~ Sli.do Q&A ~
iSAFT Test Tool for deterministic on-board Ethernet networks

Do you think that TSN will replace TTEthernet in the future?

It seems so, mainly for the satellite platforms. For launchers and manned vehicles TTE seems for the moment the selected technology. TTE suppliers are now also providing TSN solutions.

Can you indicate your main conclusions from the comparison between the TSN and TTE protocol specs?

Both technologies can be used for deterministic data delivery over Ethernet networks. Unfortunately the technologies are not similar, so different implementations for each protocol.

Have you made an analysis and comparison for performance and implementation complexity between TSN and TTE?

No, a full analysis has not been done. However based on the comparison of the standards, performance is not an issue for both networks, TSN standards are IEEE standards and open, they seem somehow simpler to implement.

The PCIe block was shown as 100% utilization. Was it a hard IP core within the FPGA?

The design uses the PCIe integrated block (provided by the Kintex7 FPGA) as part of the PCIe / DMA IP core provided by the board's manufacturer.

Did you investigate how to make TSN IP smaller (i.e. how to optimize it)?

We tried different configurations of the IP core in order to reduce resource utilization. Specifically, we tried reducing the number of priority queues and the maximum cycle time. The results indicated a very low decrease in resources (around 5%). It is an issue for future investigation.

Why are DSP blocks required only in the case of TSN? / Why in the case of DSN we need more DSP blocks?

The TSN protocol (and more specifically the IEEE802.1AS / PTP synchronization) includes algorithms for synchronization assessment, time master selection etc. that require arithmetic operations in the FPGA. Thus the DSP block usage is higher than the SpW/SpFi protocols.

Is TSN (more than other onboard buses) suitable to implement Internet protocol support in space networks?

TSN is an upper protocol layer that is based on the IP protocol, in that sense IP is a pre-requisite for TSN, not another network.

Was this a de-risking activity? Do you have a follow-up activity already planned? If yes, what will be the scope?

Yes. A follow-up activity is planned to develop 1) a complete TSN Test Tool and 2) a flight qualified TSN End Node IP Core.

Will TSN not be the preferred solution for non-qualified systems?

TSN can be used for flight qualified systems, at the moment there is no IP Core or ASIC, flight qualified, this needs to be done.

I see that TTTech offers both TSN and TTE solutions. Will they develop something like a bridge between the 2 standards?

This is a question for TTTech, I cannot answer.