RPA Dubai

June 2011

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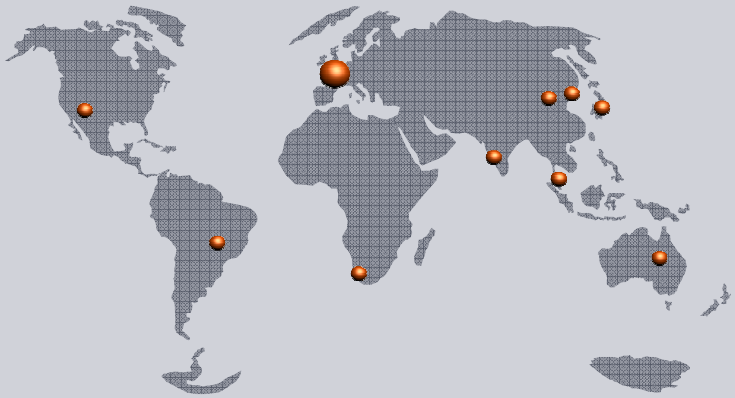
PROFIBUS
PROFINET
PROFIenergy
Wireless

Jörg Freitag
PI Chairman

PROFIBUS • PROFINET



Major technologies in PI

PI (PROFIBUS & PROFINET International)

Regional PI Associations | PI Competence Centers | PI Training Centers | PI Test Laboratories

