Industrial Ethernet in Process Industry

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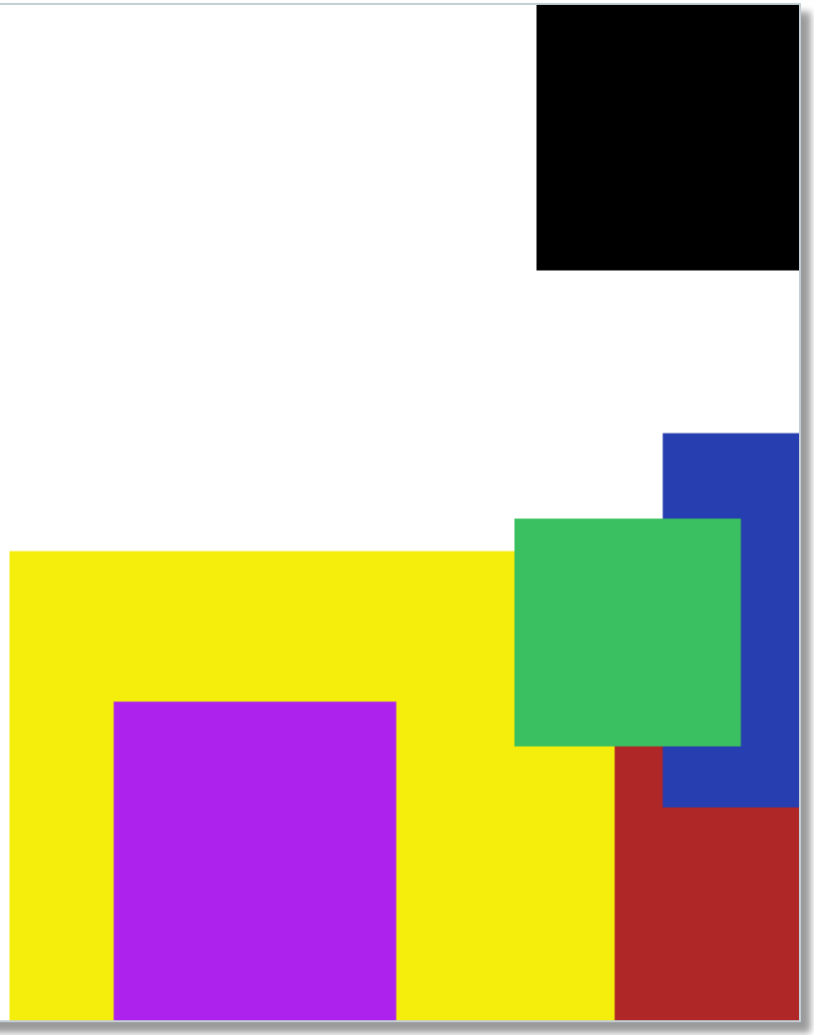
Industrial Ethernet in de proces industrie

- Wat zijn de mogelijkheden en kansen van Industrial Ethernet in de proces industrie?
- Waar loopt de klant / gebruiker tegen aan en wat zijn hiervoor de oplossingen?

