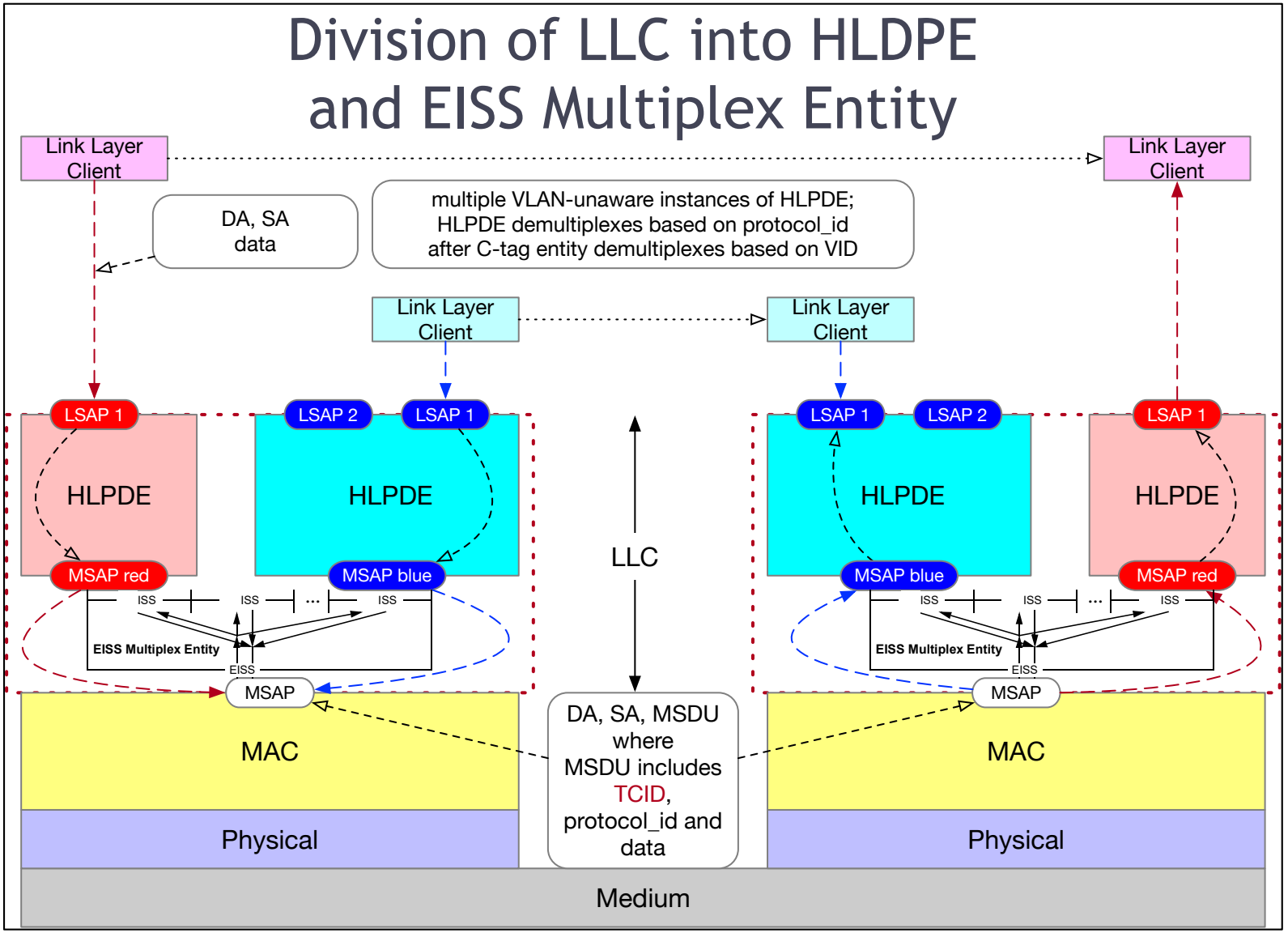
1. Do VLANs belong in the 802 Architecture?
2. Is LLC part of the 802 Architecture?

Do VLANs belong in the 802 Architecture?

- *I suspect that the real difference between our approaches to 802 is that I strongly disagree that IEEE Std 802 should make more than passing mention of VLANs. VLANs are not an architectural concept fundamental to IEEE 802. It is the service that is fundamental; VLANs are merely a multiplexing technique for the service, on par with virtualization techniques such as Ethernet-over-XYZ.*
  - Norm Finn to Nendica reflector, 2022-01-27
- Discussed in 802.1-22-0003
  - *VLAN-aware end stations in the IEEE 802 Architecture*
  - argues that:
    - *In VLAN-aware end stations, both the protocol ID and the VID are required to distinguish LSAPs and therefore distinguish Link Layer clients.*
    - *VLANs are a core, though poorly documented, aspect of the 802 architecture.*

VLAN-aware end station models

- *Several models presented in 802.1-22-0003*
- *No consensus reached, especially on stacked tags.*



Is LLC part of the 802 Architecture?

- 802.1-22-0007 (“*Saying goodbye to LLC*”)
  - *proposes to delete LLC*
- 802.1-22-0012 (“*LLC Functionality*”)
  - *proposes that “an LLC is indispensable”*
  - *During discussion, reviewed the VLAN model of the prior slide.*
  - *Participants indicated that this approach fundamentally represents basic VLAN-aware end-station*
    - *Suggested to revise IEEE Std 802.1Q to improve upon:*
      - *“A VLAN-aware end station can use the EISS Multiplex Entity (6.17) to provide multiple SAPs, one per VID of interest, to separate MAC Clients.”*

Remaining open issues include:

- Do VLANs belong in the 802 Architecture?
- Is LLC needed in the 802 Architecture?
- How are arbitrarily stacked tags described?
- How are isolating and non-isolating tags described?
- Others…