

LAPP ASIA PACIFIC WEBINAR 2021

ACCELERATING TECHNOLOGY OF THE FUTURE WITH SINGLE-PAIR ETHERNET (SPE)

LAPP

THE SPEAKER



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ACCELERATING TECHNOLOGY
OF THE FUTURE WITH
SINGLE-PAIR ETHERNET (SPE)

A compact yet groundbreaking innovation



1970

1999

1. ETHERNET DEFINED

2. MARKET INSIGHT & TRENDS

3. ABOUT SPE THAT WE KNOW SO FAR

4. LAPP SPE CABLES

5. PRODUCT APPLICATIONS

6. Q&A

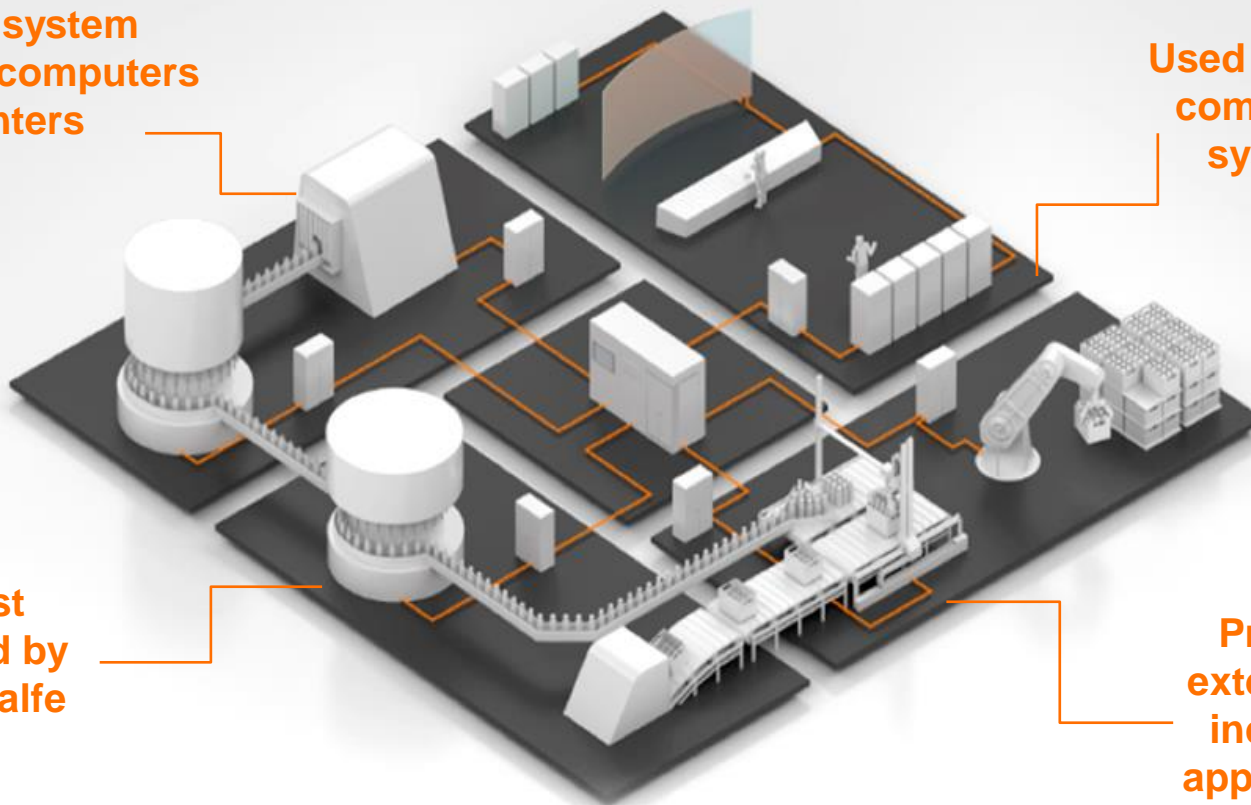
ETHERNET -

Network system
connecting computers
to printers

Used widely in
commercial
systems

Idea first
conceived by
Bob Metcalfe

Protocol
extended to
industrial
applications



A small, blue and green globe is positioned on the right side of the image, resting on a blurred background of a world map. The map shows various continents and lines of latitude and longitude. The globe is the central focus of the right half of the image.

**MARKET INSIGHT
& TRENDS ON
INDUSTRIAL
ETHERNET &
COMPONENTS**

The background image shows an industrial facility at night, illuminated by blue lights. A network of glowing white lines with bright blue nodes is overlaid on the scene, connecting various points across the facility. The overall color palette is dominated by blues and oranges.

