

SIEMENS

SIMATIC

PCS 7 PCS 7 - PC Configuration (V9.0)

Installation Manual

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Valid for PCS 7 as of V9.0

Legal information

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indicates that property damage can result if proper precautions are not taken.

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Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines, and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit:

<http://www.siemens.com/industrialsecurity>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under

<http://www.siemens.com/industrialsecurity>.

Preface

Purpose of this documentation

This documentation provides you with an overview of the PC components used in PCS 7. It contains the following information:

- The PC components you can use for specific PCS 7 applications.
- The software and hardware you require for specific PC components.
- The licenses you require for individual products.
- The potential PC configurations for an application.
- How you can set up and configure your PC network.

This documentation is intended for persons involved in configuration, commissioning, and service.

Options for accessing PCS 7 documentation

The documentation required for PCS 7 includes the following types:

- **PCS 7 Readme**

The readme file is available in two versions:

- **PCS 7 Readme (offline)**

This version is installed by PCS 7 Setup. The file only contains general information and links to documents on the Internet.

- **PCS 7 Readme (online)**

This version contains all information on the installation and use of PCS 7 in the format which is already familiar to you. The file is only available on the Internet to keep it always up-to-date.

Note

The information provided in the *PCS 7 Readme* (online) on the Internet takes precedence over **all** other PCS 7 documentation.

Read this *PCS 7 Readme* carefully, because it contains important information and amendments on PCS 7.

- **PCS 7 System Documentation**

System documentation contains information that covers several products, such as configuration manuals and Getting Started manuals. This documentation serves as a guideline for the overall system and explains the interaction between the individual hardware and software components.

Note the information on "PCS 7 Documentation Portal Setup" in the product overview *Process Control System PCS 7; PCS 7 - Documentation*, Section "Options for accessing the documentation".

- **PCS 7 Product Documentation**

Product documentation contains information about special hardware and software components. The individual documents provide detailed information on the specific component.

Full versions of the documentation are available from the "Technical Documentation SIMATIC PCS 7" website:

<http://www.siemens.com/pcs7-documentation> (<http://www.siemens.com/pcs7-documentation>)

You can find additional information in the product overview *Process Control System PCS 7; PCS 7 - Documentation*, Section "Options for accessing the documentation".

Required basic knowledge

To understand this documentation, you should be familiar with automation engineering and process control engineering.

You should also have experience of using PCs and similar (for example programming devices) and the Windows operating system used.

Conventions

In this documentation, the names of elements in the software interface are specified in the language of this documentation. If you have installed a multi-language package for the operating system, some of the designations will be displayed in the basic operating system language even after you change the language and will, therefore, differ from the designations used in the documentation.

If you use the operating system Windows 10, you can find the Siemens SIMATIC programs in the Start menu under **All apps > Siemens Automation**.

Changes compared to the previous version

Below, you will find an overview of the most important changes in the documentation compared to the previous version:

As of PCS 7 V9.0

- Adaptation of the Windows operating systems

As of PCS 7 V8.2

- Adaptation of the Windows operating systems

PC components of a PCS 7 system

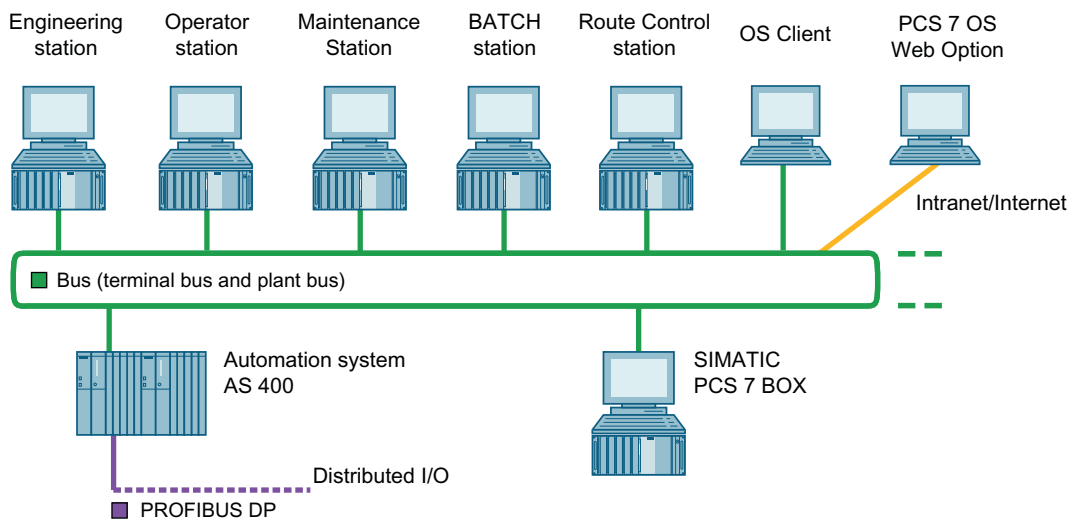
3.1 Basic configuration of the PCS 7 plant

Overview

In a PCS 7 plant, PC components are used for the following stations:

- Engineering stations (ES)
- Operator stations (OS)
- Maintenance station (MS)
- BATCH stations (BATCH)
- Route Control stations (RCS)
- Stations for connecting SIMATIC PCS 7 to the SIMATIC IT environment

PCS 7 refers to these stations collectively as "PC stations". The following figure outlines the most important components in a PCS 7 plant.



3.1 Basic configuration of the PCS 7 plant

Legend for figure

Station	Function
Engineering station (Page 17)	<p>You configure and download all system components of PCS 7 with the engineering station: Operator stations, BATCH stations, Route Control stations, automation systems, central and distributed I/O.</p> <p>Engineering stations are PCs on which the PCS 7 engineering software is installed for the configuration of a PCS 7 project.</p>
Operator station (Page 18)	<p>The operator station is used to operate and monitor the PCS 7 system in process mode.</p> <p>You connect the operator station to the plant bus to enable the required data communication with the automation system.</p> <p>Operator stations are PCs on which the PCS 7 OS software is installed.</p> <p>The operator station can be designed as a single-station system for smaller plants and less stringent requirements. In larger plants with more stringent requirements, the OS can be designed as a multiple-station system with OS servers and OS clients.</p>
Maintenance Station (Page 18)	<p>The maintenance station is based on an operator station (OS). This OS focuses on "Plant Asset Management" and enables diagnostics and maintenance of the plant.</p> <p>When the diagnostics structure is created in the plant hierarchy, an OS is assigned the functions for asset management. The OS functions can be supplemented with diagnostics functions and program packages for a specific plant.</p> <p>Note: The Engineering Station is used as a Maintenance Client. The Maintenance Station accesses SIMATIC PDM when SIMATIC PDM is in use.</p>
BATCH station (Page 18)	<p>The BATCH station is used to operate and monitor batch process sequences in process mode.</p> <p>A connection to an operator station is required for data communication with the automation system. The BATCH station is connected to the terminal bus for this purpose.</p> <p>BATCH stations are PCs on which the SIMATIC BATCH software is installed.</p>
Route Control Station (Page 18)	<p>You use a route control station (RCS) to automate the transport of materials and products in a PCS 7 plant.</p> <p>The route control station is connected to the plant bus to provide the required data communication. A connection to an operator station is required to display messages.</p> <p>Route Control stations are PCs on which the SIMATIC Route Control software is installed.</p>
Bus system (terminal bus and plant bus) (Page 43)	<p>The PCS 7 AS, OS, BATCH, RCS and ES components communicate (between and among each other) via a bus system (Industrial Ethernet). In PCS 7 plants, this bus is divided into:</p> <ul style="list-style-type: none"> • A terminal bus for communication between the following components: <ul style="list-style-type: none"> – Operator control and monitoring systems (OS, BATCH, RCS) – Engineering station – Higher-level components (for example, MES, office networks) • A plant bus for communication between: <ul style="list-style-type: none"> – Servers (OS, RCS) and automation systems – Automation systems (SIMATIC connections)
Automation system	<p>The automation system performs the following tasks:</p> <ul style="list-style-type: none"> • The AS acquires and processes the process tags from the connected I/O (centralized and distributed) and outputs control information and set points to the process. • The AS supplies the operator station with data for visualization. • The AS recognizes operator inputs and returns them to the process.
SIMATIC PCS 7 BOX (Page 37)	<p>A SIMATIC PCS 7 BOX is an industrial PC for small plants. It can encompass the functions of a PCS 7 process control system (engineering, automation, operator control and monitoring) when used in conjunction with distributed I/O.</p>

3.2 High availability (redundant) configurations

Introduction

The use of high availability components in a process control system minimizes the risk of a production downtime. A redundant design ensures increased availability of a control system. This means that all components involved in the process have a backup and perform a portion of the control tasks.

If a fault occurs or one of the process control system components fails, the still functional redundant component takes over the control task.

Redundancy for PC stations in a PCS 7 plant

You can use redundant components in PCS 7 to ensure high availability of PC stations.

- Note the following properties for redundant server pairs:

Property	Description
Reaction to server failure	In a project with a redundant server pair, the advantage is that if one of the servers fails, operator control and monitoring of the process can continue via the redundant server.
Behavior from the client perspective	From a client perspective, a redundant server pair behaves like one server.
Configuration	You configure all of the configuration data for one server only. You then download the configuration data to both redundant servers.
Configuration limits	A redundant server pair behaves like one server. You can find additional information on this in the section "Differences between multiple station systems and single station systems (Page 18)".

- Note the following properties for redundant network components:

Property	Description
Response to cable failure (disruption in a ring line)	The typical networks in a ring structure in PCS 7 feature cable redundancy. The network remains in operation even if one cable fails.
Response to failure of network adapters of PCs or switches	If you use redundant network adapters and redundant network connections, the network remains in operation even when a network adapter or switch fails.

3.2 High availability (redundant) configurations

Property	Description
Switch over in the event of a terminal bus failure	Approved network adapters are used for a redundant connection of the PC stations to a terminal bus ¹⁾ : <ul style="list-style-type: none"> • Onboard network adapters ²⁾ • Standard network adapters (INTEL) ²⁾
Switch over in the event of a system bus failure	Approved network adapters are used for a redundant connection of the PC stations to a system bus ¹⁾ : <ul style="list-style-type: none"> • Onboard network adapters ²⁾ • Standard network adapters (INTEL) ²⁾ • Communications processors CP 16xx ²⁾

1) You can find additional information in the product overview *Process Control System PCS 7; Released Modules*.
 2) You can find additional information on this in the manual *Process Control System PCS 7; High Availability Process Control Systems*.

Recommendations

You should always use redundant server pairs when the availability of the respective application is critical to your PCS 7 plant.

If PC stations of a PCS 7 plant are integrated into a domain, we recommend that you use multiple domain controllers.

Additional information

- You can find information about the client-server architecture in the "Differences between multiple station systems and single station systems (Page 18)" section.
- You can find information on how to activate redundancy in the "Configuring redundancy for redundant servers (Page 89)" section.
- You can find information about activating redundancy for operator stations in the manual *Process Control System PCS 7; High Availability Process Control Systems*.
- You can find information about configuring and implementing redundancy for BATCH stations in the manual *Process Control System PCS 7; SIMATIC BATCH*.
- You can find information about configuring and implementing redundancy for Route Control stations in the manual *Process Control System PCS 7; SIMATIC Route Control*.

3.3 Possible ways to operate engineering stations

Working with multiple PCs

You have a variety of options available when working on engineering stations to engineer PCS 7 systems. You can, for example, use more than one PC when engineering a PCS 7 system if a single PC is inadequate for the job.

The difference between working with multiple PCs when engineering and working with a single engineering station only involves a few steps.

Property	Working with multiple engineering stations	Working with a single engineering station
Area of application	<ul style="list-style-type: none"> • Medium-sized and large systems • Configuration phases • Spatially distributed configuration of engineering stations 	<ul style="list-style-type: none"> • Small systems • Local operator stations • Training systems
Monitors	1 or 2 recommended	
Combination/ Method of operation	<ul style="list-style-type: none"> • PCS 7 project engineering with multiple engineering stations (Page 21) 	<ul style="list-style-type: none"> • PCS 7 project engineering with a single PC (Page 22) • Combination of engineering station and operator station on a single PC (Page 22) • Engineering with SIMATIC PCS 7 BOX: You can find information on this in the manual <i>Process Control System PCS 7; SIMATIC PCS 7 BOX</i>

3.4 Differences between multiple station systems and single station systems

You can configure each PCS 7 application for process mode, for example OS, BATCH, RCS, Maintenance Station, as a single station system or a multiple station system with client-server architecture.

