

# Single Pair Ethernet Hoe nu verder?

Egbert Stellinga  
Product Manager DC  
Phoenix Contact Netherlands B.V.

# Introduction

## About the presenter



Egbert Stellinga  
Product Manager Device Connectivity



PHOENIX CONTACT B.V.  
Postbus 246  
6900 AE ZEVENAAR  
Tel. +31 (0)316 59 18 23  
Mobile +31 (0)653 15 77 98  
mailto: [estellinga@phoenixcontact.nl](mailto:estellinga@phoenixcontact.nl)  
[www.phoenixcontact.nl](http://www.phoenixcontact.nl)

## About Phoenix Contact

### Mission

“Solutions for electrification, networking and automation are our contribution to a world in which renewable energy is available for the benefit of everybody.”

### Facts & Figures

**1923**  
Founded

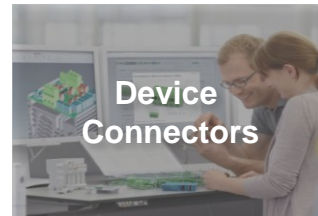
**20.000**  
Employees

**11**  
Prod. locations

**>100**  
countries

**€3.5B**  
sales

### Products



### Markets



Single Pair Ethernet, hoe nu verder?

# Agenda

---

- Introduction
- What is Single Pair Ethernet?
- SPE use cases
- SPE maturity
- SPE Availability

What is SPE?

## IIoT is driving connection of devices

There is a need for

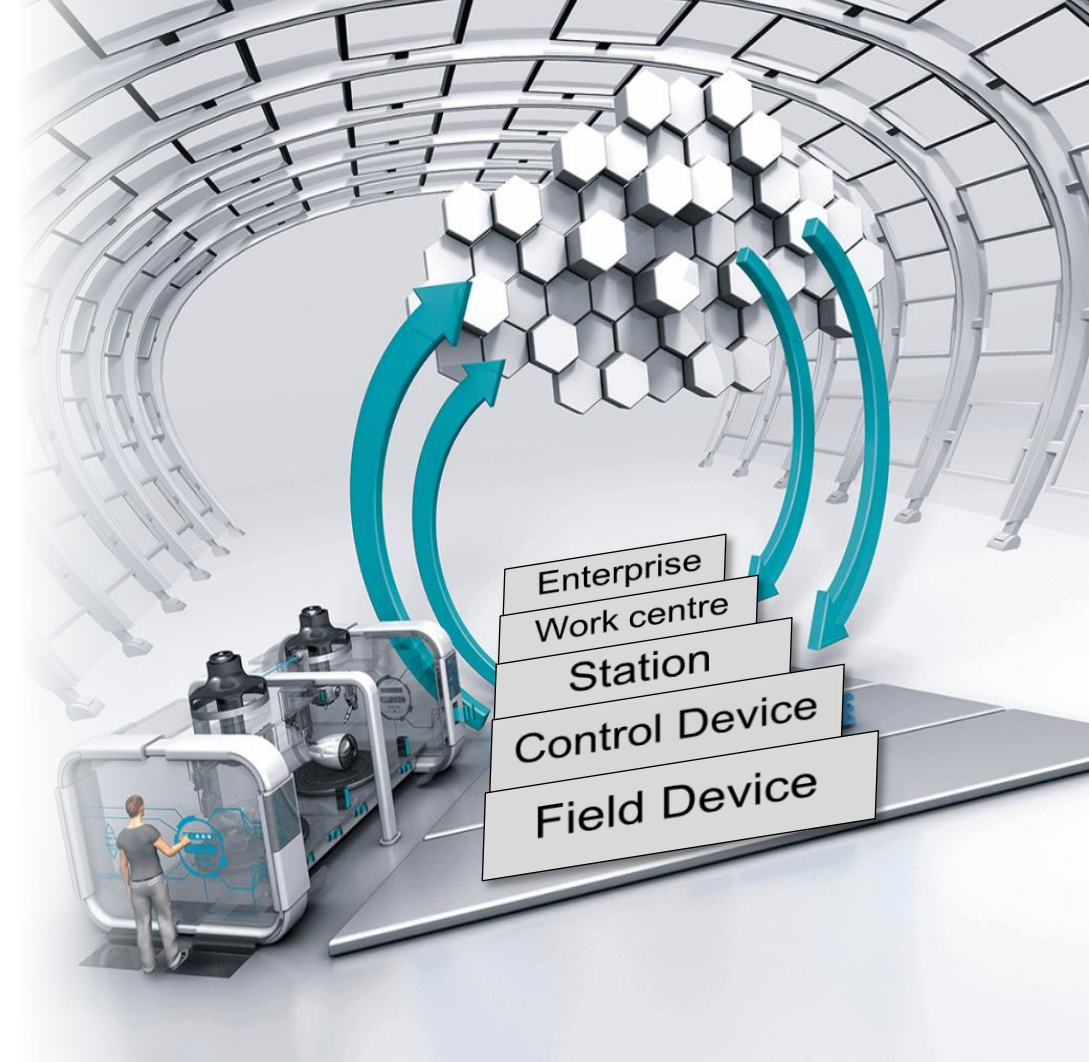
- Transparency
- Reduction of complexity
- Flexibility

