Only an open network technology will enable the transition to high productivity e-F@ctories

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Already fast becoming a reality, the e-F@ctories of the future leverage the Industrial Internet of Things (IIoT) to support smart, data-driven operations. These facilities are setups that can only work (and succeed) if backed by openness, interoperability and interconnectivity. This is why choosing the right network technology and protocols from an industry-leading organization is key.

Tom Burke, Global Strategic Advisor at the CC-Link Partner Association (CLPA), explores the key aspects of network communications for future-orientated manufacturing facilities.

e-F@ctories are all about dataflows, which generate and transfer insights on processes, equipment and other assets to drive productivity, performance and efficiency. This means that industrial communications can no longer be segmented, with parts of the enterprise completely disengaged from others. Instead, converged networks are required to fully realize the potential of digital transformation strategies.

Standard communications solutions have certainly come a long way in enabling interconnectivity. However, the current situation is still fragmented, requiring machine builders and end users to carefully consider the individual features of

network technologies and the protocols available when embarking on a digitalization journey.

In effect, the market is still characterized by custom industrial Ethernet solutions, based on vendor-specific proprietary standards and with limited interoperability. Nonetheless, there are leading players in the sector that are bucking this trend, driving the development and adoption of technologies that can overcome present limitations to realize seamless connectivity.

Defining interoperability and interconnectivity

The first aspect that companies should seek when looking at their communications is openness. A solution that enables open networking architectures ultimately supports the exchange of data among hardware devices form a multitude of makers. In effect, automation vendors are able to decouple network hardware and software to develop compatible devices and interfaces.

It is precisely for these reasons that the CC-Link family of network technologies for industrial communications was developed as an open-source solution. Even more, the CLPA is committed to driving its adoption by helping device vendors to develop compatible products, certify them as well as enhance their market reach.

In addition to openness, it is recommended to favor a network or protocol that can offer interoperability or other companion specifications that support the unification of industrial communications. Thanks to this approach, end users can easily tap into the information produced by different machines or divisions within an enterprise.

When looking at this aspect, the CLPA has been driving key initiatives to deliver seamless connectivity, e.g. by incorporating MQTT and establishing valuable

collaborations with other prominent organizations. These include, for example, the development of a joint specification with PROFIBUS & PROFINET International (PI) as well as the incorporation of OPC UA technology within CC-Link IE open gigabit industrial Ethernet.

Identifying future-oriented features

One of the most interesting parts of interoperability is the ability to reliably leverage solutions that were previously not accessible to specific domains. One example is the application of Simple Network Management Protocol (SNMP) to the operational technology domain.

This technology has been widely used throughout information technology (IT) to help engineers gain a unique insight into the health and performance of their networks and devices, however the operational technology (OT) side has never been able to benefit from it. Thanks to one of the industry's most advanced network technologies, CC-Link IE TSN, this is no longer the case. Therefore, it is now possible to use SNMP to advance industrial automation and Industrial Internet of Things (IIoT) applications.

Finally, selecting a solution from a network technology provider that is committed to unified conformance testing is extremely advantageous, especially when it comes to delivering pioneering solutions. More precisely, as the market demand for Time-Sensitive Networking (TSN) grows, businesses can benefit from a standardized test plan to confirm the conformance and compatibility of products with TSN functions. This can ensure that all devices within a network can utilize the same protocols and standards.

To address this need, the CLPA is committed to the TSN Industrial Automation Conformance Collaboration (TIACC). This aims to develop and promote a single common conformance test plan to certify TSN-compatible products, in line with the IEC/IEEE 60802 TSN profile for Industrial Automation. Thus, the organization is actively engaged with other leading specialists, such as the Avnu Alliance, ODVA, OPC Foundation (OPCF) and PI, as part of this newly launched industry-wide initiative.

A solid pillar

The network of the future will be characterized by enhanced interconnectivity and openness in order to support seamless communications between a wide, ever-expanding range of devices. With a proven track record of improving and building on these core elements with every network technology released by the organization, the CLPA is well placed to address the need for easy to implement, transparent data sharing. By selecting the CC-Link family of network technologies, machine builders and end users are a step closer to achieving the unified architectures of the future.
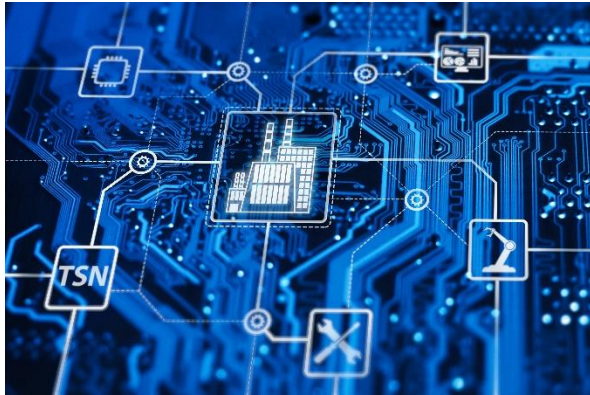
Image captions:

Image 1: Only an open network technology will enable the transition to high productivity e-F@ctories

About The CC-Link Partner Association (CLPA)

The CLPA is an international organization 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 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 4,100 corporate members worldwide, and more than 2,000 compatible products available from over 370 manufacturers. Around 38 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

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