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SIMATIC PDM MS
Technical slides

A TIA Product of the Product Family SIMATIC PCS 7

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Challenges in productions plants of process industry

Fast commissioning

Uninterrupted operation

Effective condition assessment

In a large variety of ...

… Types of communication: PROFUBUS DP/PA, HART, FF, Modbus, Ethernet, PROFINET

… Field devices and plant components

… Status information and parametrize data

Answer is a plant related Maintenance and Service Station

SIMATIC PCS 7 MS
- In SIMATIC PCS 7 integrated Maintenance Station
- Diagnostic and service for components of the distributed control system

SIMATIC PDM MS
- Stand alone Maintenance Station
- Diagnostic and service for smart field devices

SIMATIC PDM
- Effective service tool and commissioning

SIMATIC PDM MS –
Diagnostic and Service for smart Field Devices

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- **SIMATIC PDM MS** is the universal maintenance station for smart **field devices** with
  - Field device diagnostics
  - Field device management
  - Overview functions
  - Condition protocols
  - Parameter archiving
- Can be used independent from used automation system
- Can be used as central or unit related maintenance station
- Has the same functionality like the SIMATIC PCS 7 maintenance station

Holger Rachut | Product manager | SIMATIC PDM MS V2.0

SIMATIC PDM MS – Highlights

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- Independent from the system environment (PCS 7 or S7 project, third party)
- Compact Maintenance Station based, flexible and expansible
- Multiple use in projects, e.g. unit related or as a data collector
- Function is similar as SIMATIC PCS 7 Maintenance Station
- Can use the existed infrastructure of SIMATIC S7/PCS 7 projects or
- Can use the own infrastructure
- Support much communication types or gateways between the networks
  - Ethernet
  - PROFINET[1]
  - PROFIBUS DP/PA
  - HART

1 Locale connection

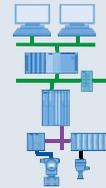Holger Rachut | Product manager | SIMATIC PDM MS V2.0
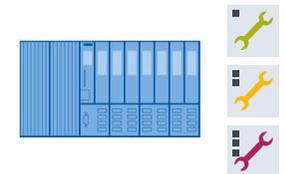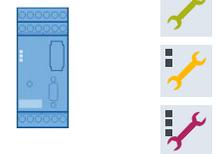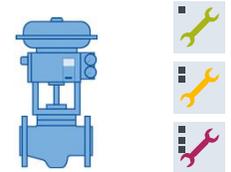
SIMATIC PDM MS –
Positioning in the Product Family
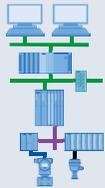
SIMATIC PCS 7 MS (Basis)

- No license requires
- Event driven
- Time-controlled (polling)
- Small ➔ large projects
(appropriate PCS 7 project)
- One maintenance station per project

- Client/Server structure
of the maintenance station

SIMATIC PCS 7 MS

- License requires
- Event driven
- Time-controlled (polling)
- Small ➔ large projects
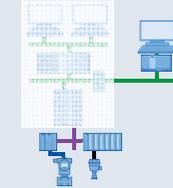(appropriate PCS 7 Projekt)
- One maintenance station
per project

- Client/Server structure of maintenance station
- SIMATIC PDM on the engineering station
- SIMATIC PDM in Server/Client structure
- Data-gateway-functionality

SIMATIC PDM MS

- License requires

- Time-controlled (polling)
- Small ➔ medium projects
(up to 500 objects)
- More than one maintenance stations
per project possible
- Cross project usable
- Single-station system

- SIMATIC PDM on the engineering station
- SIMATIC PDM in Server/Client structure
- Data-gateway-functionality

Holger Rachut | Product manager | SIMATIC PDM MS V2.0

Positioning of the different Maintenance Stations
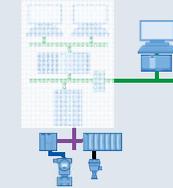
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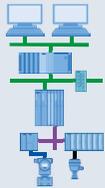
SIMATIC PCS 7 MS (Basis)

- Integrated in a PCS 7 project
- Bound to the PCS 7 version of the technological project
- Contains overview/segment pictures
- Contains global message views

- Covers all components of the SIMATIC PCS 7 project

- Numbers of diagnostic objects is determined by the project
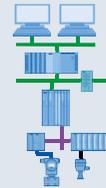
SIMATIC PCS 7 MS

- Integrated in a PCS 7 project
- Bound to the PCS 7 version of the technological project
- Contains overview/segment pictures
- Contains global message views
- Device specific message views
- System functions (e.g. filter)
- Condition monitoring passible
- Covers all components of the SIMATIC PCS 7 project

- Numbers of diagnostic objects is determined by the project

SIMATIC PDM MS

- Independent from PCS 7 projects
- Not bound to the PCS 7 version of the technological project
- Contains overview/ segment pictures
- Contains global message views
- Device specific message views
- System functions (e.g. filter)

- Covers all EDD/based components

- Numbers of diagnostic objects is independent from the project

Holger Rachut | Product manager | SIMATIC PDM MS V2.0

Requirements of the NAMUR –
Basis for the development of the Maintenance Stations

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NE 129
(vormals NE 91)

"Plant Asset Management"

NE 105

"Specifications for Integrating
Fieldbus Devices
in Engineering Tools"

NE 107

"Status messages
of field devices"

Source: NAMUR web side
NAMUR – is an international association of user companies (established in 1949) and represents their interests concerning automation technology
NAMUR – represents several thousand process control technology specialists, with around 300 participating almost in 40 working groups
NAMUR – Important results of the exchange of experience in the working groups are published as NAMUR recommendations (NE) and worksheets (NA)

NAMUR

NE 129 –
"Plant Asset Management"

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The Asset Management System is intended to Support plant engineering in its task of Online Plant Asset Management

Near-plant asset management is in responsibility of the technical operational management

- Condition monitoring for assets as part of the DCS
- Transformation of information from the real project
- Separation of maintenance information and process information
- Standardized interfaces for integration of field devices
- Common visualization for all assets
- Presentation of assets in different views and hierarchy levels
- Tabular or graphical overviews
- Easy evaluation of the state of the assets
- Logging and documentation of events concerning the assets
- Decision support for service staff
- Standardized interfaces to supervisory systems

NAMUR

NE 105 – "Specifications for Integrating Fieldbus Devices in Engineering Tools"

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The goal is to be able to efficiently and safely operate, parameterize and manage the data of devices from various manufacturers with a uniform tool

- Long-term viability of device integration
- Standard procedure for the integration of new devices
- Uniform user guidance for all components
- One device descriptions for one device
- Cross-platform compatibility of the device description
- Full support of device functionality
- Standardized data filing
- Certification of the device description
- Device description is an integral component of the device

NAMUR

Holger Rachut | Product manager | SIMATIC PDM MS V2.0

NE 107 –
"Status messages of field devices"

Self-monitoring enables field devices to provide information about their own status

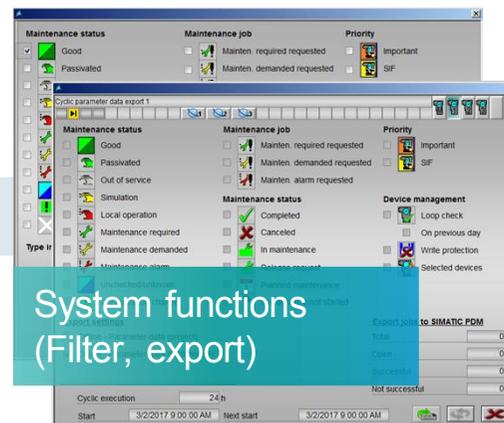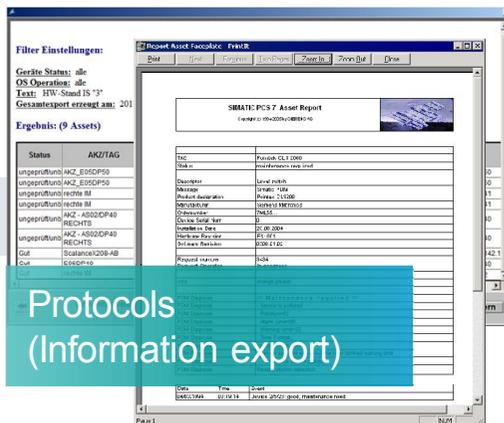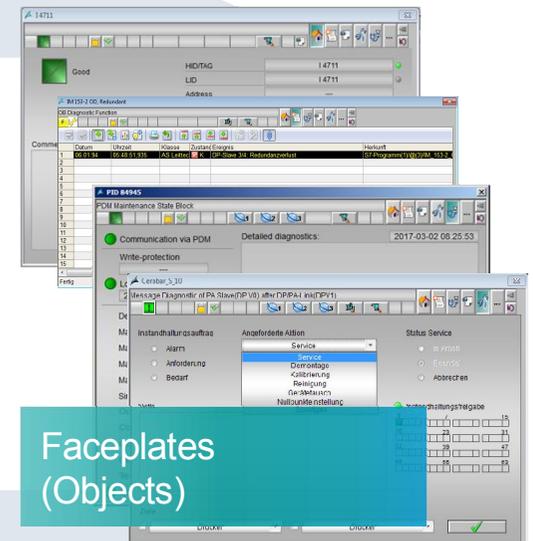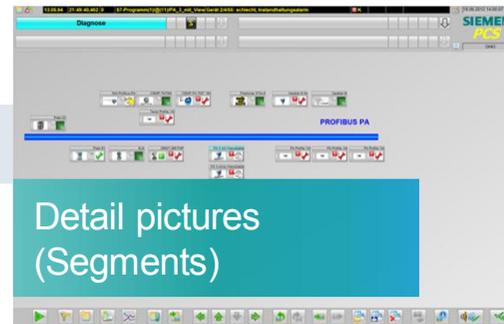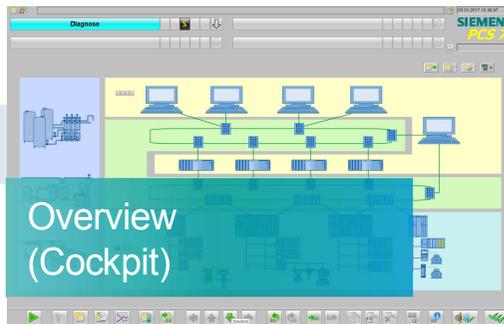**There are four defined standard signals for all field devices to present in the operation area. They are implemented as required and tell us about device condition**

