EtherCAT
Technology Group

Further information:
www.ethercat.org

EtherCAT and TSN in heterogeneous networks

The EtherCAT Technology Group (ETG) has supplemented EtherCAT with Time Sensitive Networking (TSN) technologies, expanding the field of possible EtherCAT applications to include heterogeneous network environments. With the help of TSN, industrial controls can contact a number of different EtherCAT segments in real-time through Ethernet networks. In doing so, no changes to the EtherCAT slave devices are required: the EtherCAT Device Protocol, including all high performance characteristics, is fully preserved. Also expanded by TSN is the EtherCAT Automation Protocol (EAP) for communication between controls, which will result in even more deterministic performance on this level.
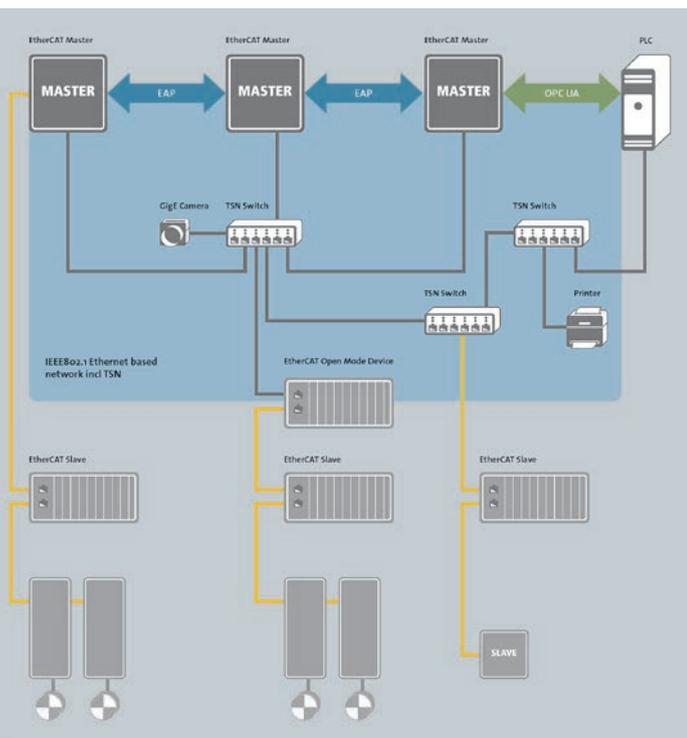
EtherCAT streaming connects to EtherCAT segments in heterogeneous networks.

The ETG has specified the technology expansion in the form of a profile, which highlights the fact that no changes to the TSN standards are needed. This approach also considerably simplifies the adaptation to the final versions of the TSN technologies, because specification in the IEEE is not yet fully complete. The ETG has supported the development of TSN from the very beginning through active participation in the IEEE committee, and is coordinating the specifications through a liaison with the IEEE 802.1 Working Group. This ensures that ETG will also be able to access the IEEE 802.1 specifications that have not yet been adopted. Therefore, the technology can be introduced almost at the same time as TSN.

EtherCAT uses the TSN streams with any data rates for real-time communication above EtherCAT device segments. In the segment itself nothing is changed: the unique performance of the EtherCAT protocol built upon processing on the fly, highly precise synchronization, flexible topology selection, excellent diagnostic capabilities and simplicity through fully automated addressing of devices are all fully preserved. Similarly, the thousands of different EtherCAT devices available worldwide do not need to be modified at all. The stream adaptation feature that connects the EtherCAT segment to the heterogeneous TSN network can be placed either in the last TSN switch or in the first EtherCAT slave device.

Dr. Guido Beckmann, Chairman of the ETG Technical Committee classifies the new specification as such: "The incorporation of TSN standards will significantly improve the real-time characteristics of generic Ethernet. With our technology expansion we make use of TSN in an ideal way – and exactly where TSN can offer significant advantages: in the factory networks. As one frame is sufficient for EtherCAT to communicate with a whole segment, and thus with the entire fieldbus network, EtherCAT is virtually predestined for integration with TSN networks. We achieve this without turning our technology inside out. EtherCAT together with TSN offers the 'best of both worlds'. Therefore, this prepares EtherCAT perfectly for the future."

A Whitepaper on the subject, written by Dr. Karl Weber, has been published in November 2017 and is available on the official ETG website.

ETG celebrates 10 years in the US, China and South Korea

Three out of the five EtherCAT Technology Group (ETG) offices recently celebrated their 10th anniversary. In 2007 the ETG, with global headquarters in Nuremberg, Germany, had just reached the milestone of 500 member companies and decided to expand the organization's international presence. The ETG office in Yokohama, Japan had already been founded in 2006. The next step was to open up offices in the US, China and South Korea in order to best support the local ETG member companies.

The ETG China office is located in Beijing and is still led by Beryl Fan, who coordinated the opening of the office. Upon the founding of this office in 2007, the ETG had 10 members in China – in 2016 they welcomed their 500th member company. Today the ETG counts almost 800 members in China and Taiwan.

Other important milestones in the development of EtherCAT in China include the 2013 accreditation of Beihang University as an official EtherCAT Conformance Test Center (ETC) and the acceptance of EtherCAT as a Chinese national standard in 2014. Today EtherCAT is considered the most popular fieldbus for drive technology in China.

In late 2007 an ETG South Korea office opened in Seoul, managed by Key Yoo. EtherCAT has made great gains in the Korean semiconductor industry, automotive, consumer electronics manufacturing and other key industries such as shipbuilding and robotics. Moreover, the leading local control system manufacturers have made EtherCAT their standard system fieldbus.

The ETG office in North America is led by Bob Trask. The US office also takes care of members from Canada and Latin America. The ETG has more than 600 members in the Americas, making it the largest fieldbus organization also there.

The ETG is in a prime position at the international level. More than half of the currently 4,600 member companies are headquartered outside of Europe. More than a third hail from Asia, which is the fastest-growing region in the EtherCAT community.

10 year anniversary in Beijing, China