Technologies

PROFIBUS®

Fieldbus based Automation Technology

Proxy Technology

PROFINET®

Ethernet based Automation Technology

PI Worldwide Support

Belgium
RPA, PICC

France
RPA, PICC, PITC

Netherlands
RPA, PICC,
PITC, PITL

Russia
RPA

Sweden
RPA, PICC

Czech Rep.
RPA, PICC, PITL

Germany & Austria
RPA, PICC
PITC, PITL

Norway
RPA, PICC, PITC

Slovakia
RPA

Switzerland
RPA, PICC, PITC

Denmark
RPA

Ireland
RPA, PICC, PITC

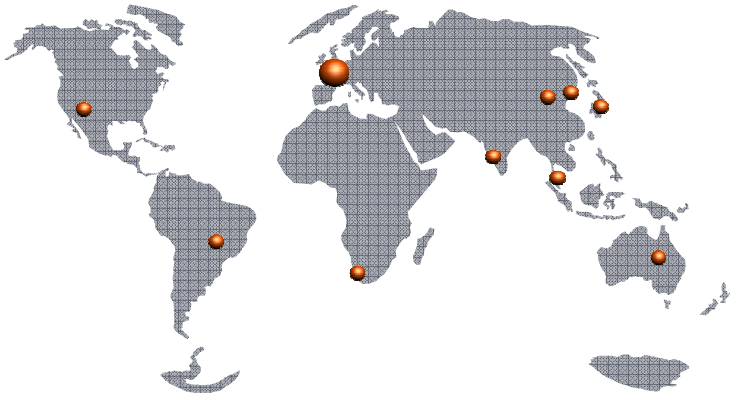
Poland
RPA, PICC

Spain
RPA, PICC

UK
RPA, PICC, PITC

Finland
RPA

Italy
RPA, PICC



China
RPA, PICC, PITL

India
RPA, PICC

Japan
RPA, PICC, PITL

Korea
RPA, PICC

Middle-East
RPA

Brazil
RPA, PICC

Chile
PICC

USA
RPA, PICC,
PITC, PITL

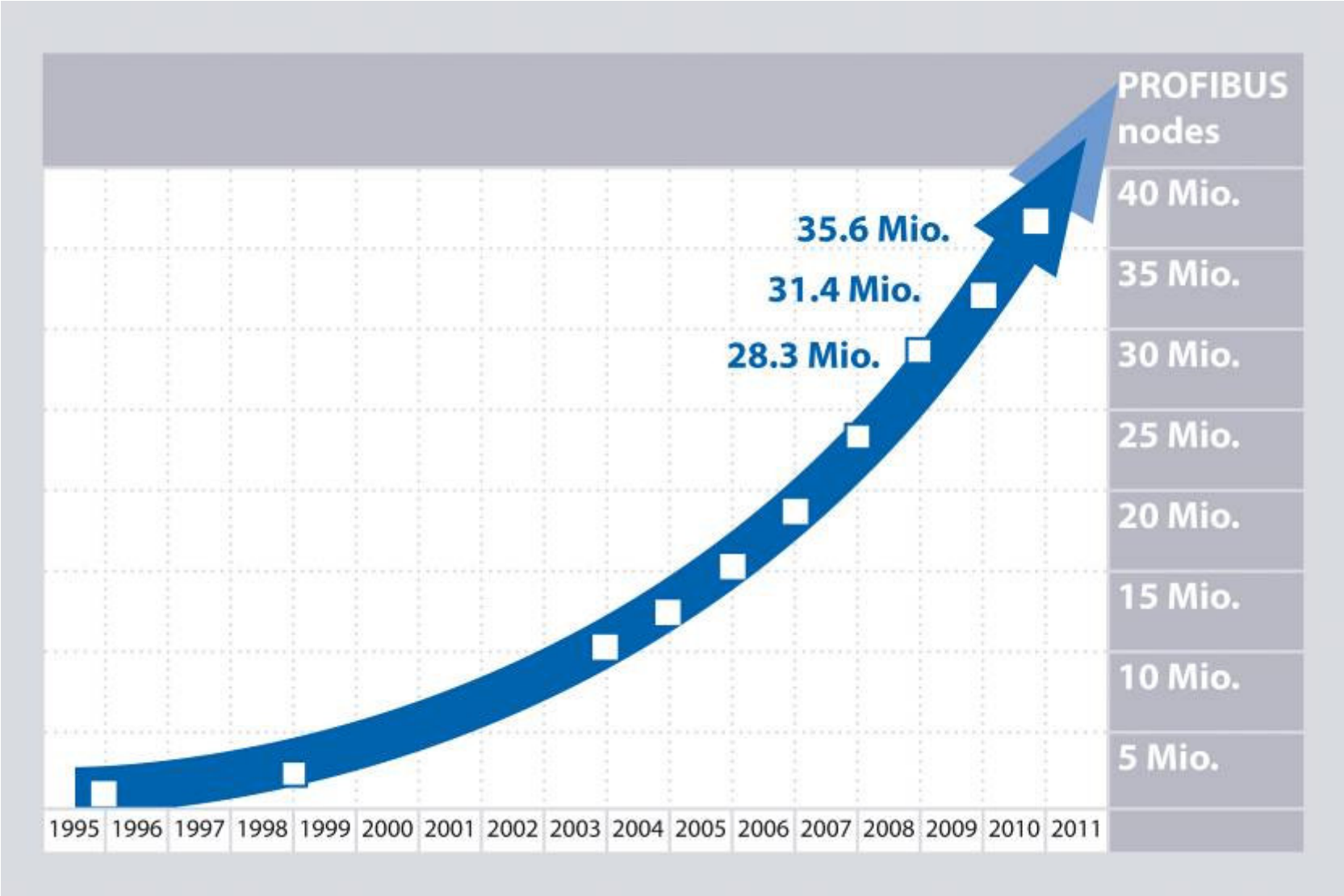
Southern Africa
RPA, PICC, PITC

Australia/
New Zealand
RPA, PICC, PITC

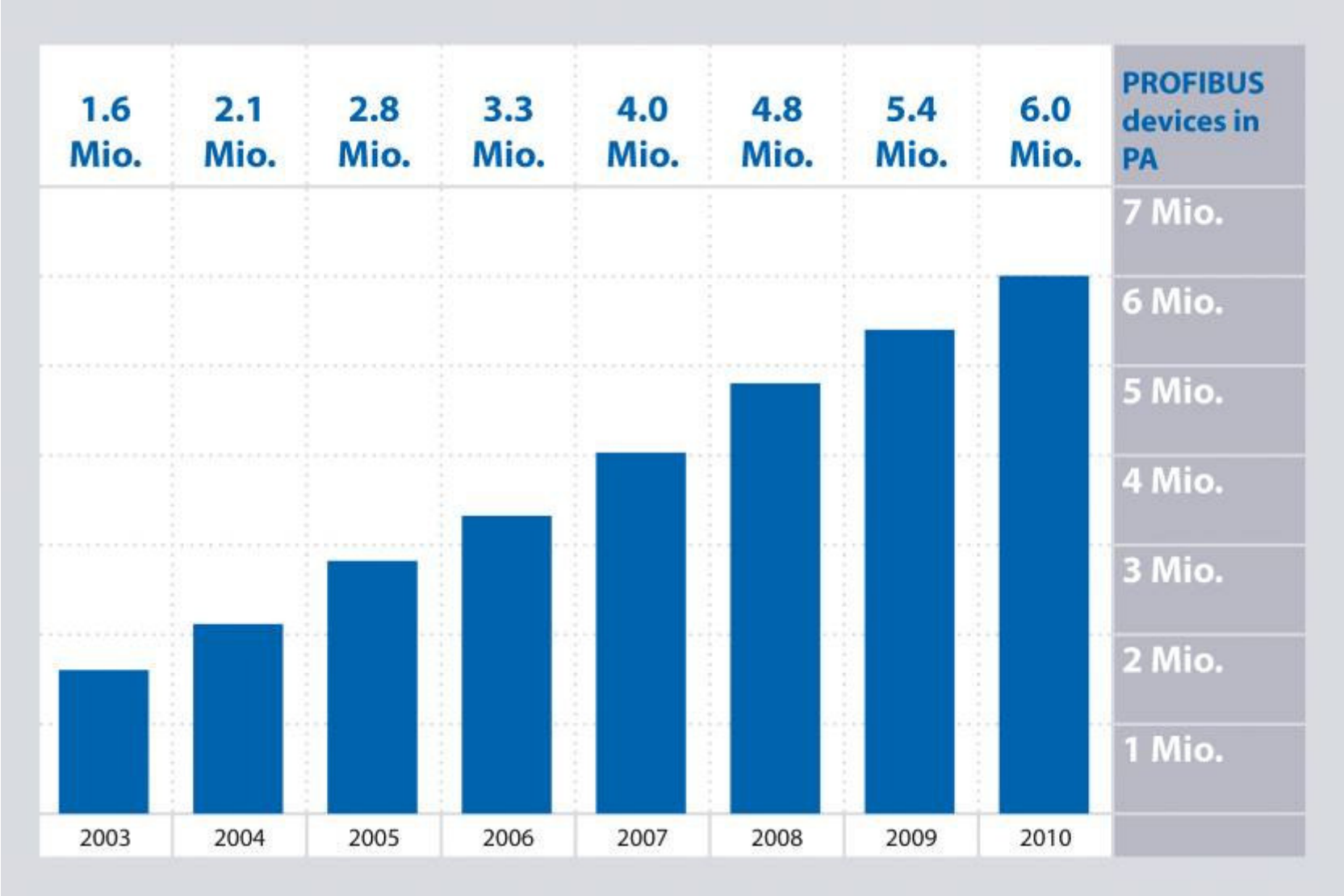
South-East-Asia
RPA, PICC

PI worldwide:	PI Technical Support:
27 Regional PI Associations (RPA)	40 PI Competence Centers (PICC) 18 PI Training Centers (PITC) 10 PI Test Laboratories (PITL)

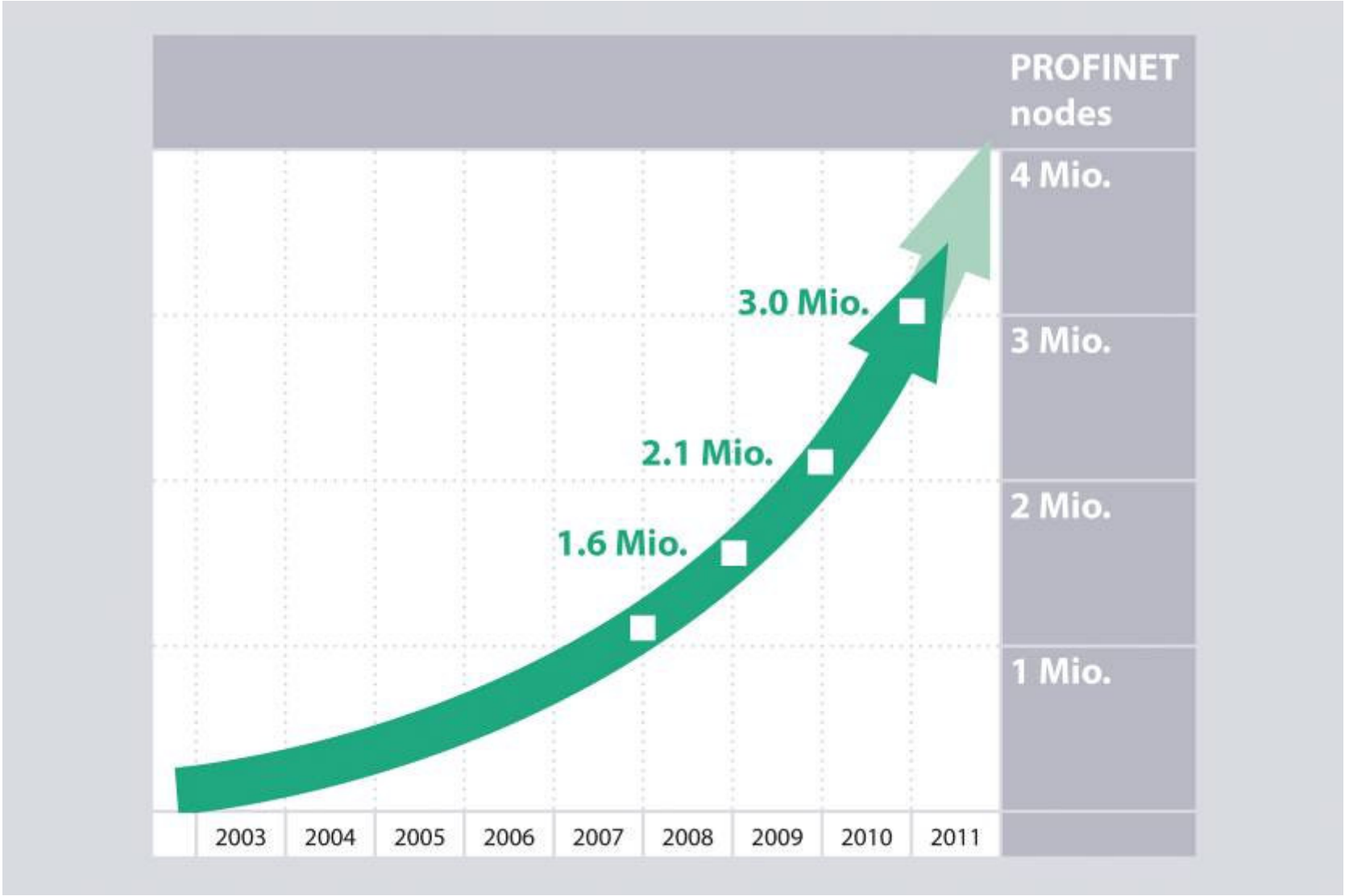
PROFIBUS


PROFIBUS nodes
40 Mio.
35 Mio.
30 Mio.
25 Mio.
20 Mio.
15 Mio.
10 Mio.
5 Mio.
35.6 Mio.
31.4 Mio.
28.3 Mio.
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

