PROFINET –
The Backbone for Industrie 4.0

Brazil 2016
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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

- 2010: 684,000
- 2011: 1,27 Mio.
- 2012: 2,19 Mio.
- 2013: 3,25 Mio.
- 2014: 3,50 Mio.
- 2015: 3,75 Mio.
- 2016: 4,00 Mio.

Note: The data is from PROFIBUS & PROFINET International (PI) – 06.2016.
"High speed alone isn't everything. PROFINET is not only fast, it can also simply do more."
State of the art– Today with PROFIBUS DP and PA

Operator

Engineering

Plant Asset Management

Industrial Ethernet

Controller

Plant Access Point

PROFIBUS DP

Remote I/O

Link

PROFIBUS PA

Field Devices

Traditional I/O

MCC¹

PROFIBUS PA

Field Devices

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
PROFINET in Hybrid-Applications

“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

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In the future with PROFINET down to the field level
In the future PROFINET down to the field level

«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
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

Harmonized EDDL™

Device Package

Harmonized EDD

Advanced Features (optional)

Leading Industry Suppliers

- ABB
- Emerson
- Endress+Hauser
- Honeywell
- Invensys
- Siemens
- Yokogawa
- FDT Group
- Fieldbus Foundation
- HART Communication Foundation
- OPC Foundation
- PROFIBUS/PROFINET International

FDI – Field Device Integration

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Goal: Open device integration

FDI concept for open device integration

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

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From PROFIBUS to PROFINET

More Performance

Better Diagnostics

Less Networks

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

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sustainable competitiveness

- Reducing the time to market
- Enhancing flexibility
- Increasing efficiency
- Self Optimization
- New Business Models
- Digital Twin
- Individualized Products
- New Production Technology
- Security
- Standardization

Data - Connectivity - Uptime
From data to information

Data

raw: 72

syntax: 72 °C

semantics: 72 °C
upper limit 40°C!

temperature sensor

Value

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PROFINET: every bit of information is valuable

Data

raw: 72

temperature sensor

syntax: 72 °C

semantics: 72 °C

upper limit 40°C!

simple field bus

PROFIBUS & PROFINET with Profiles

This is essential for meaningful analytics!
How many networks do you want?

If you use PROFINET!

Connectivity

PLC

Quality Management System

welding robot
Convergence of IT and OT

Domain specific data transfer (Realtime, Safety, …)

Internet Communication

The Internet of Things!

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The PROFINET of Things

Data
Aquire – Evaluate – Learn

Connectivity
Connect everything without effort

Productivity
Efficiency and Uptime are key

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Energy Management made easy
Energy Management: realized savings

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

Ready for operation: 2,200 W
Breaks (after 20s): 900 W
PROFenergy: 90 W
Potential / Robot: ~ 200 W

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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!
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

Enhanced Robustness

Convergence of IT and OT

TSN

IPv6

Data Semantic

Multiple services on network

F-Device Flexibility

Dynamic Interfaces

Enhanced Profiles

Security

Device Information Cloud

Gigabit

Network setup

Diagnosis

Asset Management

Maintenance
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

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Industrie 4.0

Brazil 2016
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PI Chairman

Thank You!