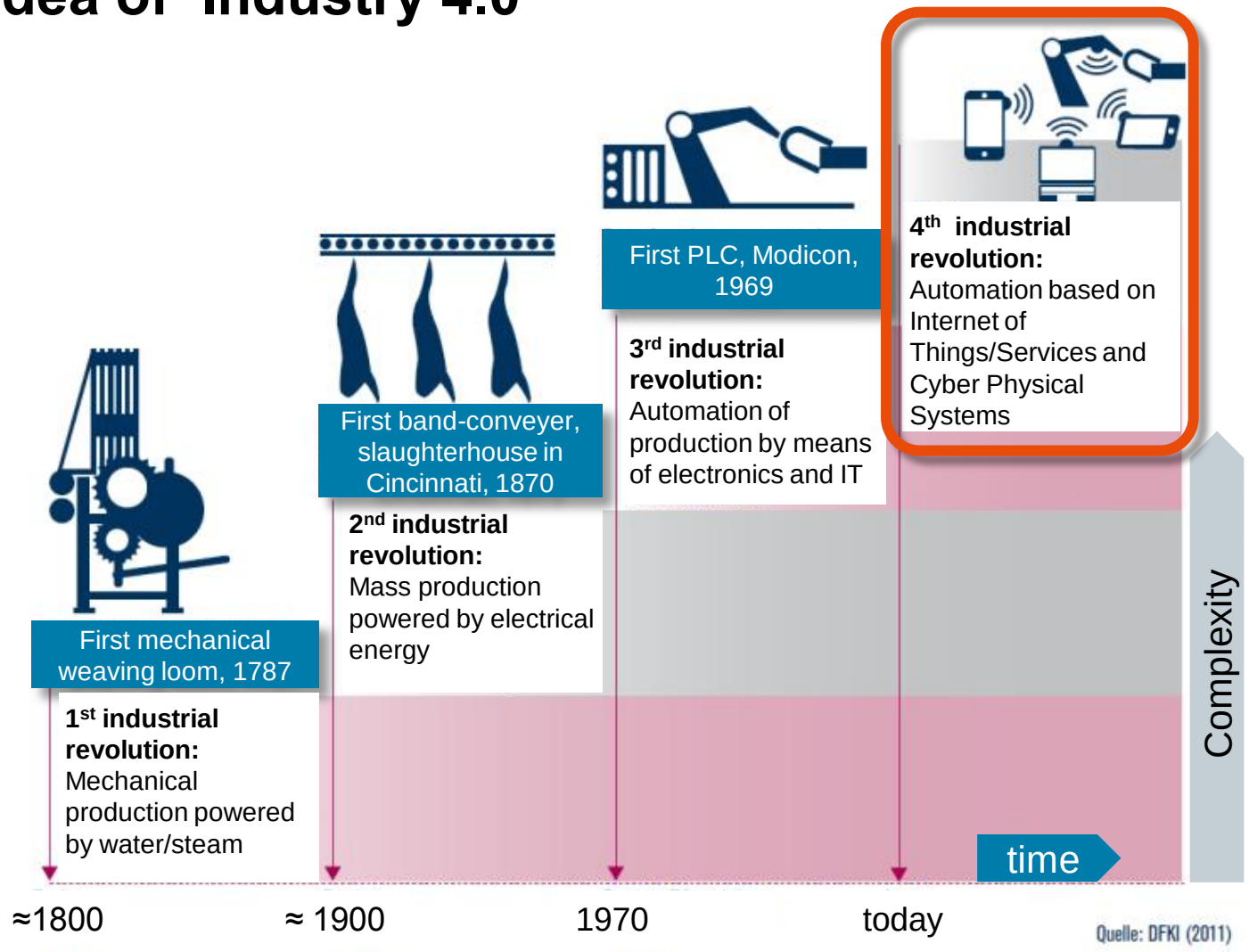
All ‘things’ will be on the Internet

the internet of things



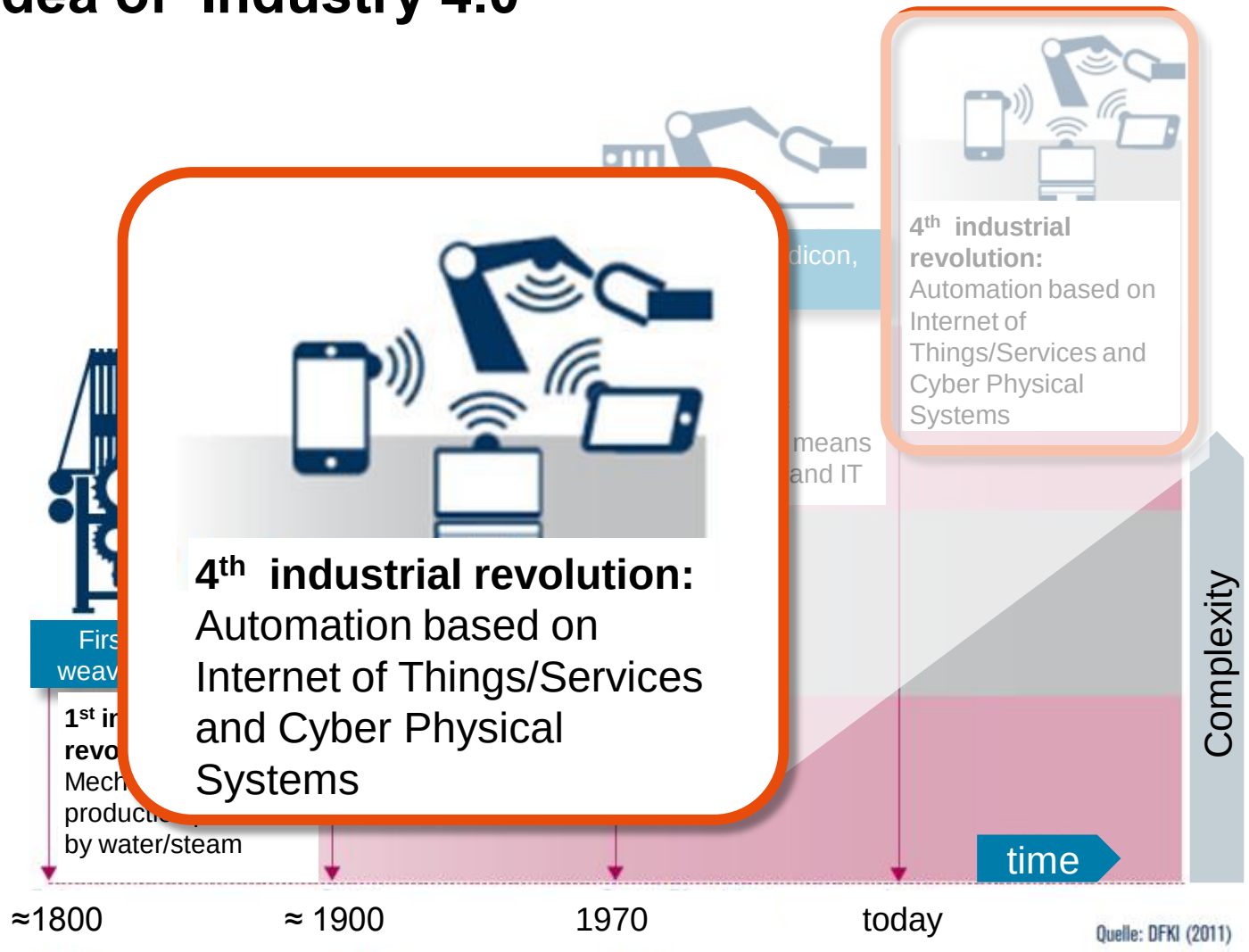
Also field instruments and actuators will become ‘things’

The idea of ‘Industry 4.0’



Industrial Ethernet

The idea of ‘Industry 4.0’



Industrial Ethernet

Vision or Reality of Internet technologies?

- Internet, or more general, Information Technologies will be directly integrated in devices on the shop floor respectively on the field level of process plants.
- Classical industrial communication technologies - particularly fieldbuses - will be substituted in the long run by Internet based technologies.
- Industrial Ethernet will play an important role in this scenario.
- All kinds of wireless technologies - WLAN, WWAN, PAN, WSAN - will also perfectly fit into these architectures.
- This will bring open, transparent network architectures for seamless horizontal and vertical integration.

Remark: Due to the long life cycles of process plants there will be a long period of time of coexistence of classical and advanced technologies.

From Ethernet to Industrial Ethernet

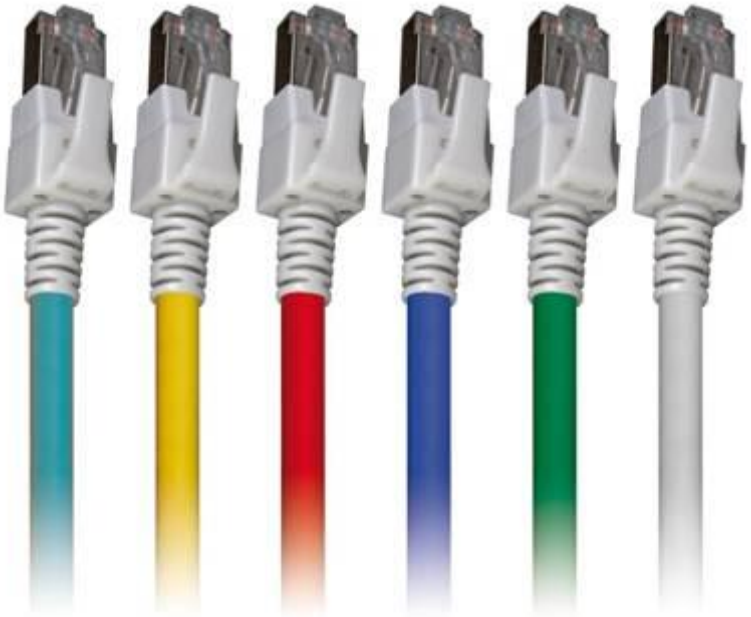
Let’s not be starry-eyed!