**“GLOBAL INDUSTRIAL
ETHERNET CABLES TO
GROW AT CAGR**

15.7%
**FROM YEAR
2022 TO 2027 ...”**

INDUSTRY RESEARCH BIZ

Global Industrial ETHERNET components trend remains very positive

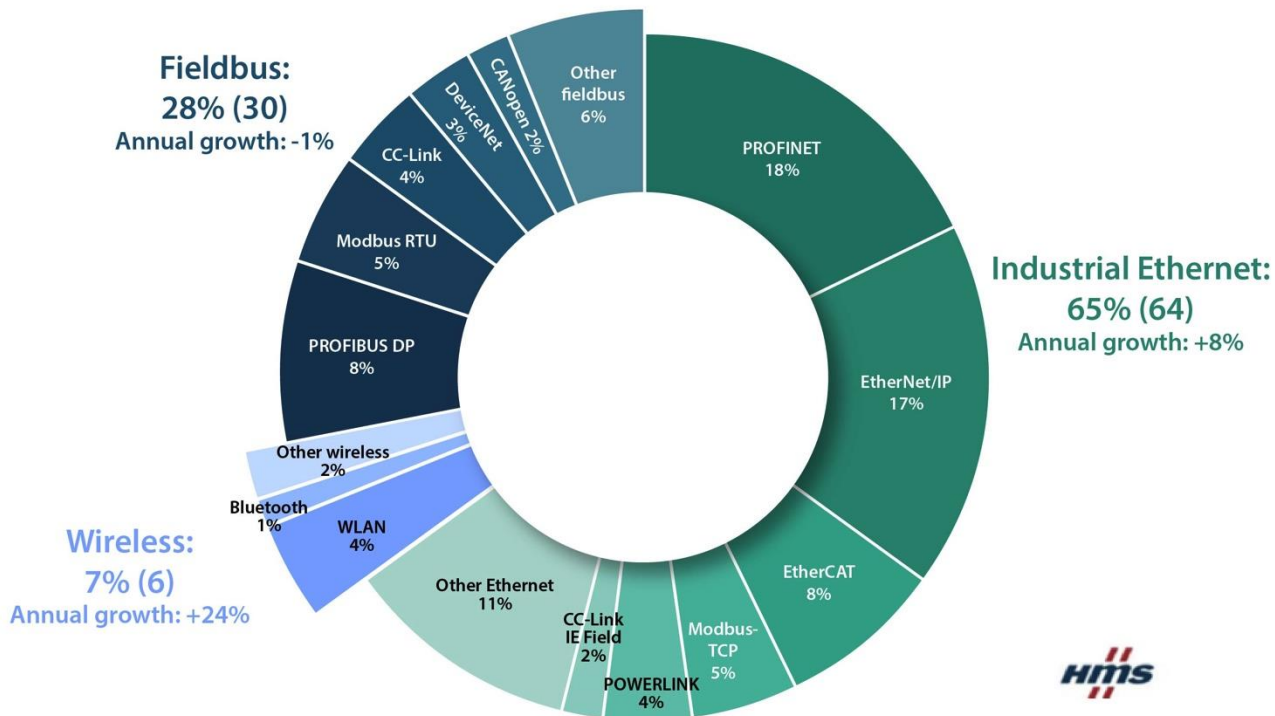
Global revenue of **2.2 billion USD**,
APAC accounted for
1/4 of the market

APAC grew the fastest in
the last 4 years at
21.8%

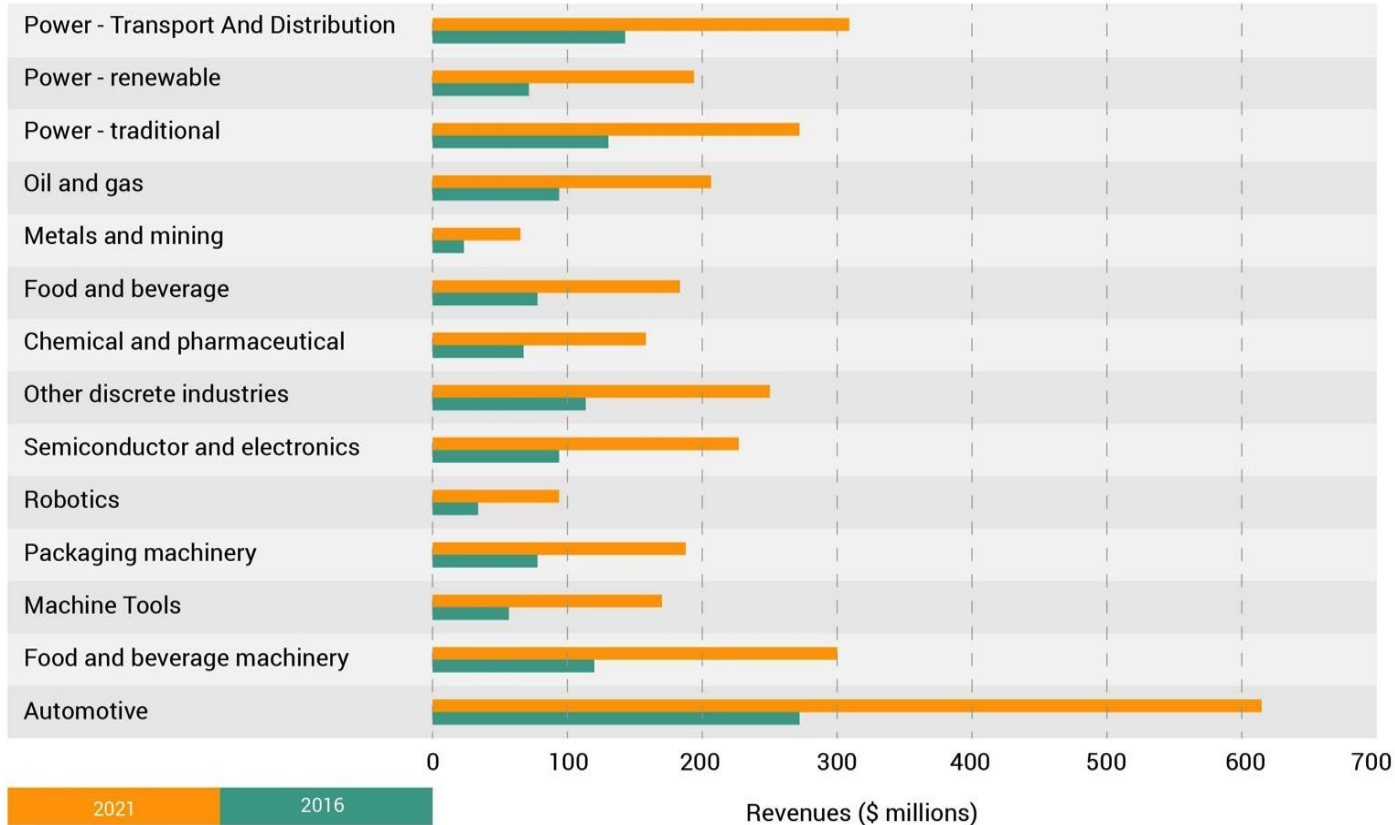
Industrial Ethernet components to
grow
at **19.3% CAGR**

