EtherCAT and TSN – the perfect match?

Martin Rostan, Executive Director of ETG

Martin Rostan, Executive Director of the EtherCAT Technology Group (ETG) explains in an interview with IEE editor Dr. Martin Large to what extent TSN makes sense in interaction with EtherCAT.

Mr. Rostan, at SPS 2019 you said that the topic of Time-Sensitive Networking (TSN) is causing much confusion because there are many "myths and rumors" circulating. What exactly did you mean by that?

Martin Rostan: Well, some promoters tell their customers that with the help of TSN you can turn a lame plough horse into a successful race horse. And that TSN is ready and available. But "TSN" as such does not even exist: The IEEE working group is working on a whole bundle of TSN technologies, of which only a certain part is available as a specification. For example, the standard for time synchronization was only adopted at the beginning of this year – so there can't be any chips today that have cast it in silicon. And exactly how networks with TSN properties are to be configured is still a completely open question.

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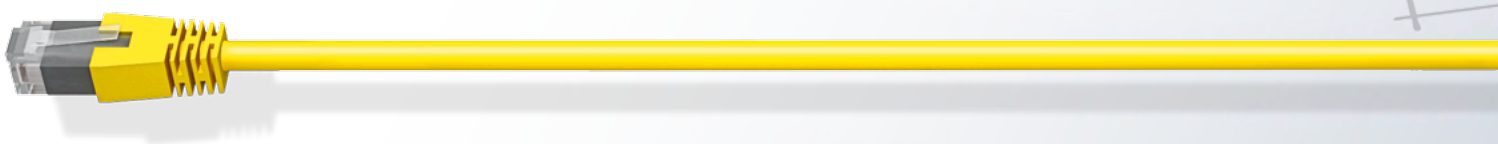

You also stated that ETG will emerge stronger from this development. Why?

Martin Rostan: Because EtherCAT remains stable, available and reliable, while PROFINET, CC-Link IE and probably also EtherNet/IP are developing new versions based on TSN technologies which are however not backward-compatible. And so they will be set back at least another five years until they reach a stable version with reliable interoperability supported by a sufficient number of devices.

The classic fieldbuses have been buried for years. Will TSN be the last nail in the coffin?

Martin Rostan: I rather see EtherCAT as the challenge for the classic fieldbuses: The simplicity of these systems is fully maintained with EtherCAT, while TSN technologies will push the complexity of the other industrial Ethernet systems much higher. We do not call EtherCAT "the Ethernet fieldbus" for nothing.

The first specification for the integration of TSN in EtherCAT was already presented in 2017. In 2019 you said, "ETG will integrate TSN when it is ready and makes sense." That sounds like a roll backwards.

Martin Rostan: No. For us, "integrating TSN" does not mean turning EtherCAT itself inside out and making TSN the basis of our Ethernet fieldbus. After all, our TSN profile, which was presented in 2017, describes how EtherCAT systems can be coupled to TSN-based networks. We were ahead of the curve because we have been actively involved in the IEEE working group right from the start. And that's why we will be well prepared when TSN finally finds its way inside the factory walls and why ETG is also contributing to the completion of the TSN specifications. At the same time, we are not necessarily dependent on the success of TSN: EtherCAT will not be "TSN-based".

What role does the EtherCAT and TSN Technical Working Group, founded in 2018, play in this?

Martin Rostan: The EtherCAT Technology Group has been an official liaison partner of the IEEE 802.1 working group since the end of 2017. The ETG Technical Working Group "EtherCAT and TSN" fills this partnership with life, and is of course also responsible for the specification mentioned above.

What will be the benefits for users when TSN is added to EtherCAT – something you yourself call a "perfect match"?

Martin Rostan: The user will be able to combine EtherCAT systems perfectly with a TSN-based heterogeneous production network. The simplicity and performance of EtherCAT are retained. And the connection via the company network to higher-level or neighboring controllers and systems becomes real-time capable using TSN technologies.

Will TSN cause changes to the EtherCAT frame?

Martin Rostan: No. TSN will not change EtherCAT, but will add to it. "Supplementing with TSN technologies" is therefore much more appropriate for EtherCAT than "integration of TSN".

How does TSN affect your EtherCAT G and G10 activities?

Martin Rostan: EtherCAT G and G10 also complement the proven EtherCAT technology without replacing it. EtherCAT G and G10 retain the simplicity as well as the diagnostic and configuration properties of EtherCAT throughout. Thus, EtherCAT G is the means of choice for increasing the bandwidth of EtherCAT applications. The combination with TSN, on the other hand, has a slightly different focus: Here, the connection to heterogeneous systems is in the foreground. Both approaches are therefore justified without getting in each other's way.

How do you see the development around Single Pair Ethernet (SPE)?

Martin Rostan: Here, too, we participate in the relevant IEEE working groups and actively support the development. Whether SPE will be introduced as an additional physical layer option for EtherCAT is still an open topic, however.

Will the topic of TSN play a role for you at future trade fairs?

Martin Rostan: Of course! We will continue to demonstrate our approach in this regard. And we will continue to counter myths and rumors with facts, even if it is no longer the case everywhere …

Published in IEE, issue 04/2020, Hüthig, www.huethig.de

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