- There are significant differences between Ethernet for office/home networks and industrial networks.
- Industrial Ethernet versus Ethernet for office/home networks follows extended specifications regarding
  - Robustness → mechanical, environmental, electrical
  - Network topologies → line, ring, redundant ring
  - Network dimensions → geographically extended networks
  - Very short reaction time → mainly for fast processes in factory automation, in specific applications also in process automation to enable it for industrial use.

Ice cream and Industrial Ethernet

What have ice cream and Industrial Ethernet in common?

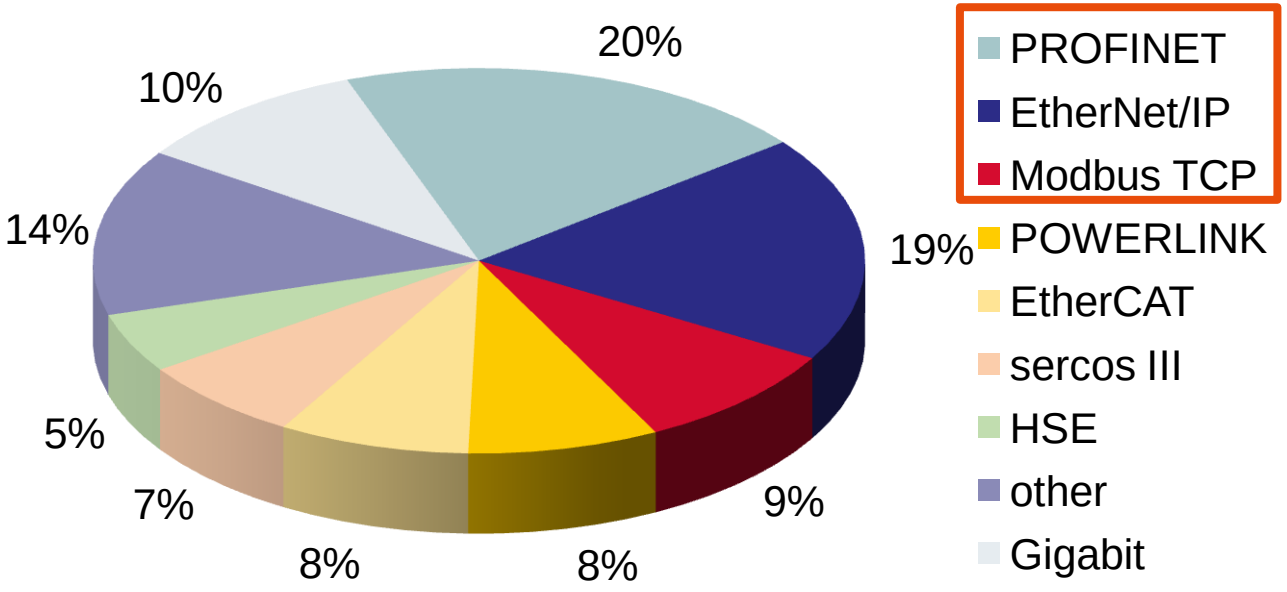
… lots of different flavors!



Which Industrial Ethernet flavors will become important?

There are two main Industrial Ethernet protocols in the market that have significant market shares and growth rates and seem to become important for Process Automation: EtherNet/IP and PROFINET.

Forecast 2015 according to IMS Research, 2012



Target Industries

Demand for Industrial Ethernet in the field for process automation will initially emerge out of the hybrid industries.

