PROFINET –

The Backbone for Industrie 4.0

Brazil 2016

Karsten Schneider
PI Chairman

Worldwide Support

27 Regional PI Associations

53 Competence Center

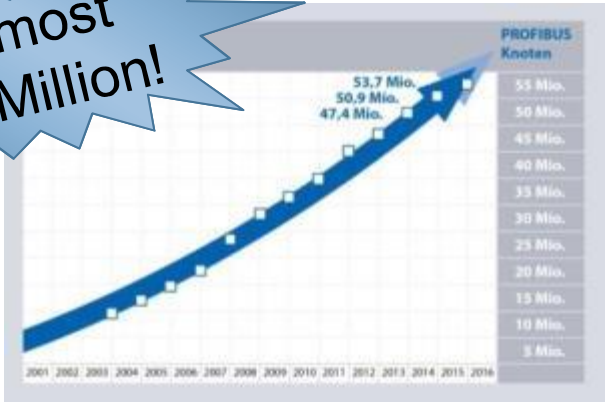
28 Training Center

10 Test Labs

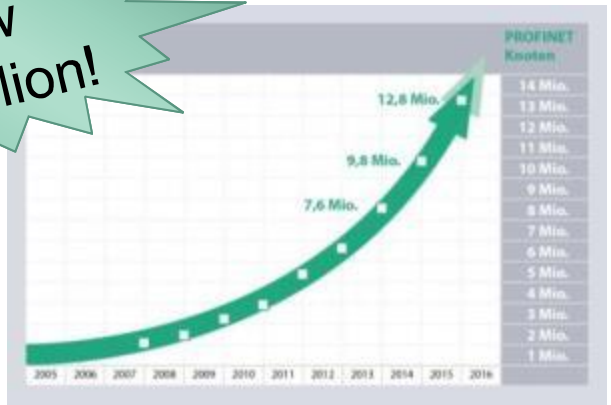
New **PROFIBUS Certified System Design** course

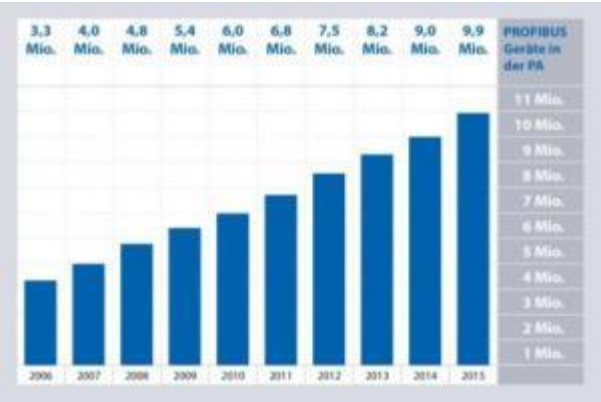
Where are we today?

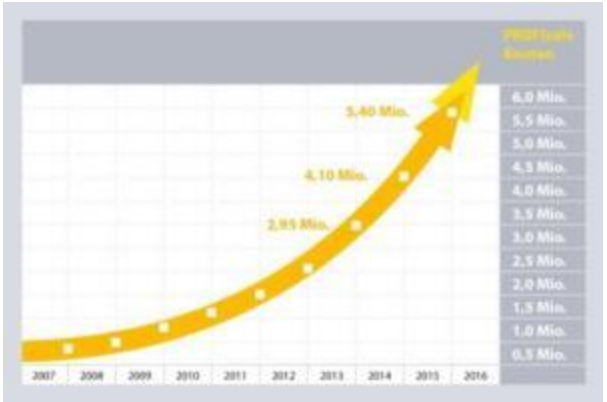
Almost 54 Million!



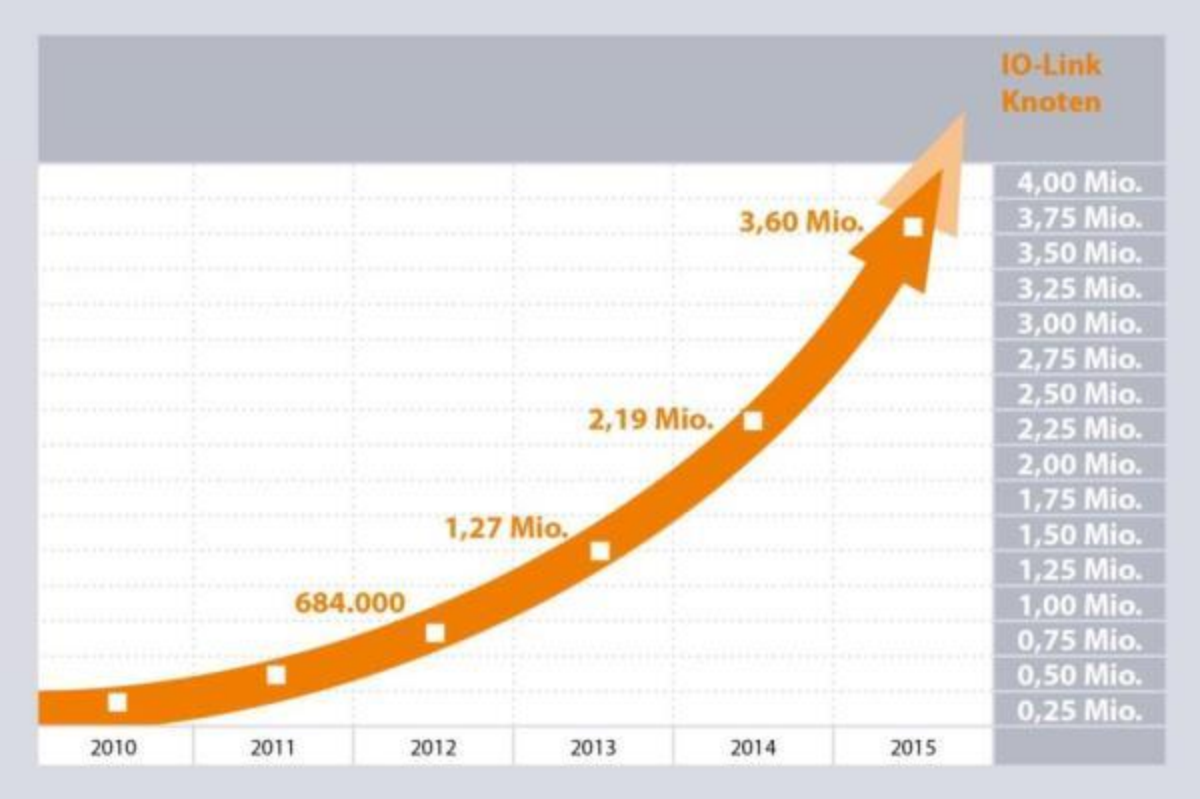
Now 13 Million!