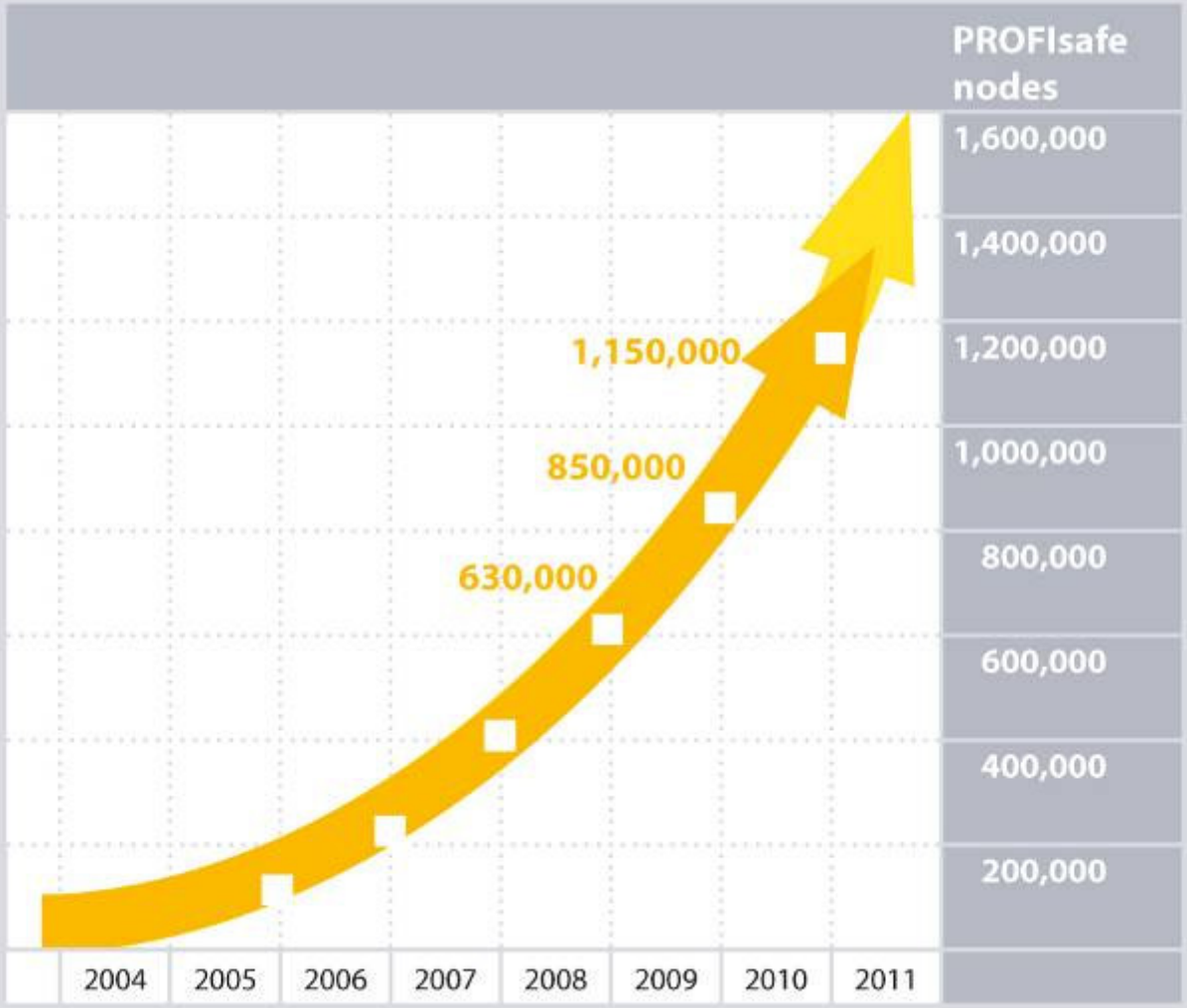
PROFIBUS in PA



PROFINET


PROFINET nodes
4 Mio.
3 Mio.
2 Mio.
1 Mio.
3.0 Mio.
2.1 Mio.
1.6 Mio.
2003
2004
2005
2006
2007
2008
2009
2010
2011

PROFIsafe


PROFIsafe nodes
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
1,150,000
850,000
630,000
2004
2005
2006
2007
2008
2009
2010
2011

PROFINET on the rise

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2007: Every 15th device sold with PI technology (PB/PN) is PROFINET

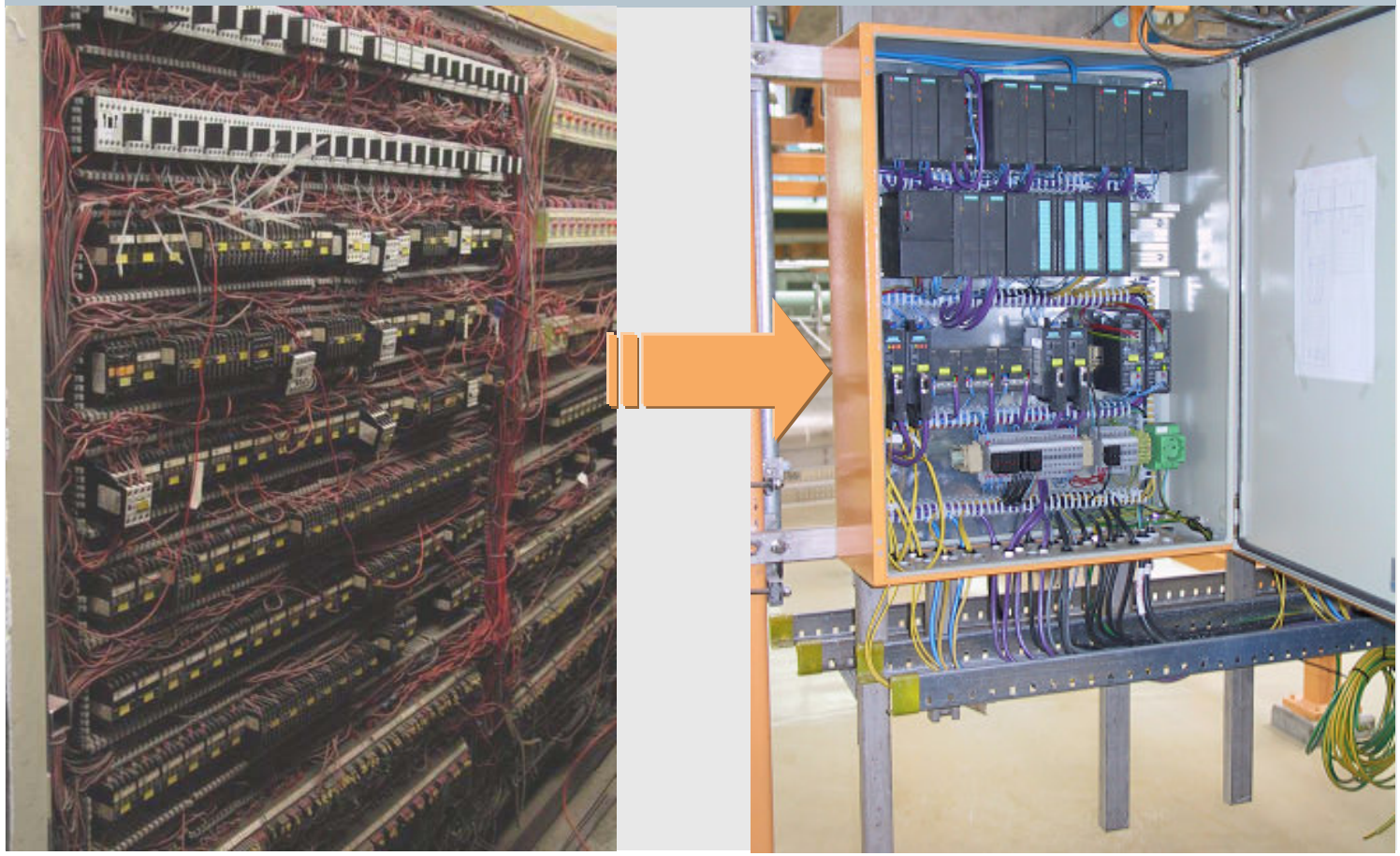
2008: Every 12th device sold with PI technology (PB/PN) is PROFINET

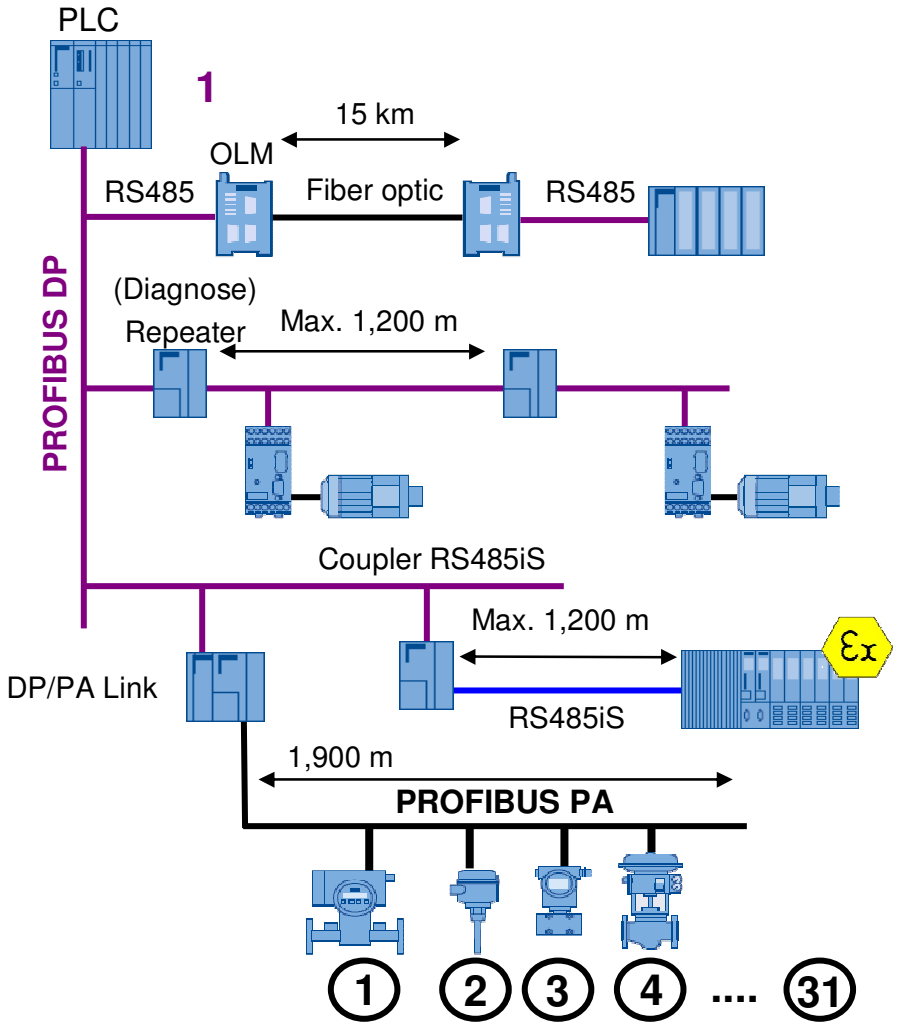
2009: Every 7th device sold with PI technology (PB/PN) is PROFINET