Definition of a multiple station system

A multiple station system is a system of related PCs in which the functionality of a PCS 7 application in a client-server architecture is distributed over several PCs, for example, OS clients and OS servers. The Process Control System; SIMATIC PCS 7 DVD provides the associated client or server software for this.

In the case of multiple station systems, we recommend that you configure a terminal bus (separate from the system bus) for data communication between clients and servers.

Definition of a single station system

A single station system or "single station" is a PC that provides the entire functionality of a PCS 7 application, for example the operator station. The Process Control System; SIMATIC PCS 7 DVD provides the "single station" software for this.

You can connect single station systems to the system bus as well as to the terminal bus (for example, when there are also multiple station systems in the PCS 7 plant).

Properties of multiple and single station systems

Property	Multiple-station system	Single station system
Areas of application	Medium-sized and large systems	<ul style="list-style-type: none"> • Small systems • Local operator stations • Training systems
Configuration	Client-server architecture with multiple PCs: <ul style="list-style-type: none"> • Operator station multiple station system (Page 24) • BATCH station multiple station system (Page 25) • Route control station multiple station system (Page 26) • Maintenance station multiple station system (Page 27) 	One PC for all functions of a PCS 7 application: <ul style="list-style-type: none"> • OS single station system (Page 32) • BATCH single station system (Page 35) • Route Control single station system (Page 36) • SIMATIC PCS 7 BOX stations (Page 37) • Maintenance station single station system (Page 36)

3.4 Differences between multiple station systems and single station systems

Property	Multiple-station system	Single station system
Workstations	<ul style="list-style-type: none"> • Maximum number of clients that a server can supply with process data: 40 • Maximum number of permissible monitors per server for process mode in a plant: 60 • If you operate no more than 4 clients on a server, you can use a server as an operator control and monitoring station. 	1 workstation with a maximum of 4 monitors (depending on the application)
	<p>Maximum number of monitors that can be connected to a workstation:4 (depending on the hardware features of the PC)</p> <p>You can operate the resulting system areas with a single keyboard and mouse.</p>	
Availability	<p>To guarantee high availability of the PCS 7 plant, you can configure the server as redundant server pairs (PCs):</p> <ul style="list-style-type: none"> • Operator station <ul style="list-style-type: none"> – OS server – MS server • BATCH station <ul style="list-style-type: none"> – BATCH server • Route Control station <ul style="list-style-type: none"> – Route Control server • Archive server <ul style="list-style-type: none"> – Process Historian <p>You can find additional information on this in the section "High availability (redundant) configurations (Page 15)".</p>	
Number of servers	<p>Maximum number of servers or server pairs in the PCS 7 plant that can simultaneously access a project on the OS clients: 18</p> <p>The following each count as one server:</p> <ul style="list-style-type: none"> • Server for multiple station systems (see configuration) • Redundant server pair (see configuration) • Archive server 	

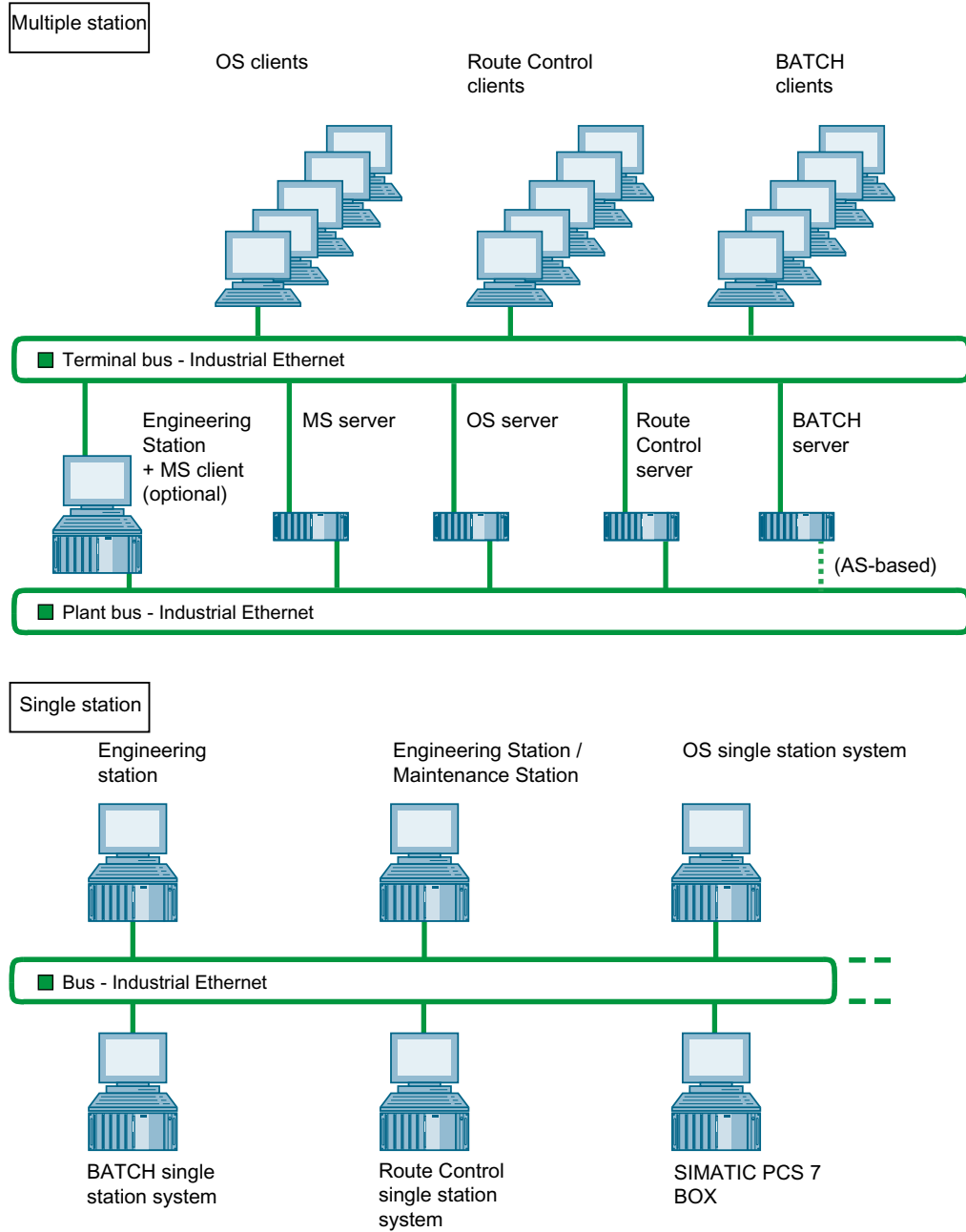
Intranet and Internet connection

You can realize the Intranet and Internet connection via OpenPCS 7 or Web Option for OS.

You can find more information on this in the sections "Remote access via the Web Option for OS (Page 40)" and "Access to PCS 7 data using OpenPCS 7 (Page 42)".

Example configuration

The following example configuration shows the use of multiple station and signal station systems in a PCS 7 plant:



3.5 Solutions for engineering stations

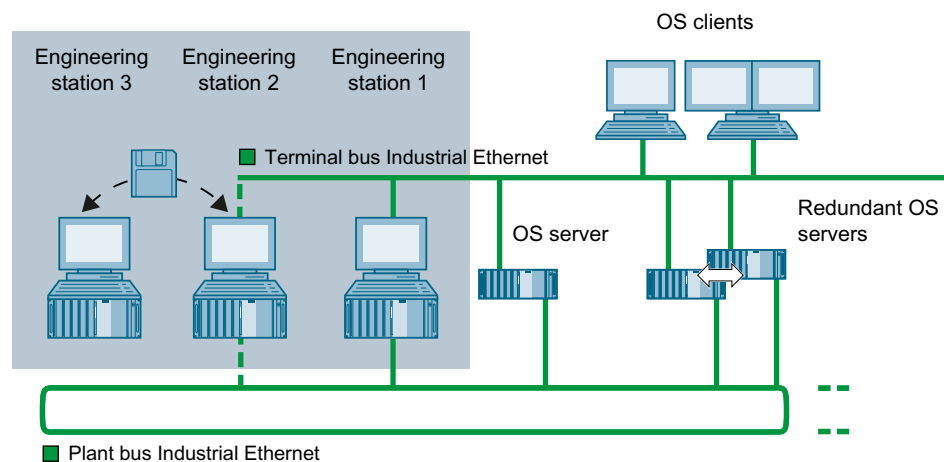
3.5.1 PCS 7 project engineering with multiple engineering stations

Distributed engineering

You can distribute the engineering tasks for a PCS 7 plant over multiple engineering stations (Distributed Engineering). PCS 7 provides the following options for this:

Option	Application
Configuring in a multi-project	You can use multiproject engineering to allow several project teams to work on complex projects at the same time. The engineering stations can be connected over a network or they can be located in separate areas.
Branching and merging charts from a project	You can branch and merge the projects at the chart level (S7 program) to allow several engineers to work at the same time.
Configuring over a network	Several engineers can work on specific parts of a project (for example, AS, OS) stored on a central engineering server at the same time, working from their networked engineering stations.

Example configuration for multiproject engineering



Additional information

The engineering procedure is described in detail in the configuration manual *Process Control System PCS 7; Engineering System*.

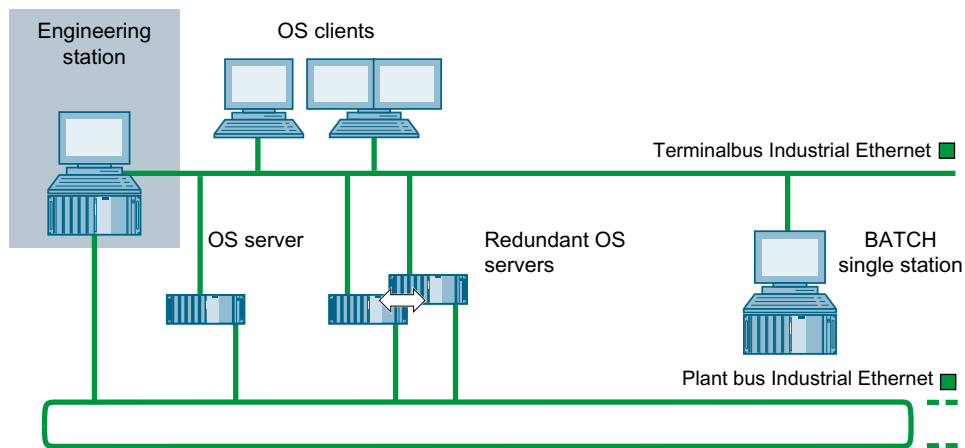
3.5.2 PCS 7 project engineering with a single PC

Central engineering

You can configure a PCS 7 plant centrally for all PCS 7 applications (OS, BATCH, Route Control, AS) with a single engineering station.

Connect the engineering station to the plant bus and the terminal bus when you download the configuration information to the target systems and test it in process mode.

Example configuration



SIMATIC PCS 7 BOX

SIMATIC PCS 7 BOX can also be used as an engineering station for small standalone systems. You can more find information on this in the manual *Process Control System PCS 7; SIMATIC PCS 7 BOX*.

3.5.3 Combination of engineering station and operator station on a single PC

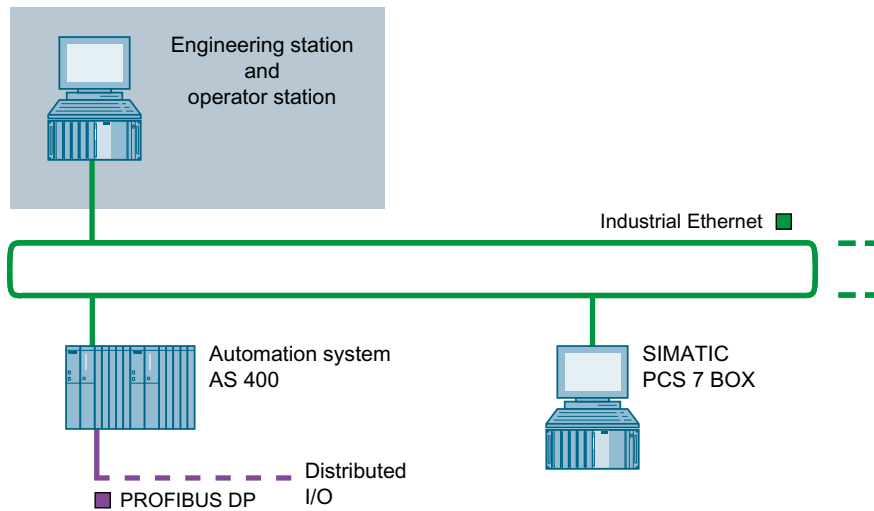
Engineering station and operator station on a single PC

You can configure a small system, such as a training station, centrally for all PCS 7 components, for example, with OS, BATCH, Route Control, AS, with a single engineering station.