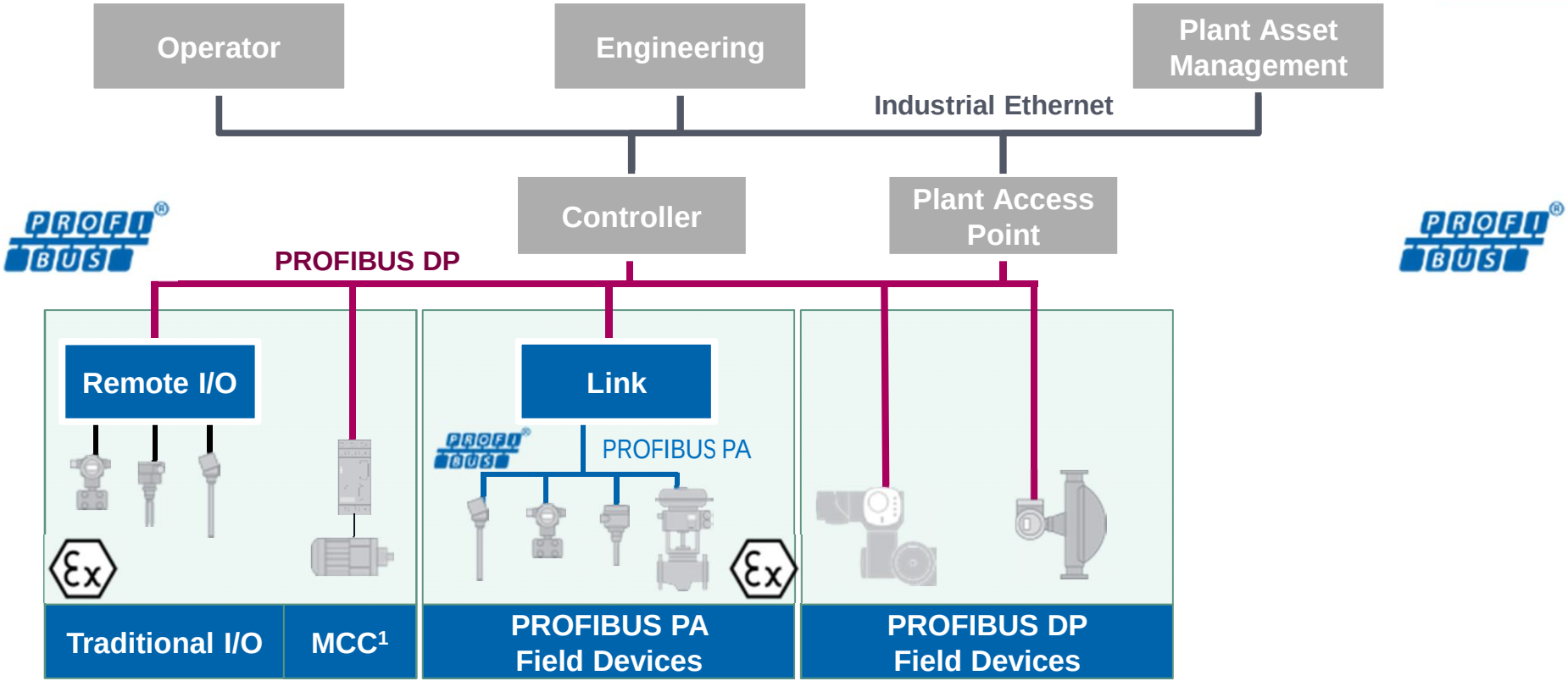


IO-Link Nodes



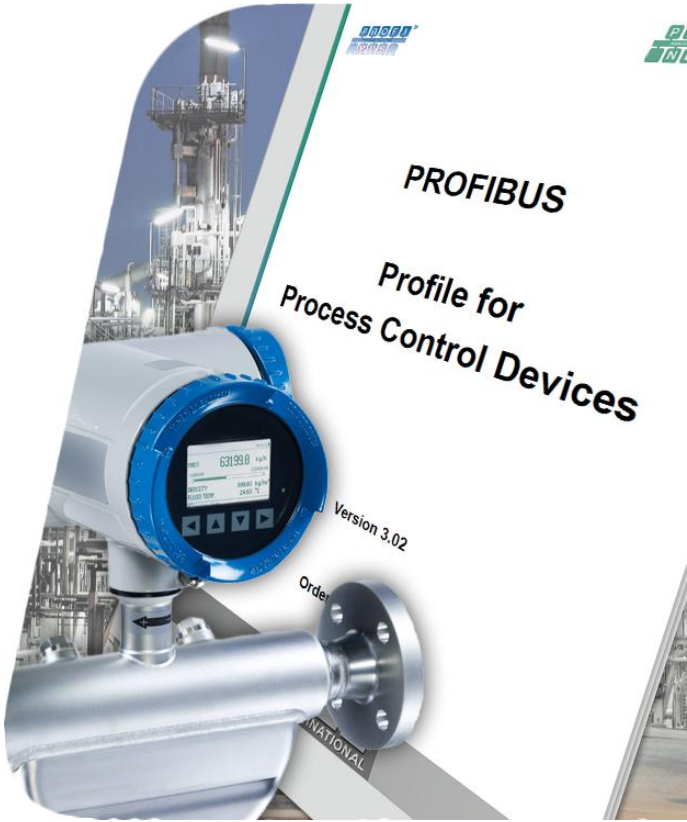
PROFINET in Process Automation

State of the art– Today with PROFIBUS DP and PA

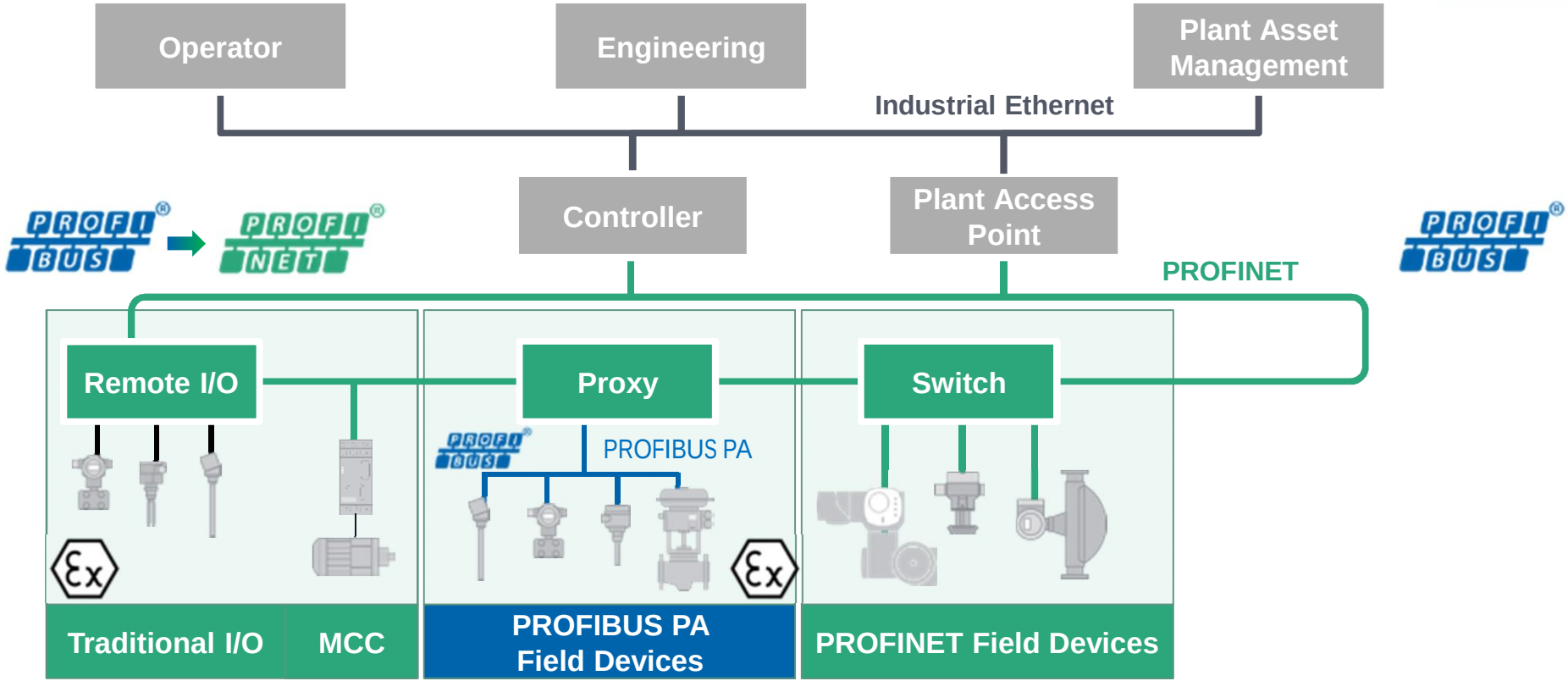


[1] MCC: Motor Control Center

- **PROFIBUS PA Profile** 3.02 focuses on easy device handling, such as…
  - Device handling similar to **4…20mA**
    Condensed Status & Diagnostic Messages
  - **Easy** diagnostics
    Automatic Ident.-Number Adaption
  - **Easy** device replacement
    Faster Parameter Transmission
  - **Easy** life cycle management
    Device Identification in non-powered state



Tomorrow with PROFINET and PROFIBUS PA



PROFINET in Hybrid-Applications

Food & Beverage

Environmental

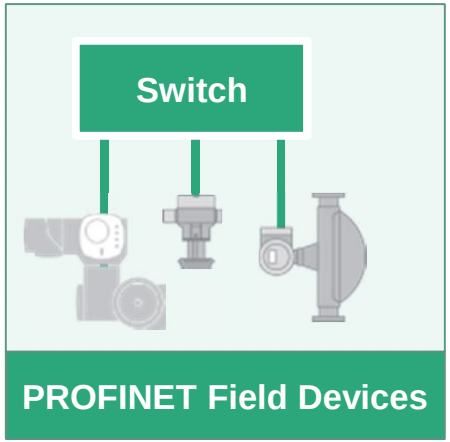
Life Sciences

“Factory and Process Automation meet in Hybrid applications”