2010: More than every 6th device sold with PI technology (PB/PN) is PROFINET

The fieldbus network motivation

- Save space and costs !!!





- Max. 124 DP slaves per PROFIBUS DP master system
- Electrical networks can be extended with repeaters (segments)
  - max. 31 DP slaves per segment
- OLM's (Optical Link Module) for long distances, also provide greater EMC stability
- RS485iS coupler for PROFIBUS DP in hazardous areas
- Copper with RS485 and fiber optic use the same communication protocol
- PROFIBUS PA provides "power on the bus" for smart field devices
- DP/PA Link takes only one address on the upstream DP bus

PROFIBUS PA features ...

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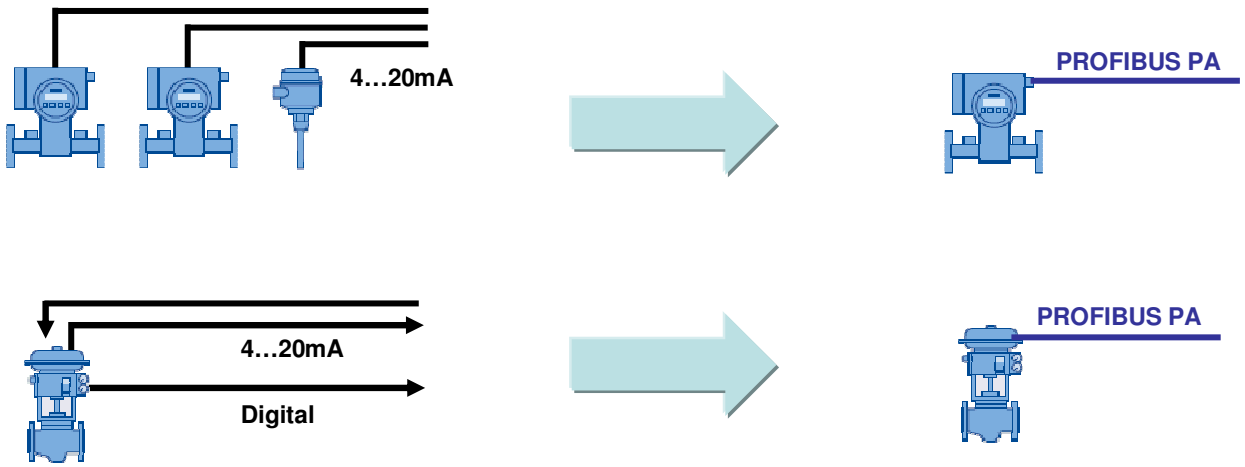
- **Cost and space savings …**
  - Less instruments using multivariable devices
  - Less wiring
  - Less I/O cards
  - Less controller logic



PROFIBUS PA features ...

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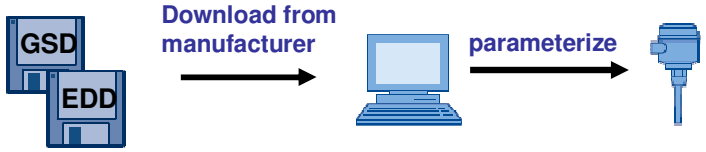
- **Free choice of devices due to open standard**
  - **Interchangeability**
    Devices can be operated in device manufacturer independent mode according „PA Profiles“ e.g.
    - counting
    - pressure
    - flow
    - level …
  - **Interoperability**
    Universal device description independent from DCS or device manufacturer



PROFIBUS PA features ...

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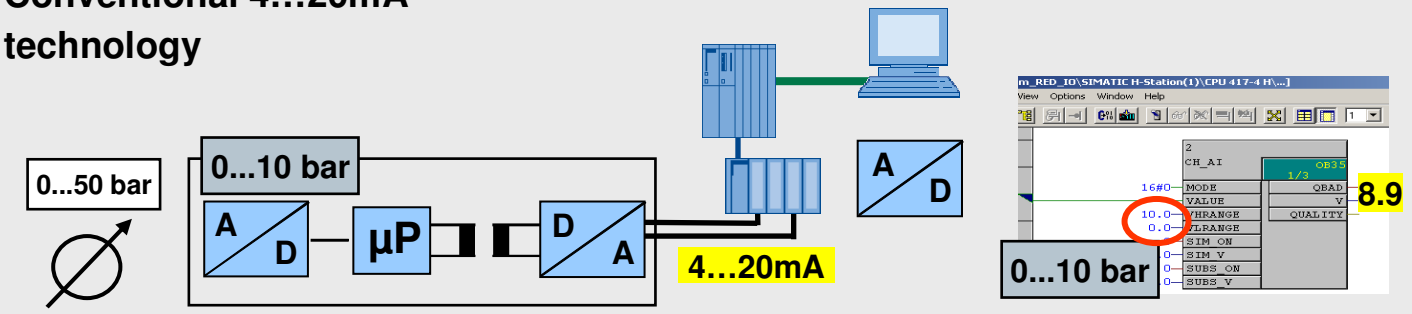
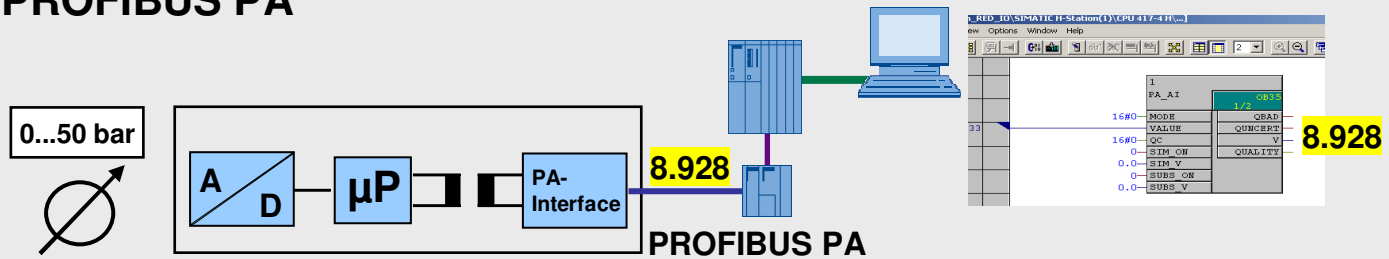
- **Higher Accuracy**
  - Less conversions
  - 32 bit resolution, digital transmission
  - No application specific measuring ranges

