SIMATIC PCS 7 V8.0
The high-performance Process Control System

SPACe 2012
Siemens Process Automation Conference

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SIMATIC PCS 7 – performance you trust

Integrated Engineering
Safety Integrated
TeleControl
Advanced Library Concept
Scalable Archiving
Profinet
Continuous Integration
Hazardous Areas

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Hazardous Areas
Siemens in process automation with SIMATIC PCS 7
Our customers benefit from a worldwide PCS 7 installed base

- Over 11,600 projects* in all sectors of the process industry with SIMATIC PCS 7
- Nearly 45,600 PCS 7 Controllers shipped since PCS 7 Market Launch.

(Based on 9,329 reported PCS 7 projects in the Customer Knowledge Base up to CKB-ID 13,728 / Updated from 13,447)
**SIMATIC PCS 7 V8.0**  
Highlights Hardware

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**Profinet for Process Automation**
- First vendor with redundant Profinet for PA
- Redundant ring topology
- Coexistence of Profibus and Profinet

**Controller AS mEC RTX**
- Complete System integration like S7-400 (incl. APL and alarm support)
- Central I/O support
- Optionally Remote I/O via PROFINET
- In S7-300 compatible design

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**Innovated H-System**
- New middle class CPU 416HF
- Profinet system redundancy
- Increased performance and scalability (HF)

**Advanced Process Library V8.0**
- Numerous improvements regarding visibility / usability
- Motor Management Starter & Compact Drives
- APC & mech. assets (pump) in APL design
SIMATIC PCS 7 V8.0
Highlights Software

Process Historian
- Fully integrated long-term archive system
- Scalable data storage from multiple projects in real time
- New reporting system based on Microsoft

Advanced ES
- New type concept acc. ISA 88 (Control Module Types / Control Modules)
- New user interface in AdvES (supp. project progress)
- Variants of Control Module Types in AdvES

Windows 7
- Windows 7 (32 and 64 Bit)
- Windows Server 2008 (32 and 64 Bit)

Process Device Manager
- Renewed operation concept, modern design
- New Device Integration Manager (DIM)
- New curve display, renewed export/import
Integrated Engineering
Optimized results with minimal effort
Integrated Engineering with COMOS and SIMATIC PCS 7

1. First DCS with integrated plant engineering
   - Data exchange without additional interfaces
   - Single vendor software

USP Documentation update (as-is)

Plant modernization

SIMATIC PCS 7

COMOS

Product design
Plant design
Basic engineering
Detail engineering
Installation & commissioning
Operation & maintenance

Process flow chart
Ready for bid
Ready for construction
Operational plant

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IA AS PA PRM
Integrated Engineering
Today’s Situation Using a Motor as an Example

COMOS

- 3-D model
- Function chart
- Cabinet design
- P&ID
- Circuit diagram
- Single-pole representation

SIMATIC PCS 7

- PCS 7 software configuration
- PCS 7 hardware configuration

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**Advanced Engineering System – AdvES**

→ What is AdvES?

### Functions

- AdvES links tools for basic and detailed planning (e.g., EPlan, ELCAD, SmartPlan, etc.) with PCS 7 ES tools (TH, CFC, HW Config).
- Option package for SIMATIC PCS 7 ES
- Important functions in AdvES ...
  - Prepares data for use in PCS 7
  - Acts as a data import application
  - Transfers process tag lists + signal lists to PCS 7 ES
  - Recognizes (one-off assignment) process tag types & generates instances
  - Accepts autom. PH, signal & parameter settings from process tag / signal lists
  - Generates hardware (decentralized I/O including channel assignment) from signal lists

### Benefits

- More efficient engineering workflow, higher quality / shorter project times (engineering / planning offices)
- Shorter time-to-market (much work done in parallel)
- Full plant documentation via simple expansion based on Comos PT
- Siemens standard product
Safety Integrated

Highest performance with minimized risk
Failsafe Technology Homogenously Integrated