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Handling

e Tools

Hybrid Industries

Food & Beverage

Life Sciences

Environmental

Process Industries

Oil & Gas

Chemical

Power & Energy

Primaries & Metal

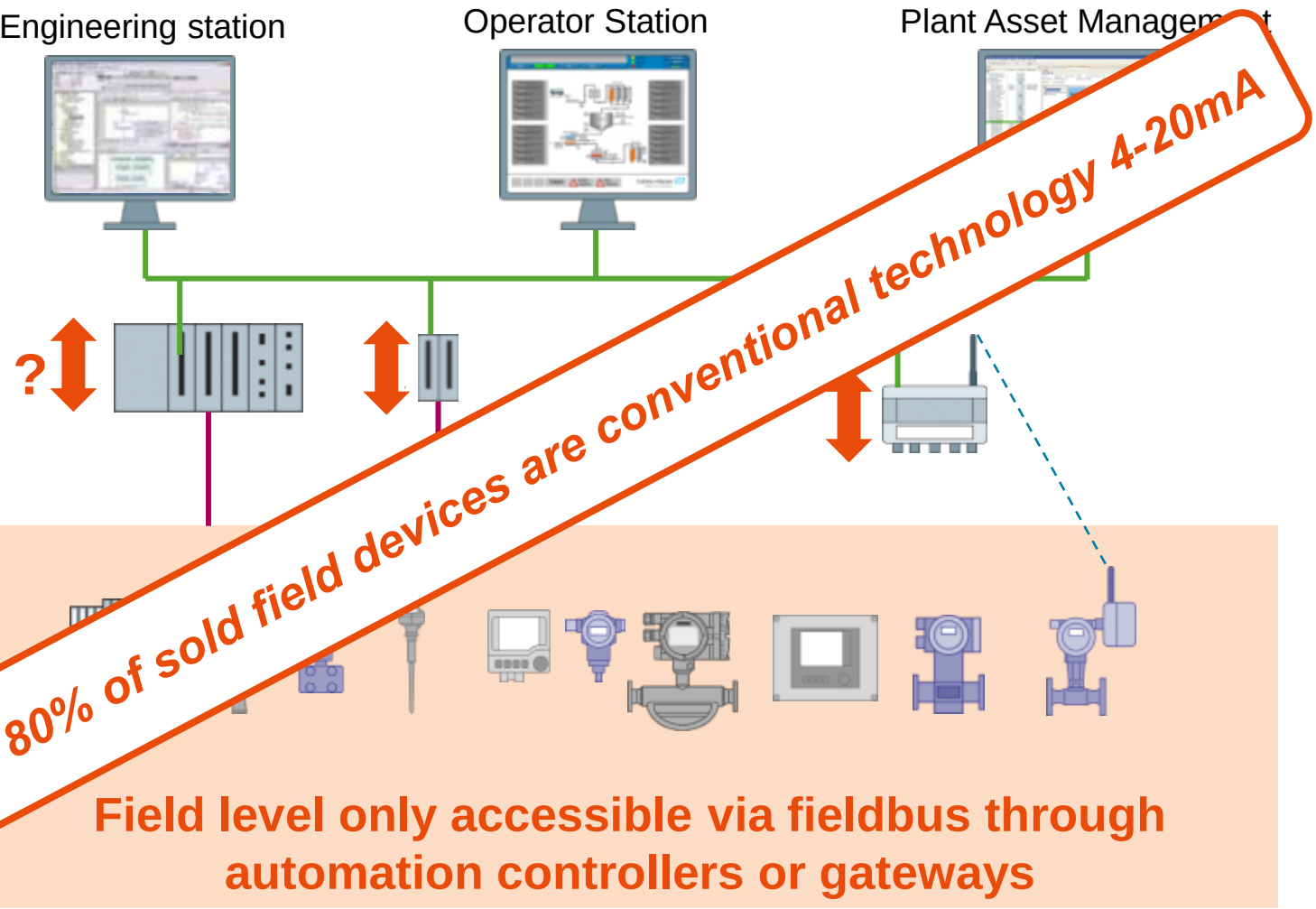
PLC

DCS

Ethernet

Industrial Ethernet

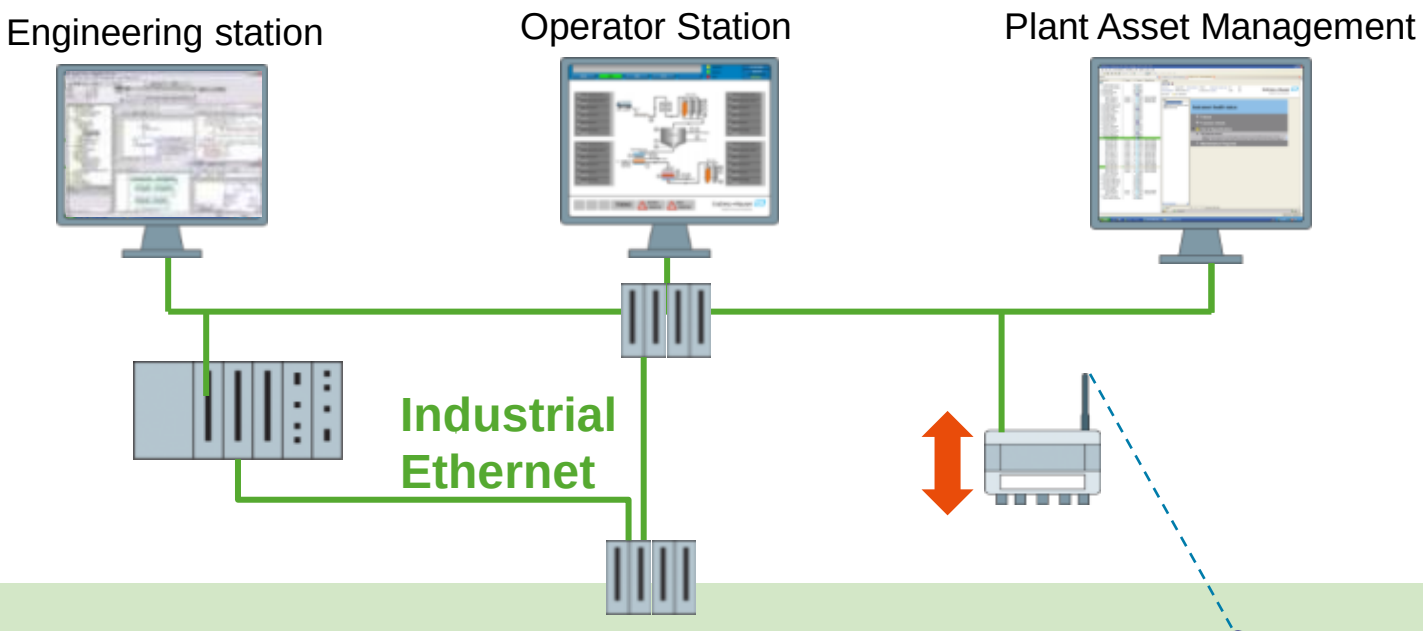
Classical fieldbus architectures in Process Automation