Conventional 4…20mA technology



PROFIBUS PA



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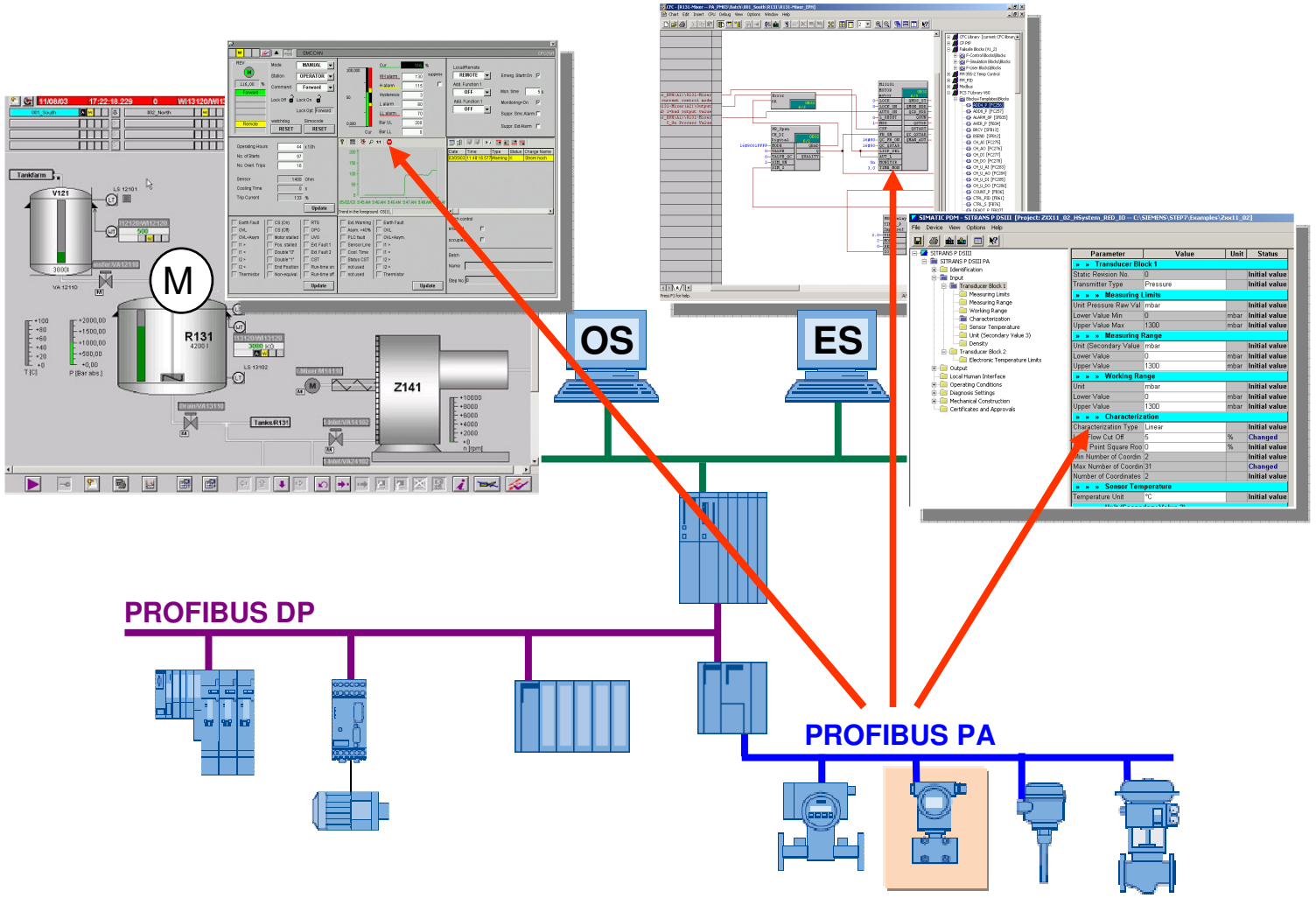
Central configuration, parameterization and diagnostics



PROFIBUS PA features ...

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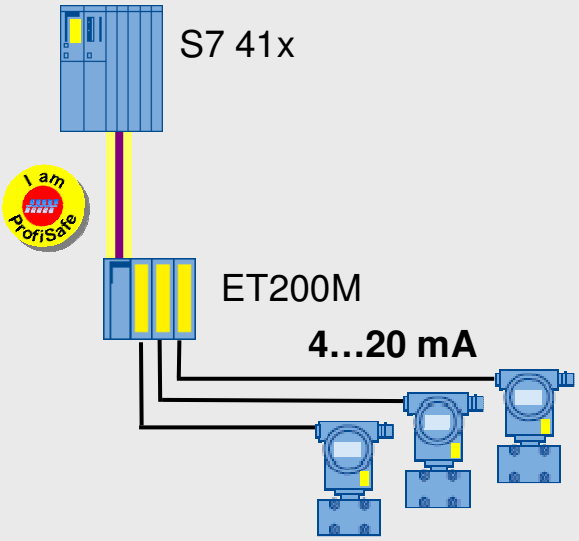
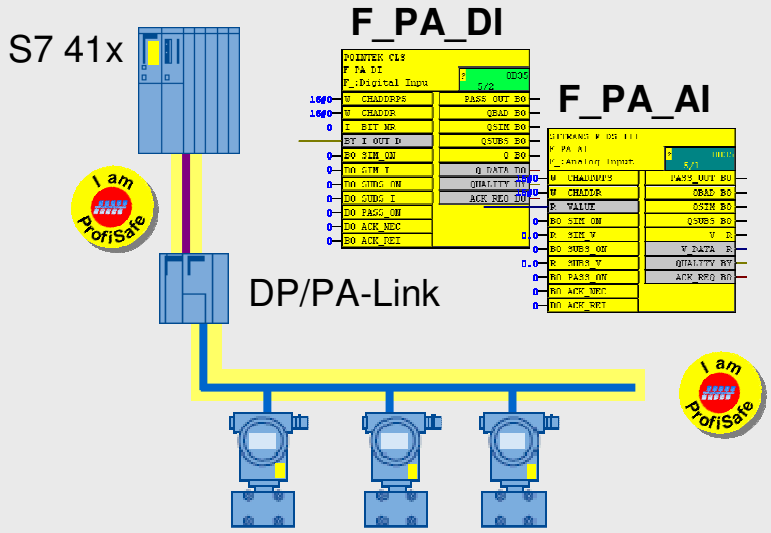
- **Process safety support with PROFISafe**
  - IEC 61508/11
  - The whole communication path to the field device is failsafe now!
  - No fail-safe-I/Os required, less cabling



PROFIsafe on PROFIBUS DP



PROFIsafe on PROFIBUS DP *and* PA

PROFIBUS PA features ...

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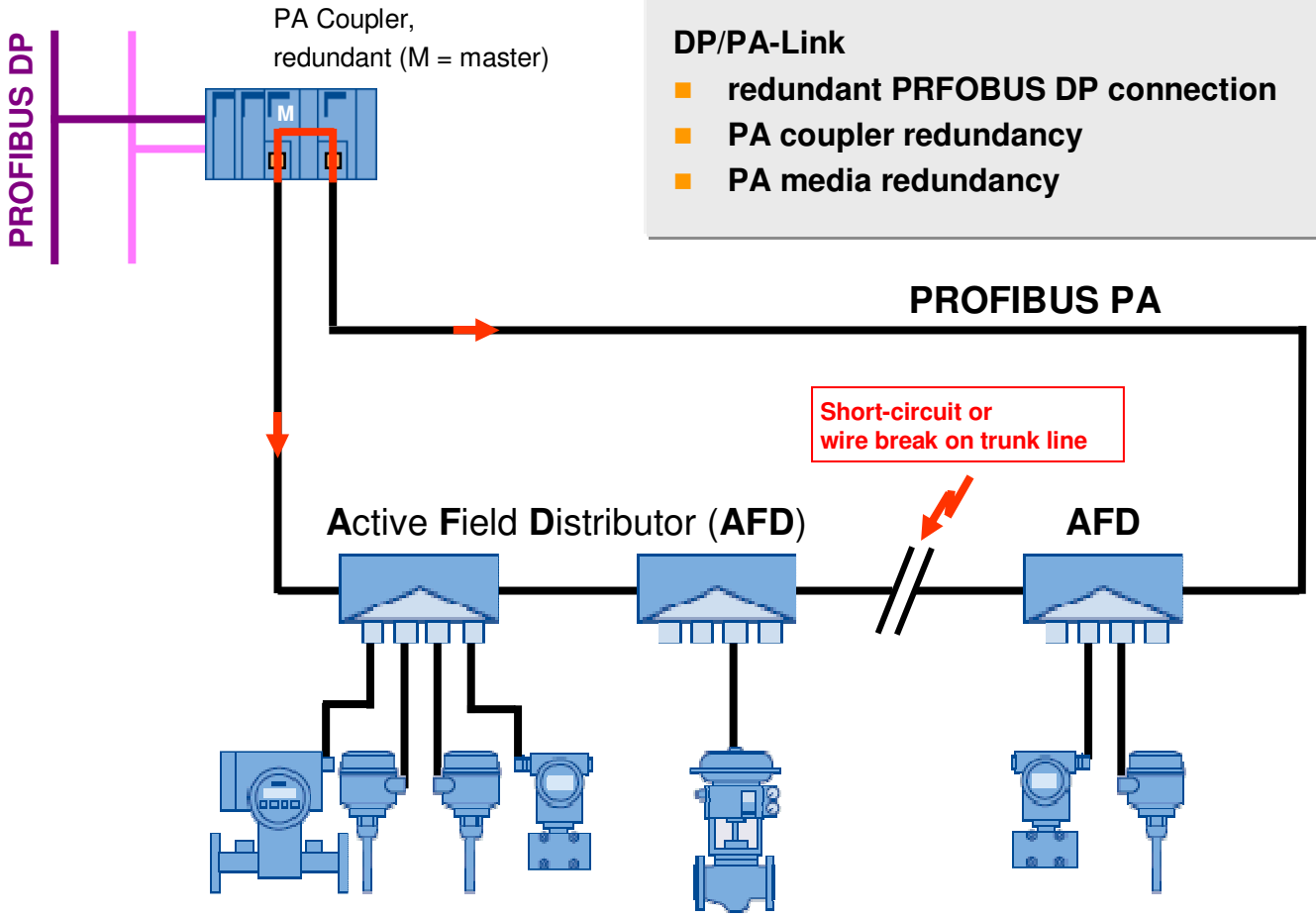