- Common standard and failsafe functionality in one controller and on one PROFIBUS or PROFINET line
- Direct communication of standard and safety programm
- Common engineering tool
- Integrated process diagnostics
Fast and Reliable Engineering

**USP**  
**Same look & feel for operators**
- Engineering with CFC and cause & effect matrix
- Automated generation of TÜV certified failsafe logic with matrix tool

**1. First remote I/O for intrinsic safe areas and failsafe loops**
- Cost-optimized installation
- Seamless integration in PCS 7

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Flexible, Highly-Available and Fault Tolerant
= FMR (Flexible Modular Redundancy)

- Redundancy for all components
- Physically separated components
- Individually defined degree of redundancy
- Tolerates several simultaneously occurring faults
TeleControl / PowerControl

Plant Automation, TeleControl and PowerControl in one System
Remote Terminal Units in Oil- & Gas

- Metering stations in pipelines & gas networks
- Valve stations in pipelines
- Wellhead monitoring and automation incl. Emergency Shut Down (ESD)
  - Gas Well
  - Oil Well
  - Gas injection wells
  - Water injection wells

These applications require integration of both local automation and distributed automation stations
SIMATIC PCS 7 PowerControl → Protocol IEC61850

### Functions

- Protocol for protection and control technology in electrical switchgear (station automation)
- Integration of SIPROTEC devices
- Integration of third-party IEC 61850 devices
- New applications for PCS 7 – renewable energies
  - IEC 61850-7-410 → Hydro power plants
  - IEC 61400-25 → Wind power plants

### Benefits

- Even more plant integration
- Investment protection through standardization
- Increase the responsibility of operators
- Easier maintenance thanks to a uniform overall view

Integrated within a single system: power control + plant automation + TeleControl
Advanced Library Concept
The right library for each Application
Functions

- Integration of any motor management starter (e.g. SIMOCODE pro)
- Integration of any compact drives (e.g. SINAMICS, Micromaster)
- All of the drives are integrated in APL, incl. CFC typicals (acc. to the ProfiDrive Frame Standard)
- Counter modules in ET200M, ET200iSP + ET200S (FM350 can be used as a flow meter for metering)
- Diagnostic blocks including Profinet support (for all enabled Profinet components in PCS 7)

Benefits

- Standard integration with APL blocks without additional library / no additional license required
- Available immediately for new PCS 7 versions
- Fast and simple configuration and commissioning
**Integrated APC**

- Fully integrated in SIMATIC PCS 7 (same look & feel for engineering and operation)
- APC is part of standard library (no additional licence)
- Highly available APC (runs on redundant AS)

**Linked APC**

- Open for 3rd party APC tools
- Connection to installed APC tools (support of customer preferred tools)
- Standard procedure for large scale APC

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**Softsensor**

- NeuroSystems
- Fuzzy Control
- FuzzyControl++
- Adaptive Control

**PID Tuning**

- INCA Sensor
- INCA PID-Tuner
- SIMULATIONS
- SIMBApro
- Fuzzy Control
- FuzzyControl++
- Adaptive Control

**Control Performance Monitoring**

- Smith Predictor
- MPC 4x4
- Override Control
- Lead-Lag
- Gain Scheduling
- Feed-Forward Control

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The Library Concept in SIMATIC PCS 7

**Functions**
- APL – the (!) standard library in SIMATIC PCS 7
  - PCS 7 standard library for all industries
  - Technological function blocks
  - Block icons & faceplates
  - Standard drive integration
  - Embedded APC functionality for robust process optimization
- IL – the (!) industry specific extension for PCS 7
  - PCS 7 industry-specific blocks
  - PCS 7 HVAC
  - PCS 7 panel integration
  - S7 package unit integration

**Benefits**
- Focus on industry specific technology combined with ease-of-use in applicational design
- Same look & feel in the whole system facilitates handling and reduces risk of operator failures
Industry Library → Integration of Package Units

