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TSN Configuration Enhancements PAR and CSD
Discussion Material

Salt Lake City
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Proposed PAR Need

- The management models and User/Network Interface (UNI) already described in Clause 46: Time-Sensitive Networking (TSN) configuration of IEEE Std 802.1Q only include the concepts (e.g. in form of a YANG types module) for managing bridged LANs using Time-Sensitive Networking (TSN) features. In order to be able to fully manage such bridged LANs with TSN features, comprehensive interfaces and management modules are required that are currently not available.

  The proposed amendment will address these issues.

Proposed PAR Scope

- This amendment specifies interfaces and managed objects to enhance the configuration of Time-Sensitive Networks. It particular it enhances the User/Network Interface (UNI) with new capabilities and also provides enhancements to the interface of end-stations to the network in order to extend the usability of the ‘Centralized network/distributed user model’. This amendment also addresses errors and omissions in the description of existing functionality.

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Proposed PAR

P802.1Qxy

Submitter Email: j.l.messenger@ieee.org
Type of Project: Amendment to IEEE Standard 802.1Q-2018
PAR Request Date: dd-mm-2019
PAR Approval Date: dd-mm-2019
PAR Expiration Date: 31-Dec-2022
Status: PAR for an Amendment to an existing IEEE Standard
Root Project: 802.1Q-2018

1.1 Project Number: P802.1Qxy
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Title: Standard for Local and Metropolitan Area Networks--Bridges and Bridged Networks
Amendment: Configuration Enhancements

3.1 Working Group: Higher Layer LAN Protocols Working Group (C/LM/WG802.1)
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3.2 Sponsoring Society and Committee: IEEE Computer Society/LAN/MAN Standards Committee (C/LM)
Contact Information for Sponsor Chair
Name: Paul Nikolich
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4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 12/2021
4.3 Projected Completion Date for Submittal to RevCom
Note: Usual minimum time between initial sponsor ballot and submission to Revcom is 6 months.: 10/2022

5.1 Approximate number of people expected to be actively involved in the development of this project: 30
5.2.a. Scope of the complete standard: This standard specifies Bridges that interconnect individual LANs, each supporting the IEEE 802 MAC Service using a different or identical media access control method, to provide Bridged Networks and VLANs.

5.2.b. Scope of the project: This amendment specifies interfaces and managed objects to enhance the configuration of Time-Sensitive Networks. It particular it enhances the User/Network Interface (UNI) with new capabilities and also provides enhancements to the interface of end-stations to the network in order to extend the usability of the 'Centralized network/distributed user model'. This amendment also addresses errors and omissions in the description of existing functionality.

5.3 **Is the completion of this standard dependent upon the completion of another standard:** No
If yes please explain:

5.4 **Purpose:** Bridges, as specified by this standard, allow the compatible interconnection of information technology equipment attached to separate individual LANs.

5.5 **Need for the Project:** The management models and User/Network Interface (UNI) already described in Clause 46: Time-Sensitive Networking (TSN) configuration of IEEE Std 802.1Q only include the concepts (e.g. in form of a YANG types module) for managing bridged LANs using Time-Sensitive Networking (TSN) features. In order to be able to fully manage such bridged LANs with TSN features, comprehensive interfaces and management modules are required that are currently not available.

The proposed amendment will address these issues.

5.6 **Stakeholders for the Standard:** Developers, providers, and users of networking services and equipment for industrial, professional audio-video, automotive, consumer electronics and other systems requiring distributed stream reservation services for streaming of time-sensitive data.

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?: Yes
If yes please explain: The Simple Network Management Protocol (SNMP) MIB will be assigned an Object Identifier (OID) based on the Registration Authority (RA) OID tutorial and IEEE Std 802.
The YANG Data Model will be assigned a Uniform Resource Name (URN) based on the 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 by the Link-local Registration Protocol (LRP).
The amendment may allow an OUI or Company Identifier (CID) to be used to create code points used in managed objects and protocol fields.