DP/PA-Link

- **redundant PRFOBUS DP connection**
- **PA coupler redundancy**
- **PA media redundancy**

- Automatic bus termination

PROFIBUS PA enables ...

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- Fast and easy installation because of bus-powering and automatic bus termination
- Prevention of unexpected plant downtimes due to scalable redundancy concept
- Early fault recognition and preventive maintenance due to enhanced diagnostics and asset management support
- Cost- and space saving configurations as a real alternative to conventional technologies (4 … 20mA, HART, fail-safe etc.)
- Complete hardware configuration change in run without production downtimes (including modifications on trunk line)

PROFIBUS and PROFIBUS PA are state-of-the-art and fit for the future

PROFIBUS PA profile – The step ahead!

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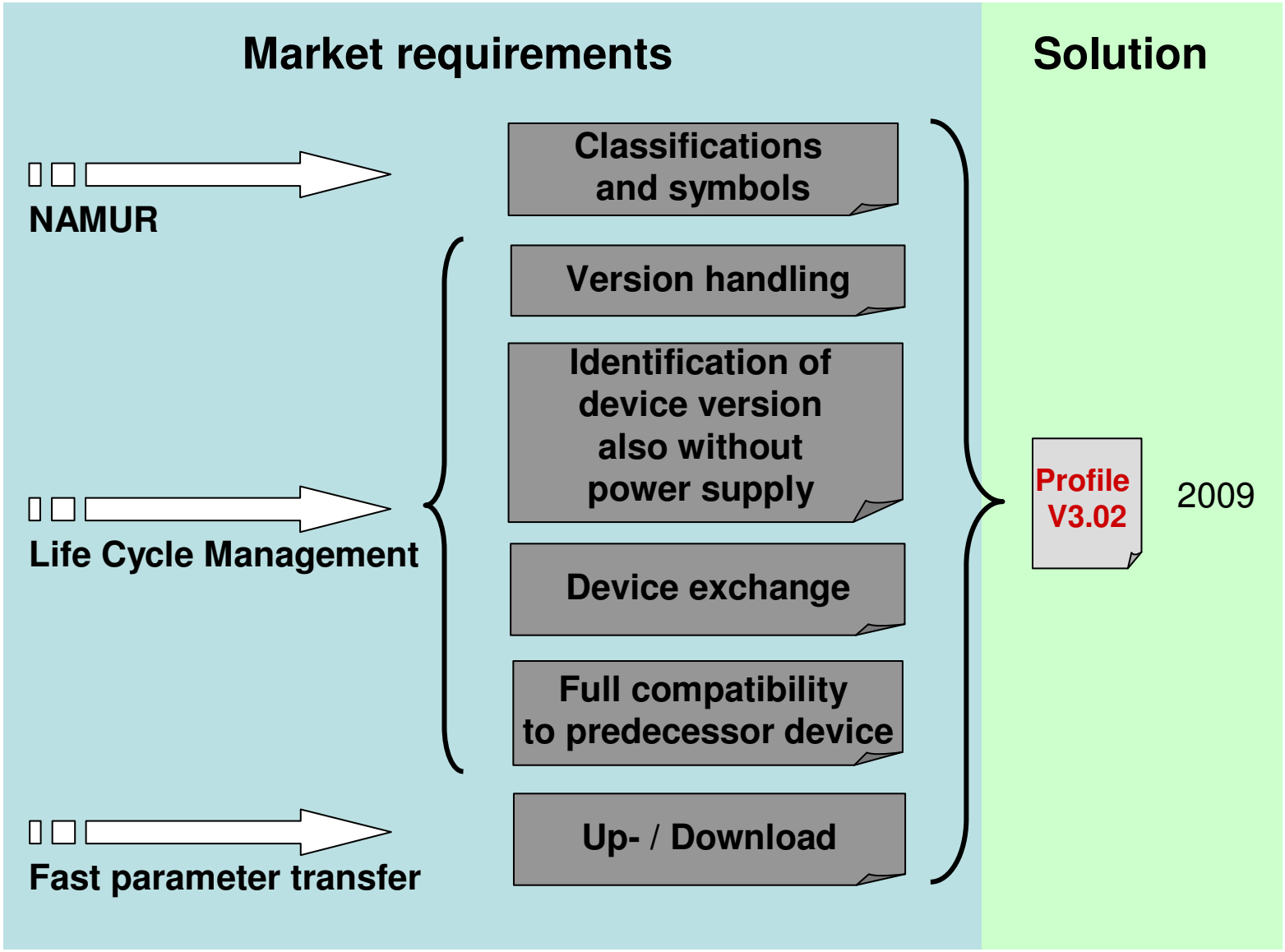

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PROFINET – for all applications

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Factory Automation

Motion Control

Process Automation

PROFINET

- Worldwide established in Factory Automation and Motion Control
- Already used in Process Automation for In-/Outbound
- Standardization activities for primary processes finalized

One system for all applications

Enhancements for PROFINET in PA

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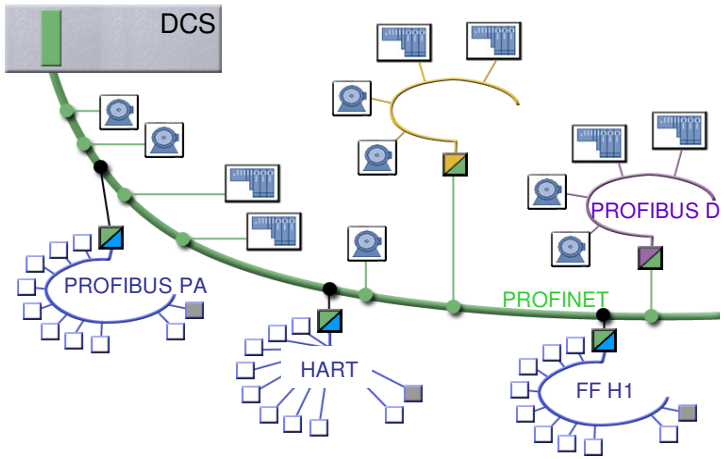
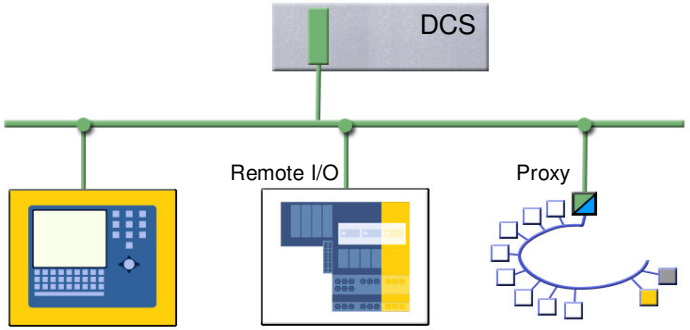
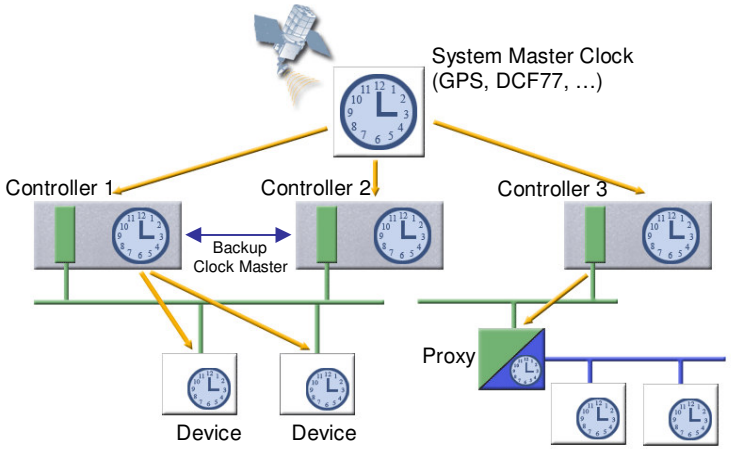
Fieldbus Integration