You can combine the engineering station and an operator station for this purpose. The operator station is configured as a so-called single station system in this case.

The example configuration below shows a plant with a common plant/terminal bus. Various functions are carried out via this bus, for example, loading the configuration data to the target systems, testing the plant and process mode.

Example configuration



SIMATIC PCS 7 BOX

SIMATIC PCS 7 BOX can also be used as an engineering station for small standalone systems. You can find additional information on this in the section "SIMATIC PCS 7 BOX Stations (Page 37)" and in the manual *Process Control System PCS 7; SIMATIC PCS 7 BOX*.

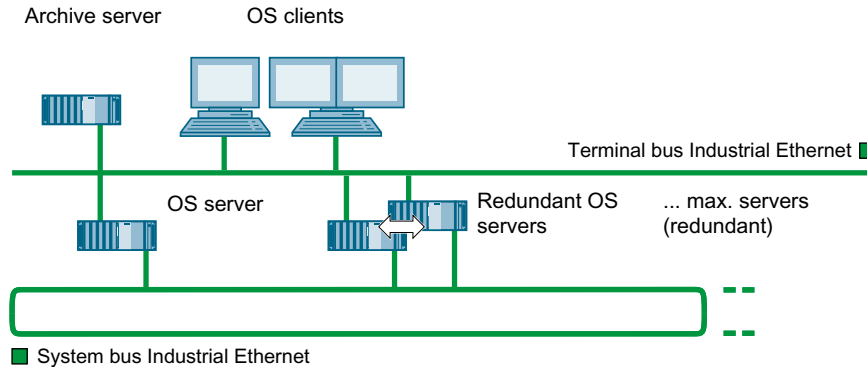
3.6 Solutions for multiple station systems

3.6.1 Operator station multiple station system

Operator station as multiple station system with client-server architecture

- The OS multiple station system consists of OS clients (workstations), which are supplied with data (project data, process values, archives, alarms, and messages) from an OS server or multiple OS servers via a terminal bus (OS LAN).
- The OS servers feature additional client functions that allow them to access data on other OS servers (their archives, messages, tags and variables). Process pictures from an OS server can then also contain tags of other OS servers.
- You can achieve high availability for the Operator Station by configuring a redundant OS server. You also need the "SIMATIC PCS 7 Server Redundancy" software package for redundant OS servers.
For smaller plants, system configurations with multiple OS single station systems is appropriate. You can find information about this in section "OS single station system (Page 32)".

Example configuration



Maintenance station

The maintenance station is based on the operator station, with extra functions added for diagnostics. The maintenance station can therefore also be structured as a multiple station system. You can find additional information on this:

- In the section "Maintenance station multiple station system (Page 27)"
- In the configuration manual *Process Control System PCS 7, Maintenance Station*

Multiple station system with "Web Option for OS"

You can access the data of an operator station using Internet Explorer if the following conditions are met:

- The "Web Option for OS" is installed on an OS client that is assigned to an operator station.
- The necessary access rights in the network are in place.

You can find additional information on this in the section "Remote access via the Web Option for OS (Page 40)".

Long-term archive with Process Historian

The Process Historian is used in PCS 7 as an external server for long-term archiving of system data. You can find information on this in the system manual *SIMATIC; Process Historian Administration*.

Additional information

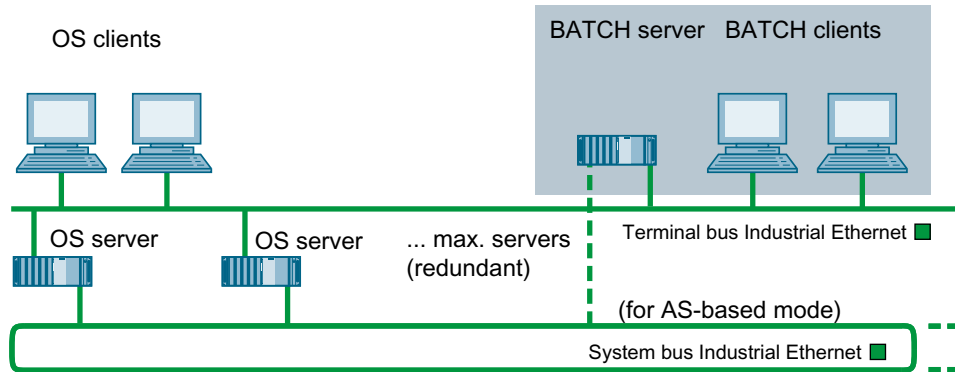
- You can find information on configuration limits in the section "Differences between multiple station systems and single station systems (Page 18)".
- You can find information about long-term archiving of plant data in the section "Process Historian and Information Server (Page 29)".
- You can find information on using the OS client in a virtual operating environment on the Internet "<https://support.industry.siemens.com> (<https://support.industry.siemens.com/cs/ww/en/view/51401737>)".

3.6.2 BATCH station multiple station system

BATCH station as multiple station system with client-server architecture

- A BATCH station multiple station system consists of BATCH clients (workstations) that are supplied with data (project data, process values, archives, alarms and messages) from a BATCH server via a terminal bus.
- There can only be one BATCH project with one BATCH server in a PCS 7 plant. Only one BATCH project can be activated on a BATCH server.
- You can use a BATCH client to operate and monitor several PCS 7 systems. To do this, start several BATCH client applications on the BATCH client and select different batch projects at the start (each with one BATCH server). It is advisable to use a multi-display-connection for such instances.
- You can achieve high availability for the PCS 7 system by configuring a redundant BATCH server. In terms of the number of servers in a PCS 7 project, a BATCH server set up as redundant is considered a BATCH server.

Example configuration



AS-based operation

If AS-based recipes are configured in BATCH projects, it is essential that the BATCH server is connected to the system bus.

Additional information

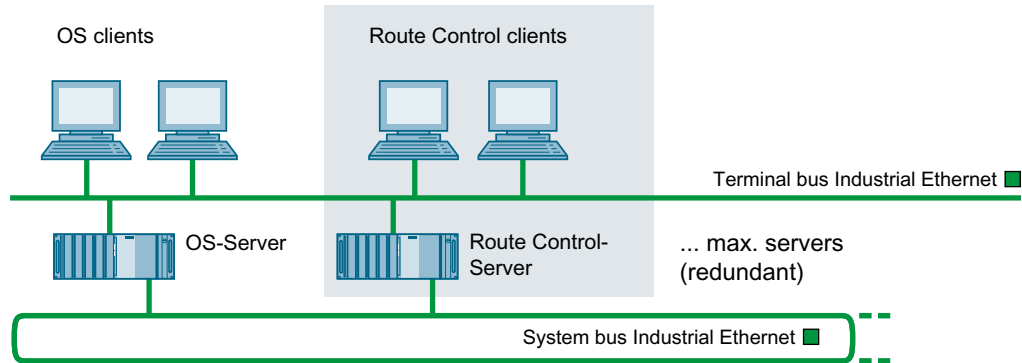
You can find information on configuration limits in the section "Differences between multiple station systems and single station systems (Page 18)".

3.6.3 Route control station multiple station system

Route Control station as multiple station system with client-server architecture

- A route control station multiple station system consists of route control clients (workstations) that are supplied with data (project data, process values, archives, alarms and messages) from a route control server via a terminal bus.
- There is only one route control project with one route control server in a PCS 7 system (even when redundant).
- The route control server requires a connection to an OS to store messages.
- You can achieve high availability for the route control station by configuring a redundant route control server. In terms of the number of servers in a PCS 7 project, a redundantly configured route control server is counted as a single route control server.

Example configuration



Additional information

You can find information on configuration limits in the section "Differences between multiple station systems and single station systems (Page 18)".

3.6.4 Maintenance station multiple station system

Introduction

The Maintenance Station is used for the diagnostics and asset management of a PCS 7 plant.

Maintenance Station as multiple-station system with client-server architecture

The Maintenance Station as a multiple-station system consists of the following components:

- Maintenance server (MS server for short)

The MS server concentrates the picture information and data required for system diagnostics on one PC. The MS server needs the following data to display information, such as project data, alarms, messages on the MS client:

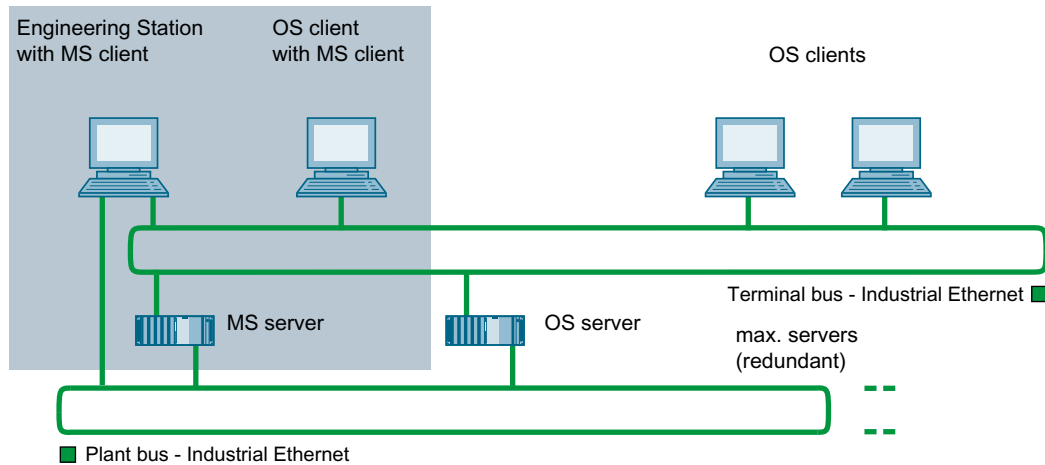
 - Server data from the OS servers
 - Configuration of the network components

You can achieve high availability for the Maintenance Station by configuring a redundant MS server.
- Maintenance client (MS client for short)

The MS client uses diagnostic screens to visualize the diagnostic status and provides required operator control and monitoring functions.

 - The engineering station or an OS client can be used as the MS client. The online status of the hardware can be determined if the MS client is installed on the Engineering Station.
 - Up to 4 monitors can be connected to a MS client via a multi-display-connection. You can operate the resulting system areas with a single keyboard and mouse.

Example configuration



Notes on installing the Maintenance Station

Note the following points during installation:

- The MS server is an OS server configured for system diagnostics.
- The MS client can be used on the engineering station or an OS client. You can find configuration instructions in the configuration manual *Process Control System PCS 7; Maintenance Station*.

You can find additional about installation in the section "How to install the PCS 7 software (Page 84)".

Note on the use of a dedicated Maintenance Station on a redundant, high availability plant bus

When connecting an MS server on a separate PC station via two standard network adapters, for example, Intel Desktop adapters, to a redundant plant bus (two separate rings) keep in mind that the IP addresses of the ring devices in ring 1 and ring 2, as well as the two standard network adapters connected to these rings, must be located in different IP address ranges.

Example:

- Ring 1
 - IP address range: 192.168.1.0 - 192.168.1.255
 - Subnet mask: 255.255.255.0
- Ring 2
 - IP address range: 192.168.2.0 - 192.168.2.255
 - Subnet mask: 255.255.255.0

Additional information

- Appendix "Approved configurations (Page 150)"
- Manual *Process Control System PCS 7; Maintenance Station*

3.6.5 External archive servers and reporting system

3.6.5.1 Process Historian and Information Server

The Process Historian is used in PCS 7 as an external server for long-term archiving of system data.

The Information Server is used in PCS 7 as a reporting system for plant data that are archived on the Process Historian.

Overview of Process Historian and Information Server

	Process Historian	Information Server
Function	Central long-term archiving system	Central system for creating and distributing reports based on the data stored in the Process Historian
Saving data	from various PCS 7 projects	
• Messages and process values	Archiving	
• OS reports		
• BATCH reports	Archiving	
Displaying data	possible at any time	possible at any time
• Visualize messages and process values via filter functions		possible
• Showing BATCH reports		Report as PDF file

	Process Historian	Information Server
<ul style="list-style-type: none"> Filtering BATCH data 		Using SQL functions
Saving archive data to external media	manual and automatic saving possible	
Exporting process values		
<ul style="list-style-type: none"> via WinCC controls 	<ul style="list-style-type: none"> CSV file XML file 	
<ul style="list-style-type: none"> Report formats 		<ul style="list-style-type: none"> PDF file RTF file DOCX file XLSX file
Importing process values		Import add-in for Excel on any computer
Displaying archive data via the Web		possible, as the IS is a Web server
Redundant configuration	possible	

Note

Installation of the Process Historian

Note the following points during installation:

- Install the Process Historian on a separate PC to ensure the best performance.
- We recommend a RAID system for data security.