Why is Ethernet not widely used in field devices?

- Relatively bulky Cables & Connectors are not allowing for application in small sensors.
- Max. 100m reach limits access to remote locations
- Multidrop not supported
- Cumbersome installation
- Relatively Costly components and installation

Result:

- Other fieldbuses like IOlink, canbus, profinet are widely adopted in the field device layer
- These fieldbuses drive the need for Gateways -> Complex network topology and Complex cabling
- This complexity can lead to a painful process of design, installation, commissioning and maintenance

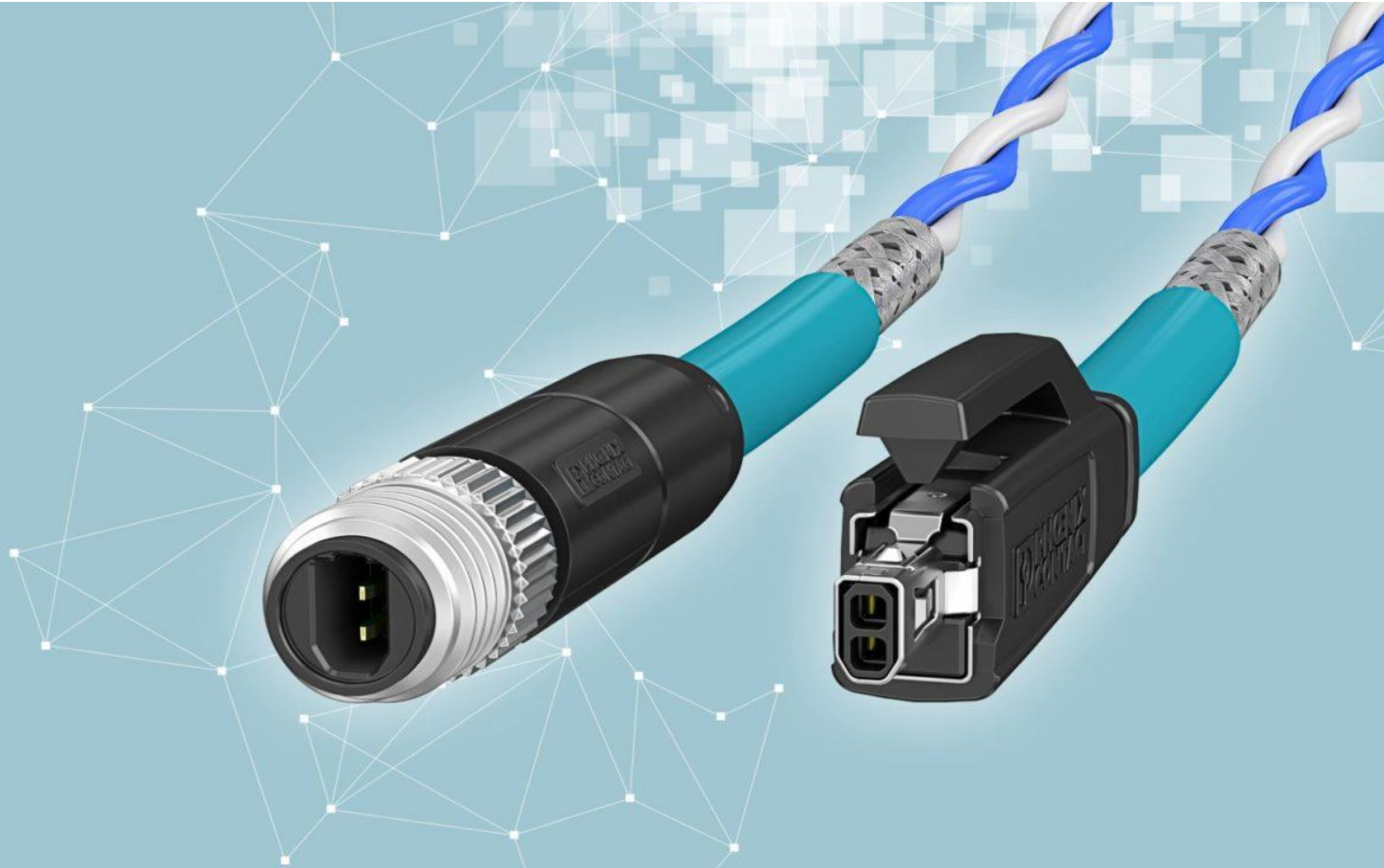


Single Pair Ethernet enables Ethernet in the last meter(s) of the network

# WHAT IS SINGLE PAIR ETHERNET?

What is SPE?

