DETERMINISTIC6G

Project Authorization Request (PAR) Development on Traffic Engineering Extensions for Delay Uncertainties (P802.1Qee)

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Background

- Former contributions to P802.1Qdj on support for wireless
  - "Configuration Enhancements for 5G as TSN Bridge”
    - https://www.ieee802.org/1/files/public/docs2020/dj-farkas-configuration-enhancements-for-5G-0920-v01.pdf
  - "Configuration Enhancements for Wireless TSN”
    - https://www.ieee802.org/1/files/public/docs2021/dj-seewald-wireless-tsn-0721-v01.pdf
  - *These contributions were not considered in P802.1Qdj for wireless being out of scope*
- Recent contributions on adding support for wireless
  - “Control Plane Extensions for Wireless-Aware Traffic Engineering with Corresponding YANG Data Models”
    - https://www.ieee802.org/1/files/public/docs2024/new-duerr-control-plane-extensions-and-YANG-for-wireless-aware-TE-0924-v01.pdf
  - “Control Plane Extensions for Wireless-Aware Traffic Engineering”
    - https://www.ieee802.org/1/files/public/docs2025/new-farkas-control-plane-extensions-for-wireless-aware-TE-0225-v01.pdf,
    - https://www.ieee802.org/1/files/public/docs2025/new-farkas-control-plane-extensions-for-wireless-aware-TE-0325-v02.pdf

Further References

- Delay measurements of virtual TSN bridge (documentation and data):
  - D4.2: Latency measurement framework https://deterministic6g.eu/images/deliverables/DETERMINISTIC6G-D4.2_v1.0.pdf
  - Github: https://github.com/DETERMINISTIC6G/deterministic6g_data
- Wireless-friendly scheduling
  - D3.4: Report on Optimized Deterministic End-to-End Schedules for Dynamic Systems, https://deterministic6g.eu/images/deliverables/DETERMINISTIC6G-D3.4-v1.0.pdf
  - Contact authors for more information: simon.egger@ipvs.uni-stuttgart.de
- YANG models, NETCONF integration (files and documentation)
  - D3.4: Report on Optimized Deterministic End-to-End Schedules for Dynamic Systems, https://deterministic6g.eu/images/deliverables/DETERMINISTIC6G-D3.4-v1.0.pdf
  - Github: https://github.com/DETERMINISTIC6G/deterministic6g_yang_models

802.1 WG Motion at 2025 March IEEE 802 Plenary

802.1 authorizes the TSN TG to generate PAR and CSD at the May 2025 interim session for pre-circulation to the EC for an amendment to IEEE 802.1Q allowing bridged networks to support LANs with more uncertain delays than those of point-to-point wireline MAC technologies.

5.5 Need for the Project

IEEE Std 802.1Q currently does not provide support for traffic engineering to take into account the characteristics of LANs with more uncertain delays than those of point-to-point wireline MAC technologies. For instance, wireless systems often appear as a logical bridge in a bridged network. However, such logical bridges have significantly different characteristics compared to wireline bridges. IEEE Std 802.1Q currently does not provide means to describe such differences for traffic engineering. Extensions to bridge attributes are needed to enable effective traffic engineering for deployments including LANs with more uncertain delays than those of point-to-point wireline MAC technologies.

5.2.b Scope of the Project

This amendment specifies procedures and managed objects to extend bridge attributes for traffic engineering for LANs with more uncertain delays than those of point-to-point wireline MAC technologies. Additionally, this amendment addresses technical and editorial corrections to existing IEEE Std 802.1Q functionality.

2.1 Project Title

IEEE Standard for Local and Metropolitan Area Networks--Bridges and Bridged Networks Amendment: **Traffic Engineering Extensions**

5.6 Stakeholders for the Standard

Manufacturers, distributors, vendors, and users of Virtual LAN bridging equipment and components thereof.

6.1.2

- **Is the Standards Committee aware of possible registration activity related to this project?**

  Yes

- **Explanation:**

  The YANG Data Model will be assigned a Uniform Resource Name (URN) based on the IEEE Registration Authority (RA) URN tutorial and IEEE Std 802d. The amendment will use the IEEE 802.1 Organizationally Unique Identifier (OUI) to create a globally unique application identifier as required. The amendment may allow an OUI or Company Identifier (CID) to be used to create code points used in managed objects and protocol fields.

8.1 Additional Explanatory Notes

- #6.1.2:
  - While 'YANG' (developed by the Internet Engineering Task Force) appears to be an acronym, its expansion is not meaningful. YANG is a data modeling language for the definition of data sent over network management protocols.
  - IETF Request For Comments (RFC) 7950, The YANG 1.1 Data Modeling Language IEEE Std 802 IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture
  - IEEE Std 802d IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture Amendment 1: Allocation of Uniform Resource Name (URN) Values in IEEE 802 Standards
  - link to the IEEE RA URN tutorial: https://standards.ieee.org/wp-content/uploads/import/documents/tutorials/ieeeurn.pdf
  - link to the IEEE RA Object Identifier (OID) tutorial: https://standards.ieee.org/wp-content/uploads/import/documents/tutorials/oid.pdf

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