The Process Historian is a node on the terminal bus and is not connected to the system bus.

Note

Installation of the Information Server

The Information Server can be installed on the following PC stations:

- On a separate PC
- On a Process Historian

Access protection

You can configure access protection with user-specific rights on the Process Historian.

Additional information

Process Historian and Information Server

- Documentation *SIMATIC HMI; SIMATIC Process Historian*
- Documentation *SIMATIC HMI; SIMATIC Information Server*

3.6.5.2 Long-term archiving with the Process Historian and Information Server

Functions of the Process Historian

You can perform the following functions with the Process Historian:

- Archive messages and process values from PCS 7 OS
- Archive batch data from SIMATIC BATCH
- Transfer archive data to external storage media

Functions of the Information Server

- Integration and creation of reports from Office products (Excel, Word, PDF)
- Display archive data of a batch
- Web-based display and generation of reports

Additional information

- Documentation *SIMATIC; Process Historian*
- Documentation *SIMATIC; Information Server*

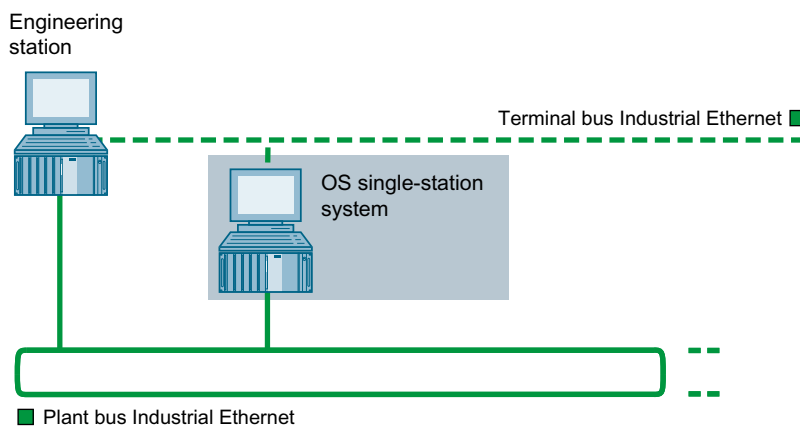
3.7 Solutions for single station systems

3.7.1 OS single station system

OS as single station system on a single PC

- The OS single station system is an operator station on a single PC with complete operator control and monitoring functionality for a PCS 7 project (process cell/unit).
- The OS single station system on the system bus can be used in parallel with additional single station or multiple station systems.
- Select one of the following configurations for high availability in a single station system in a PCS 7 system:
 - Configuration with redundant OS single station system
Install the "OS Single Station Redundancy" license key on each PC station of the redundant pair.
 - Configuration with multiple OS single station systems with the same configuration
- The OS single station system can also be used in combination with an engineering station on a PC.
You can find additional information on this in the section "Combination of engineering station and operator station on a single PC (Page 22)".
- You can also use the OS single station system in combination with an engineering station and an automation system on a PC. This solution is offered as the SIMATIC PCS 7 BOX RTX.

Example configuration



Plant configuration with multiple OS single station systems

Configurations with OS single station systems are possible in SIMATIC PCS 7.

The following example shows the maximum configuration for single station systems:

- 1 redundant OS single station system (single station system + single station system standby)
Options:
 - SIMATIC BATCH
 - Web server/client (maximum 3 Web clients per OS single station system)
 - Communication with OS-internal OPC servers (OpenPCS 7 license required)
- 6 non-redundant OS single station systems (as reference OS from the OS single station system)
- Process Historian
- Maintenance Station

Requirements:

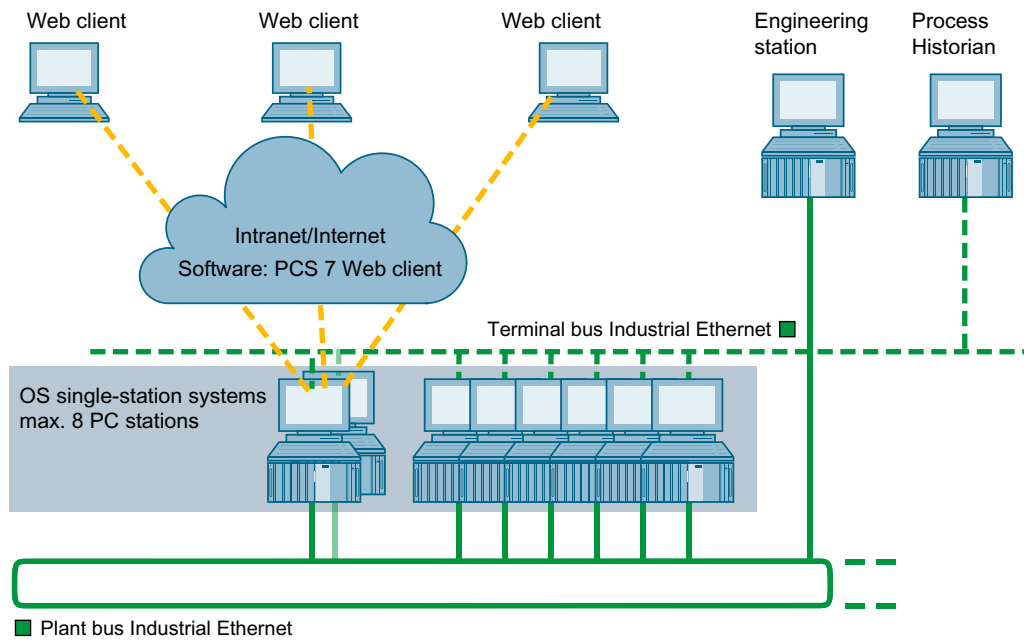
- Operating systems:
 - You can find information about this in the documentation *Process Control System PCS 7; PCS 7 Readme (online)*
 - When selecting operating systems, orient yourself with the configurations of the pre-configured PC stations in *ST PCS 7* catalog.
- Automation systems (depending on the firmware version)
 - PCS 7 CPU 410 Process Automation V8 or S7-400 CPU as of firmware version V6
 - PCS 7 CPU 410 Process Automation V8 or S7-400H CPU as of firmware version V6
- Separate engineering station required.

Note

Displaying operator and OS process control messages

Locally generated operator messages and local OS process control messages are displayed on an OS single station system.

A system-spanning overview of the operator and process control messages can be displayed in the Process Historian / Information Server.



Web option for an OS single station system

You can access the data of an OS using the Internet Explorer. You can find information on this in the section "Remote access via the Web Option for OS (Page 40)".

Long-term archive with Process Historian

The Process Historian is used in PCS 7 as an external server for long-term archiving of system data. You can information on this in the system manual *SIMATIC; Process Historian Administration*.

Additional information

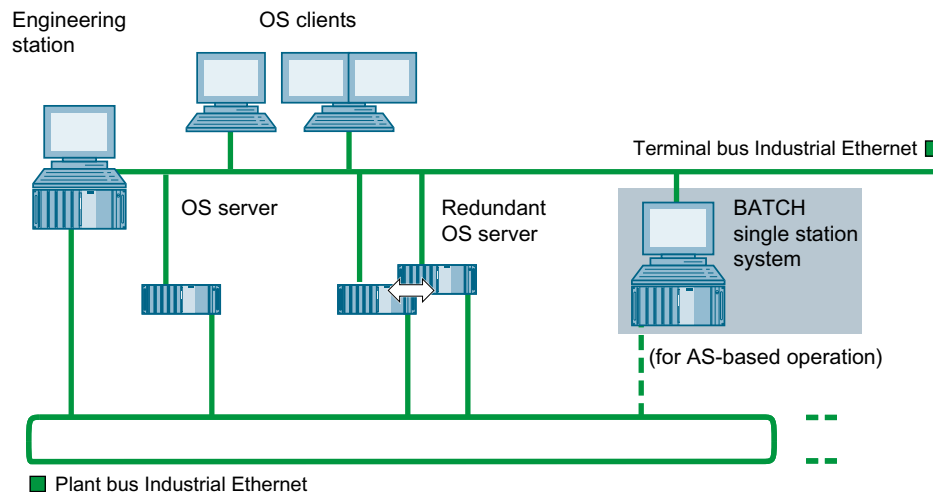
- Section "Combination of engineering station and operator station on a single PC (Page 22)"
- Function manual *Process Control System PCS 7; SIMATIC PCS 7 BOX*

3.7.2 BATCH single station system

BATCH as single-station system on a single PC

- The BATCH single-station system is a BATCH station on a single PC. Complete operator control and monitoring functionality is available for a process cell. A BATCH single-station system is associated with a BATCH project (process cell/unit).
- A connection is needed for the required data communication:
 - In PC-based operation, an interface to the terminal bus is required for coupling to an operator station (OS server) and for the data communication between the automation systems.
 - Two connections are required in AS-based operation:
 - a) A connection to the terminal bus for coupling to an operator station (OS server)
 - b) A connection to the plant bus for coupling the automation systems.
- You use a BATCH single-station system to operate and monitor an entire plant. When several process cells are operated in parallel, an additional BATCH single-station system with corresponding connections to the OS server is needed for each process cell. If you are monitoring several systems, we recommend using a BATCH station multiple-station system (Page 25).
- If several BATCH single-station systems are used: Each BATCH single-station system used must be connected to another OS system.
- You can operate BATCH single-station systems redundantly.
- A connection to an OS server must exist in order to use process mode.

Example configuration



3.7.3 Route Control single station system

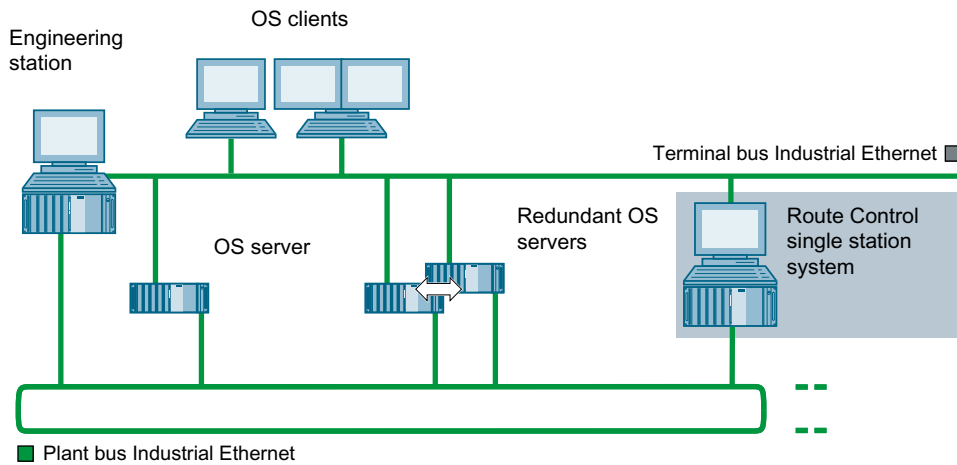
Route Control as a single station system on a single PC

- The route control single station system is a route control station on a single PC. You use the route control single station system to automate the movement of materials and products in a PCS 7 plant.
- You can operate route control single station systems redundantly.
- A connection to an OS server must exist in order to use process mode.

Note

If you use route control single station systems with other route control systems at the same time, the areas controlled by a system must be separated.

Example configuration



3.7.4 Maintenance station single station system

Overview

The Maintenance Station is used for the diagnostics and asset management of a PCS 7 plant.

The Maintenance Station as a single-station system consists of a PC station with engineering station, OS single-station system and Maintenance Station.

Note

Dedicated Maintenance Station on the redundant, high availability plant bus

If you want to connect a dedicated Maintenance Station using standard network adapters on the redundant, high availability plant bus, read the information about configuration provided in the documentation *Process Control System PCS 7; High Availability Process Control Systems*.

Additional information

- Section "Maintenance Station multiple-station system (Page 27)"
- Section "OS single-station system (Page 32)"
- Section "Combination of Engineering Station and Operator Station on a Single PC (Page 22)"
- Appendix "Approved Configurations (Page 150)"
- *Process Control System PCS 7; Maintenance Station Manual*
- *Manual Process Control System PCS 7; SIMATIC PCS 7 BOX*

3.7.5 SIMATIC PCS 7 BOX stations

SIMATIC PCS 7 BOX as a process control system for small plants

A SIMATIC PCS 7 BOX is an industrial PC for small plants. It can encompass the functions of a PCS 7 process control system (engineering, automation, operator control and monitoring) when used in conjunction with distributed I/O.