## SPE is a simplified physical layer for Ethernet

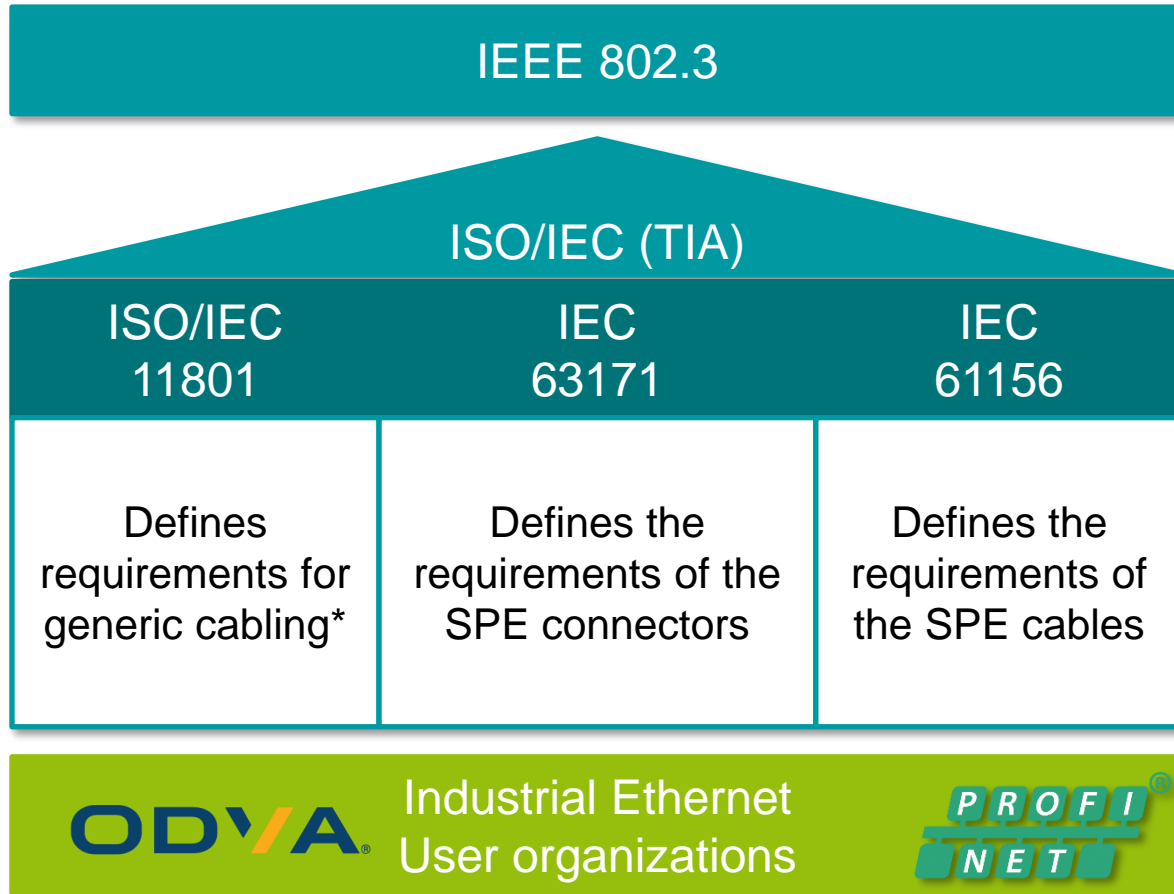


- Based on **SIMPLE** and **ROBUST** 2-wire cabling
- **FAST**, up to 1Gb/s (higher speeds are in process)
- **LONG REACH**, Enabling up to 1000m cable lengths
- Featuring a **COMPACT** design
- Allowing **MULTIDROP** topology
- Devices **POWERED** up to 50W

Like optical fibre, SPE is just another physical layer of the OSI model

What is SPE?

## SPE Standards



**IEEE 802.3** Defines the requirements for Ethernet transmission



**IEC** Define requirements for the SPE transmission channel

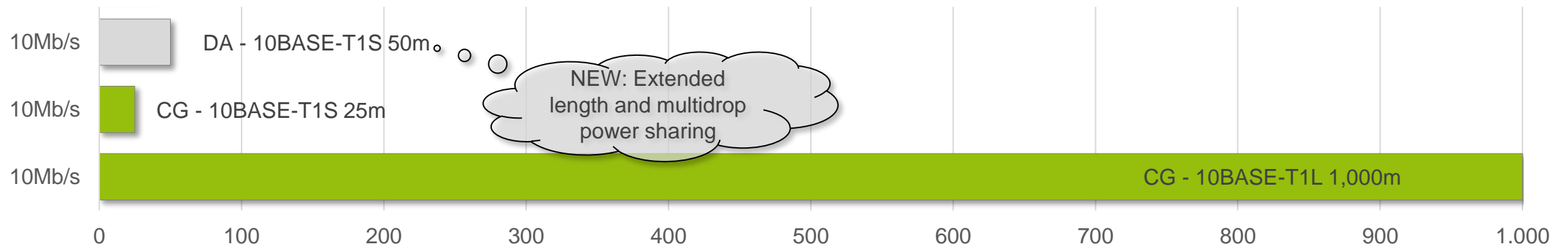


**ODVA** Define requirements for the application-specific Ethernet transmission and cabling  
**PROFINET**

\* Describes the cabling channels with all the necessary parameters (length, number of connections, bandwidth and the complete set of transmission parameters including NEXT, FEXT, shielding characteristics, etc.) in relation to the environment

What is SPE?

## Different standards for different applications





# SINGLE PAIR ETHERNET USE CASES

## Use Cases

# Application Process Automation

- Connect remote installations with up to 1km of length point to point supporting 10Mb/s speed
- Power devices instantly w/o the need for additional cables (PODL)
- Simple and cost efficient installation based on just 1 twisted pair
- IP67 and IP20 versions available
- Explosion protection available



## Use Cases

# Application examples Building Automation

- Cover distances up to 1km
- Quick and easy installation of devices using the 1 pair interconnection system
- Power devices instantly with up to 50W of power (PODL)
- Extend Ethernet into devices



Monitoring and safety technology



Building control



Lighting systems



Energy management



HVAC technology



Building communications

# Industrial Control and Factory automation



## Factory Control

- Sensors
- Actuators
- Assembly lines
- Packaging lines



## In-Cabinet Racks

- Intra-system management interface in racks
- Fans, temperature sensors, voltage monitors, DC-DC converters and optical modules