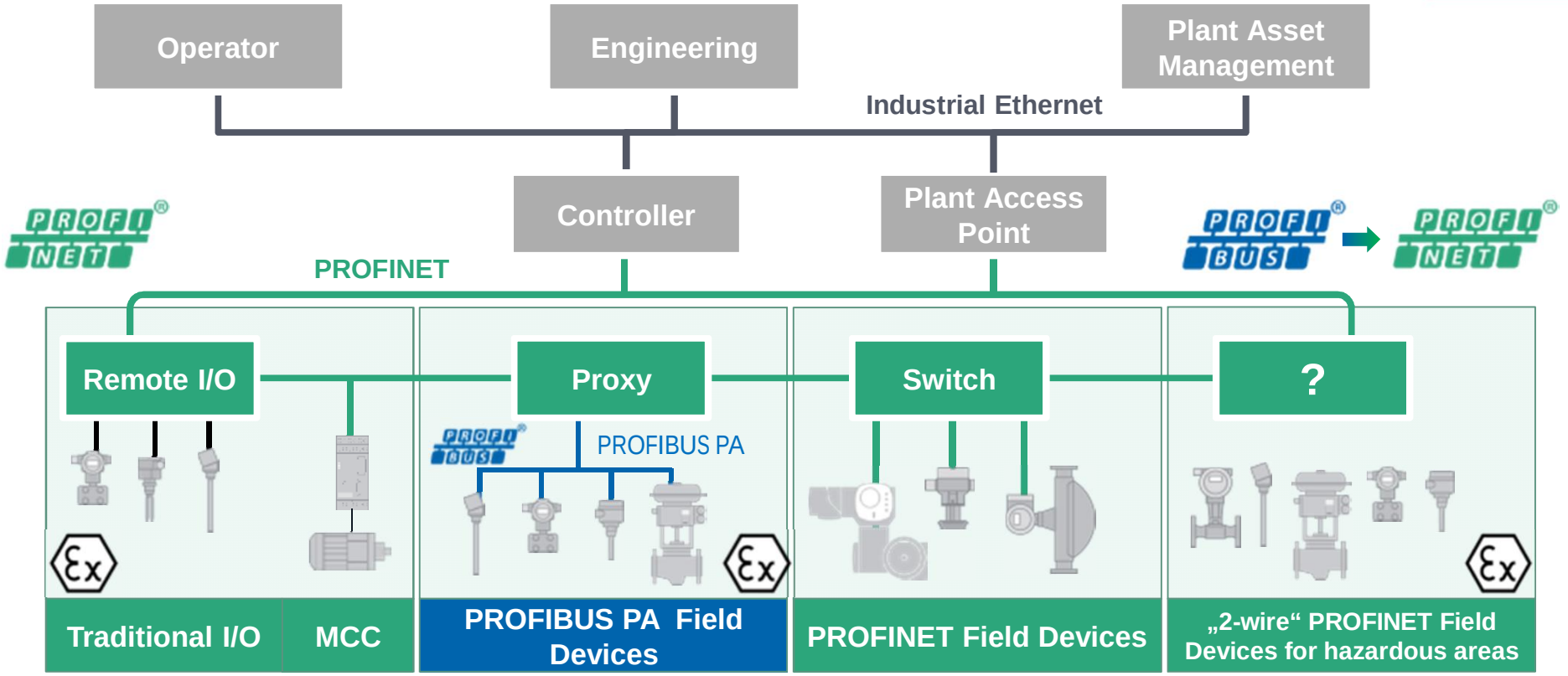
PROFINET will replace PROFIBUS DP in “non Ex-Applications”, even in field devices (Optional: PoE).

Benefits:

- One network from top to bottom
- Seamless integration in Automation systems
- Easy access for device configuration and maintenance
- More information services



In the future with PROFINET down to the field level



In the future PROFINET down to the field level


Chemicals


Oil & Gas


Power & Energy


Primaries & Metals

«Market needs have to be implemented for the use of PROFINET in traditional process industries»

Requirements:

- Communication and Power of PROFINET field device with 2 wires
- Long distances
- Usable for hazardous areas
- High availability
- Ease of use

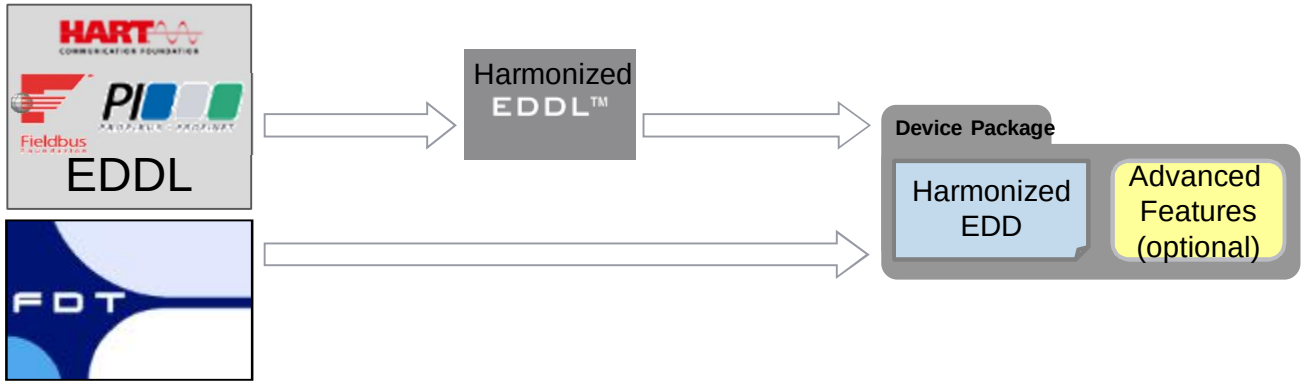
„2-wire“ PROFINET field device for Ex-Area

Complex devices– easy configuration.

