Time for Pharma 4.0

TSN-driven technologies can support advanced data governance

Data governance is paramount in the pharmaceutical industry, as it provides a key tool to confirm the safety, efficacy and quality of medicines. In order to fully leverage the ever-increasing volume of data for responsive process control, quality assurance and quality auditing, it is crucial for companies to set up robust and secure network platforms. Technologies that incorporate gigabit Ethernet and Time-Sensitive Networking (TSN) are exactly what is needed.

Thomas Burke, Global Strategic Advisor at CLPA, looks at how TSN-driven gigabit Ethernet can help pharmaceutical manufacturers improve their operations and regulatory compliance activities.

By creating smart and responsive facilities, pharmaceutical manufacturers can optimize the production of regulatory compliant, high-quality medicaments with minimum rework activities. In effect, the latest advances in sensor technology can offer ways to generate high volumes of information on the factory floor. By using these data, manufacturers can reinforce process and quality control/assurance as well as regulatory compliance.

While generating data is the first step in creating intelligent manufacturing lines, it is crucial to gather these pieces of information in order to analyze them and turn them into process knowledge. This, in turn, can offer actionable insight to improve production processes as well as provide the foundation of quality audits and reports.

Look at the bandwidth

To unlock these opportunities a network technology that can handle the constantly growing flow of data from sensors and analyzers needs to be implemented. In practice, this means offering sufficient bandwidth to transfer as many data packets as possible within a timeframe without any packet loss or network congestion.

Although many existing Ethernet systems offer a maximum bandwidth of 100 Mbit/s, pharmaceutical manufacturers that aim to build truly smart, connected factories should leverage more advanced solutions. The highest bandwidth currently available for industrial Ethernet networks is in the Gigabit range. By adopting a technology with this capacity, businesses can futureproof their industrial communications and lay the foundations for next-level data traffic.

Determinism and convergence

In addition to offering sufficient bandwidth, the ideal network should also be able to provide a deterministic method of data transmission, to assure predictable information flows. The latest Ethernet technology, Time-Sensitive Networking (TSN),bringa this capability to the table, thanks to its defining IEEE 802.1 standards that assure tight

synchronisation across the network along with providing methods to ensure predictable transmission of all data types. As a result, time-critical data from drives and controllers on the factory floor, e.g. from tableting lines, can be transmitted on the same network used for other Ethernet devices with less time critical requirements, such as vision systems or bar code readers.

The end result is converged networks, where it is possible to merge operational technology (OT) and information technology (IT) systems for truly responsive, smart data-driven manufacturing. More precisely, TSN's determinism ensures the predictable delivery of all process data flows that OT requires while offering a framework to support IT functions for higher-level enterprise systems. As a result, companies can benefit from real-time decision-making opportunities, accurate operational control as well as unmatched databases for quality compliance reporting.

The right solution is right here

Pharmaceutical manufacturers wanting to benefit from smart, connected plants and enterprises can implement them today. CC-Link IE TSN, the first open Gigabit Ethernet with TSN capabilities satisfies both the need for high bandwidth and convergence.

By implementing CC-Link IE TSN, pharmaceutical producers can achieve a number of key business benefits, which are: simpler network architectures/machine designs, greater process transparency and better management, more productivity and better integration of OT and IT systems.

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CLPAUS028 Pharma Industry Feature

Caption: By creating smart and responsive facilities, pharmaceutical manufacturers can optimize the production of regulatory compliant, high-quality medicaments with minimum rework activities. (Copyright: iStock/ aleksejplatonov)

Keywords: pharmaceutical industry, pharma, industry 4.0, industrial automation, factory automation, smart factory, convergence, time-sensitive networking, tsn, cc-link ie tsn

About The CC-Link Partner Association (CLPA)

The CLPA is an international organization founded in 2000 dedicated to the technical development and promotion of the CC-Link open industrial network family. 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 over 3,800 corporate members worldwide, and more than 2,000 compatible products available from over 340 manufacturers. Over 30 million devices using CLPA technology are in use worldwide.

Anyone interested in joining the organization can apply here: https://www.cc-link.org/en/clpa/members/index.html

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.

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