

Qdt PAR&CSD Modification

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Reason for PAR&CSD Modification

- P802.1Qdt includes 2 new functions in datacenter environment:
 - Automatic PFC headroom measurement
 - MACsec protection of PFC frames
- The current PAR&CSD require that automatic PFC headroom measurement use the Precision Time Protocol (PTP) .
- However, PTP objectives and PFC headroom measurement objectives are not aligned.
(Refer to <https://www.ieee802.org/1/files/public/docs2022/dt-lv-headroom-measurement-discussion-1122-v1.pdf> for details.)
 - PTP was not specifically designed for PFC headroom measurement. It intends to precisely measure point to point cable delay.
 - PFC headroom measurement includes roundtrip delay from the point above the MAC to a peer's point above the MAC on the other end.
- **The conclusion from previous discussion is to relax the requirement for using PTP in P802.1Qdt. Thus, the PAR&CSD are proposed to be modified.**
 - Enable the scope of the project to specify a dedicated request-response protocol for PFC headroom measurement in non-PTP supported datacenter environments (which are common today).
 - Specify PTP as an option for PTP-supported datacenter environments (which are possible in the future).

PAR Modification

5.2.b Scope of the project: This amendment specifies procedures and managed objects for automated Priority-based Flow Control (PFC) headroom calculation and Media Access Control Security (MACsec) protection of PFC frames, ~~using the existing Precision Time Protocol (PTP)~~ **using point-to-point roundtrip measurement** and enhancements to the Data Center Bridging Capability Exchange protocol (DCBX).

This amendment places emphasis on the requirements for low latency and lossless transmission in largescale and geographically dispersed data centers.

This amendment also addresses errors of the existing IEEE Std 802.1Q functionality.

8.1 Additional Explanatory Notes: #5.2.b:

- 1) PFC and DCBX are specified in IEEE Std 802.1Q: IEEE Standard for Local and Metropolitan Area Networks—Bridges and Bridged Networks
- ~~2) PTP is specified in IEEE Std 1588: IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems~~
- 2) MACsec is specified in IEEE Std 802.1AE: IEEE Standard for Local and metropolitan area networks-Media Access Control (MAC) Security**

CSD Modification

1.2.4 Technical Feasibility

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

The proposed project enables peer nodes to advertise the new capability through the Data Center Bridging Capability Exchange (DCBX, specified in IEEE Std 802.1Q) mechanism which is widely deployed today using Link Layer Discovery Protocol (LLDP, specified in IEEE Std 802.1AB). **The principle of roundtrip delay measurement is well known and has been used in many different protocols, such as the Pdelay mechanism in the Precision Time Protocol (PTP, specified in IEEE Std 1588).** ~~Roundtrip delay measurements for participating systems are based on the existing Precision Time Protocol (PTP, specified in IEEE Std 1588) delay measurement mechanism.~~

1.2.5 Economic Feasibility

c) Consideration of installation costs.

A modest reduction in installation cost of new equipment is expected.

~~There are no incremental installation costs relative to the existing PTP and DCBX that will be used by the proposed standard.~~

No incremental installation costs are expected from introducing roundtrip delay measurement and associated DCBX enhancements.