

TIME-SENSITIVE NETWORKING GUARANTEEING QUALITY OF SERVICE

A configuration method for Time-sensitive networks based on asynchronous traffic shaper that guarantees deterministic quality of service has been developed. This approach involves an ordering criterion priority level of a large number of TSN flows through an iterative process involving reduced computational complexity and guaranteeing a maximum delay requirement for each of them.

Technology for Licensing

Keywords:

Network traffic, deterministic Quality of Service, deterministic QoS, Time-sensitive networking, TSN, bridge, asynchronous traffic shaper, ATS, priority level.

Description:

Ethernet is the most popular wired technology at the link level (layer 2), however, it does not provide network traffic with deterministic quality guarantees. Time-sensitive networking (TSN) with asynchronous control mechanisms based on the Asynchronous Traffic Shaper (ATS), where synchronization of TSN switches is not required, would be a feasible and scalable solution. The main disadvantage of the proposal is that no general solutions with reduced computational complexity exist to date for the automated configuration of such networks. The main reason is the configuration versatility offered by the traffic control mechanisms of TSN networks.

The present invention provides a method to support the automation of the configuration process of TSN networks based on ATS shaper. Therefore, an iterative process is applied to prioritize an arbitrary number of network traffic flows on an ATS in order to guarantee the maximum delay requirements for all of them.

Compared to other methodologies based on reinforcement learning (which are often not generalizable to any network topology and require longer times to achieve learning convergence) or based on exact optimization methods, the methodology described in this invention solves the computational complexity problems with respect to the number of flows to be accommodated, minimizing also the number of priority levels required in the TSN switches and thus facilitating their scaling.

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- » Reduction of operating costs of ATS-based TSN networks
- » Better use of network resources by operators and a reduction of network flow rejection rate.
- » Set traffic priority in an ATS bridge.
- » Guarantee the maximum delay requirements for network traffic flows.
- » Reduced computational complexity
- » Scalable regarding network traffic flows to be prioritised
- » Compatible with other network routing and delay distribution mechanisms for ATS-based TSN configuration.

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