AS-Interface
HART
PROFIBUS
FOUNDATION Fieldbus
IO-Link

Industrial Ethernet

Open Industrial Ethernet based architecture



PROFINET
Modbus
EtherNet/IP
ETHERNET POWERLINK
EtherCAT

Field level accessible through transparent switched Ethernet network or gateways

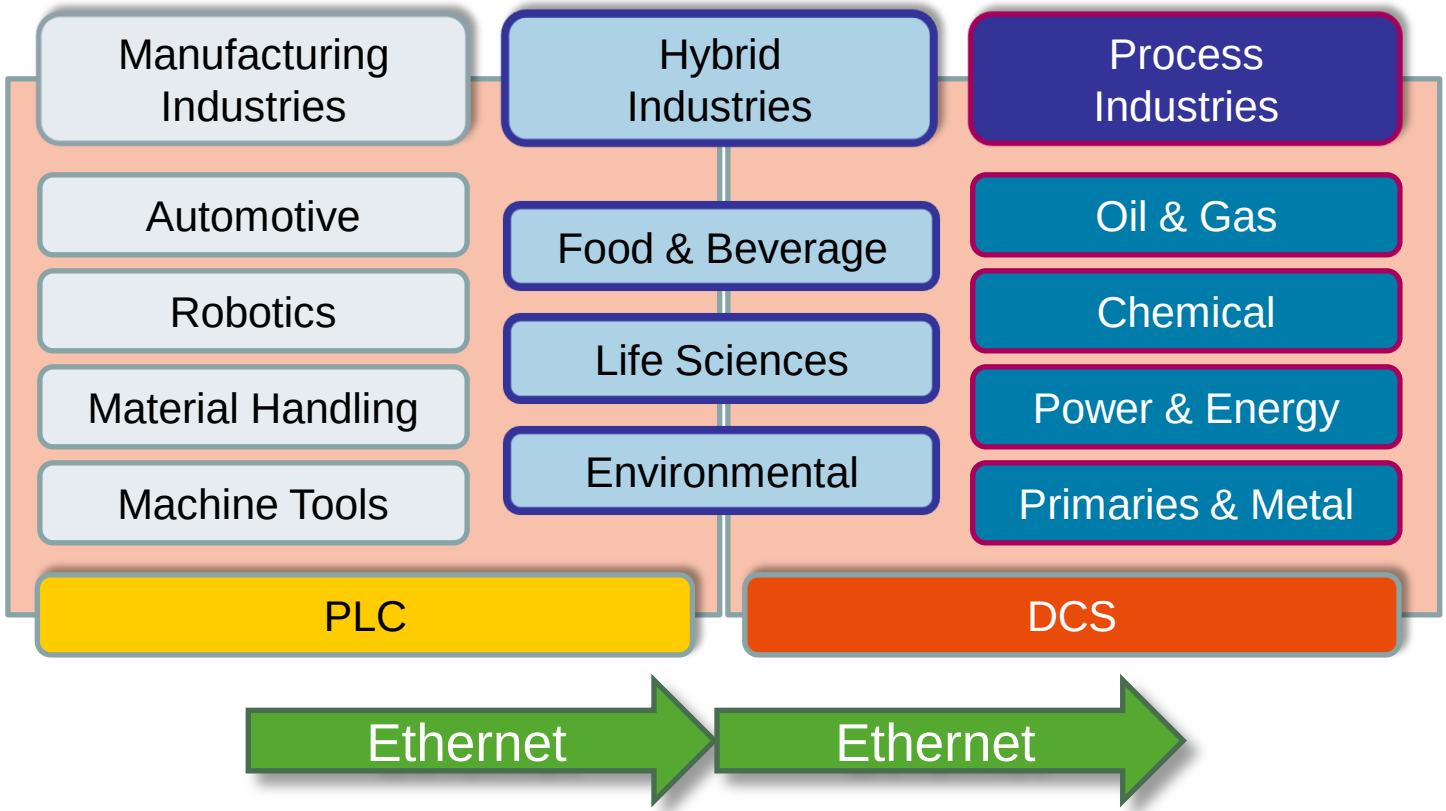
Customers/user benefits

- Higher bandwidth for more services running in parallel on ‘highway of data’.
- More flexible, modular field infrastructure installation.
- Fewer networks and hardware to engineer, configure, commission and maintain. (i.e. gateways, remote I/O…).
- Easier integration into existing Ethernet installations and corporate networks, no special requirements or conditions to meet.

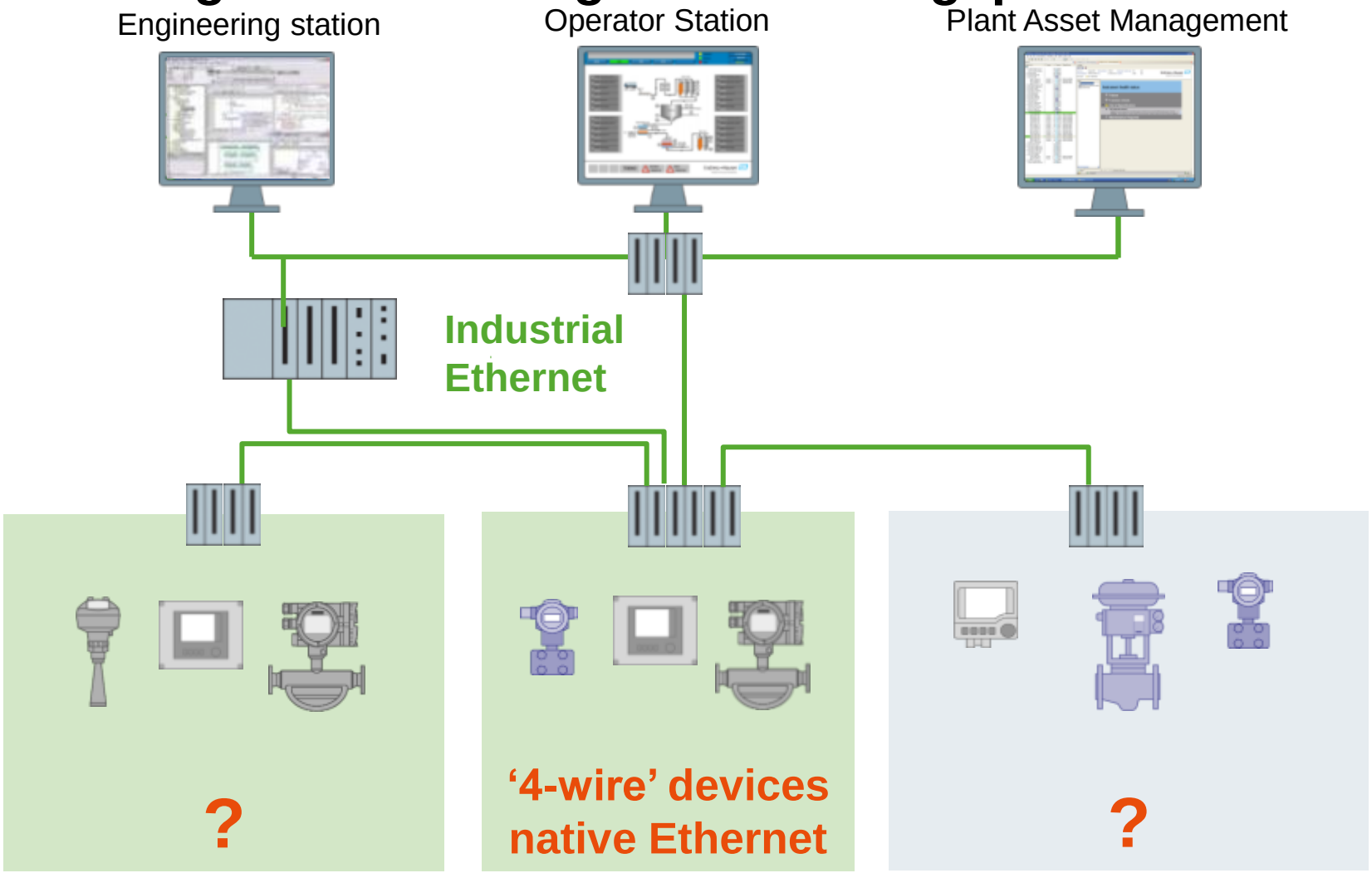
One single network architecture from ERP to the field

Target Industries

After success within the **hybrid industries** Ethernet will go to the field of **process industries**.