Area of application

SIMATIC PCS 7 BOX is particularly suitable for use at the process level in small plants:

- Small applications in production
- Self-contained package units
- Automation of a laboratory or research facility

SIMATIC PCS 7 BOX PCs work with the standard PCS 7 system software as a full member of the SIMATIC PCS 7 family. They are scalable and expandable without sacrificing compatibility.

SIMATIC PCS 7 BOX product variants

SIMATIC PCS 7 BOX is available with the following PC variants:

Product name	Variant	AS selection	Description
SIMATIC PCS 7 BOX RTX	PC station with integrated AS	Integrated: Software CPU (WinAC RTX)	SIMATIC PCS 7 BOX RTX enables ES/OS or OS operation. WinAC RTX 2010 supports up to 2000 AS process objects (PO).
SIMATIC PCS 7 BOX	PC station with external AS	PCS 7 AS RTX	SIMATIC PCS 7 BOX enables ES/OS or OS operation. WinAC RTX 2010 supports up to 2000 AS process objects (PO).
		PCS 7 AS mEC RTX (AS im S7-300 Design / SIMATIC S7-mEC)	
		AS 41x of the series SIMATIC S7-400	SIMATIC PCS 7 BOX enables ES/OS or OS operation. The maximum AS configuration limit depends on the type of AS 41x.
		AS 41xH of the series SIMATIC S7-400H (optionally with S7 F system)	SIMATIC PCS 7 BOX enables ES/OS or OS operation. The maximum AS configuration limit depends on the type of AS 41xH.
SIMATIC PCS 7 BOX	Only PC station	No AS	SIMATIC PCS 7 BOX enables ES/OS or OS operation.

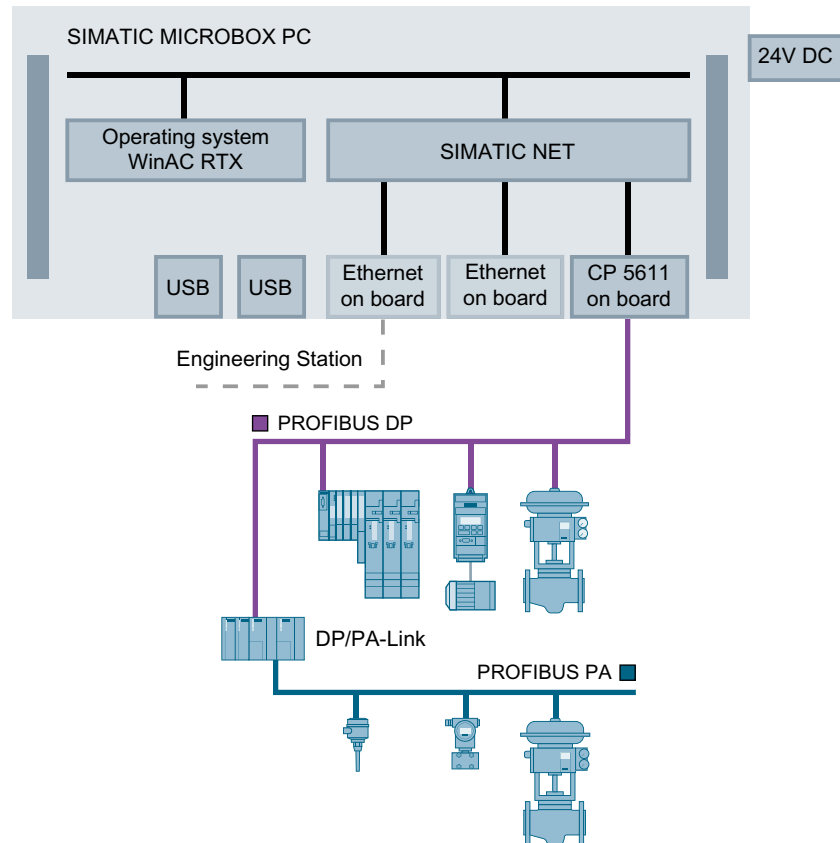
Add-on packages

You can find the ordering information for product bundles in the *ST PCS 7* catalog.

- Licensing
- SIMATIC PCS 7 BOX as a maintenance station.
- SIMATIC PCS 7 BOX with separate, external controller for SIMATIC BATCH
- SIMATIC PCS 7 BOX as Web server for up to two Web clients

Example configuration

The following figure shows the basic structure for an AS based on PCS 7 AS RTX.



Licenses

You can find information on licenses for the components of the process control system and possible plant sizes in the installation manual *Process Control System PCS 7; Licenses and Configuration Limits*.

Additional information

- Manual *Process Control System PCS 7; SIMATIC PCS 7 BOX*
- Catalog *ST PCS 7*

3.8 Solutions for accessing PC stations

3.8.1 Remote access via the Web Option for OS

Remote access with Web Option for OS

The Web Option for OS enables operator control and monitoring of automated processes over the Intranet/Internet using PCS 7.

The Web Option for OS consists of two components:

- **PCS 7 Web server**
Within an OS, the PCS 7 Web server is an OS client with Web server functionality. The PCS 7 Web server can function as a "Web server" or a "Web diagnostics server".
- **PCS 7 Web client**
These operator stations access project data available on the Web server via the Intranet/Internet. The PCS 7 Web client can function as a "web client" or a "web diagnostics client".

Client for process control

The following options have been approved for process control with PCS 7 Web client and PCS 7 Web diagnostics client:

- WinCCViewRT
Installed with the installation of PCS 7 Web client/PCS 7 Web diagnostics client.
- Microsoft Internet Explorer

Configurations in PCS 7 plants

The following configurations are possible when you use Web Option for OS in a PCS 7 plant:

- For an OS multiple-station system
 - Configuration with PCS 7 Web server and PCS 7 Web client
- For an OS single-station system
 - Configuration with PCS 7 Web server and PCS 7 Web client
 - Configuration with PCS 7 Web diagnostics server and PCS 7 Web diagnostics client

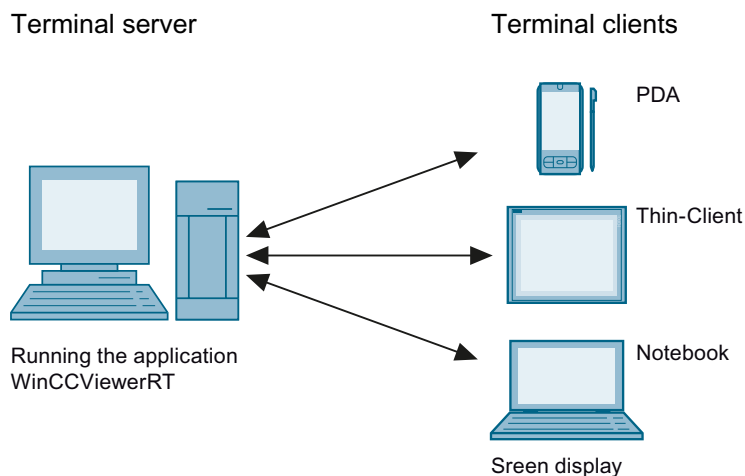
Additional information

- Manual *Process Control System PCS 7; Web Option for OS*

3.8.2 Remote access via terminal services

Using the Web option for OS

In addition to remote access via the Web Option for OS, remote control can be performed on a PCS 7 plant with local PC systems (terminal client based on the Web Option for OS).



A terminal server must be installed in the PCS 7 plant to enable this access option. The terminal server can be installed on the following PC stations:

- Separate PC
- In a multi-station system on a Web server

A terminal client opens a process (terminal session) for operation on the terminal server.

Note

Combined Web and terminal server

For the combined Web and terminal server, the memory expansion is to be increased according to the number of maximum terminal clients to be connected.

Additional information

- Information on terminal services is provided in the system manual *Process Control System PCS 7; Web Option for OS*.
- You can find information on terminal services in the system manual *WinCC; Web Navigator*.
- You can find information about redundant plant configurations with terminal services in the appropriate Microsoft documentation.

3.8.3 Access to PCS 7 data using OpenPCS 7

Accessing PCS 7 data with OPC and OLE/DB

Data from a PCS 7 plant can be made available to third-party systems using OLE DB or OPC via a PC station with OpenPCS 7, a so-called Open PCS 7 station.

You can use OpenPCS 7 at the following levels:

- Automation level
- Plant control and production control levels
- MES level (Manufacturing Execution Systems)
- ERP level (Enterprise Resource Planning)

Interface formats

The client applications access data on the OpenPCS 7 station via interfaces.

OpenPCS 7 uses the following interface formats for data communication:

- OPC UA (Unified Architecture)
- OPC DA (Data Access)
- OPC A&E (Alarm and Event and Historical Alarm and Event)
- OPC HDA (Historical Data Access)
- OLE/DB (integration of data in applications that support OLE (for example, MS Office))

Additional information

Process Control System PCS 7; OpenPCS 7 manual

3.9 Connecting PC stations

3.9.1 Tasks of terminal bus and plant bus

Overview

With PCS 7, the AS, OS, BATCH, Route Control and ES communicate via a bus system, based on an industrial Ethernet.

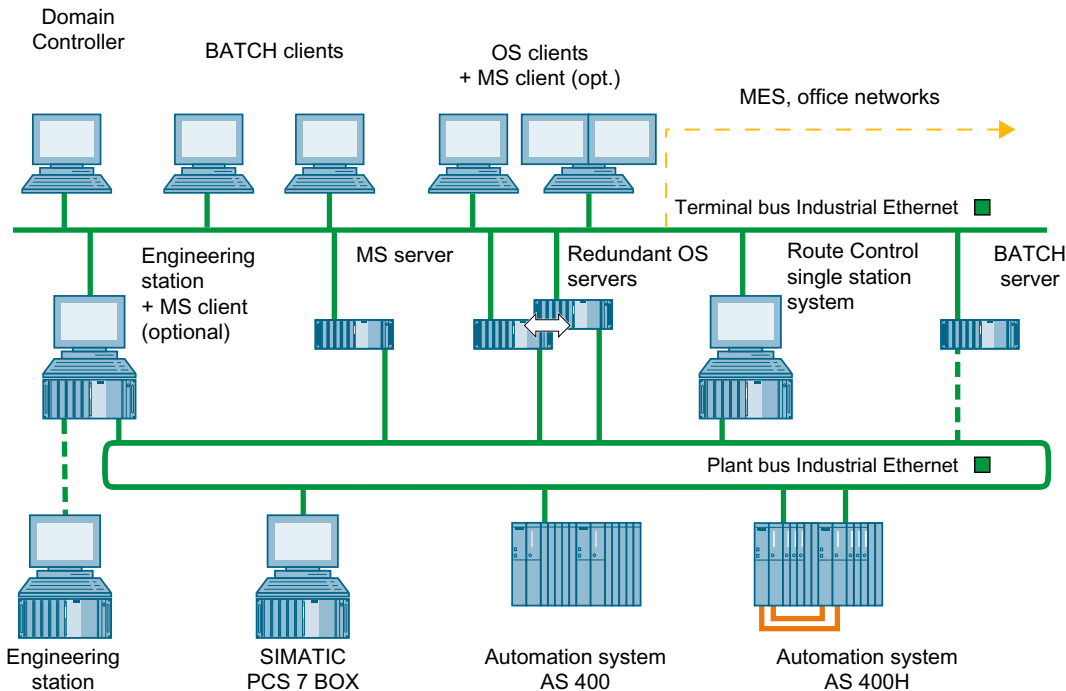
The bus system in PCS 7 consists of:

- Terminal bus
- System bus

You can find additional information on this in the section "Differences between multiple station systems and single station systems (Page 18)".

A description of an example for a small system is available in the section "Combination of engineering station and operator station on a single PC (Page 22)".

Example configuration



Topology

The terminal bus and system bus can be configured as follows:

- As Industrial Ethernet (10/100/1000 Mbps)
- Bus, tree, ring, star or redundant ring structures

Data communication

- Terminal bus

The following table shows data communication in the PCS 7 plant.

PCS 7 is also connected to components at higher levels, for example MES level and office networks, via the terminal bus.

Data communication	Between the following components:
Download of the configuration data	Engineering station and the following stations: <ul style="list-style-type: none"> • Operator control and monitoring systems (OS server, OS clients) • BATCH stations (BATCH server, BATCH clients) • Route Control stations (Route Control server, Route Control client)
Communication between the servers	<ul style="list-style-type: none"> • OS servers • BATCH servers and OS servers relevant to BATCH
Transmission of data processed by the servers to the operator control and monitoring stations (clients)	<ul style="list-style-type: none"> • OS server and OS clients • BATCH server and BATCH clients • Route Control server and Route Control clients

- System bus

Data communication	Between the following components:
Download of the configuration data	Engineering station and automation system
Operating and monitoring of the processes	Automation systems and OS server, Route Control server communication path: CPU -> CP -> BUS -> network adapter (CP) -> OS/RCS Note: Communication with SIMATIC BATCH is from the OS server to the BATCH server via the terminal bus.
Communication between automation systems (SIMATIC communication)	Automation systems Communication path: CPU -> CP -> BUS -> CP -> CPU

Shared system/terminal bus

When using PCS 7 for process engineering plants, we recommend you separate the terminal bus and system bus. This recommendation is based on the most stringent requirements for availability and robustness of these plants.