Ethernet connected nodes
grow from 28.8 million to
58.8 million by 2021

Industrial **ETHERNET**
growing steadily with
new nodes for
Fieldbus declining in
year 2021



The market for industrial ethernet infrastructure components by industry: World



Industrial
ETHERNET
components
are used
everywhere;
automotive
segment is an
early adopter



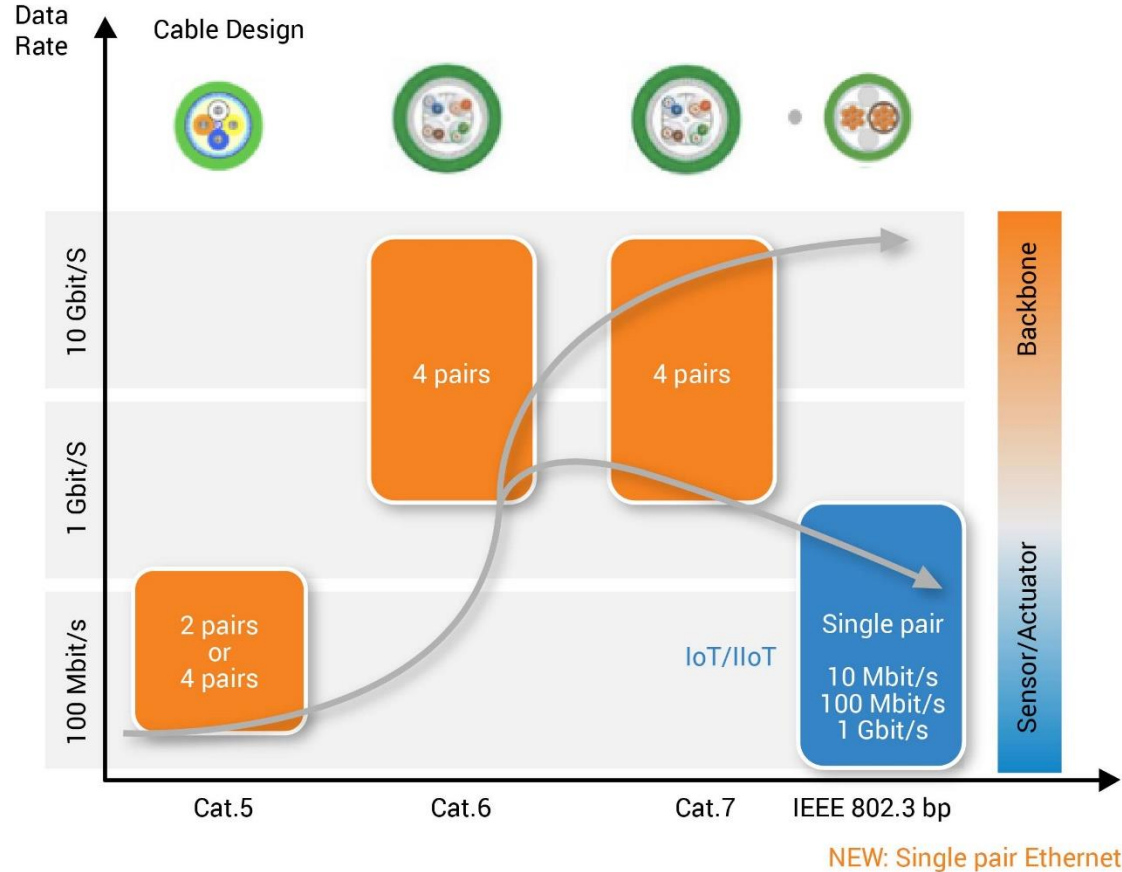
**WHAT IS
SINGLE PAIR
ETHERNET**

Conventional
Industrial Ethernet –
2-pair or 4-pair
cables

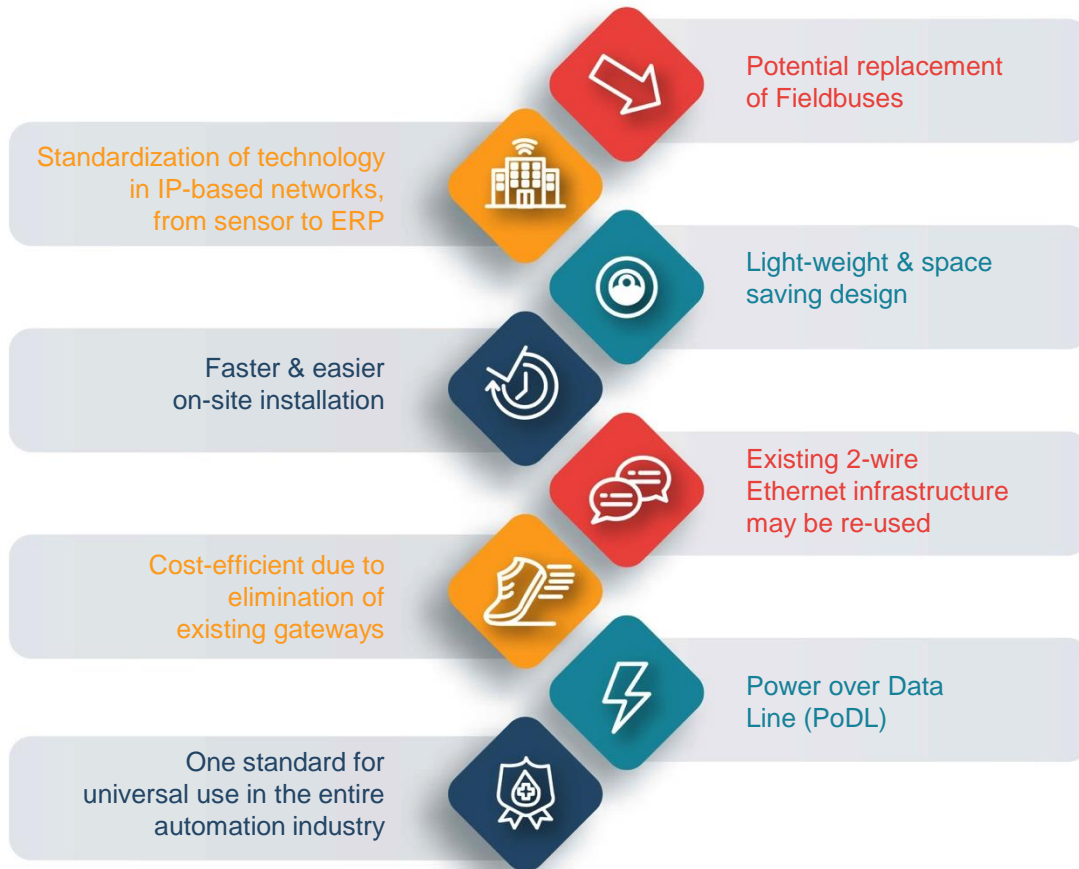


Single Pair
Ethernet –
1 twisted-pair
cable!

This is how the evolution looks like from traditional Ethernet into SPE



Here are the benefits of SPE at a glance



Let's understand the different Ethernet versions in the industry

Fast Ethernet

100 MBit/s per twisted pair, unidirectional



GBit Ethernet

250 MBit/s or 2.5 GBit/s per twisted pair, bi-directional



Single Pair Ethernet

100 MBit/s or 1 GBit/s per twisted pair, bi-directional





10 Gbit/s

802.3 ch - 15 m (STP)

1 Gbit/s

802.3 bp - 15 m (UTP) or 40 m (STP)

100 Mbit/s

802.3 bw - 15 m (UTP)

10 Mbit/s

802.3 cg - 15 m (UTP) or 1000 m (STP)