Process value valid

Failure
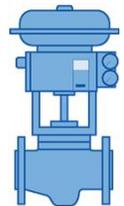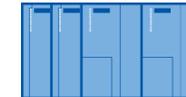
Maintenance required

Off-specification

Functional check

NAMUR

SIMATIC PDM MS –
Clear Structure for Information an Representation

Overview
(Cockpit)

Detail pictures
(Segments)

Faceplates
(Objects)

Protocols
(Information export)

System functions
(Filter, export)

SIMATIC PDM MS –
Uniform visualization of all Field Devices[1] and Field Components[1]

Standards for representing of device conditions (state) in SIMATIC PDM MS

Good	Maintenance request (low)	Maintenance not in progress
Simulation	Maintenance demand (medium)	Maintenance is requested
Local operation	Maintenance alert (high)	Maintenance in progress

1 All field devices and field components with DD/EDD device description package can be integrated

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SIMATIC PDM MS –
Easy and comfortable generation of the station

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Overview
(Cockpit)

Detail pictures
(Fieldbus)

Single pictures
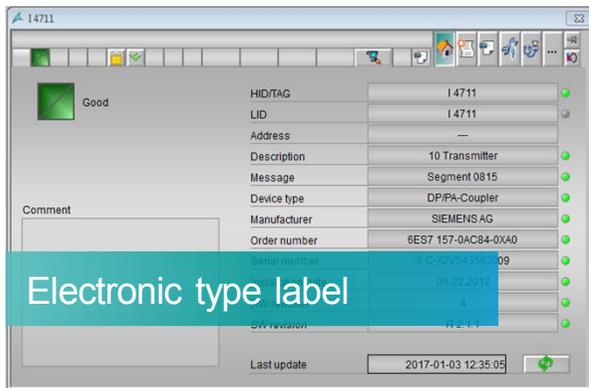(Field device)

Proses device – network view from SIMATIC PDM (Hardware – project)

1 Engineering of the process device – network view of SIMATIC PDM
- Via SIMATIC PCS 7 project data import or
- Over SIMATIC PDM Lifelist or
- Manual

2 Generation of the SIMATIC PDM maintenance station via "make"-function

SIMATIC PDM MS –
Detail displays for all Field devices

Electronic type label

Messages

Detail diagnosis

User notes

Service actions
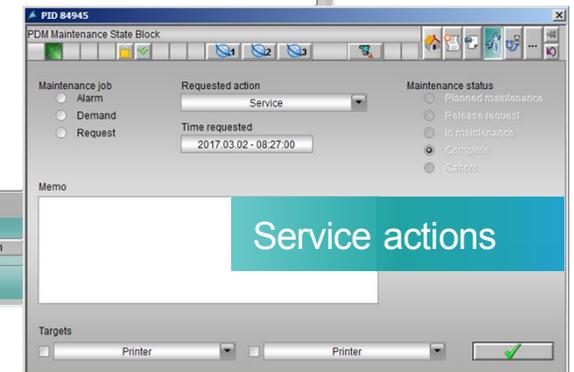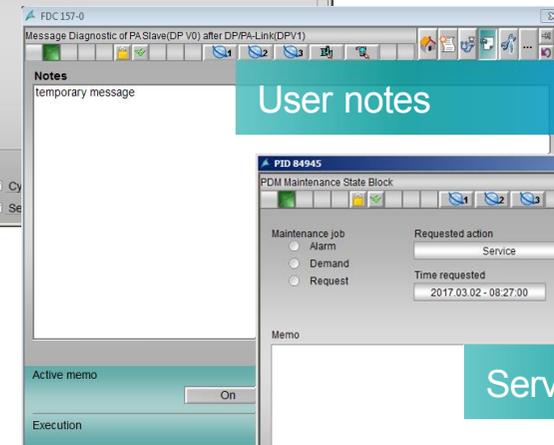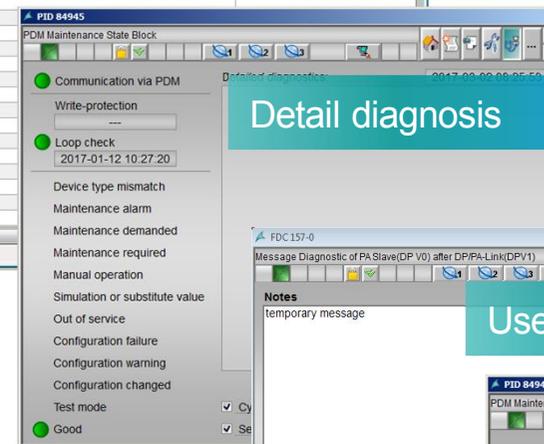
- Same "look & feel" for all, independent from type and manufacturer
- Different symbolic representation for
  - Gateways (e.g. DP/PA Links)
  - Remote I/O's
  - Signal module
  - Field devices

SIMATIC PDM MS –
System functions for all Field Devices

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System function can be used for each field device, independent from manufacturer and type

With the system functions very fast many different tasks can be solved, such as

- Overviews for device conditions
- Archiving of parameter sets
- Connection to mailing or paging systems
- Generation of commissioning lists
- Synchronization of parameter sets
- Transfer of condition, diagnostic information and parameter data to EAM or CM systems

EAM: Enterprise Asset Management; **CM:** Condition Monitoring

Holger Rachut | Product manager | SIMATIC PDM MS V2.0
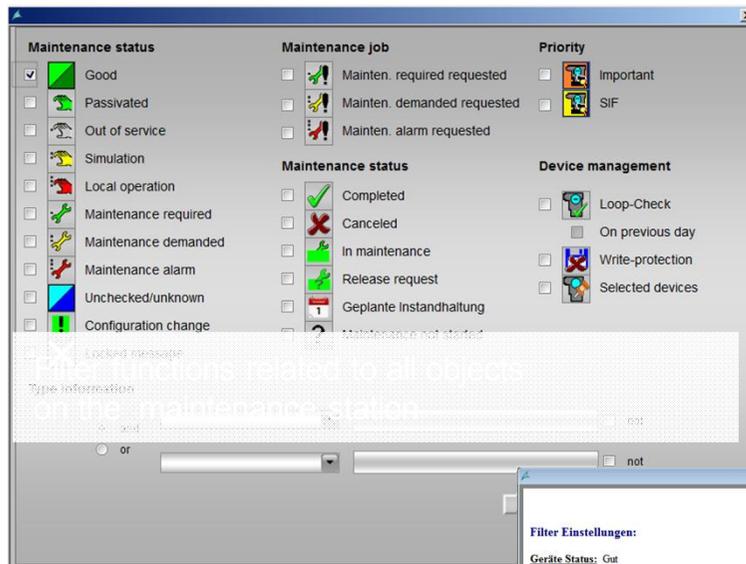
SIMATIC PDM MS –
Generation of Overview lists

Request status

Condition status

Diagnostic status

Filter type
label related

Processing status

Priority status

Check status

Selection status

Result

Save and transfer
as XML-file

The filtered data
export is ideally
utilizable when

- Commissioning
  or maintenance
  progress report
- Overviews of the
  plant condition

SIMATIC PDM MS –
System functions for Parameter data

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Cyclic export function

Condition status

Diagnostic status

Source for parameter export

Parameter synchronization

Filter function usable for all EDD-based objects in the main-tenance station

Status of current para-meter export function

Parametrization cyclic time for parameter export

EDD: Electronic Device Description (Integration in SIMATIC PDM)

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SIMATIC PDM MS –
Asset Report for each Field devices

