TSN Ethernet Controller Cores Gain Frame Preemption and Linux Driver

Two recent additions have improved the endpoint controllers we offer for Time-Sensitive Networking over Ethernet:

- Frame Preemption makes them better for highly demanding real-time operation, and
- a Linux Driver and support package facilitate integrating TSN in a Linux environment.

Frame Preemption Support

Frame Preemption allows high-priority frames to interrupt low-priority frames. This reduces the delay or latency of the high-priority frames, making the network better able to handle the real-world demands of mixed high- and low-priority traffic.

In an automobile network, for example, emergency obstacle detection and braking are higher priority than a notification that the wiper fluid is low.

TSN support for frame preemption is governed by two standards:

- 802.1Qbu governs the TSN bridge management features, and
- IEEE 802.3br governs the Ethernet MAC elements.

The TSN-EP and TSN-SE cores now handle frame preemption through support for both of these standards.

Designers using these IP cores can now readily combine frame preemption with the TSN traffic shapers (IEEE 802.1av and IEEE 802.1bv) to enable flexibility sufficient for even the most demanding use cases.

New Linux Driver

There is a rich set of tools for managing the reception and transmission of network packets through a system running Linux. The Linux Traffic Control Engine is an evolving subset of these tools that enables traffic shaping, scheduling, classification, and policing.

A Linux Driver now shipping with the TSN-EP and TSN-SE cores seamlessly integrates these TSN endpoint controller cores with the Linux Traffic Control Engine (see Figure below). This makes Linux priorities, queuing disciplines, traffic classes, and filters available for configuring the TSN cores. Once the TSN-EP or TSN-SE is so configured, the system designer can use standard Linux socket-based communication to handle network traffic.

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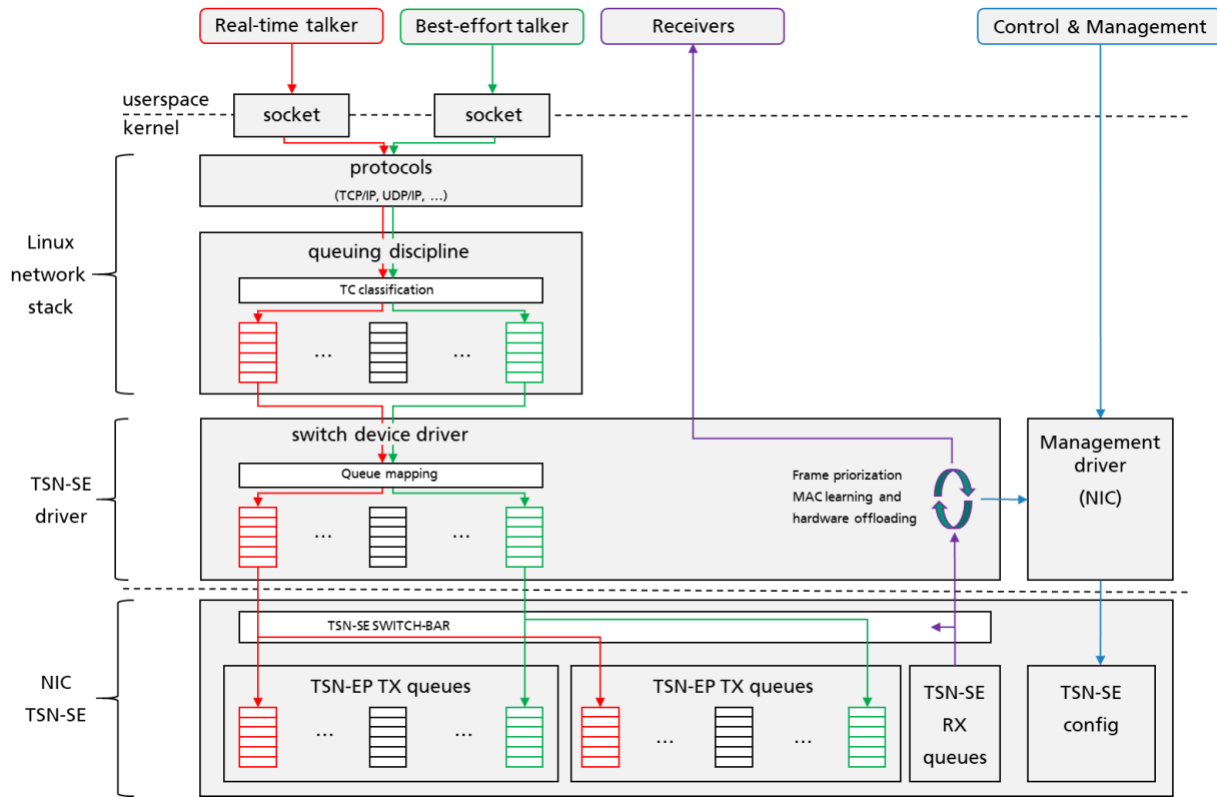
Designers can also use the *linux ptp* stack for time synchronization according to IEEE 802.1AS and IEEE standard 1588.

To further help designers understand and kickstart their TSN/Linux development efforts, the TSN IP cores ship with comprehensive documentation and Linux-specific usage examples.

Available Now

The popular suite of TSN Ethernet IP we offer is ready to reduce design risk and time in implementing this growing standard for automotive, industrial, and other time-critical networks. It includes:

- TSN-EP TSN Ethernet Endpoint Controller,

- TSN-SE TSN Ethernet Switched Endpoint Controller,

- CAN2TSN CAN-to-TSN Ethernet Gateway, and

- TSN-VIP TSN Ethernet Verification IP for the TSN-EP.

With our development partner Fraunhofer IPMS, we are committed to improving and expanding these TSN IP offerings. Contact us to talk about how we might help with your specific TSN Ethernet needs, now and down the road.