Ultra Ethernet Consortium

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Source: UEC Transport Working Group, CSIG Ad hoc.

Title: Congestion Signaling

LIAISON STATEMENT

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Approval: UEC TAC Meeting (10/29/2025)

Deadline: N/A

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Abstract: This liaison statement summarizes status of Congestion Signaling Work in UEC Transport Working Group, CSIG Adhoc.

Thank you for your liaison request “liaison-UEC-Coordination-0725”. Our working groups are preparing responses to your requests which we will forward as soon as they are complete. In the meantime, our Congestion Signaling (CSIG) working group has prepared the following liaison request regarding coordination of our CSIG work with IEEE 802.1.

The ‘Ultra Ethernet Consortium’ (UEC) is currently developing ‘Congestion Signaling’ (CSIG), a lightweight telemetry system that utilizes a short L2 tag to transmit telemetry information. The initial CSIG specification is planned for publication as part of the UE 1.1 specification in Q1, 2026. The CSIG draft is being developed by an Adhoc group under the Transport Working Group (WG). Additionally, efforts are underway to integrate CSIG into the UE Transport to enhance both congestion control and load balancing.

The goal for ‘Congestion Signaling’ (CSIG) is to define a concise in-band telemetry method that can proactively measure high strength, fine grained metrics with low overhead. The method collects ‘signal’ values by inserting a fixed size CSIG layer 2 tag in packets. The tagged packets can be part of live application traffic flows or synthetic probes generated by monitoring frameworks.

Signals are measured proactively instead of reactively. A signal value can be collected for a given application flow by inserting a CSIG layer 2 tag in the application’s packets or a snapshot of the state of the cluster can be created using synthetic packets. Synthetic packets do not have any correlation with application and are generated by instrumentation code.

The CSIG approach has additional desirable characteristics.

- Low implementation cost. CSIG layer 2 tags are small and fixed in size. They are simple to parse and edit by network devices, enabling low cost and latency efficient implementations.

- Low overhead. The CSIG layer 2 tag carries a congestion signal in a concise format that has negligible impact on available bandwidth, packets/second load or overall bandwidth efficiency.
- Ease of Deployment. CSIG tags remains fixed in size as they traverse through the fabric and collect measurements in a compare-and-replace manner. They are simpler to deploy as the impact on the MTU is not variable along the path of a packet.

The UEC CSIG draft specifies two types of CSIG tags – a compact tag 4 bytes in length and wide tag 8 bytes in length.

The 4-byte compact tag allows leverage of existing programmable hardware and is extensively deployed at massive scale in hyper scaler networks.

As the scale of network increases and AI fabrics cross the DCI boundary, there is a need for fine grained telemetry tag than provided by the compact tag. The 8-byte CSIG tag also referred to as wide tag, supports fine grained measurements of signals and handles inter-DCI networks.

The CSIG specification identifies the 4-byte and 8-byte tag with a distinct ether type. UEC is interested in working with IEEE 802.1 committee on this specification and in obtaining EtherType values for use in standards-compliant deployments.

We would appreciate feedback from the 802.1 Working Group on their interest in collaborating with UEC on this area and also how UEC CSIG specification would be able to identify EtherType values for use with CSIG 4Byte and 8Byte tags.

CSIG has defined LLDP TLVs to negotiate CSIG capability among switches. If a neighboring switch does not support CSIG, a switch must strip the CSIG tag before forwarding to that switch. This ensures CSIG tags do not escape network domains where they are supported

Attachment:
CSIG-Spec-v0.50 – https://github.com/opencomputeproject/OCP-NET-UEC-CSIG