

# **CC-Link IE TSN: One Network. One Solution.**

- **Time-Sensitive Networking is key to the future of industrial automation**
- **Combine TSN and gigabit bandwidth for powerful industry 4.0 support**
- **Converge OT and IT traffic to deliver increased process transparency**

# Be ready for the future of manufacturing with CC-Link IE TSN

## The only open industrial Ethernet to combine gigabit bandwidth with TSN

CC-Link IE TSN offers manufacturing industries the technology they need to address the challenges of Industry 4.0 by focussing on four key benefits:

### Simpler network architectures/ machine designs

Whereas in the past, system designs often used separate networks for different functions, TSN allows multiple types of traffic to be combined on the same network. This allows substantial decreases in costs, as less equipment is required and engineering work to design, configure, install and maintain network systems is also minimized. In addition, timescales for complete factory automation projects are decreased.

### Improved 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.

### Greater process transparency and better management

The convergence enabled 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 product quality.

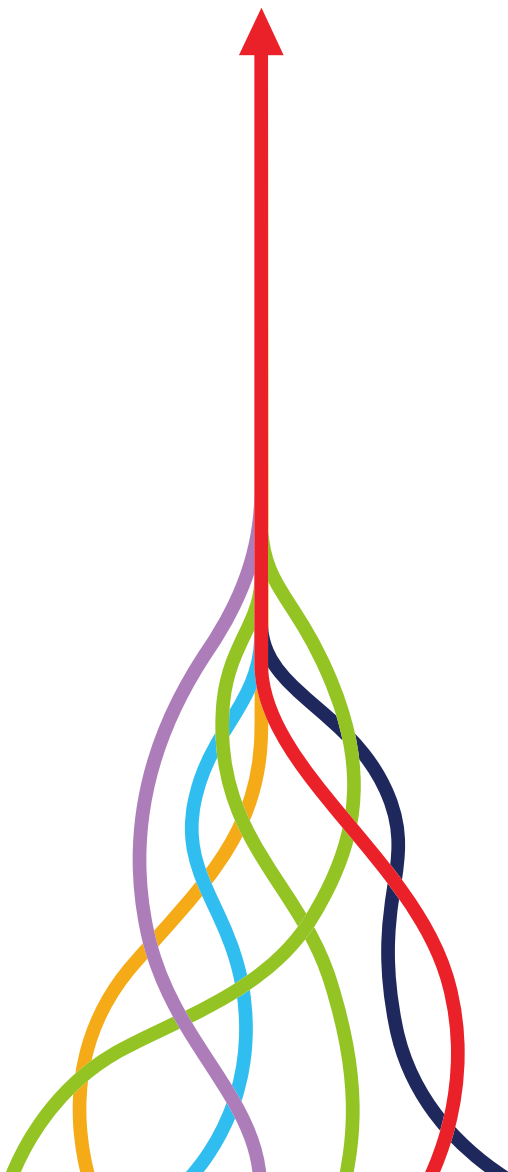
### Better integration of OT and IT systems

By converging multiple types of process 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.

### Target industries

Many different industries can benefit from the array of features CC-Link IE TSN offers:

- Automotive
- Consumer electronics
- Consumer packaged goods
- Food & beverage
- Lithium battery
- Logistics
- Semiconductor





**Delivering TSN's  
benefits to  
manufacturing**



**Getting your  
TSN product  
to market**



**Time-Sensitive  
Networking (TSN)  
- The Case for  
Action Now**

The CLPA is an industry leader in TSN technology. Download the latest white papers: **Delivering TSN's benefits to manufacturing**, **Getting your TSN product to market** and **Time-Sensitive Networking (TSN) - The Case for Action Now** at [eu.cc-link.org](http://eu.cc-link.org)