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Print variant
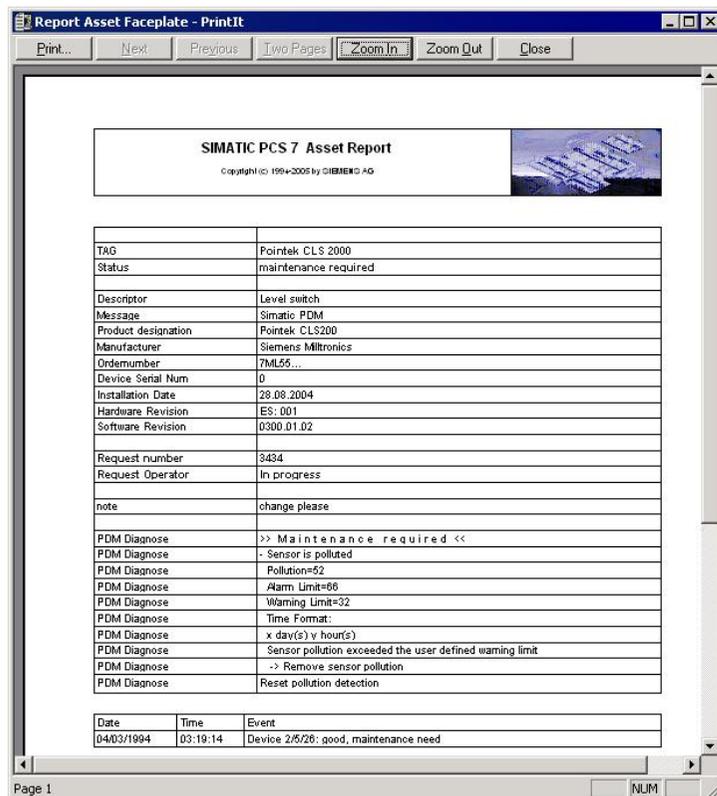
File variant (XML)

ASSET ID – clear object identification
User identification
Electronic type label
Diagnostic status
Detail diagnostic information
Processing status

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SIMATIC PDM MS –
Asset Report, Summary of all Information

- All information object related concentrated in one protocol
- Can be printed or can be transferred as XML stream for further processing
- Identical protocol structure for all devices and clear identification facilitate the further processing


```
<?xml version="1.0" encoding="UTF-16"?>
<!-- Automatically generated report -->
<?xml-stylesheet type="text/xsl" href="S:
<Document xmlns="http://www.siemens.com/
  - Parametrierter Zeitpunkt des Serviceint
```

XML

e.g. Enterprise Asset Management System

e.g. web application

e.g. COMOS MRO

e.g. plant internal archive system

e.g. mailing system

e.g. paging system

All information concentrate for each device

- Clear identification
- Login information
- Content of the type label
- Current messages
- Detail diagnostic information
- Maintenance status
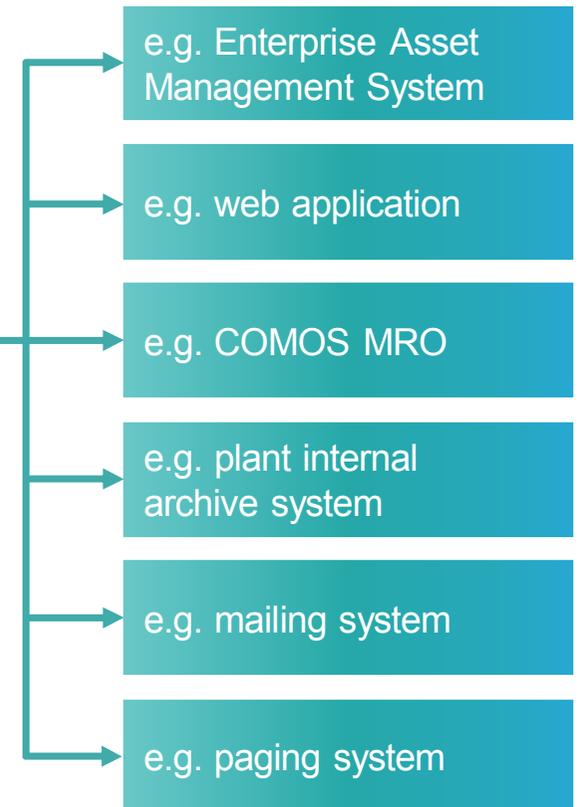
SIMATIC PDM MS –
Common electronic Type Label
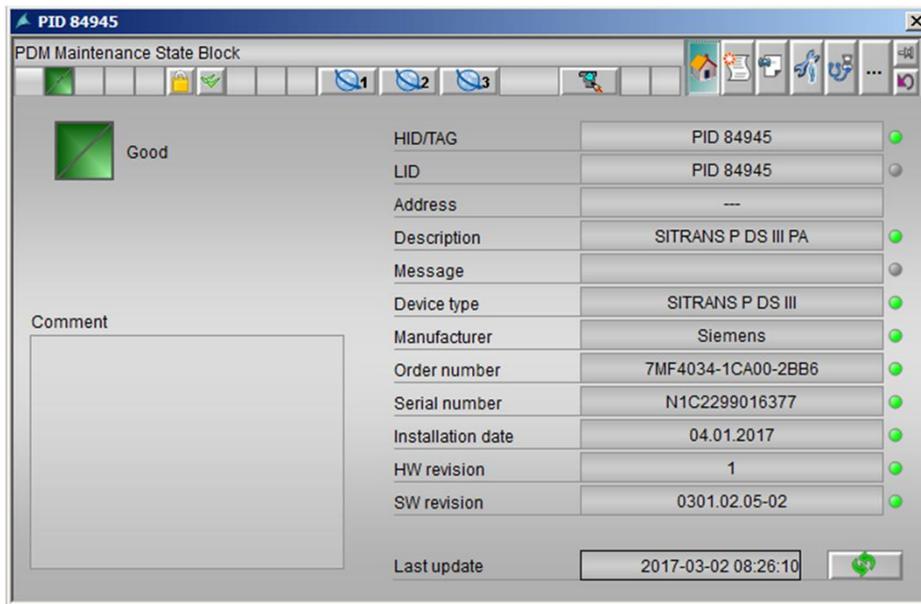
- Identity presentation for each field device independent from type and manufacturer

- Based on international Guideline "Information and Maintenance" from the PNO/PI organization

Use

Recording and transfer as XML-file

This information and a clear system-ID

- Will be used in overviews
- Are basis for the Information exchange with higher-level EAM or CM systems

PNO: Profibus Nutzerorganisation (Profibus user organization); **PI:** PROFIBUS & PROFINET International; **EAM:** Enterprise Asset Management; **CM:** Condition Monitoring

SIMATIC PDM MS –
Field device Detail Diagnostic and System Functions

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The field device status and the field device diagnosis is cyclic updated via SIMATIC PDM

Set by service staff in SIMATIC PDM

Field device status updated by SIMATIC PDM

System function "filtered parameter export"
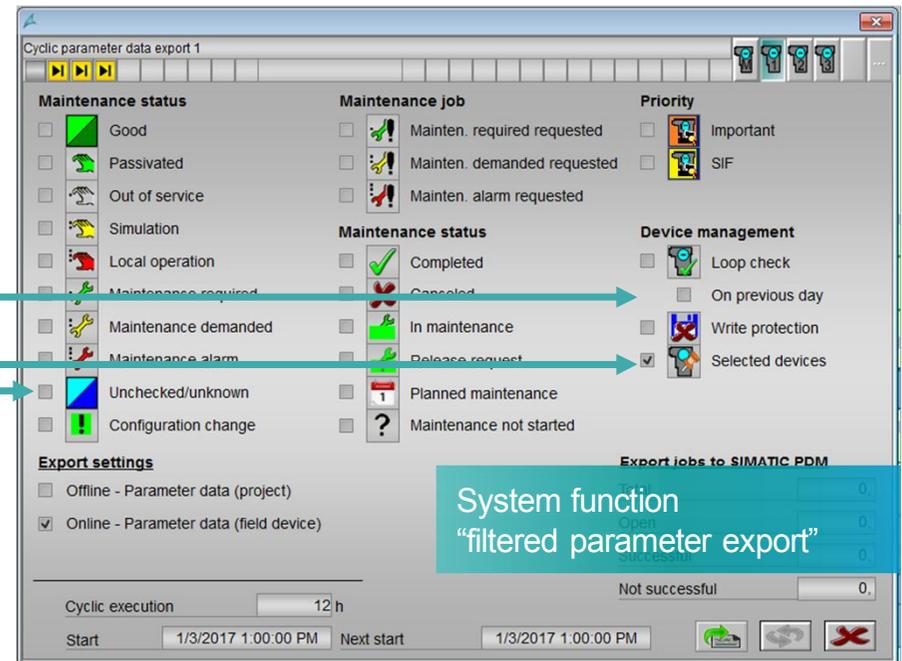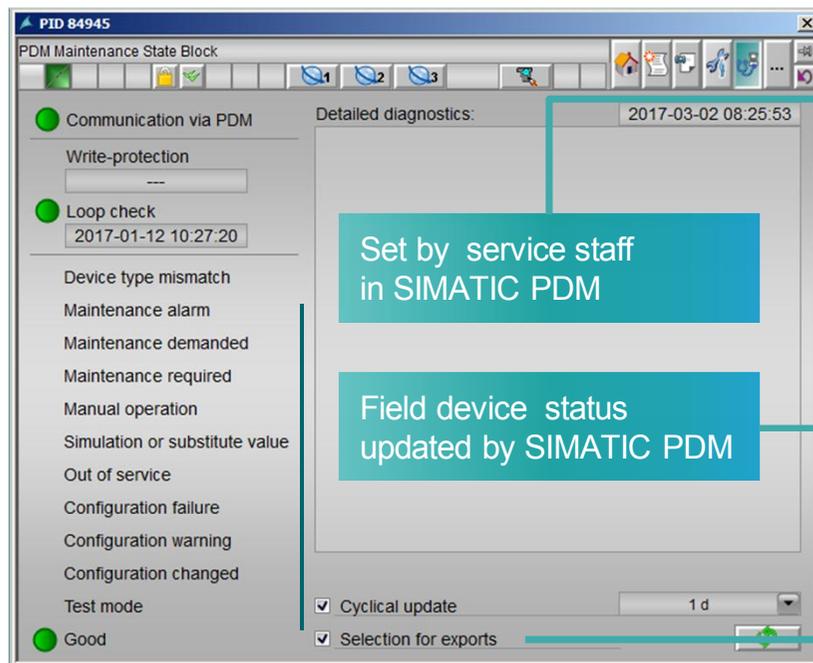
Attribute set in SIMATIC PDM can be used for filter functions on the SIMATIC PDM MS