Something is still missing to close the gap



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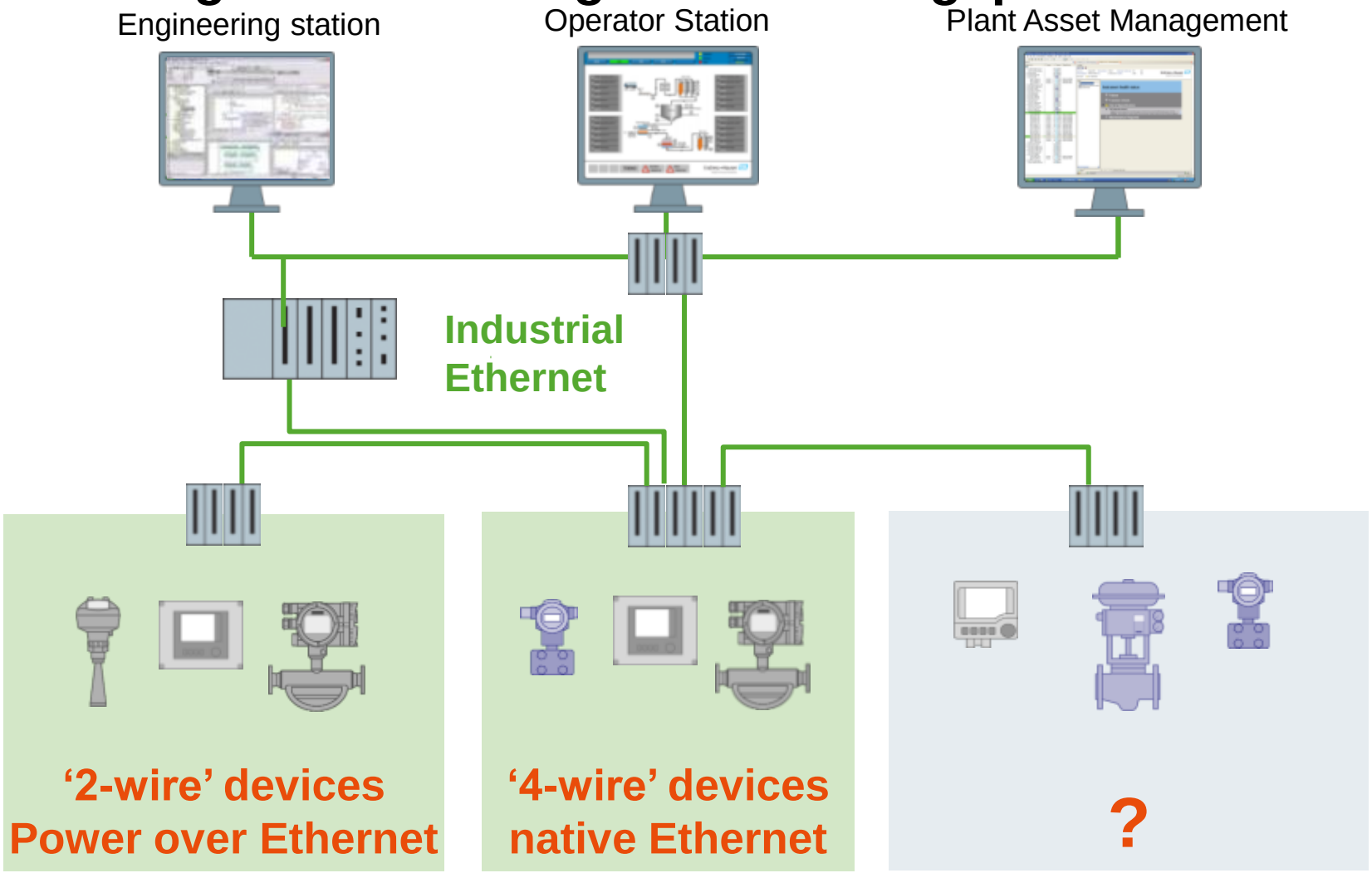