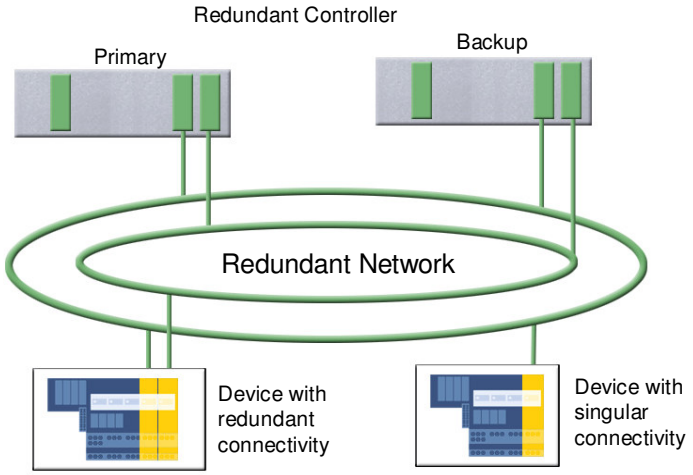
Configuration in Run (CiR)



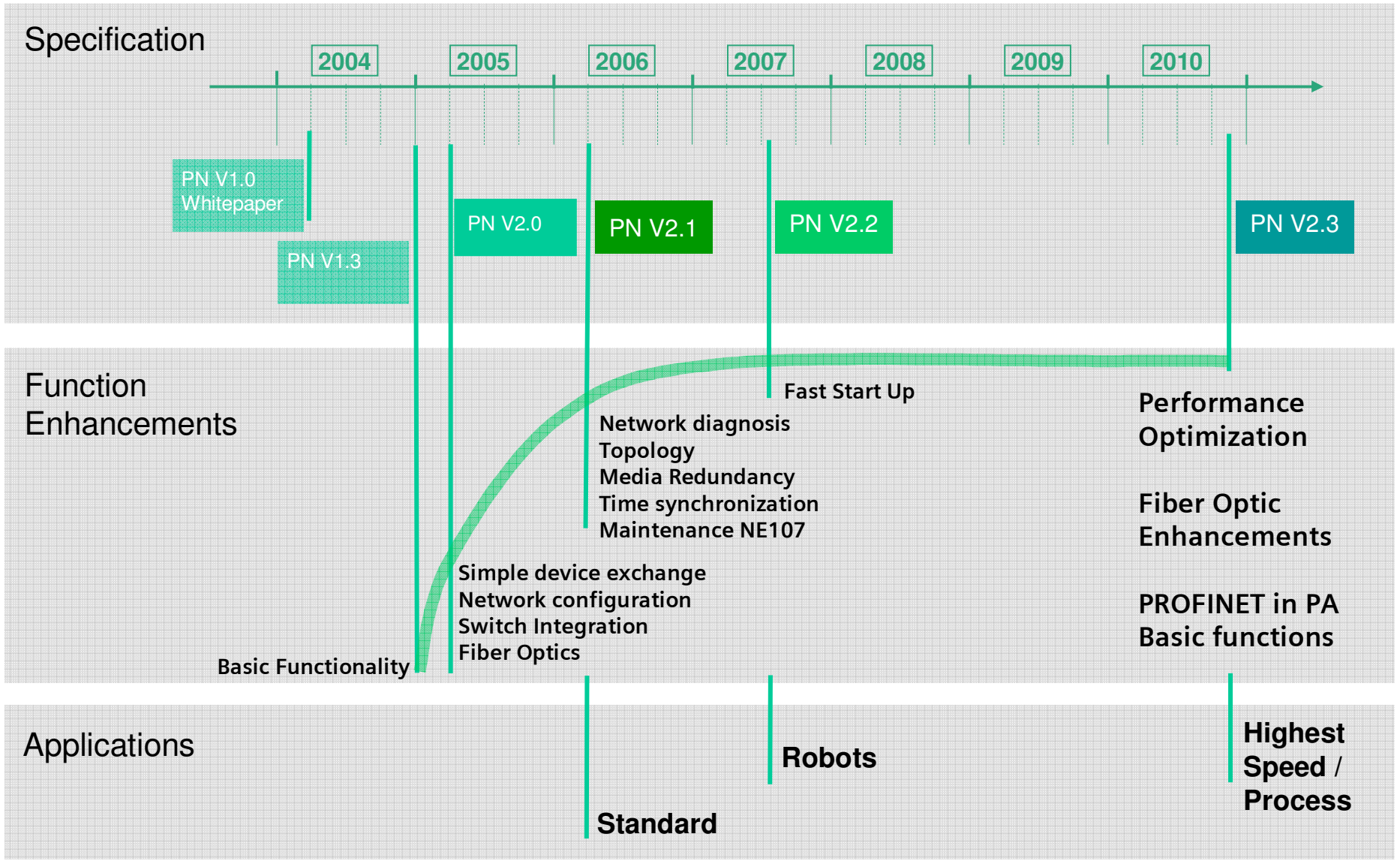
Time sync / stamping



Scalable Redundancy



PROFINET specifications



PN products from more than 60 vendors

PN products from more than 60 vendors

Benefits: Tools for PROFINET

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PROFINET Tester

- http://www.profibus.com/nc/downloads/downloads/profinet-io-tester/display/
- can be used for preparing certification

GSD Checker

- http://www.profibus.com/nc/downloads/downloads/profinet-xml-viewer-v22/display/
- verifies if a GSD complies with the specification

Wireshark

- http://www.profibus.com/nc/downloads/downloads/ethereal-wireshark/display/
- well-known network protocoll analyzer
- easy readout of PROFINET telegrams

Free downloads on PI website to support the efficient development of PROFINET interfaces

PI
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An Example From The Automotive Industry

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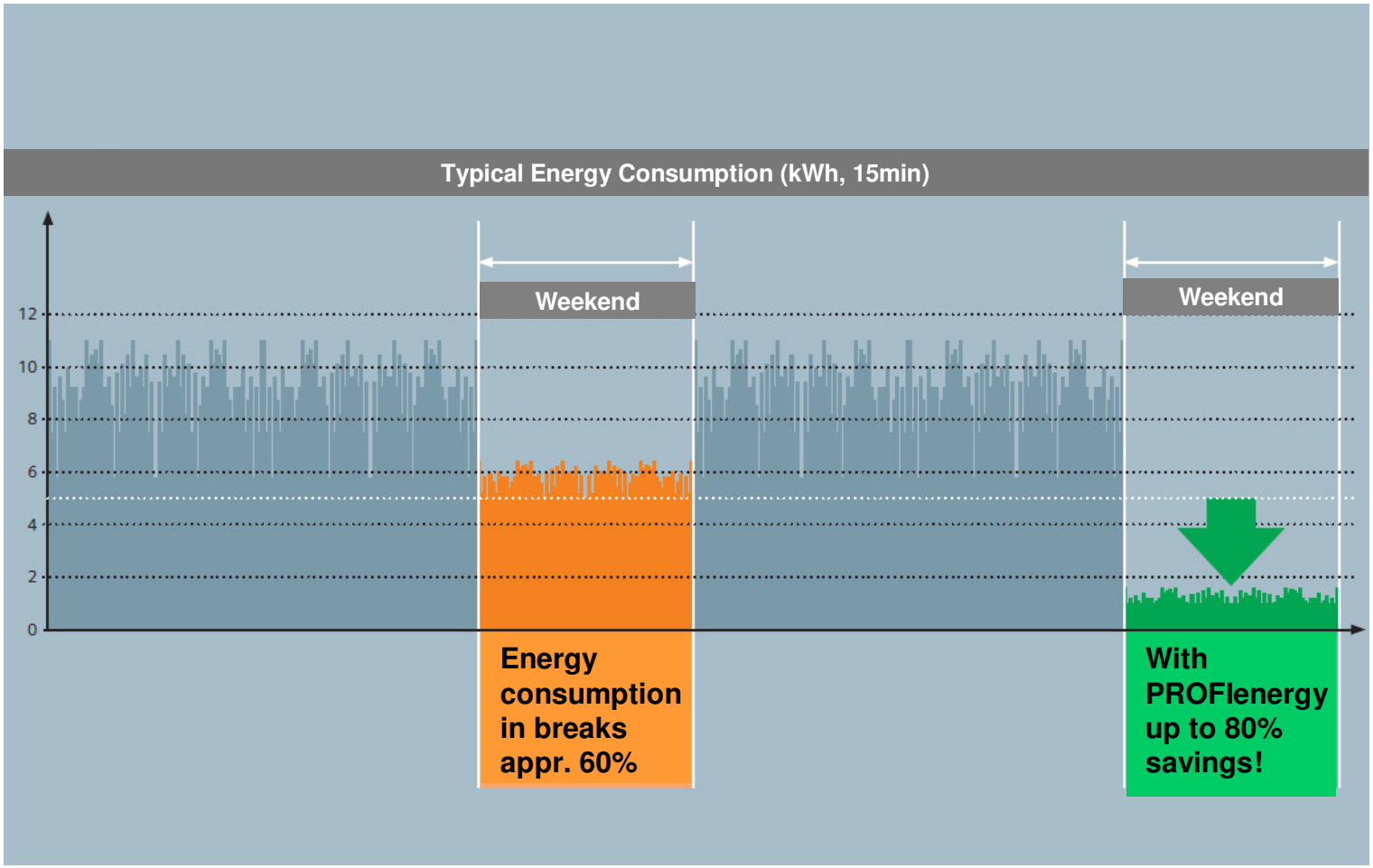