SIMATIC PDM MS –
Easy Engineering with sample Project

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1. Selection sample project

2. Create project copy[1]

3. Import AS Station

Import

4. SIMATIC PDM MS compile and download

SIMATIC
PCS 7 Projekt

1 In addition customizing SIMATIC PDM settings: User management, Configuration network IPC

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SIMATIC PDM MS –
Engineering via HWC Station Import[1]

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Process device network view
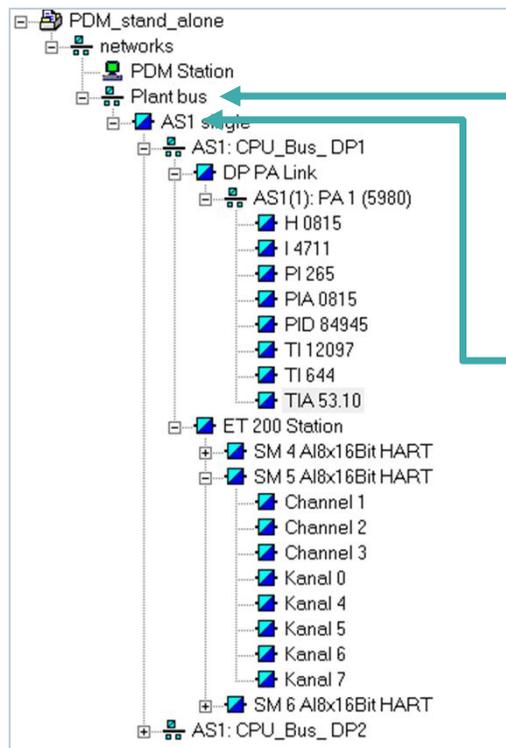
Subnet-ID parameterizing

Netpro

Import from HWK station

HW Konfig

All Information and assign-
ments will be used from
the source project
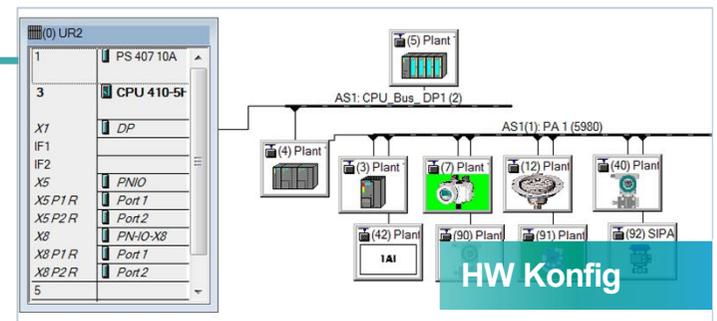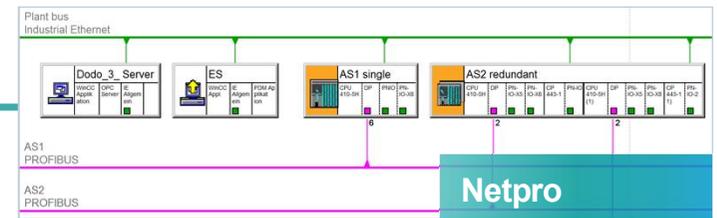
1 Possible with the same PDM version in source and target

SIMATIC PDM MS –
Engineering via HWC Network Import

Process device network view
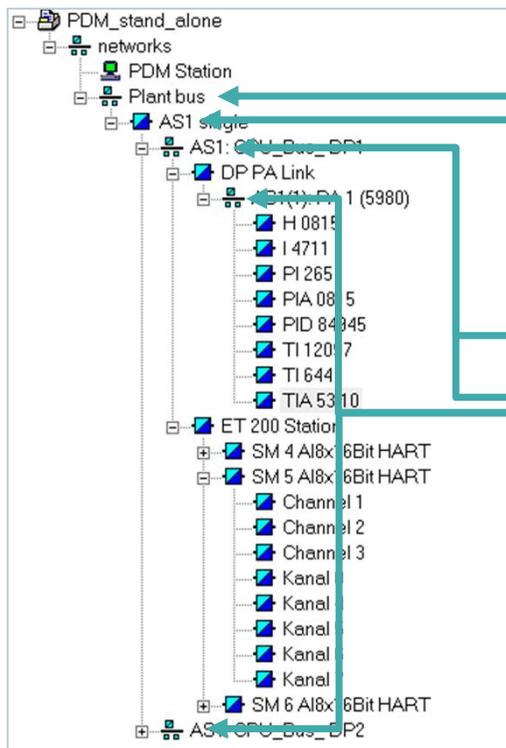
Parametrize subnet-ID

Configure/parametrizing station
- Address
- Rack-No.
- CPU slot
- Name

Insert field bus

Check field bus configuration
- Field bus CP slot
- Subnet-ID
- Name

PDM Export, Import

Netpro

HW Konfig

- Feldbus Export/Import is done inclusive
  - Assignment of the device description packages
  - Parameter data/document assignments
  - Sub-structures/Sub-networks
- Use for project sources with SIMATIC PDM <V9.1
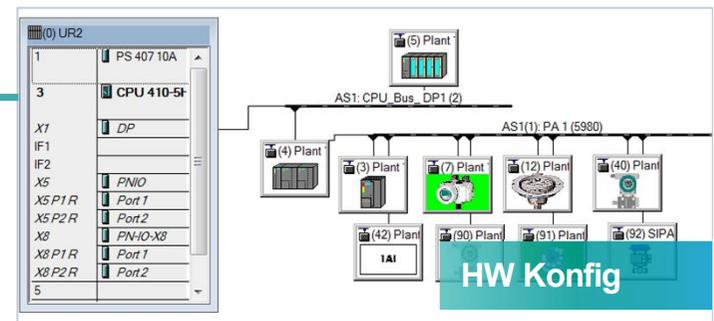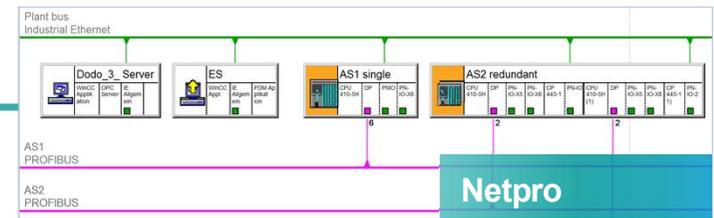
SIMATIC PDM MS –
Engineering with manually Configuration
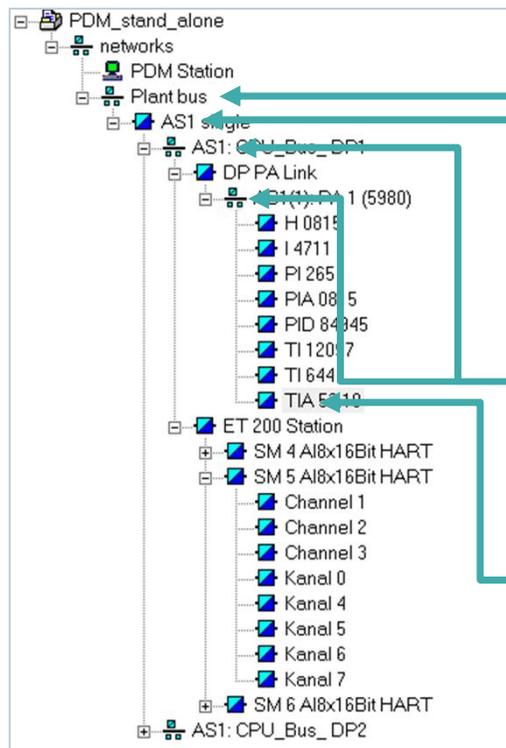
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Process device network view