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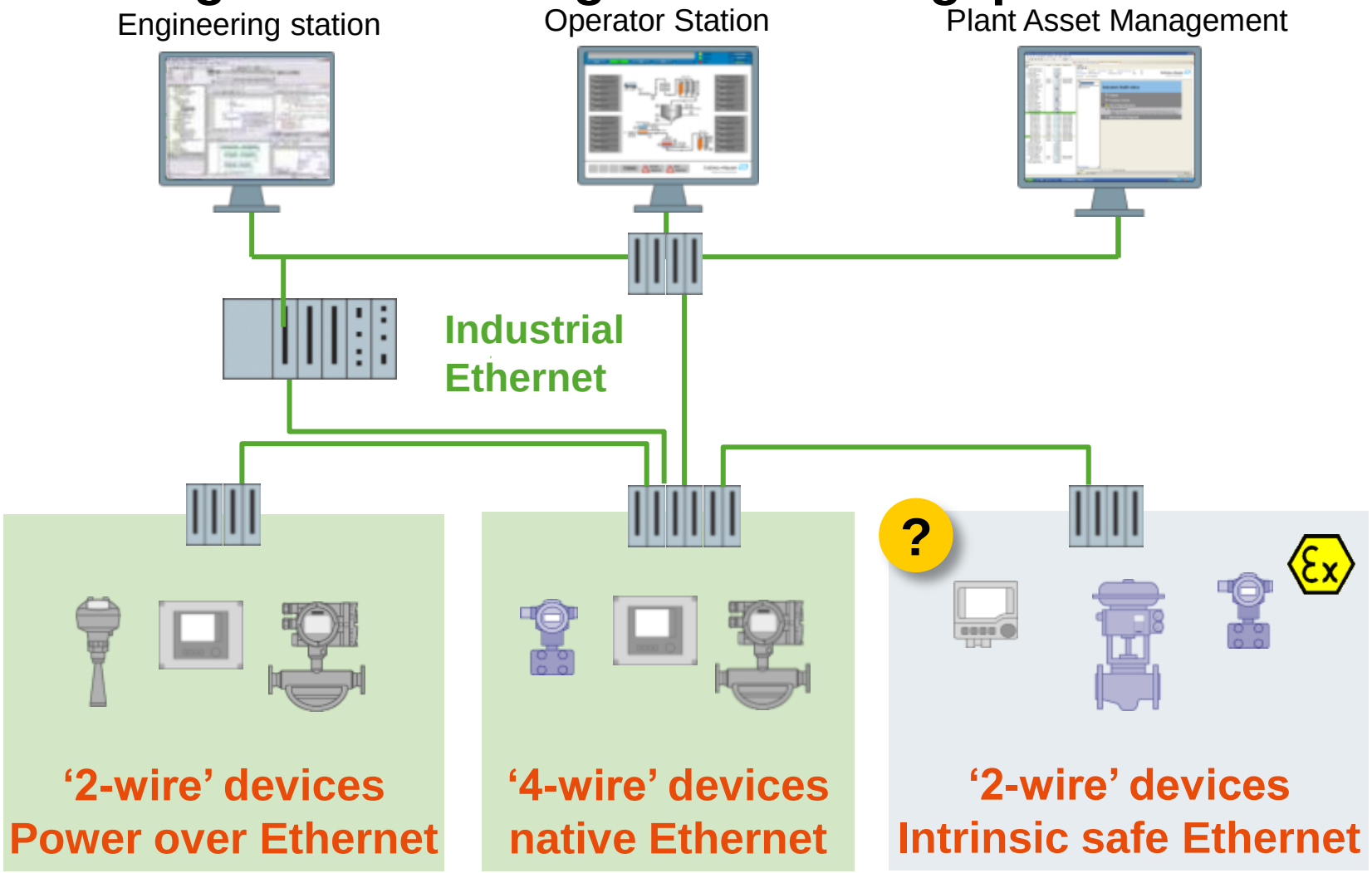
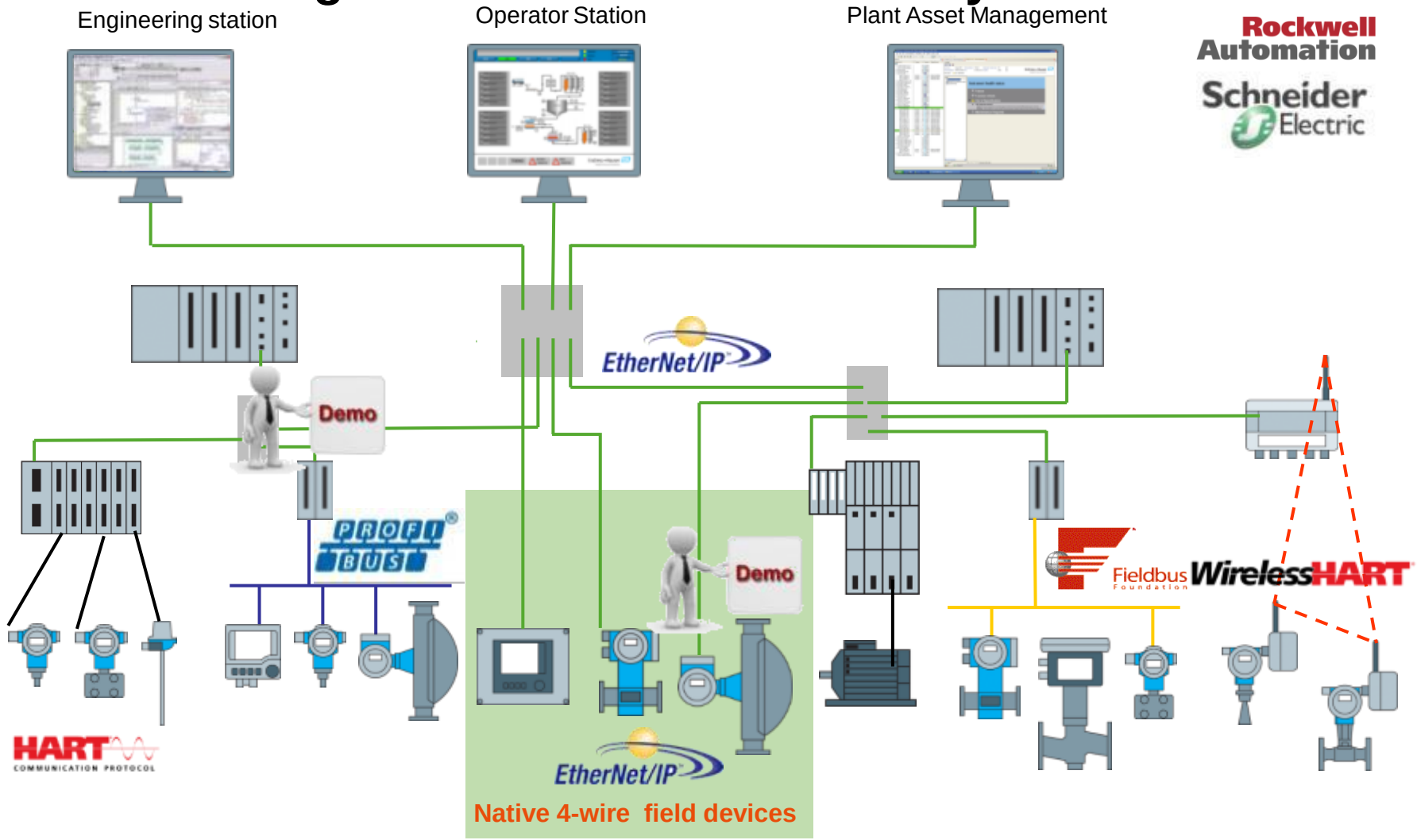


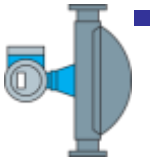
Premium Integration for Process Industry