802.3 bu PoDL –
Power over Data Line

Released

2020



IEC 63171 – SPE Connectors
IEC 61156 – SPE Cables

Here is the latest
status of the
standardization of SPE

Power over Data Line (PoDL) explained

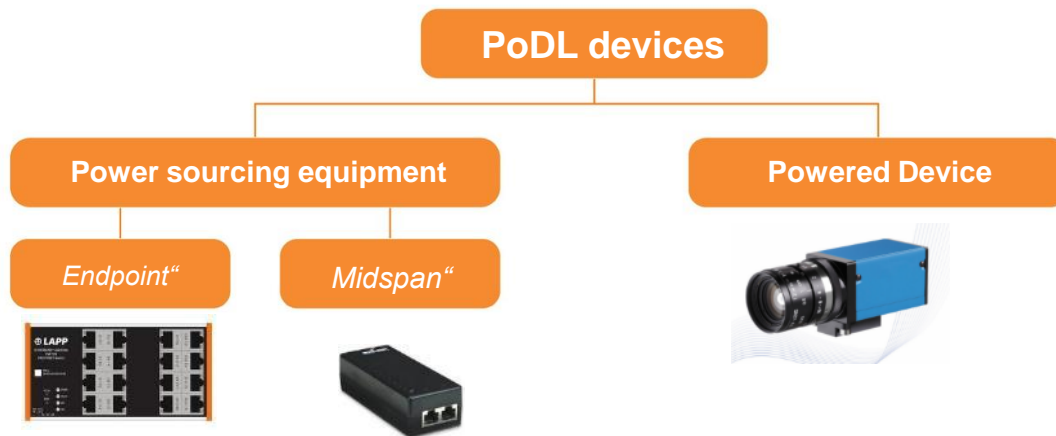
For 100Base-T1 and 1000Base-T1

0,5 to 60 W of power over a twisted pair

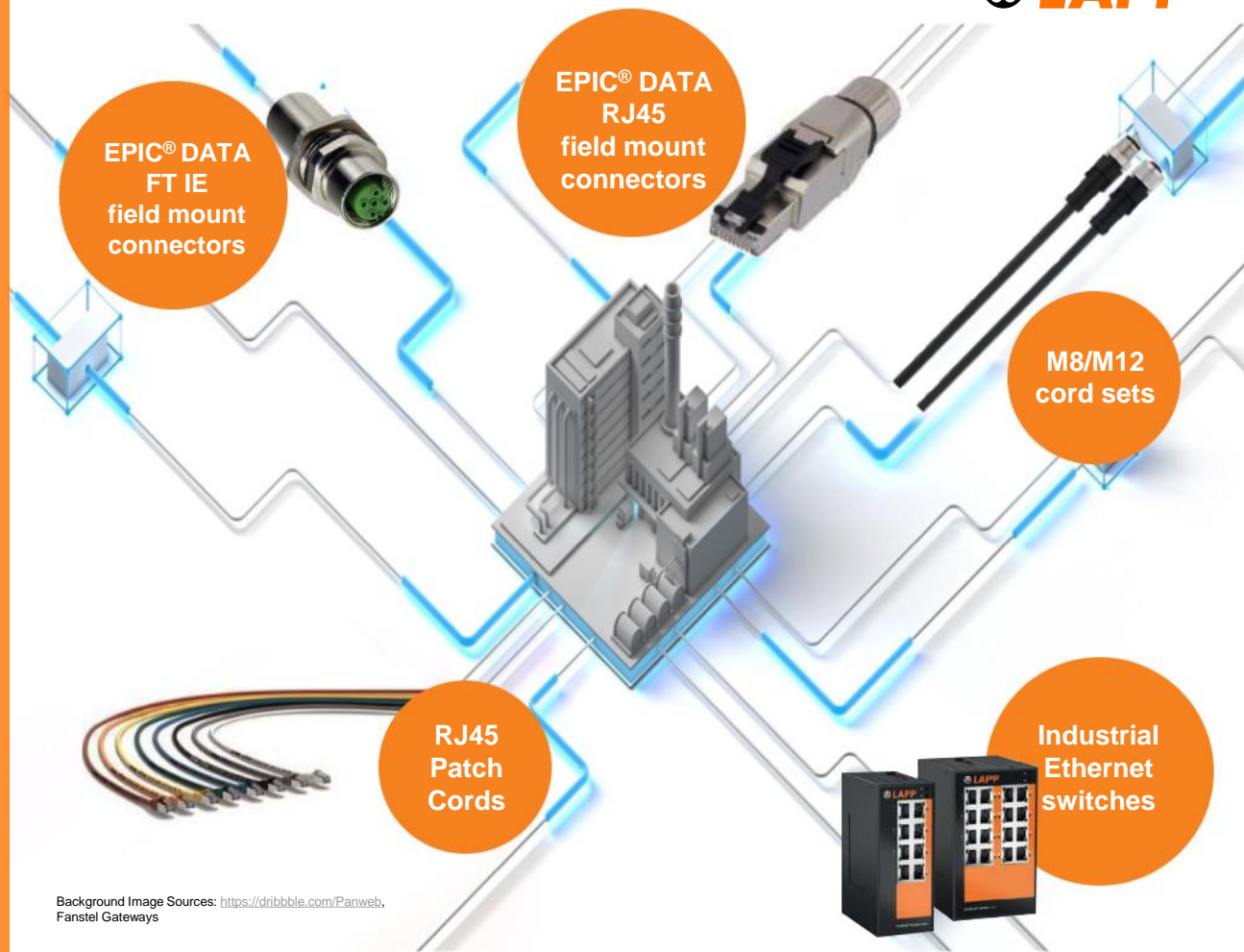
Reduction of cabling efforts

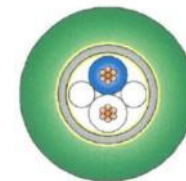
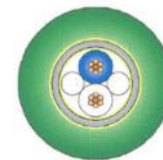
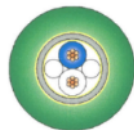
Powering devices such as IP cameras, Sensors or Remote IO

Missing power outlets can be covered



Components and other technologies that interact with Ethernet





We are ready with
the LAPP
ETHERLINE® T1
Cable Portfolio

ETHERLINE® T1 FD P
1x2xAWG26/7

2170921

PUR-sheath

Drag chain

up to 1 GBit/s

max. 40 m

Ø 4.7 mm

UL AWM 80°C, 300 V

AVAILABLE SOON

ETHERLINE® T1 Y FLEX
1x2xAWG22/7

2170922

PUR-sheath

Occasional flexing

100 MBit/s - 1 GBit/s

max. 40 m

Ø 5.8 mm

UL PLTC, CM, AWM

LAUNCHED

ETHERLINE® T1 P FLEX
1x2xAWG18/7

2170924

PVC-sheath

Fixed

10 MBit/s

max. 1000 m

Tbd.

Tbd.

AVAILABLE SOON

Here is how the
SPE connectors
are developing with
IEC 63171
standards

Industrial cabling
IEC 63171-6

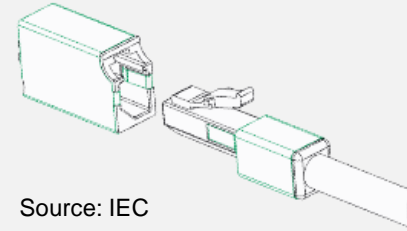


INDUSTRIAL
PARTNER
NETWORK



Source: SPE Industrial Partner Network

Building cabling
IEC 63171-1 (CommScope)



