



Contribution ID: 2088 Contribution code: THPA066

Type: **Poster Presentation**

Using TSN for accelerator control systems

Thursday, 11 May 2023 16:30 (2 hours)

In the context of Time Sensitive Networking (TSN), the Ethernet standards are being extended with new capabilities for deterministic communication, allowing standard Ethernet to be used in new fields of application. In addition, more and more companies now offer TSN compatible devices and software tools. In accelerator control systems (ACS), which need synchronization in the range of some hundred ns, TSN provides the necessary mechanisms for a one-cable timing system with deterministic low latency and best-effort data transfer in parallel. These techniques include message-based timing and fast back channel capabilities for front-end controllers, leading to high safety in medical applications. Nowadays, time synchronisation below 100 ns of up to 250 devices can be achieved using the IEEE 802.1AS standard, based on PTP (Precision Time Protocol). Deterministic communication can be guaranteed by a time-based scheduler according to IEEE 802.1Qbv standard, protecting critical traffics. This fulfils the needs of a next generation ACS for a synchrotron-based ion beam therapy facility. Time measurement results of test set-ups, using TSN capable switches and SoMs (System-on-Modules), will be reported as well as conceptual designs, which will be realized soon to implement multi-energy operation at HIT.

Funding Agency

Footnotes

I have read and accept the Privacy Policy Statement

Yes

Primary author: PETERS, Andreas (Heidelberg Ionenstrahl-Therapie Centrum)

Co-authors: BUBECK, Wolfgang (Universität Stuttgart - Institut für Steuerungstechnik der Werkzeugmaschinen und Fertigungseinrichtungen); FRICK, Florian (Universität Stuttgart - Institut für Steuerungstechnik der Werkzeugmaschinen und Fertigungseinrichtungen); MOSTHAF, Jörg (Heidelberg Ionenstrahl-Therapie Centrum); SCHOEMERS, Christian (Heidelberg Ionenstrahl-Therapie Centrum)

Presenter: PETERS, Andreas (Heidelberg Ionenstrahl-Therapie Centrum)

Session Classification: Thursday Poster Session

Track Classification: MC6: Beam Instrumentation, Controls, Feedback and Operational Aspects: MC6.T24: Timing and Synchronization