Parametrize subnet-ID

Configure/parametrizing station
- Address
- Rack-No.
- CPU slot
- Name

Insert/parametrize field bus
- Field bus CP slot
- Subnet-ID
- Name

Insert/parametrize field device node
- Address
- assignment device package
- Name

Netpro
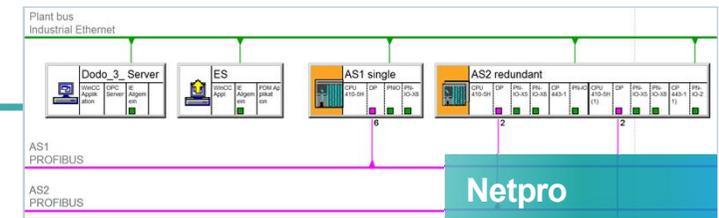
Is used

- If can not read data from the source project
- If networks or field devices be added to an existing network structure
- If the project be manually created
- By SIMATIC PDM MS projects with separate communication structure

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SIMATIC PDM MS –
Easy and low Effort in Engineering

Easy transfer of network structures and field device information into the SIMATIC PDM MS

AS 1

Project (AS 1 – AS n)

Project (AS 1 – AS n)

AS 2 – 3

Import function

Import function

SIMATIC PDM MS Station A

SIMATIC PCS 7 project Version x.x

SIMATIC PDM MS Station B

Hardware-configurator

AS 1

S7- 4xx

AS 1   AS 2   AS 3

AS 2   AS 3

S7- 4xx
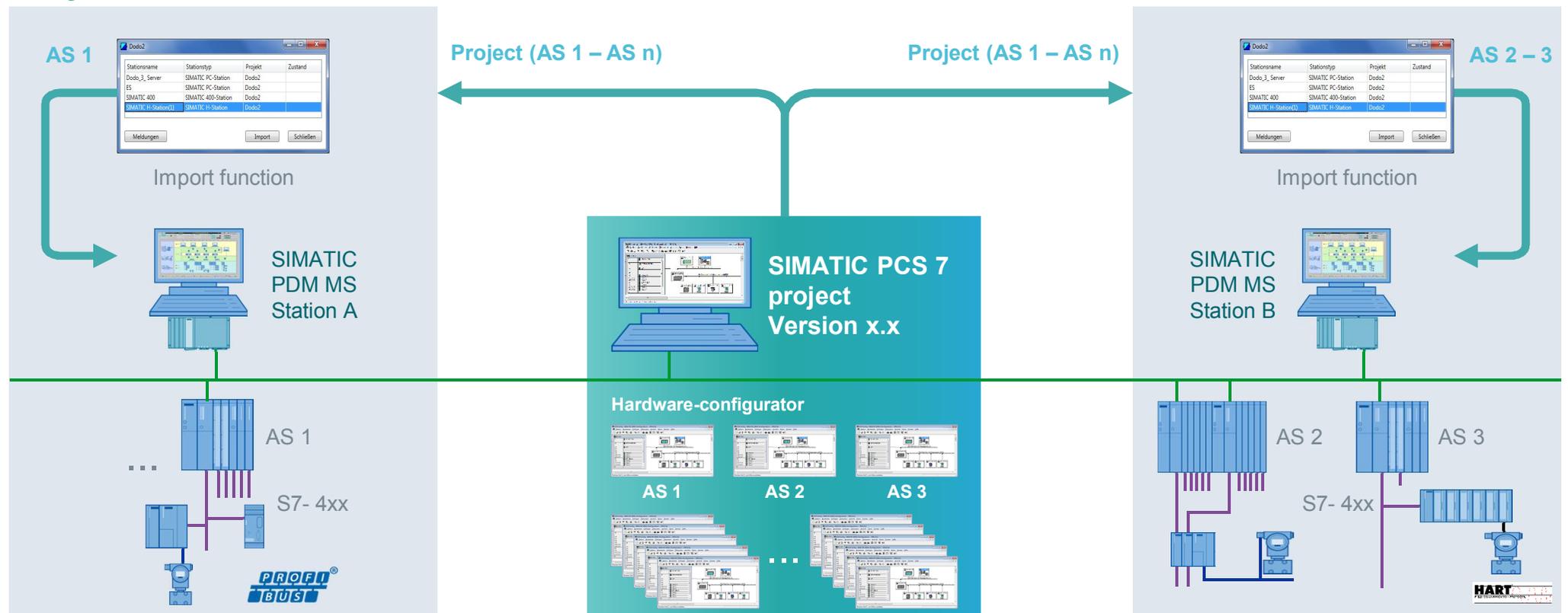
SIMATIC PDM MS –
Connected to the Plant Bus

- Field device connection from a central service station
- Handling of field devices independent of utilized automation project
- Usable with SIMATIC S7 and SIMATIC PCS 7 automation systems

**SIMATIC PDM
Maintenance Station**

S7 – 15xx[1]

S7- 3xx[1]   S7- 4xx[1]   S7- 4xxH[1]   S7- 4xx[1]   IE/PB
PNIO Link
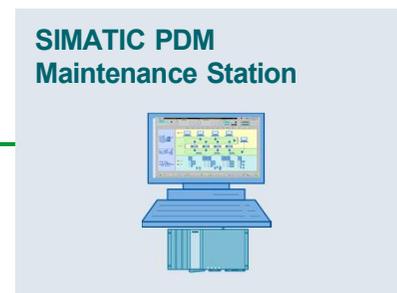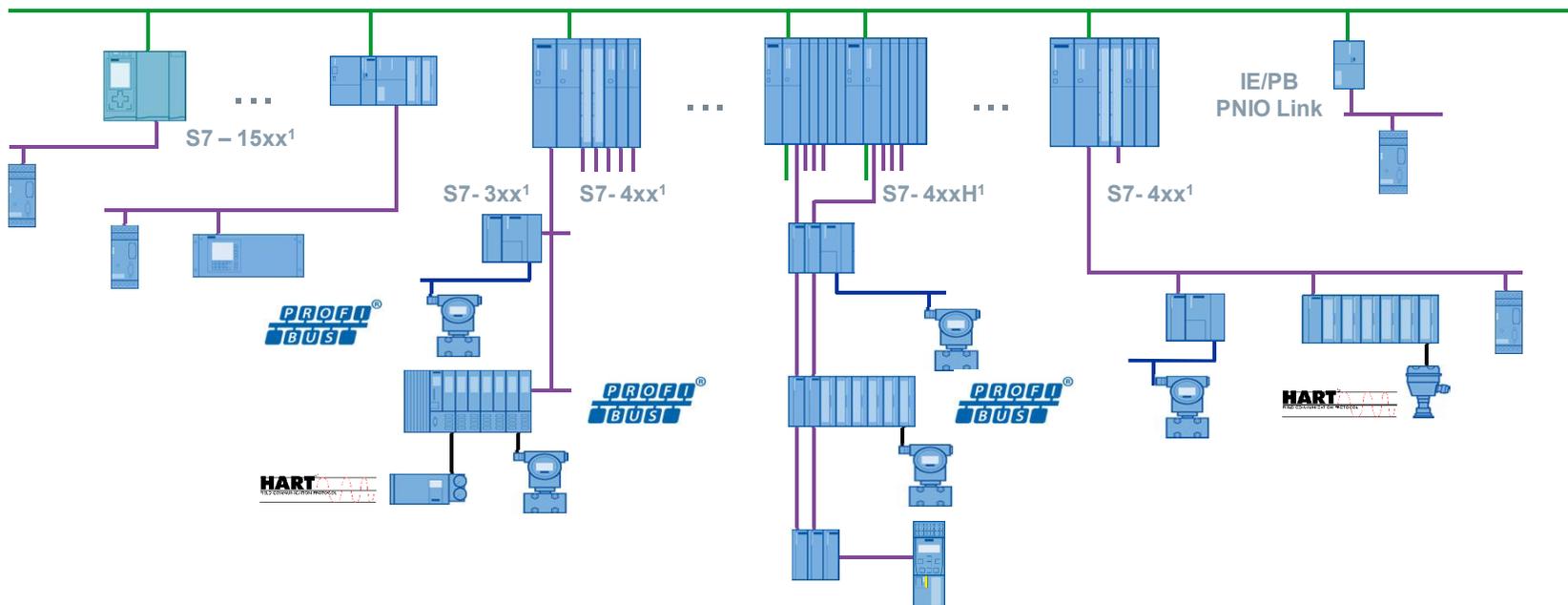
1 With integrated data set gateway (DSGW)

Holger Rachut | Product manager | SIMATIC PDM MS V2.0

SIMATIC PDM MS –
With own Communication Network

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- Connection to the field devices via separate network
- Read independent and cyclic the diagnostic information from the field devices
- Independent from used automation system

**SIMATIC PDM
Maintenance Station**

Automation systems

**Redundancy-
management in
SIMATIC PDM**

HART Multiplexer[1]