Source: IEC

Building cabling
IEC 63171-2

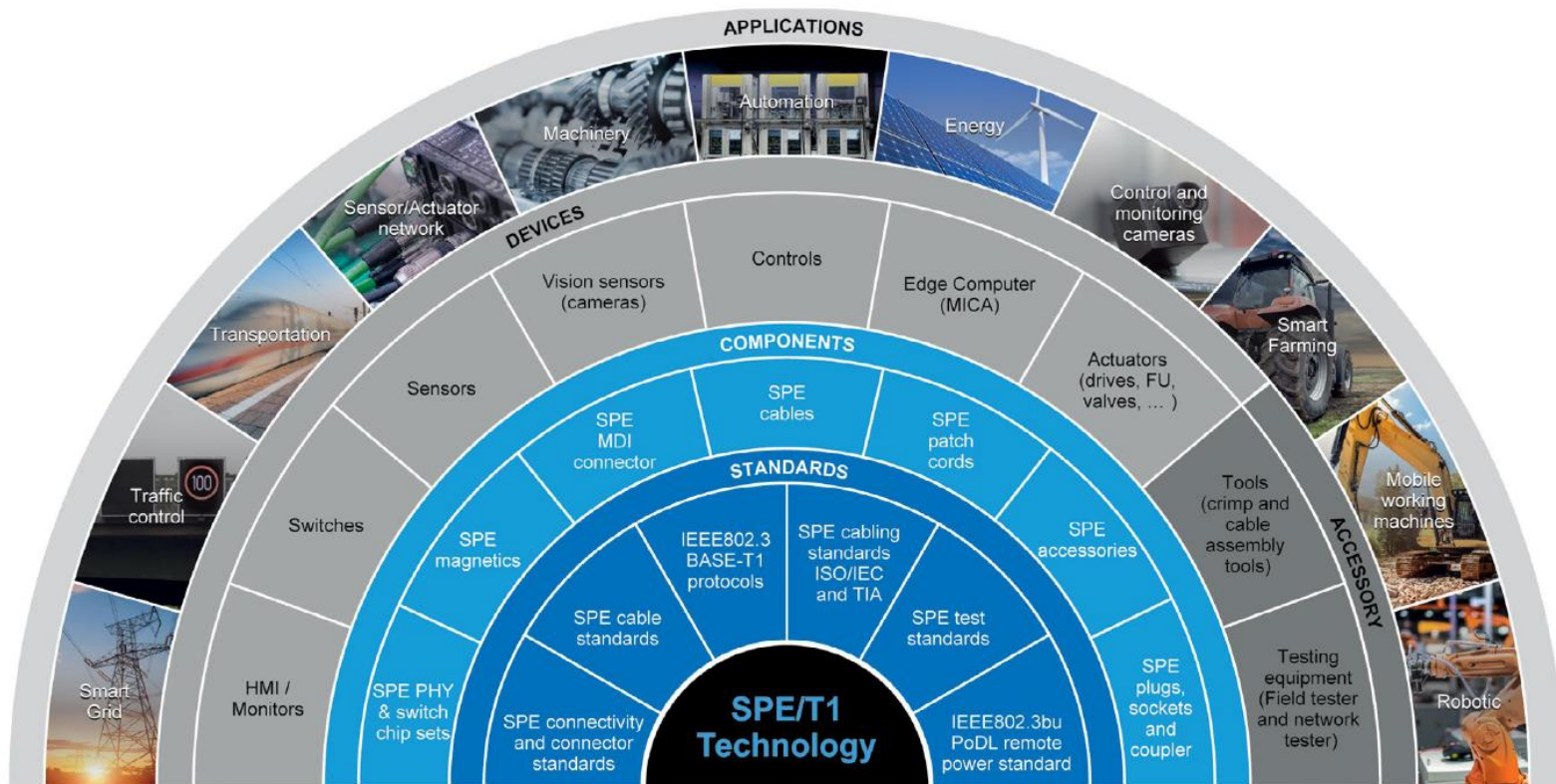
Industrial cabling
IEC 63171-5



Source: Single Pair Ethernet Alliance

POTENTIAL APPLICATIONS

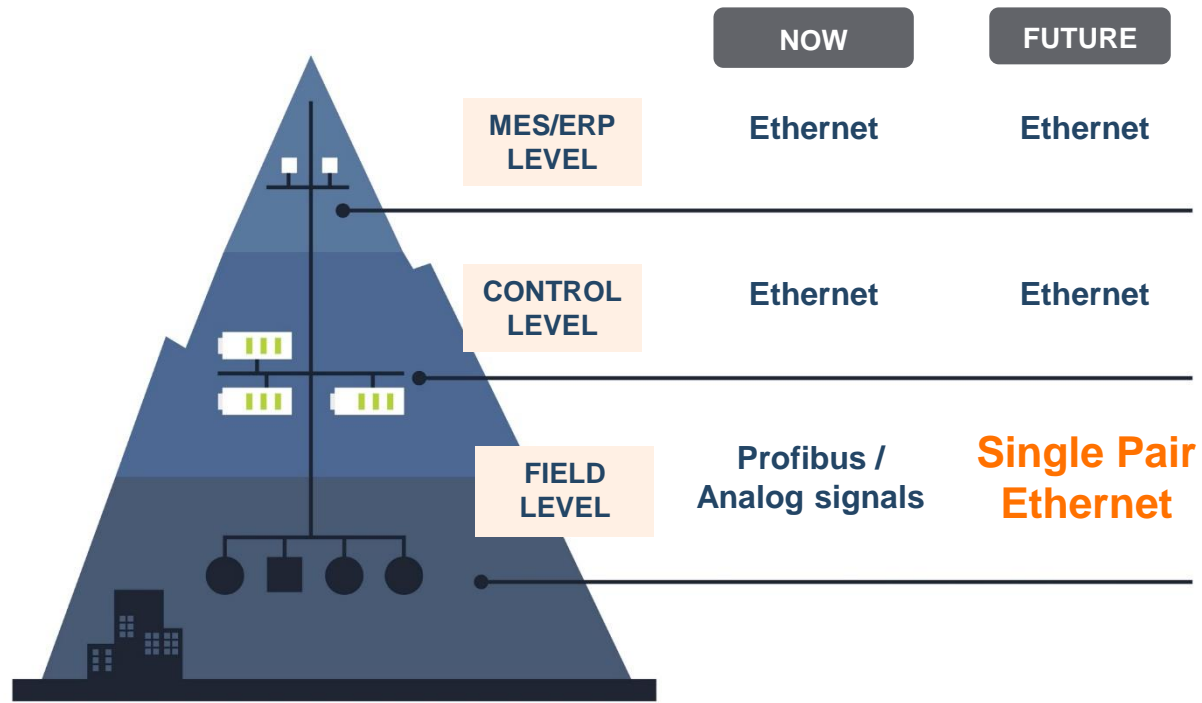




Source: TE Connectivity Whitepaper

SPE is in the driver seat to shape the future ecosystem

Applications of SPE within the automation pyramid





These are the different segments that may use SPE technology

	Automotive	Building Automation	Process Automation	Factory Automation
Application	Wiring harness in automobile	Control cabinet wiring, Field wiring	Field cabling, sensors	Ind. Control cabinet wiring, Field cabling, sensors
Transmission rate + distance	10 Mbit/s - 1 Gbit/s, 15-40 m	10 Mbit/s - 1 Gbit/s, < 1000 m	10 Mbit/s, < 1000 m	10 Mbit/s - 1 Gbit/s, ≤ 100 m