7.1 Are there other standards or projects with a similar scope?: No
7.2 Joint Development
Is it the intent to develop this document jointly with another organization?: No

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8.1 Additional Explanatory Notes:

Are any explanatory notes required for #5?
#6.1.b While 'YANG' (developed by the Internet Engineering Task Force) appears to be an acronym its expansion 'Yet Another Next Generation' is not meaningful. YANG is a widely-used standard that is relevant to the Registration Authority.
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
RA URN tutorial: http://standards.ieee.org/develop/regauth/tut/ieeeurn.pdf
RA OID tutorial: http: //standards.ieee.org/develop/regauth/tut/oid.pdf
#7.3 for adoption under the exisiting PSDO agreement (refer to Jodi Haasz, IEEE staff)

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Proposed CSD

IEEE 802 LAN/MAN STANDARDS COMMITTEE (LMSC)

CRITERIA FOR STANDARDS DEVELOPMENT (CSD)

Based on IEEE 802 LMSC Operations Manuals approved 15 November 2013
Last edited 20 January 2014

P802.1Qxy Standard for Local and metropolitan area networks - Bridges and Bridged Networks
Amendment: Configuration Enhancements

1. IEEE 802 criteria for standards development (CSD)

The CSD documents an agreement between the WG and the Sponsor that provides a description of the project and the Sponsor's requirements more detailed than required in the PAR. The CSD consists of the project process requirements, 1.1, and the 5C requirements, 1.2.

1.1 Project process requirements

1.1.1 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.

This project will use method a). The managed objects definitions will be part of this project.

1.1.2 Coexistence

A WG proposing a wireless project shall demonstrate coexistence through the preparation of a Coexistence Assurance (CA) document unless it is not applicable.

a) Will the WG create a CA document as part of the WG balloting process as described in Clause 13? (yes/no)
b) If not, explain why the CA document is not applicable.

This project will use method b). This project is not a wireless project.

1.2 5C requirements

1.2.1 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 IEEE Std 802.1Qcc-2018 Stream Reservation Protocol (SRP) Enhancements and Performance Improvements standard has introduced configuration models and a User/Network Interface (UNI) to allow configuration of bridged LANs using Time-Sensitive Networking (TSN) features from IEEE 802.1 standards. The interest in these features by the industrial and automotive markets has greatly increased during the last years. The large interest and success of IEEE 802.1 TSN features has expanded the requirements on the management of these features beyond the capabilities described in the current standard. In order to addresses the extended requirements, enhancements to the management schemes and the UNI are required.

Multiple vendors and users of industrial automation, professional audio-video, automotive and other systems require complete and comprehensive management of TSN features in bridged LAN networks through common interfaces.

1.2.2 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 WG prior to submitting a PAR to the Sponsor.

a) Will the proposed standard comply with IEEE Std 802, IEEE Std 802.1AC and IEEE Std 802.1Q?
b) If the answer to a) is no, supply the response from the IEEE 802.1 WG.

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.

The amendment will be in conformance with IEEE Std 802, IEEE Std 802.1AC, and the existing provisions of IEEE Std 802.1Q.

1.2.3 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 existing IEEE 802 standard or approved project provides a complete UNI that allows for a full configuration workflow from the view of end users.

This amendment differs from the existing standard in that it addresses and closes gaps in the configuration workflow that have been identified by individuals and groups from several areas in industrial automation as well as the need from users of the TSN features to have a comprehensive common interface between the management entities introduced in IEEE 802.1Qcc.

1.2.4 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.

The configuration enhancements are similar in principle to the management schemes and interfaces introduced in IEEE 802.1Qcc and will build on them to provide additional capabilities.

b) Proven similar technology via testing, modeling, simulation, etc.

There is a considerable body of experience in supplying interfaces and mechanisms for network management. Mechanisms needed for this project are widely used by other protocols already, e.g. YANG, for specifying management modules.

1.2.5 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) Balanced costs (infrastructure versus attachedstations).

b) Known cost factors.
c) Consideration of installation costs.
d) Consideration of operational costs (e.g., energy consumption).
e) Other areas, as appropriate.

The well-established balance between infrastructure and attached stations will not be changed by the proposed amendment.

The amendment will specify management mechanisms and interfaces to enhance already existing management and add no additional hardware costs to bridges and end stations beyond the minimal and firmly bounded resources consumed by additional management modules.

The cost factors, including installation and operational costs of bridged LANs are well-known. The proposed amendment will specify management enhancements and interfaces that provide more comprehensive management of TSN features as well as a standardized interface between the management entities introduced by IEEE 802.1Qcc and thus will provide better economic feasibility.

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Thank you