- **APL faceplates**
- **IL S7 faceplates**
- **PCS 7 operator station**
- **Local HMI for PCS 7 on a touch panel**
- **Central HMI for a package unit on PCS 7 OS**
- **Local HMI for package unit on touch panel**
- **IL S7 panel faceplate block**

- **S7-4xx**
  - Touch panel (flexible WinCC)
  - APL
  - PCS 7 APL panel interface block

- **S7-3xx**
  - IL S7 Lib
  - Package unit a

- **S7-3xx**
  - IL S7 Lib
  - Package unit b

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**iaas pa prm**
Continuous Integration

Always in the thick of it
Supported Operating Systems

### Functions
- Operating systems for ES, OS client, OS single station
  - Windows XP Professional SP3
  - Windows 7 Enterprise/Ultimate (32-bit / 64-bit)
- Operating systems for ES, OS server, CAS, PH
  - Windows Server 2003 R2 SP2
  - Windows Server 2008 (32-bit) + R2 (64-bit)

### Benefits
- Investment protection, as previous operating systems are supported (upgrade without changing HW)
- New operating system allows / provides
  - Use of new PC technologies (multi-core, bigger memory capacity, etc.)
  - Long-term support incl. permanent security enhancements
PCS 7 Industrial Workstations

Benefits

- Support
  - Windows 7 Enterprise/Ultimate (32-bit / 64-bit)
  - Windows Server 2008 (32-bit) + R2 (64-bit)
- 5 year spar part- and repair- support
- supports Hardware RAID 5
- Hot pluggable power supply
- IPC647C Half Height Server
- PC based automation systems
SIMATIC BATCH: Overview

Functions
- Controller-based execution of unit recipe logic (RUP specific)
- Enhancements for recipe design
  - Free jumps within hierarchy level
  - Monitoring Areas with automation reaction in exception situations within recipe logic
- Command Steps (e.g. for Hold Propagation)
- Batch views integrated into OS process - screens (Monitoring and control of batches, batch planning, unit list)

Benefits
- Very fast step transition times, Improved deterministic during execution of a batch
- Enhanced availability
- Flexible recipe construction
- Operator support in exception situations
SIMATIC PDM V8.0
Device Integration Manager

Functions
- Completely new optimized field device management
  - Lean structure
  - Life List with Tag- and Address- assignment
  - Improved system diagnostics
  - Message protocol in the form of a csv file for each PDM system function
- New user interfaces
  - Visual and ergonomic improvements of user interfaces
  - New, more modern design
  - New menu structure (IEC standard)
- Improved system dialogs

Benefits
- Single point of access to all fieldbus standards (FF, PA, HART)
- More transparent and user-friendly, e.g. faster access to diagnostic data
Plant Asset Management

Functions

- New operator interface / dialogs in APL style guide
- New functions:
  - Integrated Internet links
  - Direct calling of maintenance tools
  - Message group displays
- Redesigned views:
  - Maintenance
  - Message
  - Diagnostics
  - Visualization of active notes in the faceplate and block icon
- Faceplates for PROFINET devices

Benefits

- New, modern operator interface
- More user-friendly

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PROFINET for Process Automation

Heading towards new dimensions
Automation systems for PCS 7 Portfolio

The right product for every requirement

For compact solutions
- OEMs
- Package units

For the highest standards in
- Performance
- Availability

AS RTX  AS mEC RTX  PCS 7 Box  Standard AS  High-availability AS

New  Enhanced

Profinet
High-availability automation systems
Innovations

Features
- New mid-range CPU 416HF
- Enhanced computing power
- More resources
- Integrated Ethernet / PROFINET
- Routing for integrated PROFIBUS interface
- PROFINET system redundancy

Benefits
- Higher I/O capacity for each automation system
- Reduced costs
PROFINET for Process Automation

1. First DCS with redundant PROFINET IO

Continuous system integration
- Same look & feel for PROFIBUS DP and PROFINET IO

High-available PROFINET IO
- Redundant I/O network for standard controller
- Redundant PROFINET IO according to Profinet standards

Flexible network structures
- Siemens PROFINET IO components with built-in 2-port switch – no additional switch necessary
- Line, ring or star topology
- PROFINET IO and PROFIBUS DP in one controller
Scalable Archiving

Access what counts at any time
Scalable Archiving

Production

Process

New

SIMATIC IT Historian

PCS 7 Archive

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Process Historian
What’s New?