Wireless HART[1]

PROFI NET®

PROFI BUS®

HART FIELD COMMUNICATION PROTOCOL

HART FIELD COMMUNICATION PROTOCOL

1 In preparation

Holger Rachut | Product manager | SIMATIC PDM MS V2.0
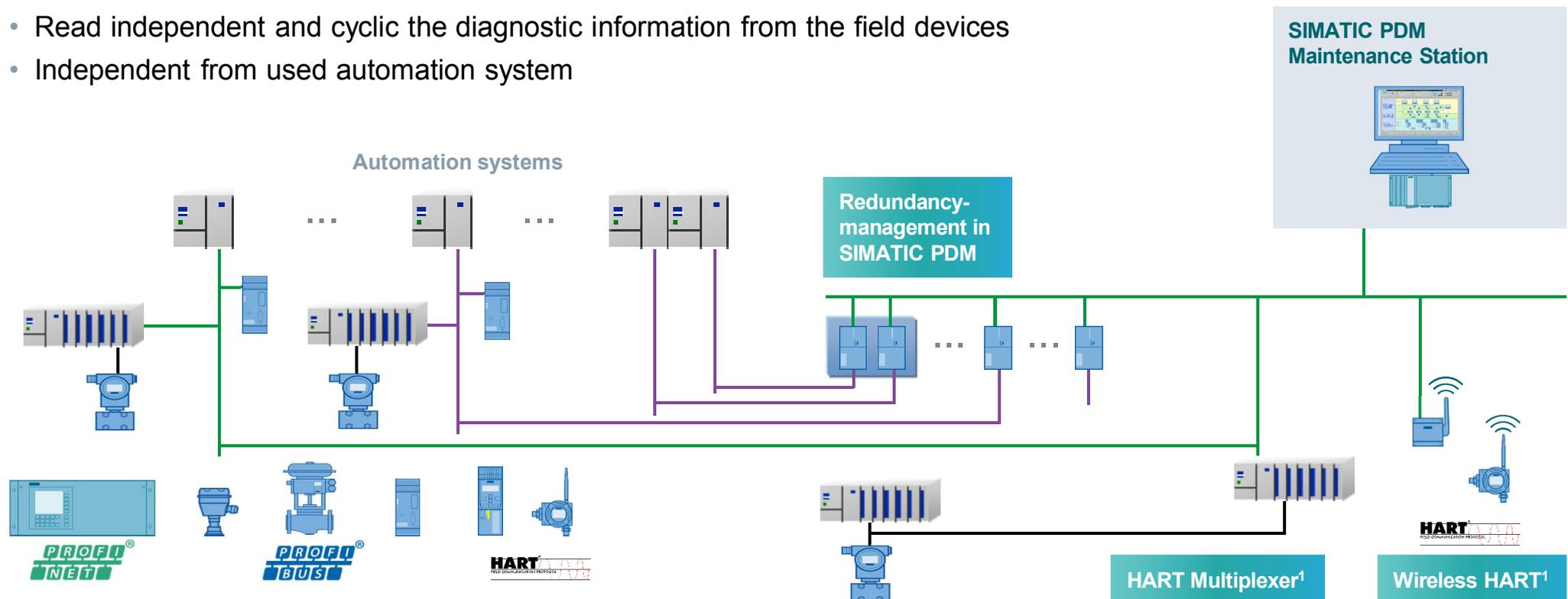
SIMATIC PDM MS –
As unit related Maintenance Station

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Access only to field devices in selected plant units

SIMATIC PDM MS
for plant unit A

SIMATIC PDM MS
for plant unit B

Operator station

Engineering station

Plant unit A

Plant unit B

S7- 4xx

S7- 4xx

S7- 4xxH

S7- 41x

Holger Rachut | Product manager | SIMATIC PDM MS V2.0
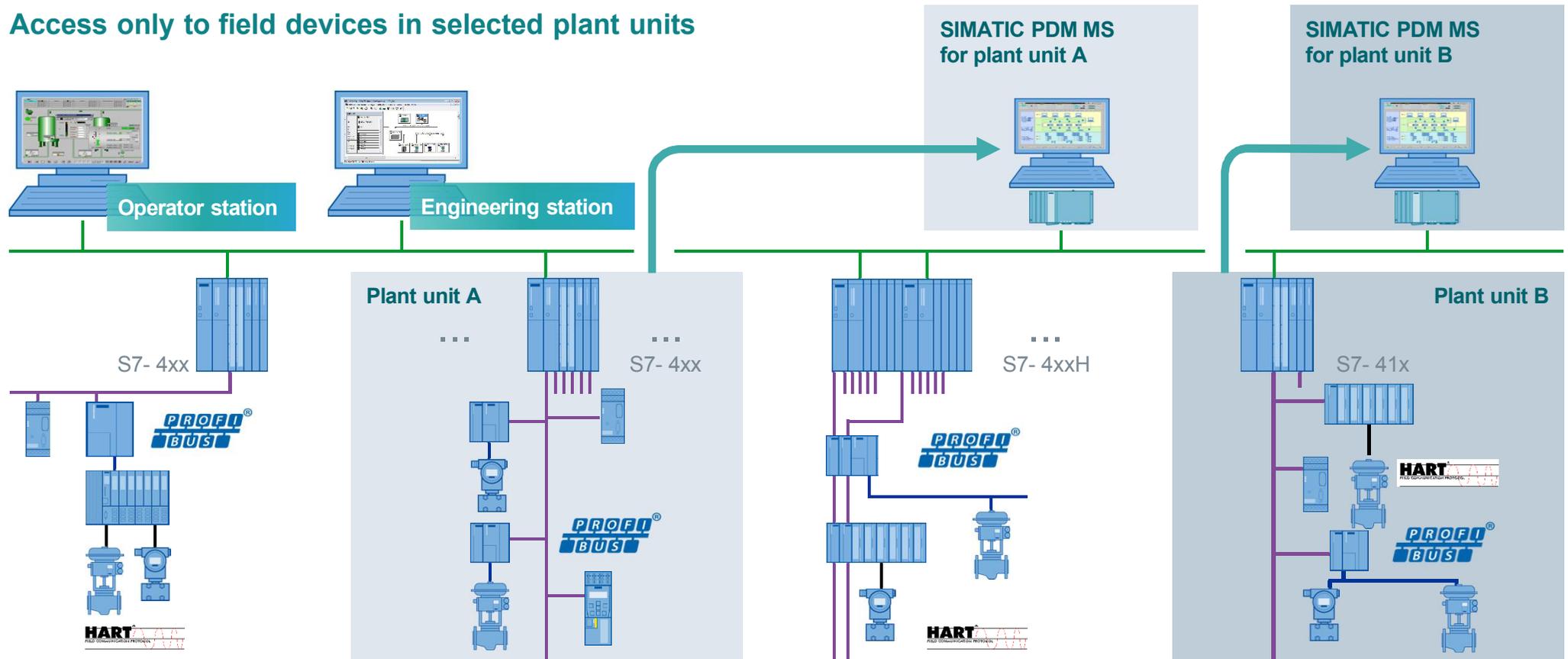
SIMATIC PDM MS –
As field device related Maintenance Stationon

Access only to selected field devices independent from the project and plant structure

SIMATIC PDM MS
for field device
group A

SIMATIC PDM MS
for field device
group B

Operator station

Engineering station

S7- 4xx

...

S7- 4xx

...