Device functions and information centrally available and manageable.

Device Integration enables access to device information from various higher level systems.

FDI - A Common Approach



Leading Industry Suppliers

- § ABB
- § Emerson
- § Endress+Hauser
- § Honeywell
- § Invensys
- § Siemens
- § Yokogawa

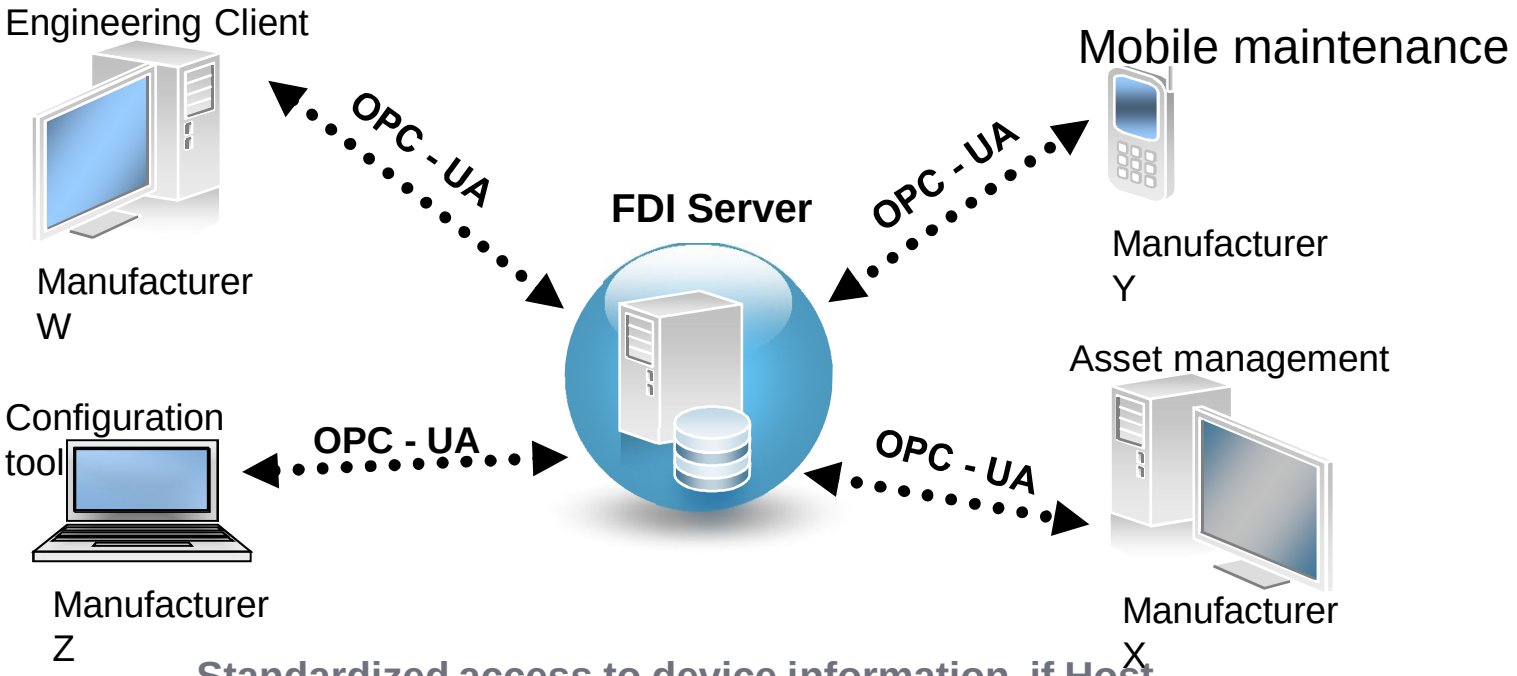
- § FDT Group
- § Fieldbus Foundation
- § HART Communication Foundation
- § OPC Foundation
- § PROFIBUS/PROFINET International

Leading Fieldbus Technology

FDI – Field Device Integration

Goal: Open device integration

FDI concept for open device integration



Standardized access to device information, if Host supports OPC UA!

From PROFIBUS to PROFINET

PROFIBUS

Less Networks

Better Diagnostics

More Performance

PROFINET

New Applications

Industrie 4.0 – What does it mean?

- people, machines, equipment, logistics systems and products communicate and cooperate
- Production and logistics processes are integrated intelligently across company boundaries
- Industrie 4.0 combines production methods with information technology
- This facilitates smart value-creation chains