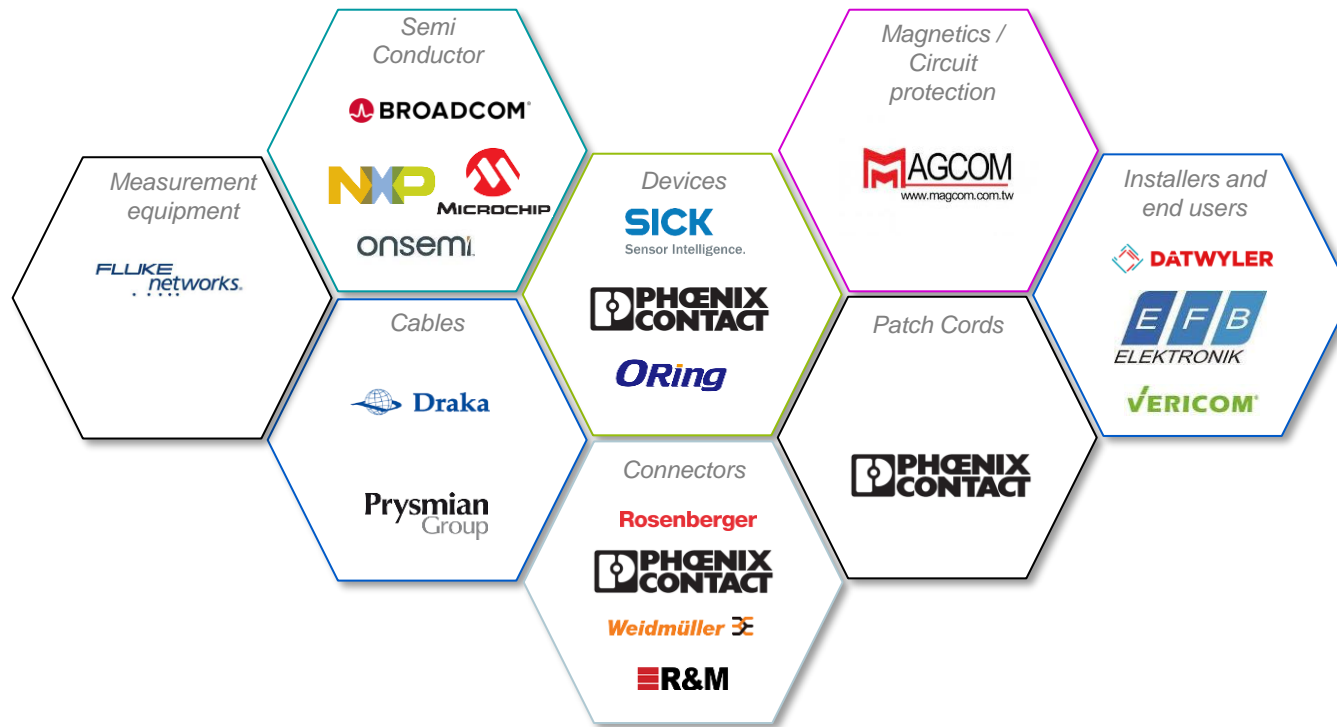


## Control Units

- On/off switches
- Buttons
- Converters
- Relays and input/output cards

# SINGLE PAIR ETHERNET MATURITY

# SPE is an Ecosystem



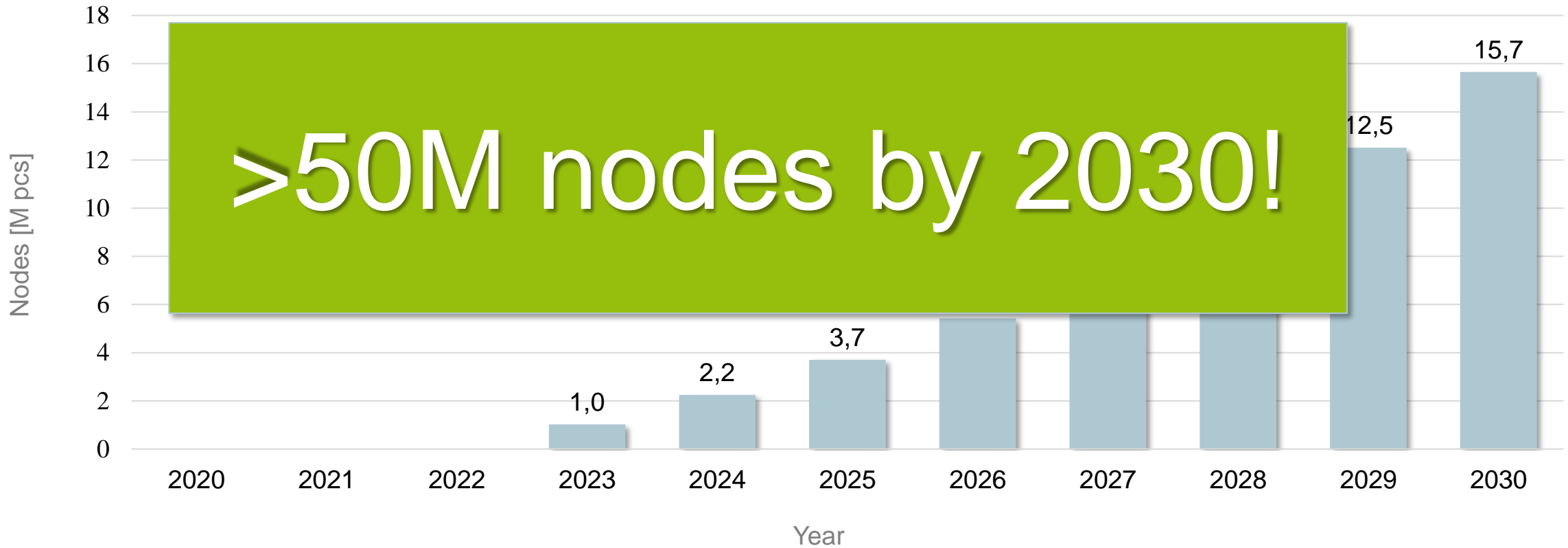
Introduction of SPE required great coordination between all stakeholders