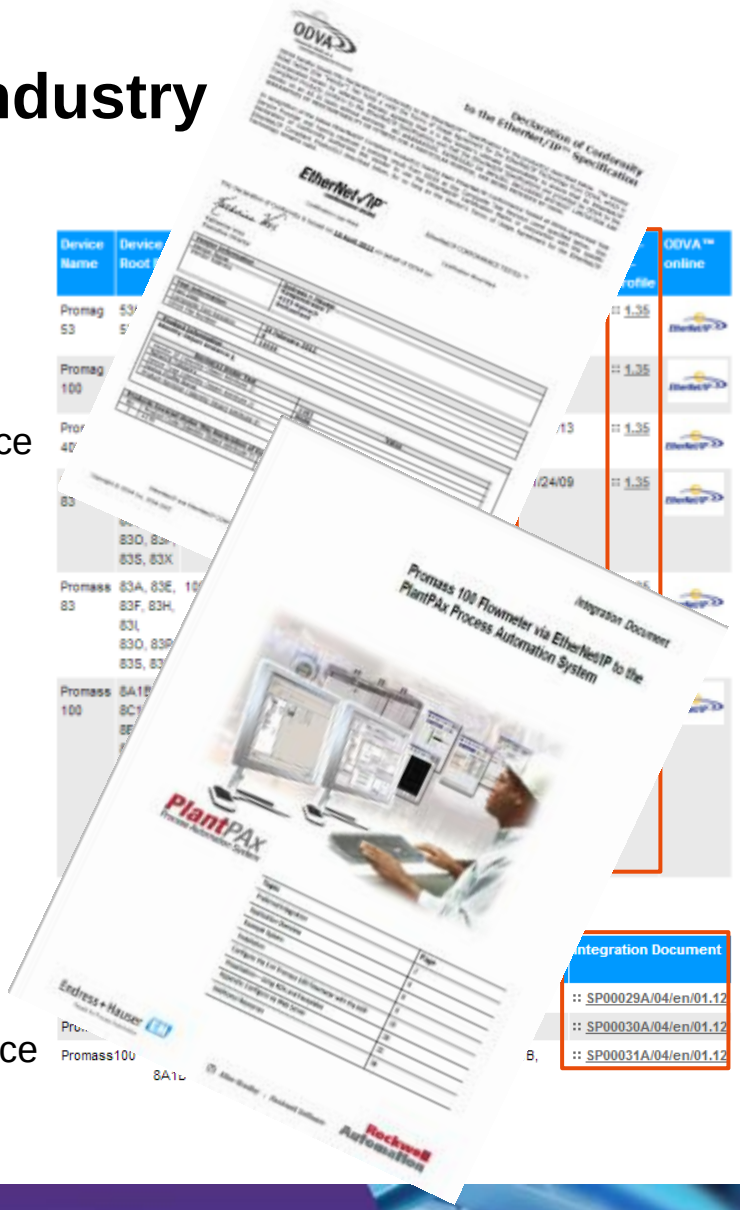
Industrial Ethernet

Premium Integration for Process Industry

Integrated Device Package

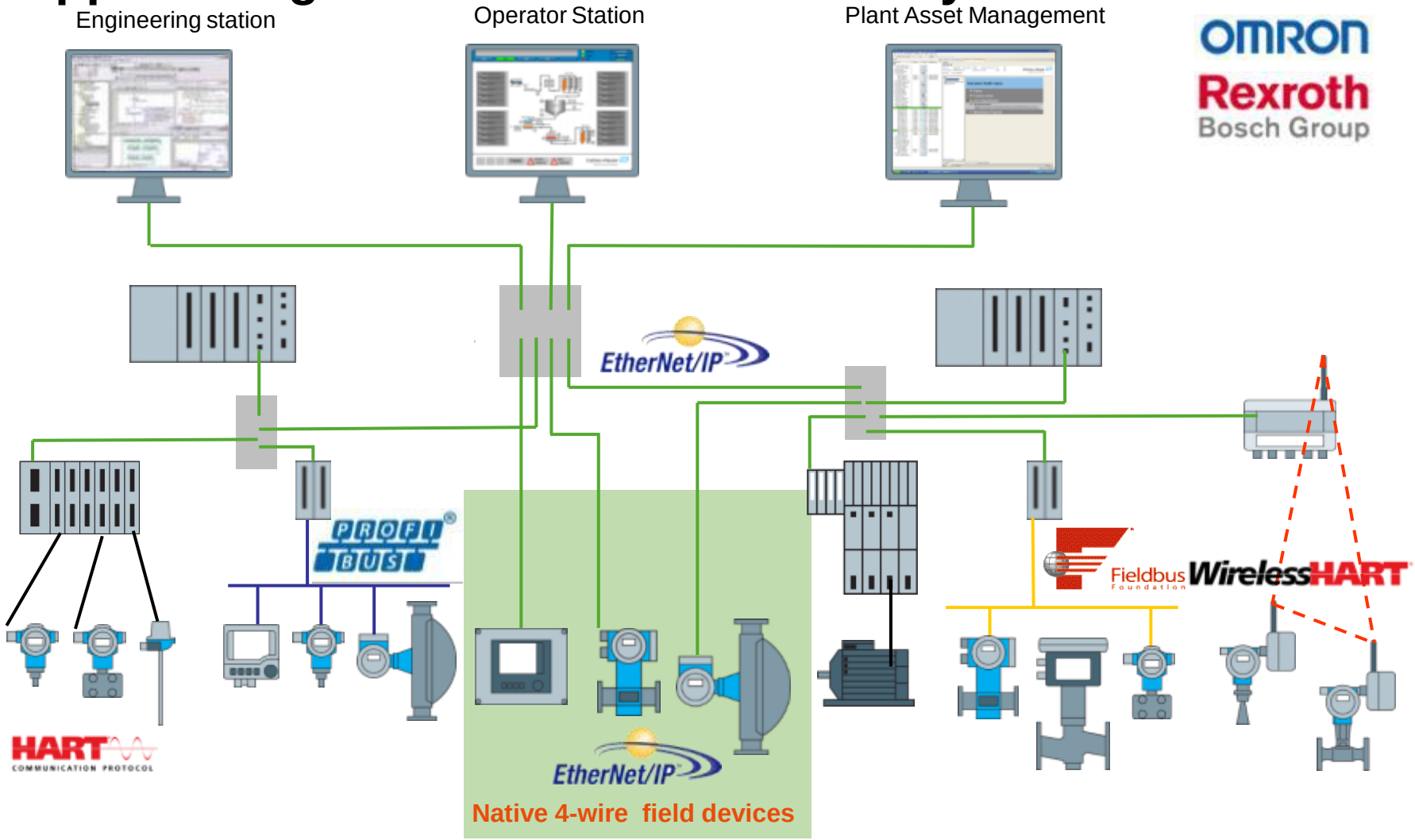


- **Electronic Data Sheets** (EDS)
  Can be downloaded from Internet and from device
  EDS files are used to identify and commission the device on a network.
- **Add-On Profile** (AOP)
  Can be downloaded from Internet
  AOP standardize module configuration, reduce programming and configuration errors and increase productivity.
- **Declaration of Conformity** (DOC)
  Can be downloaded from Internet or ODVA website
- **System Integration Document**
  can be downloaded from Internet
  Provides a step-by-step approach for integrating a device
- **Add-On Instruction** (AOI)
  Can be downloaded from RA knowledge base



Industrial Ethernet

Support Integration for Process Industry



Industrial Ethernet

Conclusions

- Internet technologies move into the field. Automation is going to become an application of the ‘Internet of Things’.
- ‘Industry 4.0’ builds on the ‘Internet of Things’, customers gain in efficiency and productivity.
- Industrial Ethernet will be a core network in these new architectures and substitute the classical fieldbuses in the long run.
- There are preconditions to be fulfilled. Standards have to be developed and IT/Cyber security becomes an important subject to all products with Ethernet connectivity - also to field devices for process automation.
- Important steps towards the new paradigm of industrial production are already done. But there are still gaps to be closed.