Source: Plattform Industrie 4.0

sustainable competitiveness

Cloud

Reducing the time to market

Enhancing flexibility

Increasing efficiency

Self Optimization

New Business Models

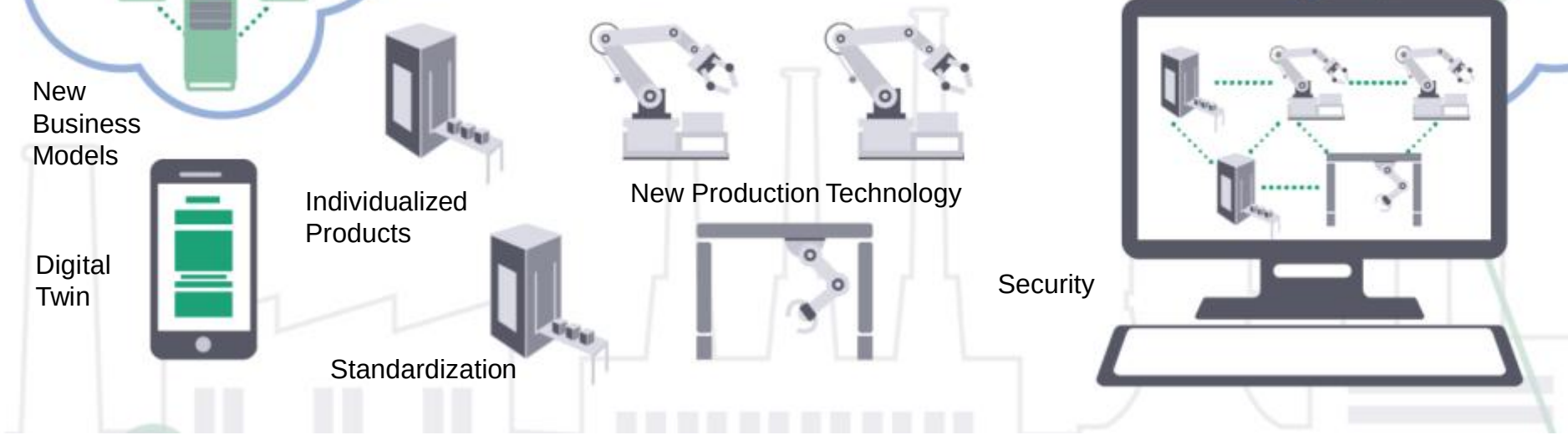
Digital Twin

Individualized Products

Standardization

New Production Technology

Security



Data — Connectivity — Uptime

From data to information

100100
001010
101100
010001

Data

raw: 72

syntax: 72 °C

semantics: 72 °C
upper limit 40°C!

temperature sensor

Value

PROFINET: every bit of information is valuable

100100
001010
101100
010001

Data

semantics: 72 °C

upper limit 40°C!

PROFIBUS & PROFINET
with Profiles

syntax: 72 °C

This is essential for
meaningful analytics!