Cross section	26-22 AWG	26-22 AWG	22-18 AWG	26-22 AWG
Robustness	Medium-high	Low-medium	High (+Ex)	Medium-high
Current Connectors	Automotive-specific	Individual wiring, terminal, RJ45, EIB	Terminal, plug, M12	RJ45, single wiring, M8/M12

A high-speed train, likely a Shinkansen, is shown at a station platform. The train is white with blue stripes and is moving along the tracks. The platform has a roof and various signs. The background shows a clear blue sky and some buildings.

**E-TRANSPORTATION
APPLICATION**

Applications within an E-transport system



Passenger
Information System



Infotainment
System



Seat Reservation
System



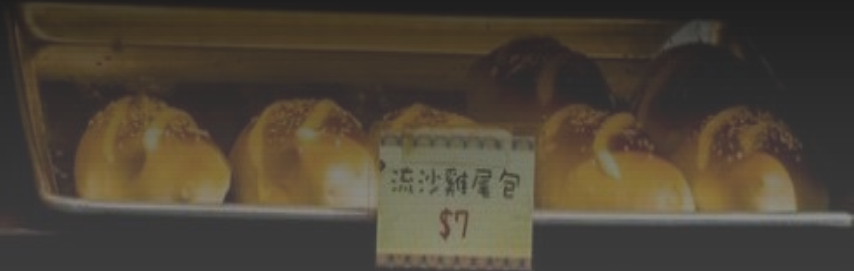
CCTV



Passenger Count
Visual

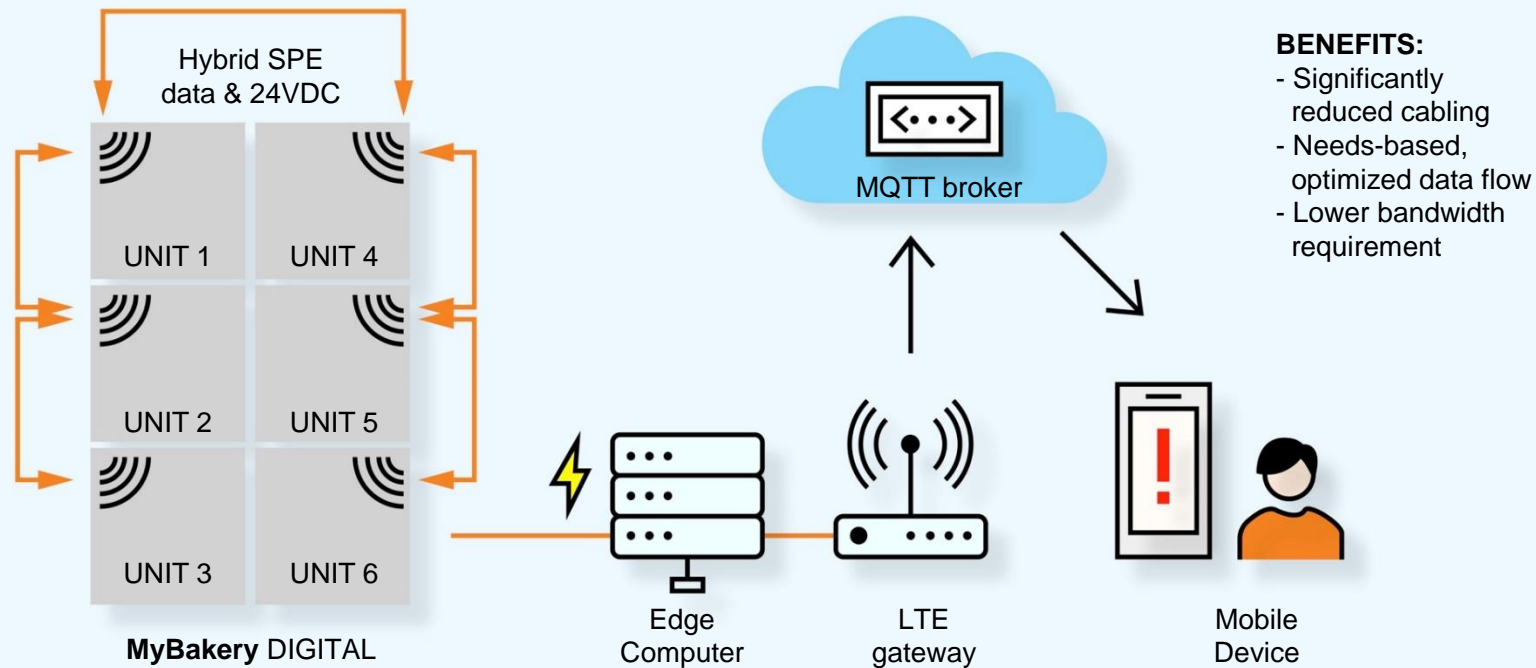
Applications within an E-transport system