Energy consumption during breaks appr. 60%!

Five Good Reasons For PROFIenergy

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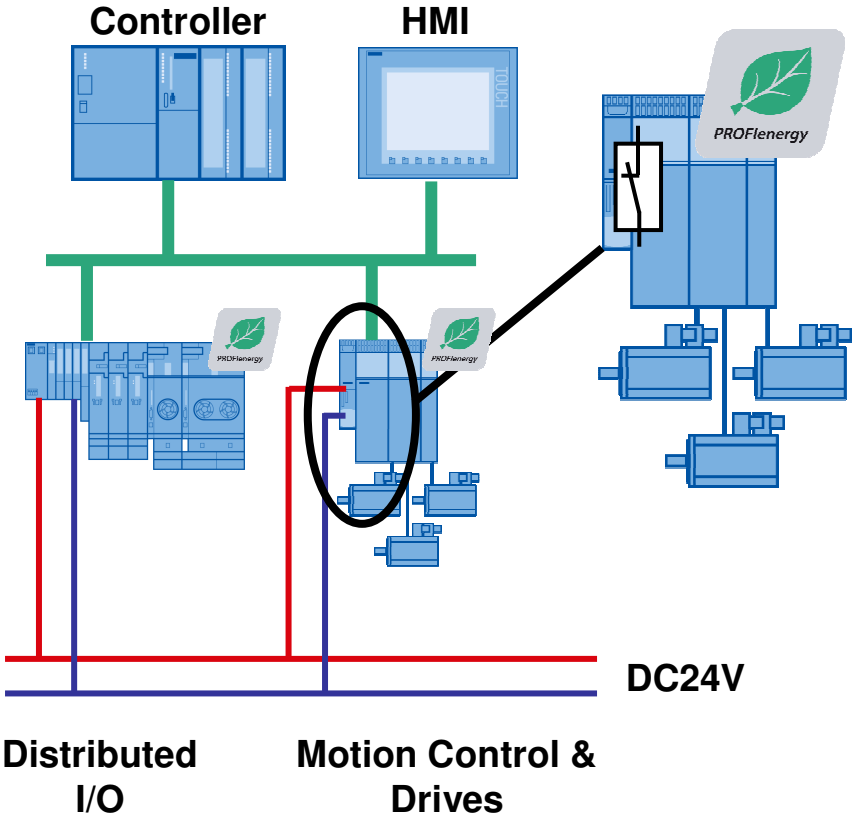

- **Cost savings** through omission of external hardware
- **Energy saving** even in short pauses thanks to granular switching
- **High system reliability** through coordinated switching
- **Investment safeguarding** through simple reaction-free integration into existing standards
- **Free selection of device** through vendor-independent standard

PROFIenergy permits energy saving in breaks through switching-off of non-required loads!

Certification of PROFIenergy

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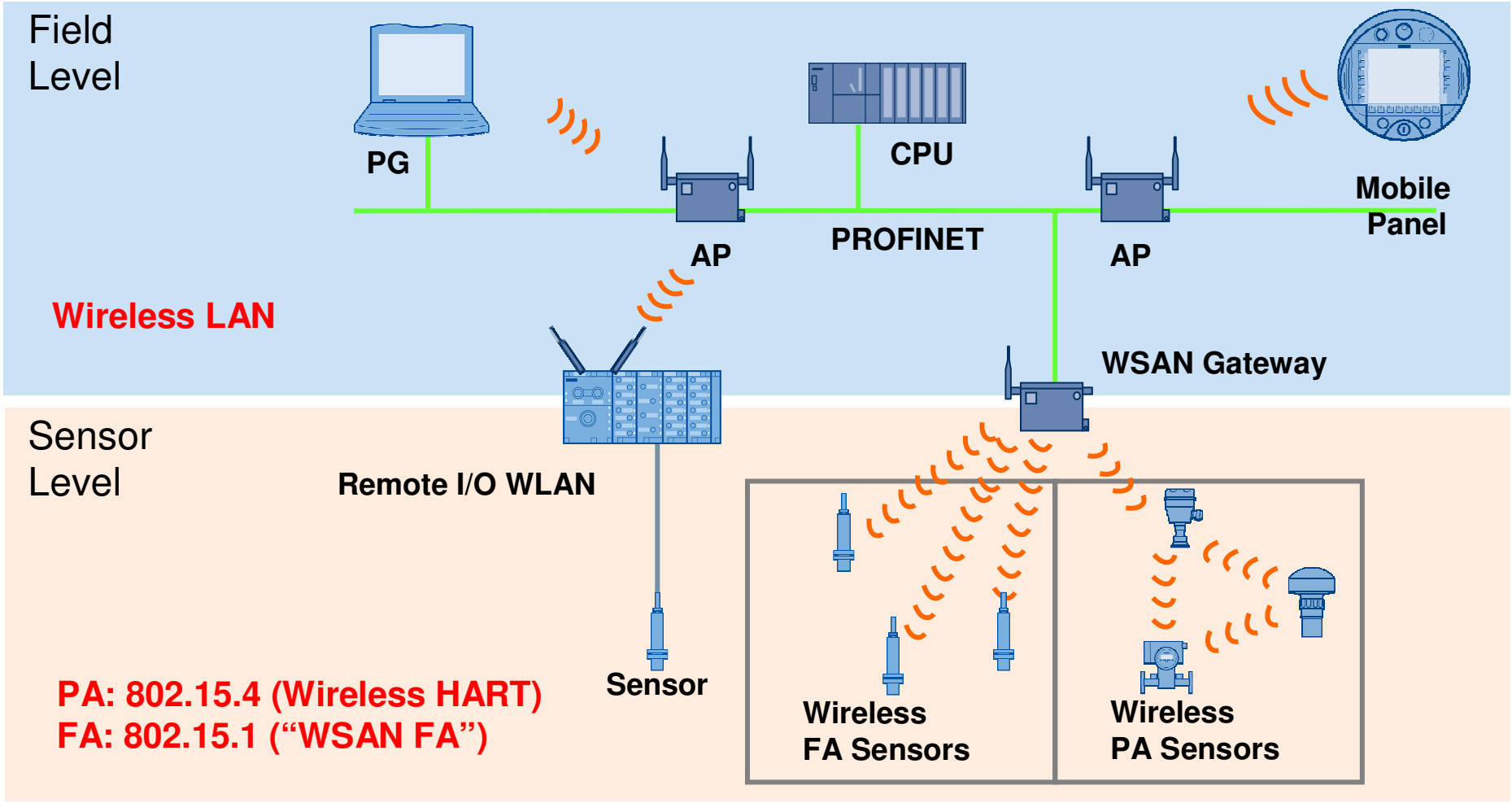
Inquiry of users → **Definition of Use Cases and requirements by PN Marketing Working Group** → **Definition of a Profile** → **Implementation device manufacturers** → **Use in projects**

- First products available, further implementations running
- NEW: Certification established,
  First certificates issued
  Test scope: Energy saving/measuring functions
- New: PROFIenergy live demo

PROFIenergy

Wireless Communication



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Jörg Freitag
PI Chairman