Value

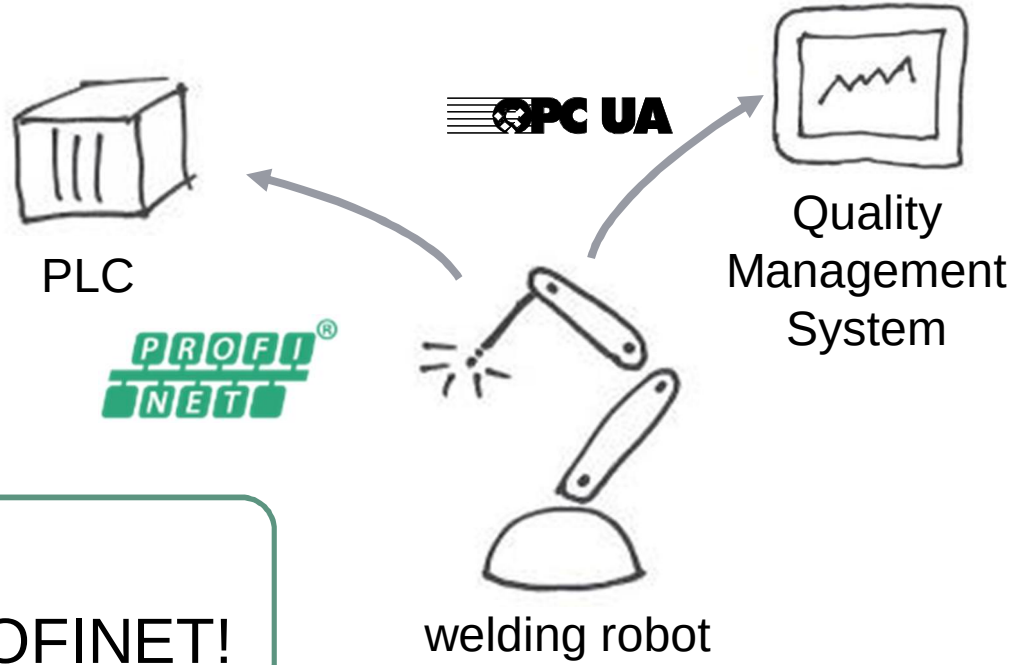
raw: 72

simple field bus

temperature sensor

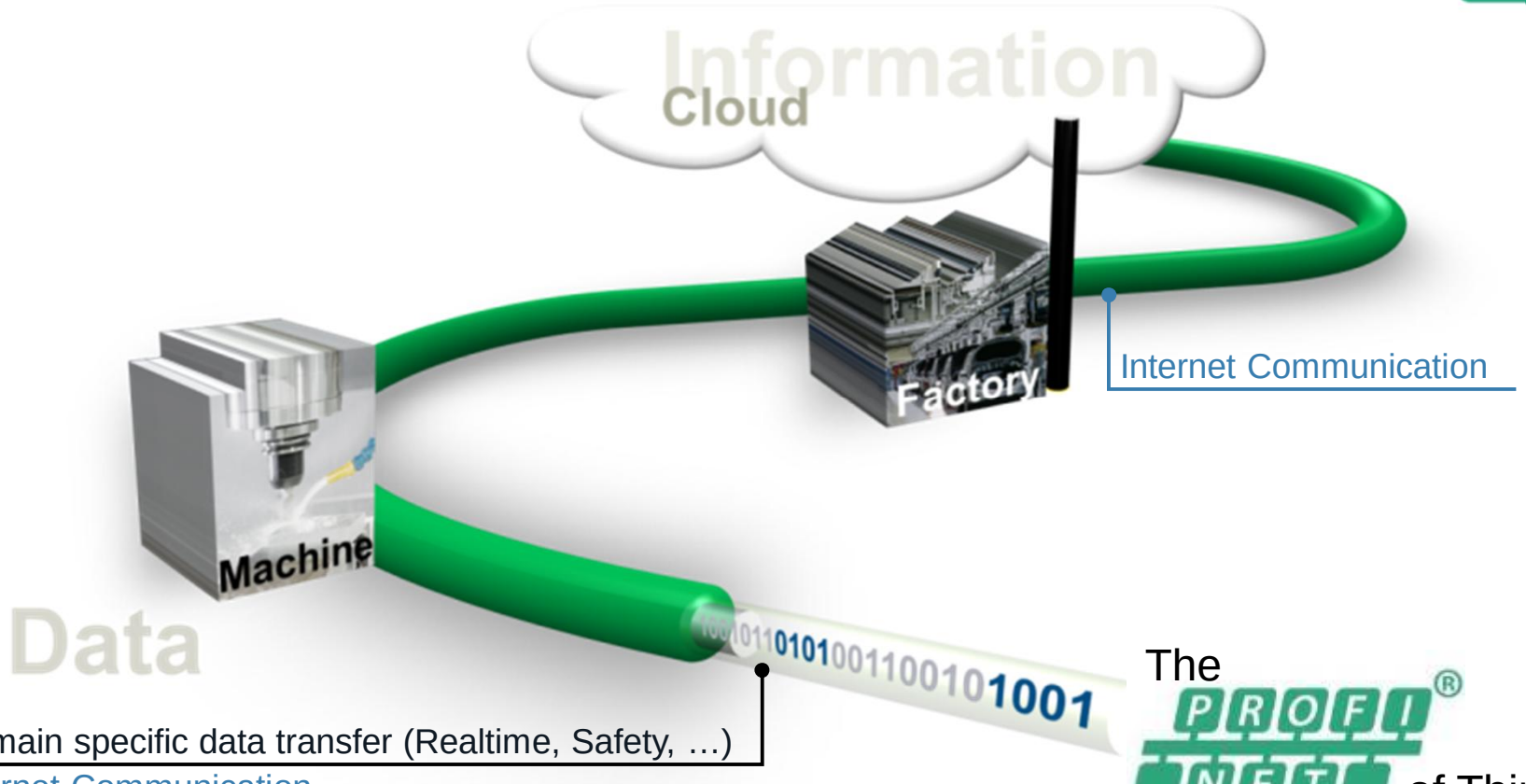
How many networks do you want?

Connectivity



1 If you use PROFINET!

Convergence of IT and OT



Internet Communication

Domain specific data transfer (Realtime, Safety, …)

Internet Communication

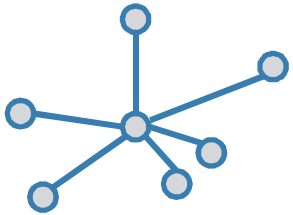
The PROFINET of Things!

The PROFINET of Things

100100
001010
101100
010001

Data

Aquire – Evaluate – Learn



Connectivity

Connect everything without effort

+

Productivity