S7- 4xxH

S7- 41x

PROFIBUS

PROFIBUS

PROFIBUS

PROFIBUS

HART
FIELD COMMUNICATION PROTOCOL

HART
FIELD COMMUNICATION PROTOCOL

HART
FIELD COMMUNICATION PROTOCOL
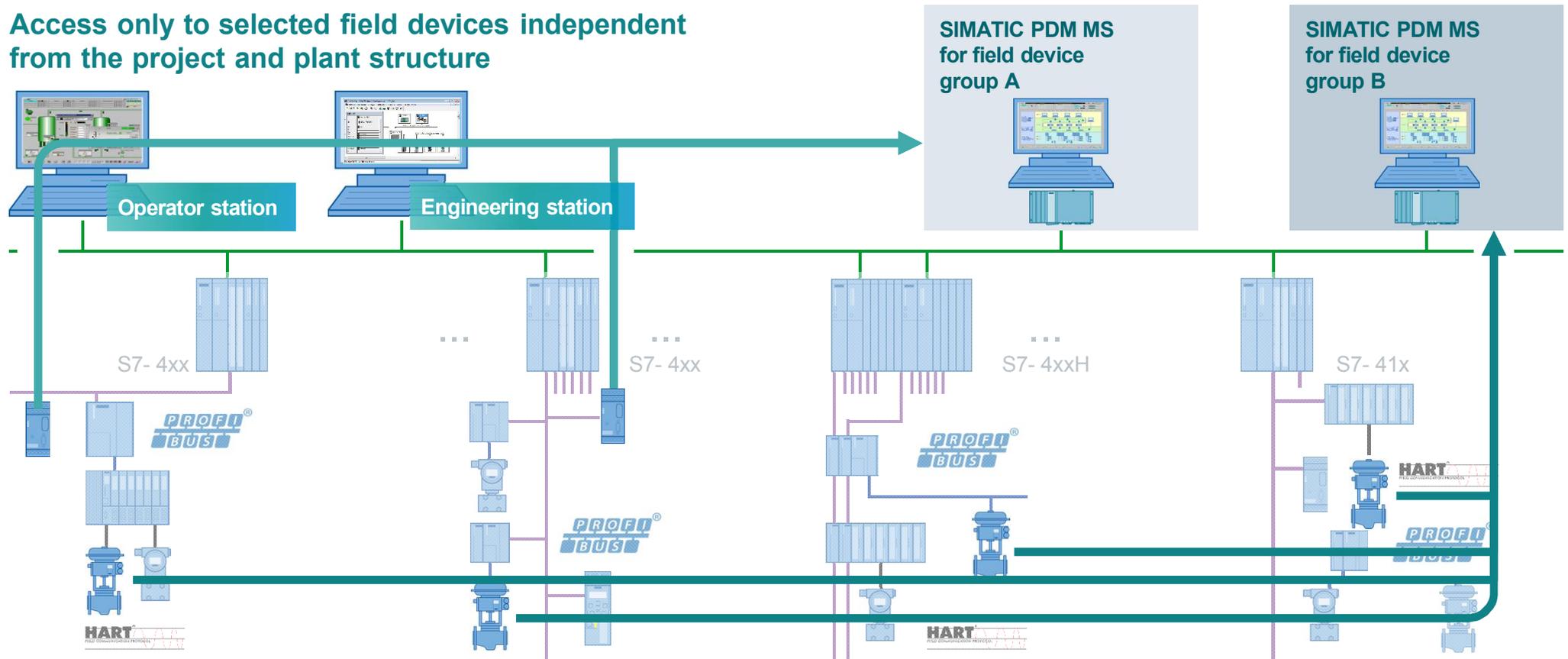
SIMATIC PDM MS –
For cyclic Data Collection and Data Transfer

Classified diagnosis

Condition state

Data reporting systems

Type label data

Event data

Process data

Parameter data

Plant A

SIMATIC PDM MS

SIMATIC Project PCS 7 Vx.x or Step 7 V xx

S7- xxx[1]

PROFIBUS®

HART

Plant B

SIMATIC PDM MS[2]

Unknown DCS/PLC

HAR Mux

HART

Plant C

SIMATIC PDM MS

S7- xxx[1]

PROFIBUS®

HART
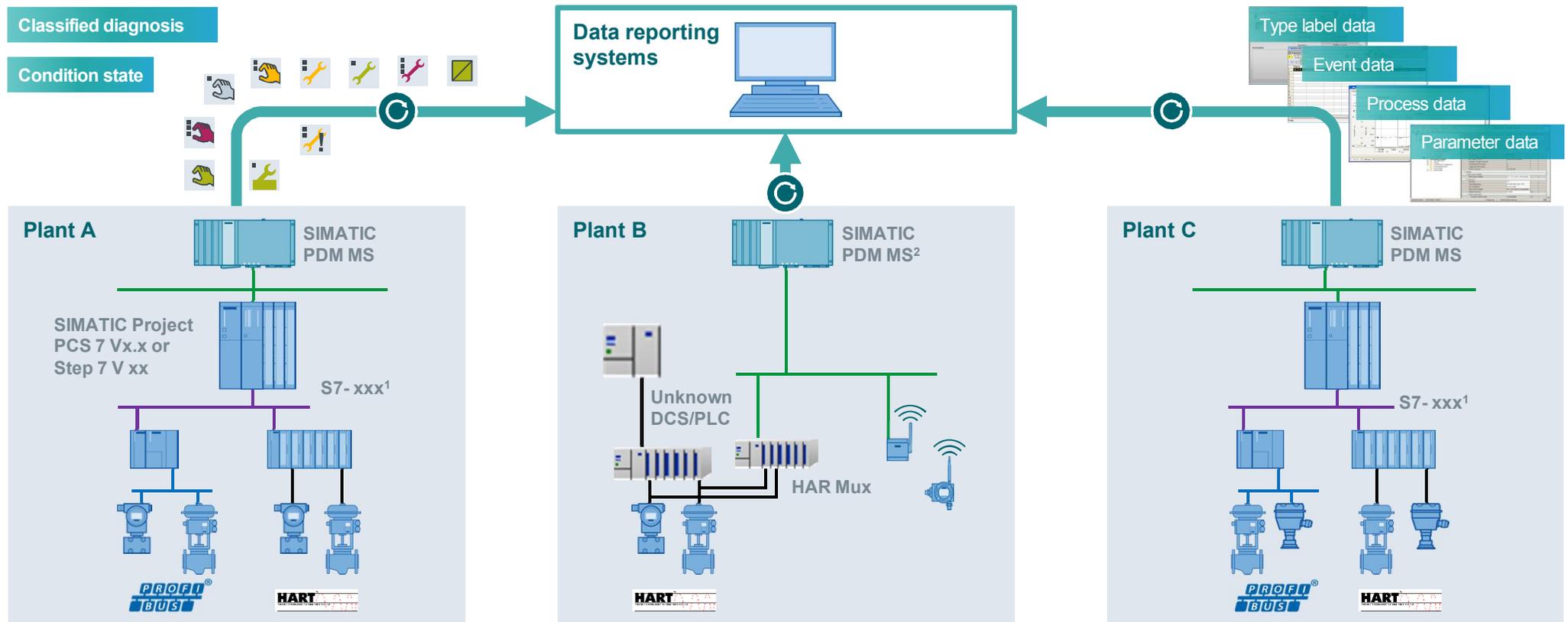
1 With integrated data gateway (DSGW); **2** In preparation   ⟳ Cyclic (1h →)

SIMATIC PDM MS –
For Data Collection in cloud based Applications

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Company network or public network

Condition monitoring systems (e.g. Comos MRO)

Enterprise asset management systems (e.g. Comos MRO)

Cloud data management systems (e.g. MindSphere)

Perimeter network (Demilitarized Zone – DMZ)

Parameter data, diagnostic information, condition data, events, Actions, etc.

Terminal bus (private network)

Plant bus (private network)

SIMATIC PDM MS station 1

...

SIMATIC PDM MS station n

Linking server e.g. as
- Cloud connector
- Terminal server
- Data server
- OPC server

... S7- 4xx

... S7- 4xxH

... S7- 41x

PROFI BUS®

HART FIELD COMMUNICATION PROTOCOL

Please observe the information given in the references to the security concept of the product family SIMATIC PCS 7 Whitepaper "Security concept PCS 7 and WinCC – Basic document"

Holger Rachut | Product manager | SIMATIC PDM MS V2.0

SIMATIC PDM MS –
Use Case for central Parameter Archiving

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Automatic parameter synchronization and archiving by using of the field device status "Configuration changed"

SIMATIC PDM MS for central database of parameter and diagnostic information

Operator station

Engineering station

S7- 4xx

Reset by the maintenance station

Automatic parameter synchronization

Synchronization

Reset

S7- 41x

Service team 1
- Local with SIMATIC PDM
- Set state "Configuration changed"

1. Parametrize +

3.

2.

Service team 2
- Local with SIMATIC PDM
- Set state "Configuration changed"

1. Parametrize +

2.

3.

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HART

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Status field device „Configuration changed"

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SIMATIC PDM MS –
Use Case for Generation of Service Progress Reports

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Status	AKZ/TAG	OKZ	Beschreibung	Nachricht	Bezeichnung	
Gut	AI8x16Bit HART	Plant 1/AS1/DP 1/ 05/ 06		---		6
Gut - Abgebrochen	AssetMon	AssetMon		Otto		---
Gut	Wika	Plant 1/AS1/DP 1/PA 1/91		PA Multivendor		91
Gut	ABB 265	Plant 1/AS1/DP 1/PA 1/07	ABB265			7
Gut	I 4711	Plant 1/AS1/DP 1/PA 1/03	10 Transmitter	Segment 0815		3
Gut	Transmitter 1 AI (PhyL 1	Plant 1/AS1/DP 1/PA 1/14				14
Gut	AO8x16Bit HART	AO8x16Bit HART		---		5
Gut	IM 153-2 HF Adresse 5	Plant 1/AS1/DP 1/ 05	ET 200M	---		5

Letzte Aktualisierung   2016-04-13 16.49.40.000   Speichern

Listing of field devices with Status "Device checked" optionally
- All field devices or
- All field device with the date off the previous day

SIMATIC PDM MS with SIMATIC PDM as Server[1] and central database

S7- 4xx

S7- 41x

Service team 1
- With SIMATIC PDM client
- Set state "Device checked"

1. Parametrize + diagnosis

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Service team 2
- With SIMATIC PDM client
- Set state "Device checked"