Note

Connection

Nodes must always be connected with two separate network adapters or communications processors even when using a shared bus.

Advantages and disadvantages

- **Advantage:**
Cost reduction can only be achieved in cabling overhead because otherwise the connection of the communication nodes in the network is no different from the recommended configuration with separate system bus and terminal bus.
- **Disadvantage:**
A shared bus is at a disadvantage with regard to access and error security. For example, a targeted attack or a device error not only disturbs communication between OS servers and OS operating stations at the terminal bus end, but also the communication on the system bus and ultimately will lead to failure of the entire automation. These security-related aspects need to be compared and weighed against the corresponding requirements in the respective project.

Additional information

- You can find information on the following topics in the configuration manual *Process Control System PCS 7, Engineering Station*:
 - Cables and network components
 - Distances between the components of a PCS 7 plant
 - Topology, operating ranges and parameters
- Section "Basic configuration of the PCS 7 plant (Page 13)"
- Section "Components for connection to the terminal bus/plant bus (Page 53)"
- You can find general information about the configuration limits in PCS 7 in the installation manual *Process Control System PCS 7; Licenses and Configuration Limits*.

3.9.2 Connection to the terminal bus/plant bus

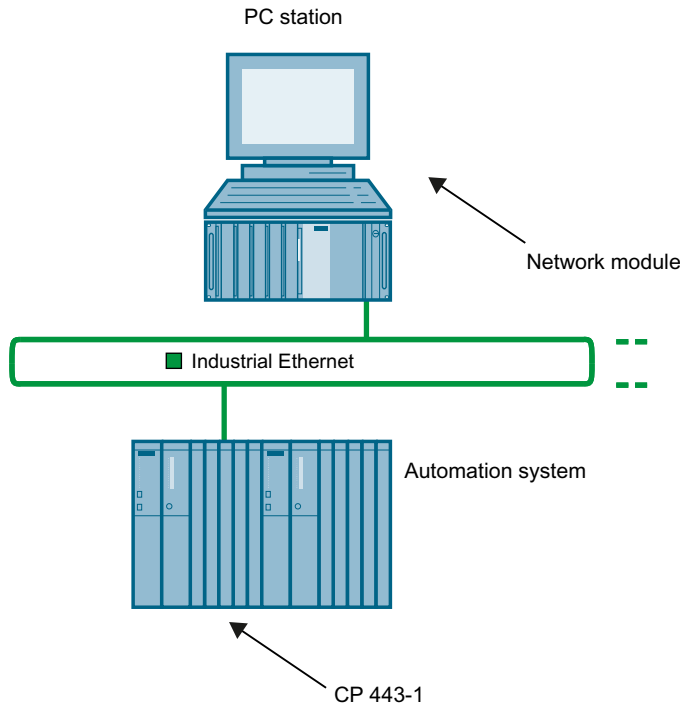
Connection of OS, BATCH, Route Control and ES

You connect operator stations, BATCH stations, route control stations and engineering stations to Industrial Ethernet using PCS 7 communication modules. The communication modules occupy a slot in the PC or programming device (PG). You use different communication modules depending on your requirements.

Additional information

You can find an overview of the communication modules available in the section " Components for connection to the terminal bus/plant bus (Page 53) ".

Example configuration



Connection of the AS

You connect automation systems to Industrial Ethernet using the CP 443-1 communication processor or the CPU's Ethernet interface. The protocols used are TCP/IP, ISO, and UDP.

Cables and network components

You can find information on the following topics in the configuration manual *Process Control System PCS 7, Engineering Station*:

- Cables and network components
- Distances between the components of a PCS 7 plant

Redundant bus systems

You can use redundant communication paths in PCS 7. You can find information on this in the function manual *PCS 7; High Availability Process Control Systems*.

3.9.3 Connecting PC Stations via Wireless LAN

Connecting a PC station via Industrial Wireless LAN (IWLAN)

Industrial Wireless LAN (subsequently referred to as WLAN) allows you to integrate mobile or stationary PC stations via an access point in a PCS 7 plant. You can integrate the following PC stations:

- OS clients
Up to 2 OS clients (via WLAN)
- Web clients
Up to 2 web clients on a PCS 7 web server (via WLAN)
- PC station
A PC station for remote access to an engineering station
You can find additional information on this in the section "Remote diagnostics functions (Page 136)".

Components for WLAN in PCS 7

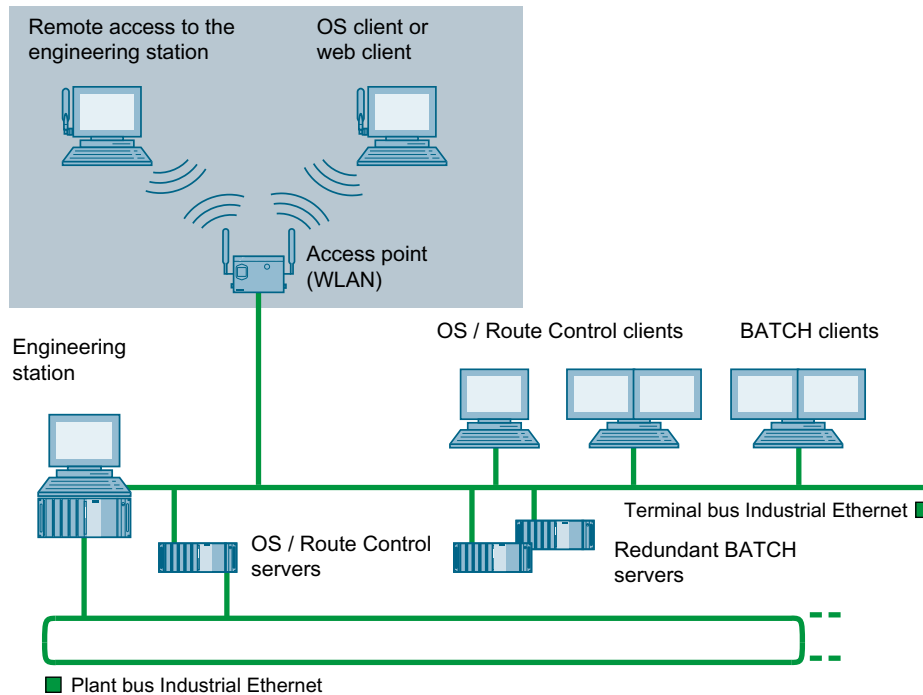
The product overview in *Process Control System PCS 7; Released Modules* lists the network and PC components that are approved for WLAN in PCS 7.

You can find the documentation after installation of the "PCS 7 Documentation Portal Setup" (see "Preface (Page 9)"):

- In the Start menu of Windows in the folder of the SIEMENS SIMATIC documentation
- In the SIMATIC Manager in the updated PCS 7 online help

Example for WLAN in PCS 7

The following figure show a basic configuration of WLAN components in a PCS 7 plant.



Additional information

You can find detailed information on WLAN components, installation guidelines and settings in the following documentation:

- Product Information *Process Control System PCS 7; PCS 7 Released Modules*
- Operating instructions of SIMATIC NET released WLAN components (see Product overview *Process Control System PCS 7; PCS 7 Released Modules*)
- System manual *SIMATIC NET; Basics - Industrial Wireless LAN*

3.9.4 Time synchronization

System-wide Time Synchronization

To obtain process data that can be evaluated, all the components of the process control system need to work with an identical, synchronized time of day. This allows you to assign messages in the correct sequence over time. The result is then consistent regardless of the time zone in which the messages originate.

One system component must be the clock for all other components so that all process control system components work with an identical time. The PCS 7 component that functions as timer is referred to as the time master. Components such as the central plant clock SICLOCK or an OS server can be configured as the time master.

The time master is responsible for distributing the time signal to the PCS 7 components to be synchronized, for example, operator stations and automation systems.

Synchronization options

The following table below shows the PCS 7 components for which time synchronization is possible:

Station	Synchronization
Operator station and maintenance station	PCS 7 internal synchronization The time master can be on one of the following networks: <ul style="list-style-type: none"> • On the terminal bus • On the plant bus
BATCH station	In the case of installation without OS, no synchronization via PCS 7.
Route Control station	You have the following options for synchronization, for example: <ul style="list-style-type: none"> • Synchronization via DCF77-client • Synchronization via the domain controller as the time master on the terminal bus
SIMATIC PCS 7 BOX	PCS 7 internal synchronization is possible. The method used depends on the product variant (Page 37) (operator station or AS)
AS	<ul style="list-style-type: none"> • Synchronization via the plant bus
Domain	<ul style="list-style-type: none"> • Synchronization via the domain controller as the time master on the terminal bus
Time master	<ul style="list-style-type: none"> • The time master is integrated in a PC or connected to the Ethernet network as a bus component. • The time master can be any device which can transmit a time signal via the Ethernet network. Additional information (a PC, for example).

Setting the time format in a system

Ensure you set the same time format (12 hour format / 24 hour format) for all programs and devices.

Additional information

You can find detailed information on time synchronization in the *Process Control System PCS 7; Time Synchronization* manual.

Hardware for PC stations

4.1 Preconfigured PC systems for PCS 7 (product bundles)

PC hardware for engineering stations (ES) and operator stations (OS)

Special versions of the basic hardware (product bundles or bundle PC) are available for engineering stations (ES) and operator stations (OS).

The bundle PCs are preconfigured PC systems for PCS 7, which have been optimized for the specific area of application.

The preconfigured PC systems that are available for PCS 7 can be found in the current *ST PCS 7* catalog under the keyword "Entry level systems".

We recommend SIMATIC PCS 7 BOX PCs for use in small standalone systems or for combined AS/OS stations in the PCS 7 network.

You can find additional information on this in the *Process Control System PCS 7; SIMATIC PCS 7 BOX* manual.

If you use other types of PCs for PCS 7, you can find the relevant hardware requirements in the "Basic hardware configuration (Page 52)" section.

Color monitors

Choose a suitable monitor for PCS 7:

- Using standard monitors: minimum resolution 1280 x 1024
- Using widescreen monitors: minimum resolution 1680 x 1050

The higher resolution allows you to better utilize the display features of the PCS 7 software, for example, for the online operation of faceplates from the libraries. Note that suitable drivers must be available.

Network connection

All PCS 7 product bundles are configured for a Windows workgroup. The firewall of the operating system is deactivated by default.

If you enter these PCs in a Windows domain, you need to reactivate the security settings using the PCS 7 setup.

You can find more detailed information on security settings in the "Notes on installing PCS 7 (Page 80)" section.

Additional information

- Catalog *ST PCS 7*
- Catalog *ST PCS 7 AO* (add-ons for SIMATIC PCS 7)

4.2 Basic hardware configuration

Information in the readme file

Read the latest information that accompanies each PCS 7 version in the document *Process Control System PCS 7; PCS 7 Readme*.

You can find information about this function in the section "Preface (Page 9)".

Additional information

- Catalog *ST PCS 7*
- Catalog *ST PCS 7 AO* (add-ons for SIMATIC PCS 7)

4.3 Components for connection to the terminal bus/plant bus

Attachment of OS, BATCH, Route Control and ES

You can connect the following PC stations to Industrial Ethernet via network adapters (network cards or communications processors):

- Operator stations
- BATCH stations
- Route Control stations
- Engineering stations

The network adapters occupy a slot in the PC or programming device (PG). Different network adapters are used depending on requirements.

Note

Bundle PC

Observe the requirements for the PC components. You can find additional information on this in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)").

Connection to the terminal bus

For connection to the terminal bus:

- Released communication modules for the PC station (for example, Intel® Gigabit CT Desktop Adapter; Ethernet onboard interface)
- Versions for the redundant connection of the PC station to a terminal bus:
 - Parallel Redundancy ProtocolYou can find information on this in the function manual *Process Control System PCS 7; High Availability Process Control Systems*.

Use the product documentation to verify that the communication modules are suitable for the terminal bus when implementing the respective concept.