Efficiency and Uptime are key

=

Energy Management made easy

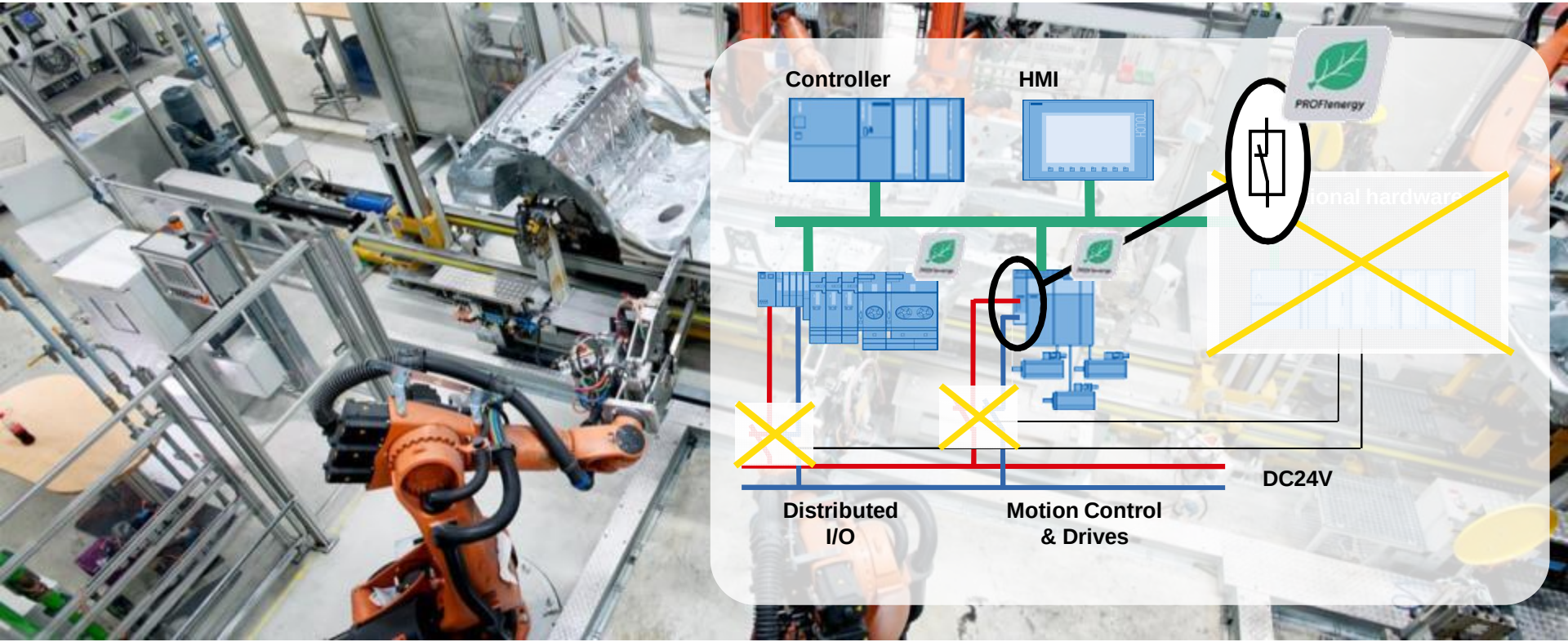


Foto source: Siemens

Energy Management: realized savings

PROFlenergy

Ready for operation: 2.200 W

Breaks(after 20s): 900 W

PROFIenergy: 90 W

Potential / Robot: ~ 200 W

500 Robots 200 W each, 52 Weekends/24h **à** **Savings: 124,8 MWh**

Foto source: Siemens

Big Data enables new business models

Grain Management

- Temperature & moisture sensors collect data from stored grain

Hazard Monitoring

- Temperature & motion sensors monitor grain elevators

Why PROFINET?