1. Parametrize + diagnosis

HART
FIELD COMMUNICATION PROTOCOL

PROFI BUS®

1 Optional
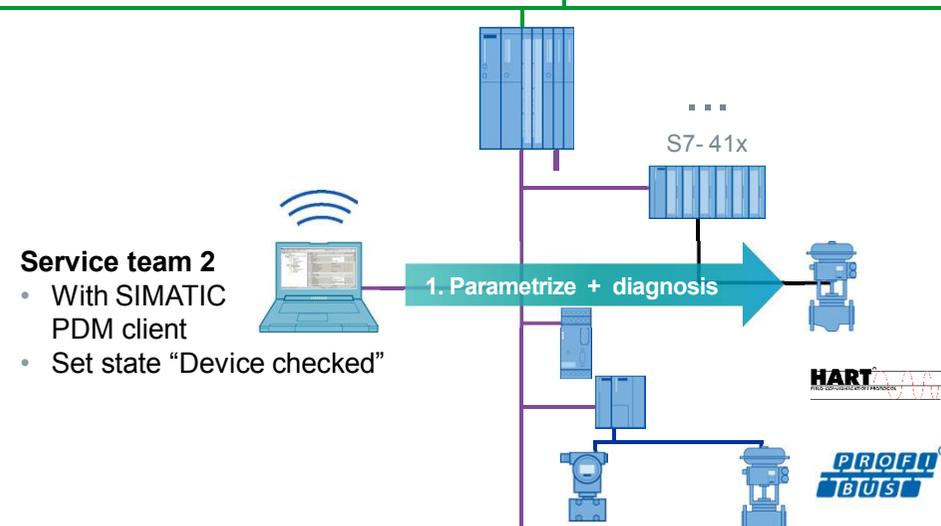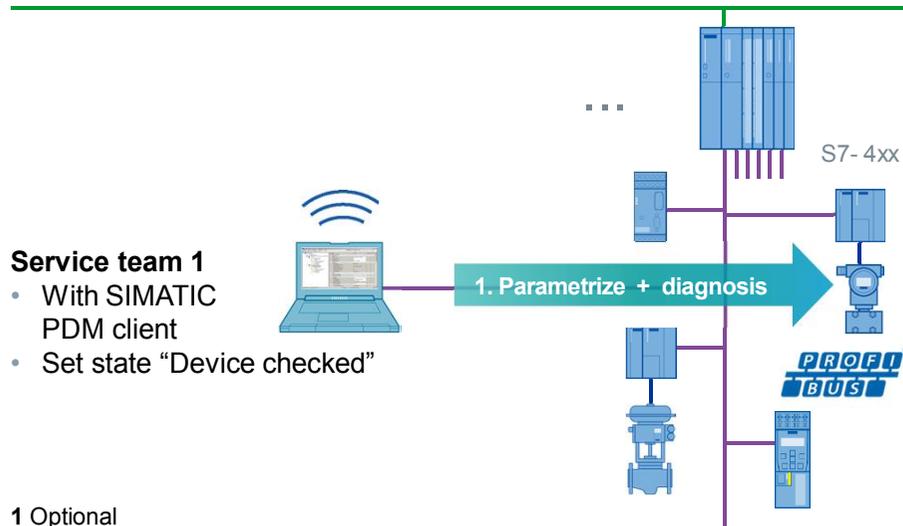
Architecture –
SIMATIC PDM Maintenance Station

External

SIMATIC PDM MS

| PCS 7 OS | Maintenance functions |
| | Display/operating functions |

| PCS 7 AS | Automation functions |

| PDM | SIMATIC PDM functions |
| | Communication functions |

Field device

- XML stream, OPC DA

- Filter-/selection functions
- Export functions

- Object presentation
- Operating functions
- Message protocols

- Message/event generation

- Up- and download of device parameter
- Read of detail diagnostic information

- Ethernet
- PROFIBUS
- PROFINET²
- HART/-Multiplexer¹/Wireless¹
- Modbus¹

1 Not available in the SIMATIC PDM MS V2.0; **2** Locale connection

Holger Rachut | Product manager | SIMATIC PDM MS V2.0

SIMATIC PDM MS –
Delivery Form and Service

Delivery form

Hardware   **Software (Image)**   **Licenses**

+ +

Basic package
- Microbox IPC 427E
- Software as restore package
- Function licenses
- Object license PO 500
  (Basic license for object counting)

Extension quantity structure
- SIMATIC PDM TAG lizense (max. 500)
- SIMATIC PDM client license (max. 30)

Service/Support/Upgrade

Software **U**pdate **S**ervice (SUS) –
Contract includes delivery or online delivery
- Software (image) for upgrade
- Software (installation) for update
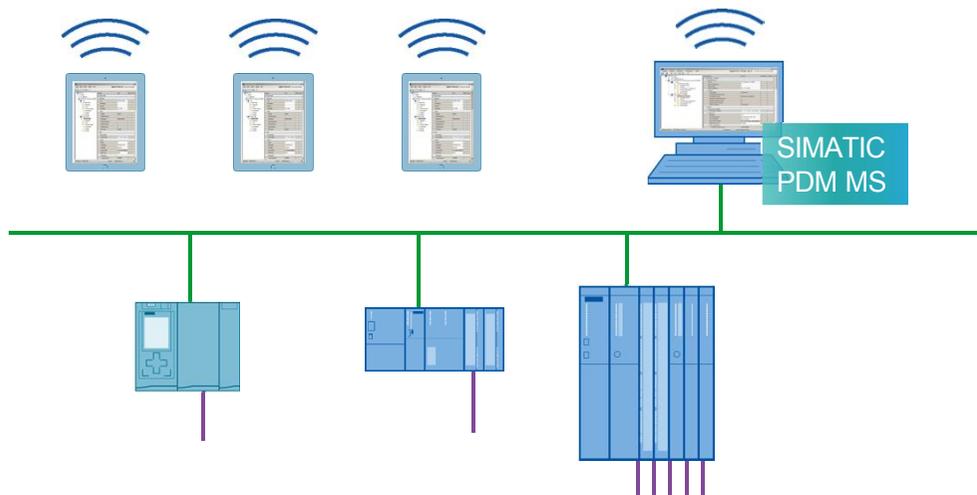- Licenses for upgrade

Upgrade
- Software (image) as online delivery
- Licenses for Upgrade

Update
- Software (installation) as online delivery

SIMATIC PDM MS –
Optional Extensions

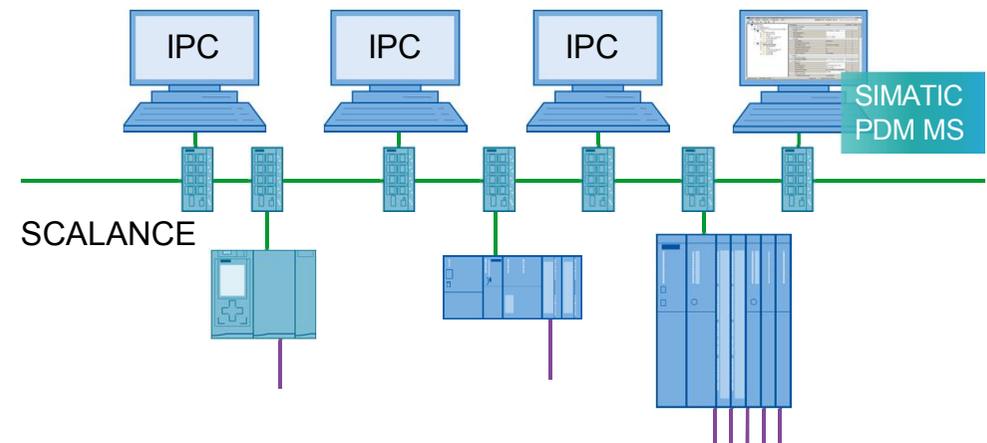**SIEMENS**
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SIMATIC PDM Server

SIMATIC
PDM MS

- No Software post installation necessary
- Additive client licensing necessary
  (6ES7658-7GB28-0YB0 or 6ES7658-7GB28-0YH0)
  - Registration of maximal 30 clients
  - Simultaneous maximal 5 clients online

Monitoring of IPC's and network components[1]

IPC   IPC   IPC

SIMATIC
PDM MS

SCALANCE

- No Software post installation necessary
- Additive SNMP-OPC-server license necessary
  (6ES7658-7GB28-0YB0 or 6ES7658-7GB28-0YH0)
  - Maximal 100 SNMP objects
    (SIMATIC IPC or Switches SCALANCE)

1 In preparation

Support information about SIMATIC PDM MS/SIMATIC PDM

SIEMENS
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SIEMENS AG

Customer Support

D-90475 Nuremberg

+49 (0) 911 895 7222

+49 (0) 911 895 7223 (Fax)

support.automation@siemens.com

Internet

Information about SIMATIC PDM
http://www.siemens.de/simatic-pdm

Information about integration of field devices
http://support.industry.siemens.com/cs/ww/de/view/50898953

Information for use of dataset gateways
http://support.industry.siemens.com/cs/ww/de/view/7808062
http://support.industry.siemens.com/cs/ww/de/view/7000978

Holger Rachut | Product manager | SIMATIC PDM MS V2.0

Thank you for your attention!

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Ingenuity for life

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SIMATIC PCS 7

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