## Key support

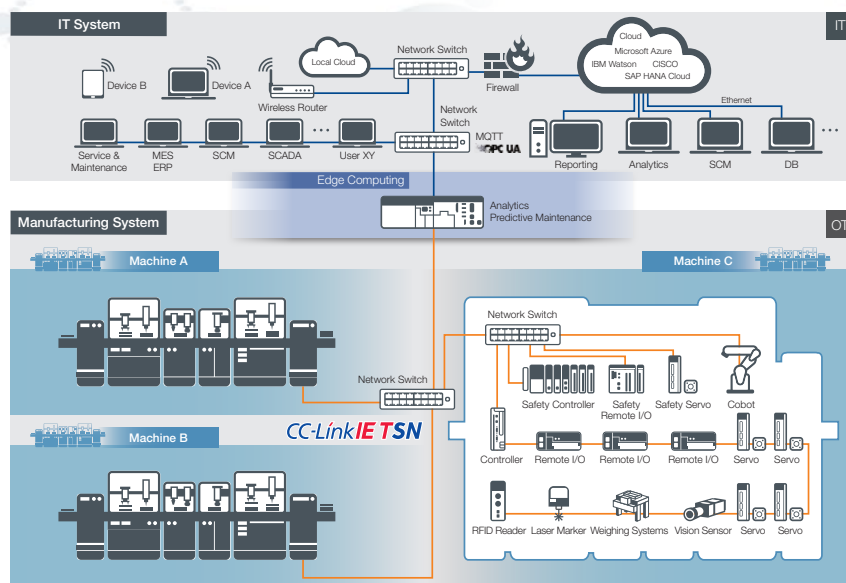
CC-Link IE TSN has been developed under the supervision of the CC-Link Partner Association (CLPA), by its leading partner companies including Mitsubishi Electric, a global leader in automation and the number one choice in Asian markets.

The CLPA was founded in 2000 with the open fieldbus CC-Link. It was the first to offer open gigabit Ethernet with CC-Link IE in 2008. CC-Link IE TSN will further strengthen this leading position as third-party support from leading vendors increases.


## Open development

Since CC-Link IE TSN is an open technology administered by the CLPA, any vendor can develop products for it after becoming a member of the association. In order to offer the maximum flexibility to potential vendors, a full spectrum of development options exist.

This includes the possibility to develop devices that use a gigabit or 100Mbit physical layer, implemented using hardware or software. These possibilities apply at both the master and remote device levels.



## CC-Link IE TSN device development options

No.	Device development options			CC-Link <i>IE</i> TSN	CC-Link <i>IE</i>  Field Basic		
	Communication speed	Master	Remote				
1	1 Gbps	Hardware	Hardware	Supported	Supported		
2		Software			Not supported		
3		Hardware	Software				
4		Software					
5	100 Mbps	Hardware	Hardware				
6		Software					
7		Hardware	Software		Supported		
8		Software					

\*Hardware\*: implemented by dedicated ASIC or FPGA.

\*Software\*: implemented by software stack running on standard Ethernet platforms.

## Technical specifications

No.	Items	CC-Link IE TSN	CC-Link IE Field	CC-Link IE Field Basic
1	Baud rate	1Gbps/100Mbps	1Gbps	100Mbps
2	Maximum input/output size per master	4G Octet(Byte)	36K Octet(Byte)	9K Octet(Byte)
3	Transient transmission	Supported	Supported	Supported
4	Communication method	Time sharing	Token passing	Broadcast polling
5	Synchronization method	Time synchronization	Frame reception timing/transmission path delay measurement	—
6	Maximum station No. per network	64,770 stations (Master: m stations, Slave: 64,770-m stations)	254 stations (Master: m stations, Slave: 254-m stations)	65 stations (Master: 1 station, Slave: 64 stations)
7	Topology	Line, Star, Ring, Line + Star, Line + Ring, Ring + Star, Mesh	Line, Star, Ring, Line + Star	Line, Star
8	Cable specification	IEEE 802.3 1000BASE-T (Category 5e or above)/100BASE-TX (Category 5 or above) compatible cable. * Shielded or double shielded cable recommended.		
9	Connector specification	RJ-45 connector (1Gbps/100Mbps) ANSI/TIA/EIA-568-B compliant. 8 pin shielded connector recommended. * M12 connector (1Gbps/100Mbps) IEC61076-2-109 compliant. 8 pin connector recommended. * M12 connector (100Mbps) IEC61076-2-101 compliant. 4 pin connector recommended. *		

\*100Mbps compatible cable / connector cannot be used for CC-Link IE Field.

## CLPA board members



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