OS Single Station
Process tags, alarms

OS Server
Process tags, alarms

BATCH SERVER
Batch data

Archiving

Reporting

Office PC
Microsoft Office (Excel, Word)

Office PC
Web Browser

Scalable Archiving

New

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Offering for hazardous areas

For demanding tasks
ET 200iSP
Remote I/O for installation in Zone 1

**Functions**
- Installation up to Ex-Zone 1 / 21
- Failsafe modules up to SIL 3
  - Digital Input Modul 8 F-DI NAMUR
  - Digital Output Modul 4 F DO
  - Analog Input Modul 4 F-AI HART
- Redundant for Interface and power supply

**Benefits**
- Line monitoring in Ex area up to the sensor / actuator
- Benefit in terms of SIL-Calculation, because of integrated Ex-Barriers
- Mixed installation → Failsafe and Standard-modules in one station
- Complete portfolio
SIMATIC Active Field Distributor AFDiS
Ring redundancy in hazardous Areas

- Increased reliability
  - Integrated repeater between trunk and spurs preserves signal quality and eliminates disruptive feedback
  - Intelligent chatter suppression eliminates disturbances during connection / disconnection of devices

- Increased plant availability
  - Unique high available media ring solution on field level for intrinsic safe FF H1 and PROFIBUS PA
  - Visible status LEDs on housing lid provide quick and easy diagnostics
  - Enhanced online change capabilities incl. topology enhancements in safe area and zone 2

- Simplified commissioning
  - Automatic bus termination feature excludes wrong termination
SIMATIC PCS 7 Fieldbus Technologies

- All fieldbus standards seamlessly integrated in one system
  - PROFIBUS PA, Foundation Fieldbus, HART
- Seamless integration of complete FF functionality
- No need of 3rd party components
  - Siemens provides complete fieldbus infrastructure (incl. power conditioning & field distribution)
- Outstanding scalable FF redundancy options
  - FF-H1 link master redundancy (2x IM)
  - Redundant power conditioning (2x Coupler)
  - Ring redundancy
- Further improvement of decentralized approach
  - High speed backbone for fieldbus is PROFIBUS and will be PROFINET in future
PCS 7 Innovation

PROFINET based on Ethernet

RING REDUNDANCY

ET200SP Fieldstation

SIMOCODE PN

FF-H1 (Ex-e)

PROFIBUS PA (Ex-e)

AFD iS

Ex-i

Zone 1

ET200 iSP PN Fieldstation

SITRANS TF280
PCS 7 Advanced Process Library
Priority Based Alarming

Function:
- Six customizable alarm classes
  - No link between event limits (HH/LL etc.) and alarm class
- New priority based alarm views
- APL without hardcoded colors
- Existing or new Alarm Concept can be selected

Benefits:
- Quick discern of colors
- Targeted Operator Guidance
- Faster reaction
- Higher plant availability
Life Cycle Service
Support over the entire Life Cycle

- Service costs cumulated
- Risk of Obsolescence
- Life Cycle Service costs per anno
- Life Cycle Service costs cumulated

Contract modules

Extended Life Cycle Service
- Modernization updates/updates
- Software update service

Basis Life Cycle Service
- Spare parts inventory (option)
- Obsolescence management (information service)

Maintenance service
- Inspection and maintenance

Standard service
- Standby service repair
- Basis services

Options
- Extended service time 24/7
- Software update services
- Extended exchange option
- Asset optimization
- Agreed technical support
- Remote services

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Thank you for your attention!

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