Connecting to the system bus

You can use the following network adapters to connect to the system bus:

- Standard communication modules:
 - If you connect up to 8 communication partners per PC station (automation systems or servers).
 - If high availability automation systems are used with CPUs (firmware version as of V6.0 or CPU 410 Process Automation V8).
 - If you require connections between PC station with 2 network adapters and high availability automation systems (2 way redundancy).
- Communication modules with onboard processors (**CP 16xx**) are required in the following cases:
 - If you connect between 9 and a maximum of 64 communication partners per PC station (automation systems or servers).
 - If high availability automation systems are used with CPUs (firmware version earlier than V6.0 or CPU 410 Process Automation V8).
 - If you require connections between PC station with 2 network adapters and high availability automation systems (2 way redundancy and 4 way redundancy).

Licensing of the network adapter

- Licensing for high availability automation systems
You can find more information on this in the function manual *Process Control System PCS 7; High Availability Process Control Systems*.
- Licensing for the configured terminal bus
If you use a CP 16xx on the system bus and configure the terminal bus in NetPro, you will require a BCE license.

Firewall on the system bus

If you use a firewall on the system bus, you will need a communications processor for the SIMATIC stations from the CP 443-1 EX xx series with at least firmware version V2.5.5; EX xx meaning: EX 10 and above)

Driver

You can find information on the availability of the drivers in the *PCS 7 Readme*.

Time synchronization

The communications processors of type CP 16xx support time synchronization on Industrial Ethernet (Fast Ethernet). A PC with communications processors can receive time frames from the following time transmitters:

- Master clock (SIMATIC SICLOCK TC 400 recommended)
- SIMATIC NET time transmitters for Industrial Ethernet
For additional information see catalog *IK PI*
- PC with CP 16xx

Additional information

- You can find approved network adapters in the catalog overview *Process Control System PCS 7; Released Modules*
- You can find information on high availability automation systems in the function manual *Process Control System PCS 7; High Availability Process Control Systems*.
- You can find information about time synchronization in the function manual *Process Control System PCS 7; Time synchronization*.

See also

Tasks of terminal bus and plant bus (Page 43)

4.4 Optional hardware components

Note

Ordering optional hardware components

You will find hardware components which are suitable and approved for PCS 7 in the *ST PCS 7* catalog.

Be aware of any dependencies on the operating system used and standards for required additional components (e.g. standards for chip cards required).

Overview

Component	Application
Smart card reader (Smart card reader)	This is used to access the PC stations via chip cards. All authorized users need a chip card.
Printer	Use a graphics-enabled printer or a line printer for message sequence reports. Printers must be supported by the operating system.
Signal module	<p>You can use the signal module to control three visual or acoustic signal transmitters. You assign tags to these three signal transmitters in the WinCC editor "Audible signal device". If a tag has the status "1", the corresponding signal transmitter of the signal module is activated.</p> <p>The signal transmitter is acknowledged/reset via the software or an external acknowledgment on the signal module.</p> <p>A group signal is also available to you on the signal module. The group signal is triggered when one of the three signal transmitters is present and can control an acoustic or visual signal transmitter.</p> <p>Connecting a signal module also facilitates sign-of-life monitoring thanks to the watchdog function.</p>
Sound card	You can use a standard sound card to expand OS single station systems and OS clients. Files, such as a "*.wav", are played back through suitable devices (loudspeakers, piezo transmitters) via the signal module.
Radio clock	This is used to synchronize the PCs and plant bus.
Intrinsically safe operating unit	If required, use an intrinsically safe PC operating unit (add-on product) in hazardous areas, zone 1 or 2 - distances of up to 750 m are possible.
Graphics card	<p>If multiple monitors are to be operated on a PC, you can install an appropriate graphics card. Typical applications are PC stations for the following applications:</p> <ul style="list-style-type: none"> • An engineering station or • A client for an operator station or SIMATIC Route Control <p>This allows you to connect up to four monitors to a PC (for clients and engineering stations).</p>
Redundant network adapters	<p>These allow you to connect PC stations to the respective bus system:</p> <ul style="list-style-type: none"> • Terminal bus • Plant bus

Additional information

- Catalog *ST PCS 7*
- Product overview *Process Control System PCS 7; Released Modules*
- Section "Overview of additional devices and drivers for PCS 7 (Page 102)"

4.5 Configuring and ordering

Station configuration software

You can find the configuration editor software that will support you in building your PC networks on the DVD *Interactive Catalog CA01; Automation and Drives Engineering*.

Ordering information

You can find the ordering information for tested PC configurations and software components in the *Process Control System PCS 7; ST PCS 7 Catalog*. The components offered represent the optimal basis for your plant for all areas of application. The catalog offers turn-key solutions.

Custom solutions

For custom solutions for PC systems (for example, RAID systems), contact your Siemens representative in the sales and service locations that are responsible for your company.

You can find your Siemens contact on the Internet (http://support.industry.siemens.com/aspa_app/).

Installing PC stations

5.1 Overview of installation steps

Introduction

Below, you will find a practical outline of the basic procedure for installing PC stations for PCS 7.

Siemens AG offers training courses on PC and network administration. Please contact your regional training center or the central training center for more information.

Security settings

Before the PCS 7 setup program performs the installation, the "Security Controller" dialog box appears. This dialog box displays the system settings that Setup for PCS 7 will make on the PC station.

You can find information on this in the "Notes on installing PCS 7 (Page 80)" section.

Overview of the individual steps for installation

This overview shows the recommended sequence of installation tasks.

Step	What?
Installation of the operating system	
1	Installing the operating system (Page 71)
2	Installing operating system service packs (Page 76)
3	Setting the location where the swap file is to be stored (Page 77)
4	Making system settings (Page 77)
5	Installing the Message Queuing service (Page 72)
6	Installing additional components (Page 78)
7	Installing the Internet Information Service (IIS) (Page 73)
8	Installing additional services for SIMATIC BATCH (Page 79)
9	Setting the color scheme and font size (Page 78)
10	Creating a backup (Page 79)
Installation of PCS 7	
11	Installing the PCS 7 software (Page 84)
12	Installing the central archive server (Process Historian) (Page 88)
13	Configuring redundancy for redundant servers (Page 89)
14	Installing a PC for PCS 7 OS Web Option (Page 89)
15	Activating the firewall in PC stations (Page 94)
16	Installing additional communication modules and PCS 7-specific settings (Page 98)
17	Licensing the PCS 7 software (Page 106)

5.1 Overview of installation steps

Step	What?
18	Preparing the PC stations (overview) (Page 111)
19	Creating a backup (Page 79)

5.2 Workgroup and domain

Working environment

You have the option of operating the computers in your PCS 7 plant in a workgroup or domain environment.

The following tables present a comparison of the advantages and disadvantages (from a technical perspective) as well as scenarios (examples) and their use in workgroups and domains.

Note

This information is provided as a basis for discussion to assist you in the selection of the appropriate environment for your computers. In addition to the technical criteria, also consider organizational criteria (for example, plant-specific IT, Microsoft expertise, resources, workload and maintenance, etc.).

Advantages and disadvantages

	Domain (AD; Active Directory)	Workgroup (WG)
General information (in relation to Microsoft Windows)	The user information is stored centrally.	Standard user settings are required at each PC station.
	Central safety database	Local safety database
	Suitable for very large networks (scalability)	Suitable for short distances in the plant and a limited number of PC stations.
	Authorizations for devices and files are managed in the AD.	Authorizations for devices and files are managed by individual PC stations.
Administrator	The administrator must have comprehensive knowledge (substantially higher qualifications).	The administrator must be familiar with the setup and management of PC stations in the workgroup network.
User accounts, group policies, resources, security	Central administration in the AD.	Distributed administration on each PC station.
Planning	Comprehensive planning is required.	Less comprehensive planning is required.
Number of PC stations	Additional PC stations required to manage the AD. Windows server required to store central security information.	Windows server only required if this is used to set up the infrastructure, for example, as a DHCP server
Use with SIMATIC Logon	<ul style="list-style-type: none"> The users set up for the AD are used. High reliability through the use of redundant domain controllers. 	<ul style="list-style-type: none"> The users can be managed at a central PC station. No redundancy is available for the central logon station to be set up.

Domain example

Changes can be made centrally, fast and conveniently in the domain structure. However, the administration of a domain requires know-how, experience and additional work.

Workgroup example

In the workgroup, the majority of settings have to be made on the local computer. If a PCS 7 plant is running with fixed settings, however, and few changes are expected, these settings only need to be made once. In this case, additional time for creating a domain and providing extra training for the operating personnel is not required.

Integration in a domain

All PCs in the PCS 7 product bundles are configured for a Windows workgroup. If you include preconfigured PC systems in a Windows domain, you must reactivate the security settings using the SIMATIC "Security Controller" software.

DHCP server

Note

In PCS 7, the use of a DHCP server is only permitted with address reservation. All PC stations must work with reserved addresses.

DNS / WINS server

The recommended solution for name resolution is the use of a DNS / WINS server.

Scenarios

Scenarios (examples)	Domain (AD; Active Directory)	Workgroup (WG)
New user is added.	The new user is created centrally in the AD and is then available immediately on all PC stations.	The new user must be added on each PC station.
User password is changed.	The password is changed centrally in the AD.	The password must be changed on each PC station.
Add or replace computer	The settings are applied automatically in accordance with the group policies of the corresponding organizational unit.	The settings must be adapted locally on the PC station.
Modify security settings	The settings are changed centrally in the AD and distributed by means of group policies.	All settings must be changed locally.
Microsoft Updates are to be distributed.	The settings for the Microsoft Windows Software Update Service (WSUS) are made centrally in the domain.	The settings for the Microsoft Windows Software Update Service (WSUS) are made at each PC station.
Devices are added (e.g. printer, fax or scanner).	The devices are announced by AD.	Devices not announced. The information for connecting to the device must be known.
	The security settings can be made centrally for each device.	Each user that uses the device must be created locally at this PC station and log on with local user information.

Scenarios (examples)	Domain (AD; Active Directory)	Workgroup (WG)
One user uses multiple computers.	The user profile can be saved centrally. This applies the settings to all PC stations at logon.	The user has a local profile on each PC station.
	If the profile is not saved centrally, every user will have their own local profile.	

The lists above are not weighted in terms of importance; you must determine which advantage or disadvantage is the most significant for the PCS 7 plant in question.

Setting package size for communication (MTU size)

As of PCS 7 V8.1 SP1, the MTU (maximum transmission unit) size must be set for all computers located in the PCS 7 plant.

- Setup makes the necessary settings on computers with installed PCS 7 components.
- The MTU size has to be set to 1494 bytes for all components without a PCS 7 installation. This can be done on computers without a PCS 7 installation (e.g. domain controller and file server) or network components based on Windows (e.g. Automation Firewall) using the tool "set_mtu_size_to_1494.exe".
 - You can find the "set_mtu_size_to_1494.exe" tool on the PCS 7 DVD 2 in the folder **Additional_Products > MTU**. Documentation on the tool can be found in the same folder.
 - An administrator must execute this file on all computers on which no PCS 7 components are installed.

Additional information

- Section "PC configuration security settings (Page 69)"
- You can find additional information on the Internet: www.siemens.com/pcs7-documentation (www.siemens.de/pcs7-documentation)
You can find the following manuals via the link:
 - PCS 7 Security Concept; Recommendations and Notes
 - SIMATIC Process Control System PCS 7; Security concept PCS 7 & WinCC - Basic document
 - SIMATIC Process Control System PCS 7; Support and Remote Dialup
 - SIMATIC Process Control System PCS 7; Patch management and security updates
 - SIMATIC Process Control System PCS 7; Managing virus scanners

5.3 Installing the operating system

5.3.1 Notes on installing the operating system

Introduction

Only appropriately qualified personnel may install the operating system, particularly the servers, and configure networks.

Below you will find information about how to make the settings.

Operating systems

You can find information about operating systems for PC stations on which PCS 7 software is installed in the *Process control system PCS 7; PCS 7 Readme* file (see "Preface (Page 9)"). Below you will find the most important information and settings for installing operating systems approved for PCS 7.

You can find information on this in the installation manual *Process Control System PCS 7; Licenses and Configuration Limits*.

Requirements

- All the necessary modules and devices have been installed in your PC.
- Check if you have a 32-bit or 64-bit version of the operating system and whether the PC station is suitable for the operating system.
- Check whether the operating system is suitable for the software that you want to install on the PC.
- Check that you have the product key. Example
PRODUCT KEY: XXXXX-XXXXX-XXXXX-XXXXX-XXXXX
The product key is available in the following places:
 - On the cover of the installation data medium
 - When you purchase software online: In a confirmation e-mail
- Ensure that you know the name of the computer to be configured (name of the PC station in the plant).
- Back up the files of the PC station if you may need them later.
- The installation data is available on a bootable medium.
The description below assumes that the installation is performed from a SETUP DVD.

Integration in networks

You can integrate PC stations for PCS 7 in a network. Note the following:

Note

Install the PC stations locally or in a workgroup. Using this procedure prevents group policies or domain restrictions from hindering the installation.