- Uptime!
- Real time!

PROFINET – the next level

One bus suits all!

- Body welding cells at BMW’s Dingolfing plant
- 14,500 Profinet IO nodes!
- One network for all communication tasks
- tool changing within 500ms
- System wide network diagnostics
- No EMC issues with Ethernet copper cables

Source: Siemens

Industrie 4.0@PNO – Use Cases

Harmonized network infrastructure

Dynamic Interfaces

Enhanced Profiles

TSN

Enhanced Robustness

Security

Device Information Cloud

Convergence of IT and OT

Gigabit

IPv6

Data Semantic

Diagnosis

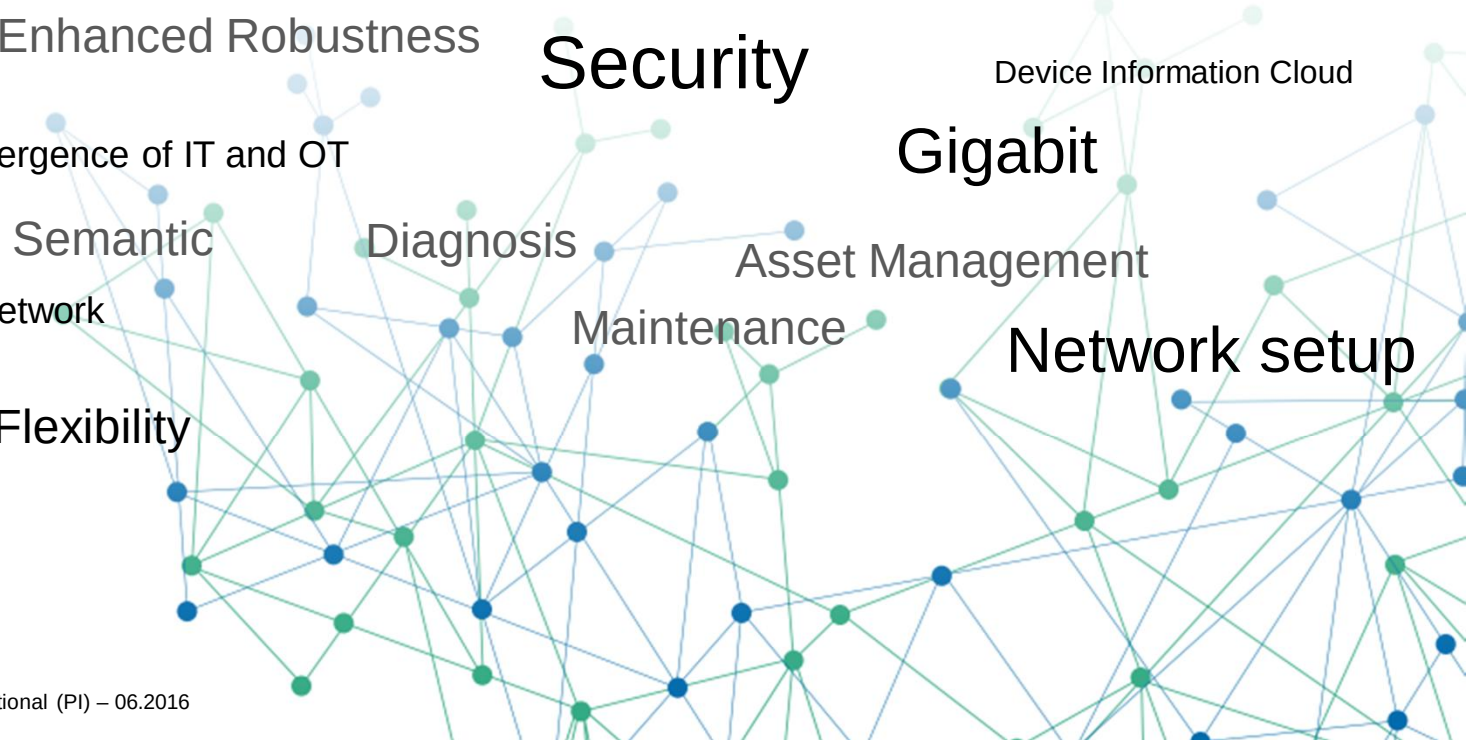
Asset Management

Multiple services on network

Maintenance

Network setup

F-Device Flexibility



Summary

Stabile Basis

- World wide use
- Profiles for simplified Engineering
- Proven in use in all industries

Future Proven Architecture

- Seamless use of TCP/IP
- Standard Ethernet
- Deterministic real time

The Backbone for Industrie 4.0


ARC WHITE PAPER

By ARC Advisory Group

November 2015

Wie Profinet und Industrie 4.0 den informationsgetriebenen Branchen neue Möglichkeiten eröffnen

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Fazit 24

ARC Advisory Group

Vision, Experience, Answers for Industry

PROFINET –

The Backbone for Industrie 4.0

Brazil 2016

Karsten Schneider
PI Chairman

Thank You!