4 key gains when adopting TSN

Time-Sensitive Networking (TSN) technology offers the foundation to set up digital manufacturing practices by enhancing industrial communications. By standardizing determinism in industrial Ethernet, TSN ultimately supports reliability, data accessibility and network convergence. These are fundamental features within highly competitive and futureproof smart factories.

Thomas Burke, Global Strategic Advisor at CLPA, looks at the most crucial improvements that TSN can deliver within an enterprise.

The automation marketplace is a symbiosis of end users, who specify projects to machine builders, who in turn look for vendors who can offer products and solutions that meet these specifications. TSN is well placed to deliver benefits to all market participants.

Let's rewind – what is TSN?

TSN is a technology that sits at Layer 2 - Data Link of the OSI model to expand the capabilities of current Ethernet networks. More precisely, this innovation is described by the IEEE 802.1 set of Ethernet sub-standards and focuses on delivering determinism and convergence of multiple data traffic streams on one network. Two particularly important TSN sub-standards that provide such abilities are IEEE 802.1 AS and IEEE 802.1 Qbv.

The first ensures that all devices on a network are synchronized, providing the basis for determinism. Once a shared sense of time is in place across a network, IEEE 802.1 Qbv defines 'time aware shapers'. These define specific 'time slots' that are assigned to different types of network traffic, which are prioritized according to the information carried. As a result, different types of data traffic can all travel across the network in a predictable way, further supporting deterministic communications. Ultimately, this method supports convergence of multiple traffic types and consequently the ability to combine the operational technology (OT) and information technology (IT) worlds.

What does this mean for end users, machine builders and automation vendors?

Simpler network architectures/machine designs

The capabilities discussed allow end users to reduce the number of networks required for their operations, as they can merge different data traffic streams together while ensuring determinism. This ability, in turn, allows machine builders to pass on cost reductions, as less equipment and engineering work is required to design, configure and install network systems. In addition, timescales for complete projects are reduced.

Greater process transparency and better management

The convergence supported by TSN strengthens data transfer across the enterprise, allowing end users to have greater process transparency. In effect, transparency is all

about being able to extract more data from industrial processes and analyze it to gather meaningful information that helps to better understand factory floor operations. This insight can then be leveraged to optimize performance, productivity, efficiency and end product quality.

Increased productivity

By supporting the creation of single networks that transfer all types of traffic, it is easier to troubleshoot and identify any potential issues. Therefore, downtime associated with maintenance or repair activities can be reduced, while overall uptime can be increased. As a result, the entire end user's manufacturing system can become more productive.

Better integration of OT and IT systems

By converging multiple types of data, TSN offers a key way to merge OT and IT. This convergence is at the heart of data-driven smart manufacturing, as it promotes innovation and collaboration by sharing and utilizing actionable information across the entire enterprise. Consequently, by embedding TSN capabilities within their products, vendors can deliver solutions with increased interoperability, along with the capability for device data to be visible across the enterprise via cloud connectivity.

The digital transformation in support of IT/OT convergence absolutely requires the interoperability and interconnectivity that the TSN technology provides. Open standardization and the ability to work with a multitude of information modeling standards organizations is imperative for end users to truly to leverage all their disparate applications and devices in a solution-based architecture. End-users require seamless data integration among their enterprises, including with existing devices and networks. For example, standards like MTConnect, PackML, and ISA S95 are crucial components.

Embrace TSN now

Companies interested in leveraging TSN to optimize their plants, machines or automation product offering can rely on CC-Link IE TSN. This is the first open industrial Ethernet to combine gigabit bandwidth with TSN capabilities to deliver a solution to simultaneously meet today's and tomorrow's application needs. When coupled with OPC UA over TSN, CC-Link IE TSN can provide an even more solid foundation for data to information transformation.

Device vendors can develop innovative compatible products and actively shape the future of automation by supporting this new technology. This is easy to do, as the ecosystem of development options available to vendors who want to offer CC-Link IE TSN certified products is broad and flexible. Moreover, compatible products and solutions from leading automation vendors, such as Mitsubishi Electric, are already available to end users worldwide.

Thanks to TSN, the future of industrial Ethernet is a step closer! To learn more about the business benefits of TSN and CC-Link IE TSN, download the white paper 'Time-Sensitive Networking (TSN) – The Case for Action Now' here: https://eu.cc-link.org/en/campaign/2020/tsnwp.

- ENDS –

Captions:

Image 1: CC-Link IE TSN supports determinism and network convergence – two essential elements of highly competitive, connected industries of the future.

Image 2: Scan the code to download a free copy of the CLPA's latest white paper "Time-Sensitive Networking – The Case for Action now".

Keywords: Time-Sensitive Networking, TSN, convergence, determinism, industrial Ethernet, CC-Link IE TSN, CLPA, business benefits

About The CC-Link Partner Association (CLPA)

The CLPA is an international organisation founded in 2000, now celebrating its 20th Anniversary. Over the last 20 years, the CLPA has been dedicated to the technical development and promotion of the CC-Link family of open automation networks. The CLPA's key technology is CC-Link IE TSN, the world's first open industrial Ethernet to combine gigabit bandwidth with Time Sensitive Networking (TSN), making it the leading solution for Industry 4.0 applications. Currently the CLPA has almost 3,800 member companies worldwide, and more than 2,000 compatible products available from over 340 manufacturers. Around 30 million devices using CLPA technology are in use worldwide.

The image(s) distributed with this press release may only be used to accompany this copy, and are subject to copyright. Please contact DMA Europa if you wish to license the image for further use.

Further Information:
Website: am.cc-link.org/en
LinkedIn: https://www.linkedin.com/company/clpa-americas
Twitter: https://twitter.com/CC_LinkNews
YouTube: https://www.youtube.com/c/cclinkpartnerassociation

Editorial contact: DMA Europa Ltd. : Anne-Marie Howe
Tel: +44 (0)1562 751436 Fax: +44 (0)1562 748315
Web: www.dmaeuropa.com
Email: anne-marie@dmaeuropa.com
Address: Europa Building, Arthur Drive, Hoo Farm Industrial Estate, Kidderminster, Worcestershire, DY11 7RA, UK

Reader contact: CC-Link Partner Association : Thomas Burke
Tel: (847) 478-2100 Fax:
Web: am.cc-link.org/en/
Email: Tom.Burke@cclinkamerica.org
Address: 500 Corporate Woods Parkway, Vernon Hills, IL - 60061

CLPAUS044