Martin Rostan,
Head of Technology Marketing,
Beckhoff

Will TSN mark the end of the fieldbus era?

Time-Sensitive Networking (TSN) is the latest topic that everyone's talking about in the industrial communication field. TSN technologies are intended to give Ethernet real-time capability, which puts all sorts of ideas into people's heads. At a recent trade show, someone told me in an almost pitying tone that thanks to TSN, standard Ethernet will now be able to cover all fieldbus-related requirements, making fieldbuses and their Ethernet-based successors like EtherCAT entirely superfluous.

Does this mean that the arrival of TSN will mark the end of the fieldbus era? Fortunately, we at Beckhoff don't just seek to invent trailblazing technologies – we are also present in all relevant standardization committees. For example, our internationally recognized communications expert Dr. Karl Weber, one of the better-known veterans of the fieldbus wars, has been active in the IEEE's TSN Task Group since its first meeting in March 2004, when the project was still known as "AVB" (Audio Video Bridging). Starting on page 10 of this issue of PC Control, Dr. Weber explains the basics of TSN in an easy-to-understand manner.

TSN is not a fieldbus, and is not looking to become one. Rather, the umbrella term TSN covers several projects that are only indirectly related to real-time communication. One subproject, for example, deals with cable redundancy, while another addresses the reservation of resources for real-time operation. Fieldbus network management, the application layer, or even device profiles, on the other hand, are not even on the agenda.

This means that TSN will provide a bundle of features for use by Ethernet-based systems. Some of these require no modification whatsoever, similar to the transition from hubs to switches decades ago, which delivered huge benefits without requiring any changes in the protocol. Others will require some reconfiguration effort and, therefore, some system modifications. Ultimately, TSN features will significantly improve the real-time capability of Ethernet, which is why a working group of the OPC Foundation recently started taking on the challenge to integrate future TSN features proactively into the OPC UA protocol – with the active participation of Beckhoff experts, of course. And yes, the real-time capabilities of TSN Ethernet are expected to extend to areas that used to be the exclusive domain of classic fieldbus systems and their Ethernet-based successors.

None of this means, however, that EtherCAT will cease to exist. Thanks to the unique functional principle of EtherCAT, i.e. processing on the fly, it will still be much faster and this without the overhead and complexity of future TSN solutions. And let's not forget that we employ the EtherCAT Automation Protocol (EAP), which uses standard Ethernet infrastructure, on the level above the EtherCAT master or to network multiple EtherCAT systems. Here, too, EtherCAT will benefit from TSN, which is why we are looking forward to TSN and keep actively participating in its development.