Application	Cabling type	Data Rate	Protocol
Passenger Counter	SPE	10 Mbit/s	10BASE-T1S (MD) Or 100BASE-T1
Door Surveillance and control	SPE	10 Mbit/s	10BASE-T1S (MD)
IP Speaker	SPE	10 Mbit/s	10BASE-T1S (MD)
SOS Terminal	SPE	10 Mbit/s	10BASE-T1S (MD)
Outside display	SPE	100 Mbit/s	100BASE-T1
Inside display	SPE	100 Mbit/s	100BASE-T1
Driver assistance terminal	SPE	1 Gbit/s	1000BASE-T1
IP camera (inside and outside)	SPE	100 Mbit/s	100BASE-T1
Cellular router and access point	4 pair	1 Gbit/s	1000BASE-T1
WLAN access points	4 pair	1 Gbit/s	1000BASE-T1
Door Opener	SPE	10 Mbit/s	10BASE-T1S (MD)
Ticketing machines	SPE	10 Mbit/s	10BASE-T1S (MD)

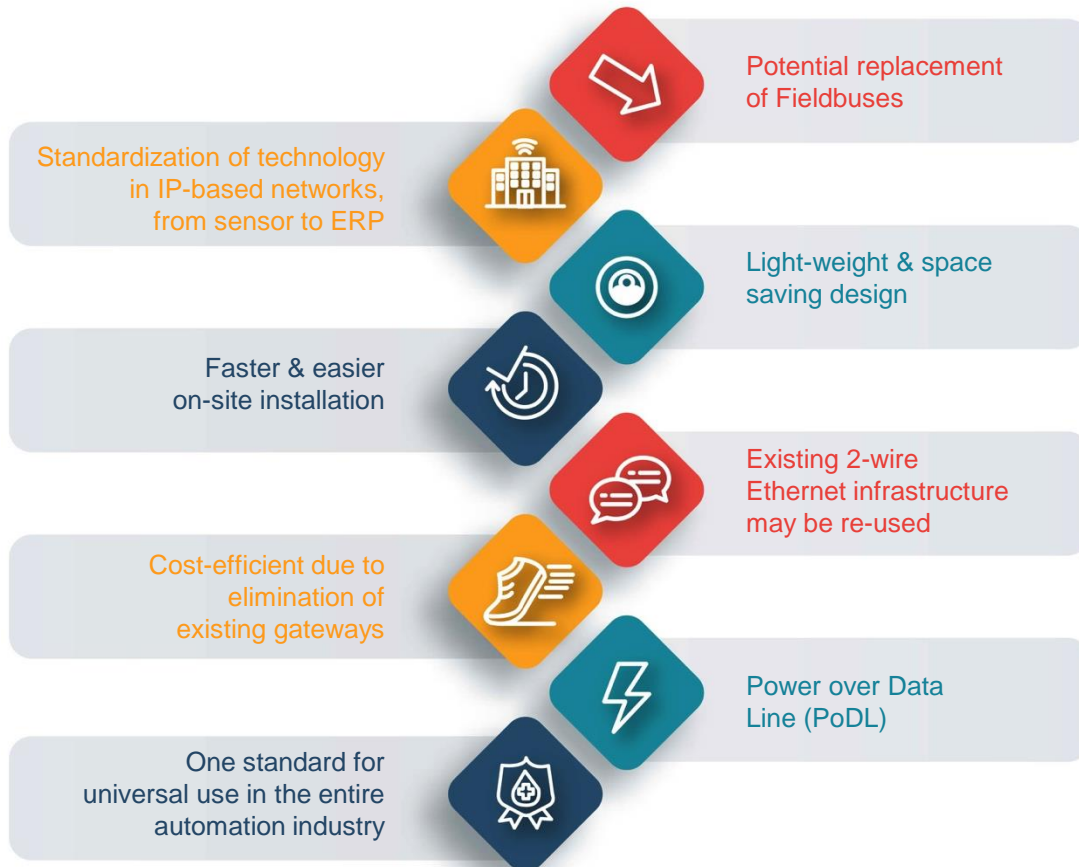


MONITORING
& REPORTING
- BAKERY

Applications in a bakery environment



Reinforcing the benefits of SPE



OLD WAYS
WON'T
OPEN
NEW
DOORS



THANK **YOU**