IEEE 802 LAN/MAN STANDARDS COMMITTEE (LMSC)

CRITERIA FOR STANDARDS DEVELOPMENT (CSD)

Based on IEEE 802 LMSC Operations Manuals approved 17 March 2022
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IEEE P802.1EH Standard: Tag-on-Frame Telemetry for IEEE 802 Networks

1. IEEE 802 criteria for standards development (CSD)

The CSD documents an agreement between the WG and the LMSC that provides a description of the project and the LMSC'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.

Item a) applies:

The IEEE P802.1EH project will include YANG Modules fitting into the IEEE 802.1 YANG framework supporting the operation of the Tag-on-Frame Telemetry feature for both End-Stations and Bridges.

1.1.2 Coexistence

A WG proposing a wireless project shall prepare a Coexistence Assessment (CA) document unless it is not applicable.

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

Item e) applies since this 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:

f) Broad sets of applicability.
g) Multiple vendors and numerous users.

Tag-on-Frame Telemetry, also known as Congestion Signaling (CSIG), was developed by UEC member companies to provide simple, effective, and efficient in-band network signals for data centers, including AI data centers. It is currently used for the following applications within the AI datacenter:

1)End-to-End Congestion Control,
2Path Selection and Load Balancing,
3)Debugging and Fault Isolation

There is already extensive vendor support from more than 4 major network equipment vendors with implementations of CSIG and very large production deployments at Google. Other AI network operators are experimenting with the technology for their data centers. In addition, there is interest in applying Tag-on-Frame Telemetry to a wider set of network applications, including traditional LAN and MAN applications.

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.

h) Will the proposed standard comply with IEEE Std 802, IEEE Std 802.1AC and IEEE Std 802.1Q?
i) 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.

This standard will comply with IEEE Std 802, IEEE Std 802.1AC, and 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 projects have a similar scope to the proposed Tag-on-Frame Telemetry project; however, this project relies on and will augment the CSIG standards work in progress at the Ultra Ethernet Consortium (UEC).

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:

j) Demonstrated system feasibility.
k) Proven similar technology via testing, modeling, simulation, etc.

CSIG is currently deployed by Google in large-scale production datacenter networks. Multi-vendor implementations already exist and are operating.

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:

l) Known cost factors.
m) Balanced costs.
n) Consideration of installation costs.
o) Consideration of operational costs (e.g., energy consumption).
p) Other areas, as appropriate.

The early implementations of CSIG used existing programmable hardware with software assistance and so don’t add significant cost to existing switch implementations. Future native silicon implementations will add new L2 tagging hardware, however, the cost of these additions should not be greater than those for the existing L2 tags supported by IEEE Std 802.1Q Bridges.