## Ecosystem and market acceptance

Eco system	Feasibility assessment	Design and validation	Sampling	Mass production
Semi manufacturers				
Magnetics/circuit protection				
Connectors				
Cables				
Patch Cords				
Devices				
Measurement equipm.				
Installers and end users				

# SPE growth according to dynamic model

SPE nodes – Potential Factory Automation





# **SINGLE PAIR ETHERNET AVAILABILITY**

Availability

# ONEPAIR Connectors IP20/IP67

SPE- Patchcable		
SPE- Connector	 <p>Field installable</p>	 <p>New 2023</p>
SPE- Jacks		 <p>M8 M12 Hybrid</p>
IP20 (IEC 63171-2)		IP67 (IEC 63171-5)















SPE hoe nu verder? - Egbert Stellinga



Availability

# M12 Hybrid Connector interfaces IEC 63171-7

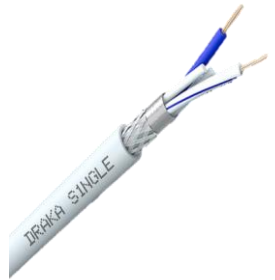
- IEC 63171-7

POWER	2-Phase			3-Phase	2-Phase		
		50V AC Max.		690V AC Max.	480V AC Max.	50V AC Max.	690V AC Max.
	1x 12A Max.	2x 8A Max.	1x 8A Max.	1x 8A Max.	1x 8A Max.	1x 16A Max.	1x 16A Max.
	Code 1	Code 2*	Code 3	Code 4	Code 5	Code 6	Code 7
MALE							
FEMALE							

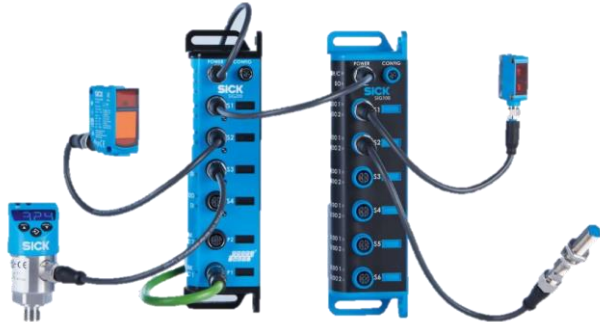


Availability

# Examples of other Products currently on the market



SINGLE  
SPE cable



Switches & Sensors



FL SWITCH 2303-8SP1 -  
Industrial Ethernet Switch



DELOS S02



TesPro CV100 SPE  
cable tester



T1L Media adapter

NEW 2023



**SPE IS UNSTOPPABLE**  
**>50M Nodes by 2030**

**QUESTIONS?**



# Thank You!

Visit us @ stand  
7D046

## More information?

Sign up for our webinar  
Single Pair Ethernet  
On 10 October 10:00 to  
11:00 am



**26 T/M 28**  
SEPTEMBER '23  
JAARBEURS UTRECHT