Analysis and modeling of asynchronous traffic shaping in time sensitive networks - DTU Orbit (23/11/2018)

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Time Sensitive Network (TSN) is an attractive solution for time-critical frame transmission in data link layer. Traffic scheduling and shaping in TSN aim to achieve bounded low latency and zero congestion loss. TSN provides traditional frame switching with reliable Quality-of-Service (QoS) parameters, however, synchronization challenges, e.g. jitter, lost timing frames, clock inaccuracy, threaten the reliability of TSN network. Emerging Asynchronous Traffic Shaping (ATS) guarantees determinism for real-time applications, e.g. automotive and industrial control, while removing the dependence on synchronous communication. This paper focuses on performance evaluation of the recently proposed ATS amendment to the IEEE 802.1 standard, two approaches are discussed: Urgency-Based Scheduler (UBS) and Paternoster policing and scheduling. Models and simulations are carried out for evaluation and comparison. Statistics on the end-to-end delay, buffer usage and frame loss rate are collected to assess the scheduling performance. Results show that ATS achieves effective traffic shaping and switching without synchronous mechanisms, while there is an evident trade-off for using these specific algorithms.

General information
State: Published
Organisations: Department of Photonics Engineering, Networks Technology and Service Platforms
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Number of pages: 4
Pages: 1-4
Publication date: 2018

Host publication information
Title of host publication: Proceedings of 2018 14th IEEE International Workshop on Factory Communication Systems
Publisher: IEEE
ISBN (Print): 978-1-5386-1066-4
Keywords: Traffic Scheduling, Time Sensitive Network, Asynchronous Traffic Shaping, Urgency-Based Scheduler, Paternoster Policing and Scheduling, Quality-of-Service
Electronic versions:
08402376.pdf
DOIs: 10.1109/WFCS.2018.8402376
Source: FindIt
Source-ID: 2436479512
Research output: Research - peer-review › Article in proceedings – Annual report year: 2018