Proposed Draft ELLA Report

DRAFT PROPOSED BY CONTRIBUTOR

Roger Marks
(EthAirNet Associates; Huawei)
roger@ethair.net
+1 802 capable

8 December 2021

Introduction and Scope

- This is an informal report of the Nendica: IEEE 802 "Network Enhancements for the Next Decade" Industry Connections Activity
- It was prepared within the Nendica Study Item on "Evolved Link Layer Architecture" [ELLA]
- The scope includes:
  - Introduction, Scope, and Background
  - Standardization recommendations
    - Proposed development schedule for the revision of IEEE Std 802
    - Proposed content of PAR for the revision of IEEE Std 802
    - Proposed content of CSD for the revision of IEEE Std 802
  - Further details on need for revision

IEEE Std 802: Overview and Architecture

- Maintained by 802.1 WG
- Originally IEEE Std 802-1990
  - Note: IEEE 802 was initiated ten years earlier.
  - originally known as IEEE Std 802.1A
- Revision IEEE Std 802-2001
- Revision IEEE Std 802-2014
- Amendments
  - IEEE Std 802d-2017: Allocation of Uniform Resource Name (URN) Values in IEEE 802 Standards
  - IEEE Std 802c-2017: Local Medium Access Control (MAC) Address Usage
  - P802f: Amendment: YANG Data Model for EtherTypes (WG ballot)

Need to revise IEEE Std 802

- Reason 1:
  - No new amendments beyond three, per SA Standards Board
- Reason 2:
  - *an IEEE standard may remain continuously active only if a revision process for that standard is completed and approved within 10 years from the date that the standard was approved or last revised*
  - *If the revision project has not been completed and approved by Year 10, the approved standard will be transferred to inactive-reserved status.*
- Should complete a revision by end of 2024.
  - Should open a PAR ASAP (March 2022)
- Do we need more than a maintenance roll-up?
  - Is there risk that a comprehensive amendment may miss deadline?
    - What consequences would follow a missed deadline?
    - Do we need a backup plan if comprehensive amendment runs late?

IEEE 802 Restructuring ad hoc

- IEEE 802 Restructuring ad hoc opened a Technical Coherence sub-ad hoc, which met 3 times in June/July, discussed ELLA development, and agreed:
  - *A project to revise IEEE Std 802 should be initiated.*
  - *The project should be charged with ambitious but documented goals.*
  - *The goals should be specified in a consensus report to accompany the PAR.*
  - *The report and PAR could be generated by a focused pre-PAR activity, conducted in, for example, a Study Group or an Industry Connections Activity such as Nendica.*

Nendica

- Nendica: IEEE 802 "Network Enhancements for the Next Decade" Industry Connections Activity
- Chartered by IEEE SA in ICAID IC17-001-03
  - https://standards.ieee.org/content/dam/ieee-standards/standards/web/governance/iccom/IC17-001-IE.pdf
  - Sept 2021 – Sept 2023
  - Subgroup of 802.1 WG
- Goals include
  - *document emerging requirements and directions for IEEE 802 networks, identify commonalities, gaps, and trends not currently addressed…*
  - *facilitate building industry consensus towards proposals to initiate new standards development efforts…*
  - *Encouraged topics include enhancements of IEEE 802 communication networks and vertical networks as well as enhanced cooperative functionality among existing IEEE standards in support of network integration.*
  - *Findings related to existing IEEE 802 standards and projects are forwarded to the responsible working groups for further considerations.*
- Deliverables include
  - *reports and other consensus outputs … recommendations regarding overviews of current industry practice and trends, new standardization topics, documentation of use cases and user needs for those topics, and proposed organizational approaches to ensure effective participation from user communities*

About IEEE SA Industry Connections

- Industry Connections
  - https://standards.ieee.org/industry-connections/
- *Industry Connections Activities do not develop standards. Industry Connections Activities may propose a new standard by submitting a project authorization request (PAR). If the PAR is approved, the standard is developed in an IEEE standards development Working Group.*

ELLA

- Nendica Study Item: Evolved Link Layer Architecture [ELLA]
  - Initiated by Nendica, 2021-07-22
- Goal is an informal report documenting:
  - *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*
  - *Possible standardization recommendations*

IEEE 802.1 WG Motion, 2021-11-16

- *802.1 authorizes Nendica to generate a PAR and, if appropriate, CSD for pre-circulation to the March IEEE 802 Plenary Session for a revision to IEEE Std 802, taking into account information from the 802.1 Technical Plenary*
  - WG vote (y/n/a): 41/1/8
  - Approved by IEEE 802.1 WG, 2021-11-16

802.1 WG Technical Plenary

- 802.1 Chair announced Technical Plenary series
  - starting Dec 2, 16:00 – 18:00 ET
  - https://1.ieee802.org/2021-12-technical-plenary-agenda/
- *This series of meetings would:*
  - *Provide wider awareness for the need to revise IEEE Std 802*
  - *Provide an opportunity to discuss the content – notably should it be the same or should it add more architecture*
  - *Provide examples of the current 802 architecture (i.e., spread around in 802, .1Q, .1AC, .3, .11, .15.x, …)*
  - *Identify gaps in the current architecture*
- Discussion points, 2021-12-02, from various participants
  - the architecture should support evolving technologies
  - three years may be insufficient to do a significant revision

Schedule demands

- Schedule, to get a PAR activated in March 2022
  - SASB vote: March 24
  - NesCom vote: March 23
  - EC decided 2021-12-07 to cancel March 2022 venue for Plenary
    - Likely electronic Plenary, 4-18 March 2022
  - Likely 802 submittal deadline: Feb 4
    - CSD and other report (if submitted) due to 802 with PAR
  - NesCom submittal deadline: Feb 11
- Need final report with proposed PAR/CSD content by Feb 4 for submittal to 802 (and PAR to NesCom by Feb 11)
  - 57 days from December 9
  - 8 weeks
    - with many holidays and January interims to work around
- Draft report with proposed PAR/CSD content to Technical Plenary of January 13
  - 35 days (5 weeks)

PAR Development Schedule: Part 1

- Schedule, to Feb 4 PAR submittal
  - Dec 2 – Technical Plenary
  - Weekly meetings (Thursday, or alternative date/time)
    - Dec 9
    - Dec 16
    - Dec 23
    - Dec 30
    - Jan 6
    - Jan 13: complete draft Nendica report
  - Jan 13: Technical Plenary - preview draft Nendica report
  - Jan 17-21: 802.1 interim session – produce draft PAR & CSD
  - Jan 27: possible revisions
  - Feb 3: finalize report
  - Feb 4: 802.1 Chair pre-submits PAR/CSD to EC
  - Feb 11: 802.1 Chair pre-submits PAR to NesCom

PAR Development Schedule: Part 2

- Schedule, to PAR approval
  - March 9 – Comments due within 802 on PAR/CSD
  - March 9-15 – 802.1 review of comments on PAR/CSD
    - Discussion in Maintenance Task Group?
  - March 15 – complete 802.1 response to comments, final PAR/CSD
  - March 16 – deadline for 802.1 response to comments within 802
  - March 18 – 802 PAR/CSD agreement at 803 EC meeting
  - March 18 – confirm 802 agreement to forward NesCom
  - March 23 – NesCom recommendation decision
  - March 24 – SASB approval vote

Project Deadline Risk Assessment

- Risk of missing 2024 deadline for revision
  - *If the revision project has not been completed and approved by Year 10, the approved standard will be transferred to inactive-reserved status.*
- Implications of inactive status
  - IEEE Std 802 currently includes no conformance text.
    - So no product conformance issues arise.
  - Content of IEEE Std 802 is embodied in ISO/IEC
    - IEEE Std 802-2014 => ISO/IEC/IEEE 8802-A:2015
    - IEEE Std 802d=> ISO/IEC/IEEE 8802-A:2015/AMD 2:2019
    - IEEE Std 802c => ISO/IEC/IEEE 8802-A:2015/AMD 1:2018
  - => standard would remain internationally active
  - IEEE Registration Authority registry of identifiers would continue in support of ISO/IEC standards, and other IEEE 802 standards using those identifiers.
  - So perhaps the implications are small.

Project Development Schedule

- Schedule, to approval of revision
  - April 2022 – TG ballot on editorial rollup
    - (P802f when available)
  - May 2022 – TG ballot open to content enhancement
  - November 2022 – WG ballot
  - November 2023 – SA ballot
    - If unable to meet this date (or March 2024), could consider rolling content enhancement into an amendment PAR and proceeding with simplified revision draft
  - November 2024 – 802 EC agreement to forward to RevCom
  - December 2024 – RevCom/SASB approval

Key elements of 802-2014 PAR

- Project title (current):
  - Standard for Local and Metropolitan Area Networks: Overview and Architecture
- Scope of proposed standard (current):
  - 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. The IEEE 802 architecture is defined, and a specification for the identification of public, private, and standard protocols is included.
- Purpose clause (current):
  - 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), and regional area networks (RANs).
- Need for the project (2014 revision project):
  - Revision of existing IEEE 802-2001 standard is needed to remove redundant material and reflect the current IEEE 802 architecture and its suite of standards.
- Stakeholders for the Standard (2014 revision project):
  - Standards developers within IEEE 802. Manufacturers, distributors, and users of products and services that conform to the LAN, MAN, and PAN standards developed by IEEE 802.
- Working Group (2014 revision project):
  - Higher Layer LAN Protocols Working Group (802.1)
- Expected Date of submission for Initial SA Ballot:
- Projected Completion Date for Submittal to RevCom:

PAR Proposed Update: Scope

- 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. The~~ summarizes the IEEE 802 family of networking standards and specifies the IEEE 802 architecture ~~is defined, and a specification for the identification of public, private, and standard protocols is included.~~, including the architecture of the logical link sublayer and the description of the IEEE 802 link layer service provided to the network layer.

PAR Proposed Update: Purpose

- 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), and regional area networks (RANs).~~ and similar networks compatible with the common IEEE 802 link layer service.

PAR Proposed Update: Need

- Revision of existing IEEE Std 802~~-2001 standard~~ is needed to incorporate amendments, remove redundant and obsolete material, update content, add conformance language, and further detail the ~~reflect the current~~ IEEE 802 architecture ~~and its suite of standards~~.

PAR Proposed Update: Stakeholders

- Client users of link layer services. Standards developers within IEEE 802. 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, 802f
- *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 2023
- Projected Submittal to RevCom: Nov 2024

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
  - 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 on need for revision

- 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
- …