Do not use the following PC stations in PCS 7 for domain management (as DHCP or DNS server, for example):

- OS server
- BATCH server
- Route Control server

If a server (OS server, BATCH server, Route Control server) is also used as a server for these services, then the PCS 7 functions may be impaired due to overloading of the PC's resources.

NOTICE

Software products of PCS 7

Only install PCS 7 software products listed in this documentation on a PC station. This applies in particular to PC stations used for process mode (OS, SIMATIC BATCH, SIMATIC Route Control).

Installing and simultaneously activating applications that are not approved by Siemens can adversely impact the PCS 7 system performance.

The user bears sole responsibility when third-party products are used. If you use third-party products, these must be installed before you install PCS 7. PCS 7 and these third-party products should not run at the same time.

Reinstalling and updating

Note the following general information in regard to updating software.

NOTICE

Important information

Please note the following:

- If the operating system for PCS 7 has not been installed on the PC station yet, reinstall the PC. This requires the operating system to be changed.
- Check the suitability of your hardware before performing a new installation. You can find additional information on this in the file *Process Control System PCS 7; PCS 7 Readme* (see "Preface (Page 9)").
- Back up your licenses (authorizations and license keys).
- Save your unchanged project and associated data prior to reinstallation (in an image, for example). You can find additional information about this in the manual *Process Control System PCS 7; Service Support and Diagnostics*.
- Make the preparations for updating the software. You can find additional information about this in the manuals *Process Control System PCS 7; Software Update*.
- Back up the data required for the software update.
- Format the hard disks and create new partitions.

Operating system languages

We recommend the following Windows MUI operating systems (Multilingual User Interface) with the following languages and corresponding regional settings:

- German
- English
- French
- Italian
- Spanish
- Chinese

When you use PCS 7, you will have to set the required language and region at every point in the Windows language settings. This affects all the settings available under "Regional and Language Options".

If you use PCS 7 ASIA, make the following settings in the Windows regional and language options:

- For the "Language version of the non-Unicode programs" select "Chinese (PRC)"
- For the "Language used in menus and dialogs", select "English" if you set the language of the PCS 7 user interfaces to English.
- For the "Language used in menus and dialogs", select "English" or "Chinese (simplified)" if you set the language of the PCS 7 user interfaces to Chinese.
- For the "Standards and formats", select "Chinese (PRC)".

If you change the "Language used in menus and dialogs", the character set may not be changed automatically in all cases. We therefore recommend that you go to Control Panel and select the "Windows Classic" style under "Display", "Display Properties", "Appearance".

Note

PCS 7 only supports the main languages (primary language) of the operating system languages, for example English (US), but not English (GB).

Windows Authenticode Signature verification

The change of the Windows Authenticode signature verification described in Microsoft Security Advisory 2915720 cannot be activated in PCS 7.

Asian version of PCS 7

The "SIMATIC PCS 7 Vx.x Asia" USB hardlock is required for each PC to operate the OS stations.

Bundle PCs

The product bundle PCs of PCS 7 are supplied with a multilingual operating system.

The default language is English; the multilingual packages which include German, French, Italian and Spanish are installed.

If you install a PC yourself, we recommend the following when selecting the operating system language:

- If the PC users only use one language, select the operating system language used for configuration/process control.
- If the users use multiple languages on the PC, select a multilingual operating system (English/USA by default) and then install the additional Multilingual User Interface Packs.

5.3.2 Partitioning hard disks

Partitioning the hard disks

If you are not using a preconfigured PC from a PCS 7 product bundle, but instead a different type, divide the PC's hard disk into the following partitions to facilitate easy data backup.

- For the operating system and the PCS 7 installation: Minimum 100 GB, see example
- For PCS 7 project data: At least 100 GB, possibly several partitions
- For backups: Back up the projects and archives to media that will not be affected by a failure of the PC or the hard disk with the original data, for example, a DVD or on the network.

If you use a preconfigured PC from a product bundle, the configuration-specific partitions are set up.

Example

Example of the hard disk in a PC station:

Drive letter	Size in GB	Drive name	Formatting	Intended use
C:	100	SYSTEM	NTFS	Operating system installation and PCS 7 installation
D:	x (remaining hard disk space)	DATA	NTFS	PCS 7 project data
Backup files				
The backup files on the "... " drive are used here as an example. If the backup files are not stored directly on the final backup medium, they can be placed temporarily on drive "C:" or "D:".				
...	100	BACKUP	NTFS	Backup files of another PC station
...	...	Second hard drive or external backup		Backup files of the PC station

Additional information

You can find information about the minimum configuration of the basic hardware in the *Process Control System PCS 7; PCS 7 - Readme* file (see "Preface (Page 9)").

5.3.3 Name of the PC station

The selection of the computer name is crucial to the project configuration. You specify the computer name during installation of the operating system on the computer.

Specifying the name of the PC station

Note

Please note when configuring an OS or BATCH server and an engineering station that the following names must be identical:

- Computer name
 - Name of the PC station
-

Select short and descriptive computer names that provide some information about the role of the PC station in the overall system.

Specifications:

- The computer name starts with a letter.
- The computer name must only contain letters and numbers.
- The computer name can contain up to 15 characters (limited by the operating system).

Additional naming conventions

You can find additional naming conventions for projects in:

- Manual *SIMATIC; Process Control System PCS 7; Engineering System*, section "Rules for naming in the PH"
- Online help *WinCC Information system* "Working with projects > Appendix > Invalid characters"
- In the file *Projects.pdf*. You can find this file in the SIEMENS SIMATIC products installation folder.

Changing the computer name

The computer name can no longer be changed after the installation of PCS 7. If the computer name is nevertheless changed, you must perform a new installation (Restore DVD).

Note

Note the following:

- If you want to change the computer name for a bundle PC, perform a new installation with the Restore DVD.
 - If you want to change the computer name for a PC you have installed yourself, perform a new installation of Windows.
-

Changing the computer name before installation of PCS 7

You can change the computer name in the Control Panel.

5.3.4 PC configuration security settings

Introduction

Current production methods increasingly require process control systems and the IT environment to come together. The need to connect company networks to public ones brings with it increased hazard potential. Information system and network security has therefore become an important factor in operating process control systems. Accurate knowledge of the sources of risks and the implementation of measures to prevent these risks from occurring is of utmost importance.

Comprehensive knowledge of administrating Microsoft Windows networks is required if you want to integrate PCS 7 PC stations into a PC network.

Recommendations and instructions

The manual *Process Control System PCS 7; Security Concept PCS 7; Recommendations and Notes* helps Administrators to plan and configure PC networks:

- It will give you an overview of network, computer and user management, as well as the management of user and access rights in PCS 7.
- It will provide you with important information about integrating PCS 7 networks into the Windows management system.
- You will learn what the options are available for time synchronization in a PCS 7 plant.
- You can find information about how to establish patch management and secure communication paths between the PC stations in a PCS 7 plant.

Note

This manual builds on the possibilities of the operating systems used with PCS 7 and assumes the reader has an understanding of administration of these operating systems.

Security settings on a PC

The required security settings are applied on the PC when PCS 7 is installed.

Note

When the PCS 7 plant is operated in a domain, the security settings must match throughout the entire domain. Consult with your administrator to agree upon uniform security settings.

Network

You must isolate the network for a PCS 7 plant via switches, routers, or gateways to ensure that no faults reach the PCS 7 plant, via office networks, for example.

You can find information about protecting data exchange between the operator stations in the following sections:

- Section "How to configure encrypted communication between the PC stations (Page 124)"
- Section "How to set up the connection between the PC station and plant bus (Page 117)"

Virus scanners and updates

Important information on the following topics is available in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)"):

- **Virus scanners**
You can find additional information on this in the section "How to install additional components (Page 78)".
- **Updates**
You can find additional information on this in the section "Installing security patches, hotfixes, service packs (Page 130)".

Additional information

- Section "Notes on installing the operating system (Page 64)"
- You can find additional information about the security settings in the following section:
 - Section "Installing security patches, hotfixes, service packs (Page 130)"
- Document *Security concept PCS 7 and WinCC - Basic Document*
- *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)")

5.3.5 Installing an operating system

Configuring the operating system

The operating system setup is largely self-explanatory. Below, you will find information about the settings which you need to adjust:

- **Security**
Take into account the recommendations in the whitepaper; *Security Concept PCS 7 and WinCC*.
This document can be downloaded from the Internet at the Customer Support (Page 75) website:
 - Assign a secure password for the local administrator.
 - You should only make connections to secure networks when connecting to WLANs. Make the system-specific settings to protect the computer.
- **Specify and format hard drives/partitions**
You can find information about this in the section "Partitioning hard disks (Page 67)".
If you want to change partitions, you may need to delete partitions and create new ones. The existing partitions are displayed in Setup.
- **Computer name**
You can find information about this in the section "Name of the PC station (Page 68)".
- **Licensing the operating system**
Make sure you have the correct number of licenses. Each server requires a server license and a system-specific number of client licenses (CALs).
A PCS 7 server bundle includes five client licenses (CAL).
The CALs are not registered or recorded in the operating system.

Installing a Multilingual User Interface Pack (MUI)

You can find information about this in the section "How to Install a Multilingual User Interface Pack (Page 75)".

Recommendations for PC stations (Windows 10 and Windows 7)

- **Deactivate games**
 - Use the search box in the start menu to open the "Programs and Feature".
 - Disable the "Games" option under the Windows features if this option is available.
- **Deactivate "Automated System Recovery/System Restore"**
 - Use the search box in the start menu to open the "System".
 - Double-click the function "Advanced System Settings".
 - In the "System Protection" tab, select "Disable system protection" or "Turn off system protection" option for all drives.

Additional information

- Section "How to install the Message Queuing Service (Page 72)"
- Section "How to configure the Microsoft Internet Information Service (IIS) for the server (Page 73)"

5.3.6 How to install the Message Queuing Service

Introduction

PCS 7 uses the Microsoft Message Queuing Service. This component is part of the operating system. MS Message Queuing is not included in the standard installation of Windows, however, and must be installed separately, if needed.

You need the installation CD of the operating system for the installation.

Requirement

- You are logged on as an Administrator.

Procedure for Windows 10 / Windows 7

1. Use the search box in the start menu to open:
 - With Windows 10 : "Programs and Features"
 - With Windows 7: "Programs and Features"
2. Under the Windows Features, activate the "Microsoft Message Queue Server" component.
3. Activate the following option: "Microsoft Message Queue Server Core Components".
 - Deactivate the subcomponents.
4. Confirm with "OK".

Procedure for Windows Server 2012 R2

1. Use the search box in the start menu to open the "Server Manager".
2. Select the "Message Queuing" component in the "Features" area.
3. Activate the following there:
 - for Windows Server 2012 R2: The options "Message Queuing Services" > "Message Queuing Server".

Checking the Message Queuing Service

Check in the event log to ensure that the Message Queuing Services have been activated correctly:

1. Use the search box in the start menu to open the "Event View".
2. In the tree view, select "Event Viewer > Application and Services Logs".

The Message Queuing Service has been installed correctly if the "Source" column contains the entry "MSMQ".

Incorrect function

If an error message appears under "Description" in the "Event Properties" dialog box, the installation has not been executed correctly. Remove and then reinstall "Message Queuing Services".

5.3.7 How to configure the Microsoft Internet Information Service (IIS) for the server

Introduction

The Internet Information Service (IIS) is required to install and use the following PCS 7 PC stations:

- PCS 7 Web server
- Information Server
- PC station where BATCH archives are stored.
- PDM Server

Deactivate the service for all other installations.

Requirement

- You are logged on as an Administrator.

Installing IIS

Table 5-1 Activating services and options:

Windows 7	Windows 10	Windows Server 2012 R2
1. Activate the "Internet Information Services" via the "Windows Features": <ul style="list-style-type: none"> - "Web Management Tools": see "IIS Functions" table below - "WWW Services": see "Web Services" table below 		1. Activate the role of "Web Server (IIS)" via the Server Manager of the operating system. 2. Activate the following role services for the "Web Server" role: <ul style="list-style-type: none"> - "Web server" see "Web Services" table below - "Administrative Tools" see "IIS Functions" table below
Note: Services and options are arranged in a different order in the operating systems.		

Table 5-2 Web services
Activate the following:

Services	Options
Common HTTP Features	<ul style="list-style-type: none"> • Default Document • Directory Browsing • HTTP Errors • HTTP Redirection • Static Content
Application Development (Application Development Features)	<ul style="list-style-type: none"> • .NET Extensibility (3.5 and (4.5 or 4.6), if available) • ASP • ASP.NET (3.5 and (4.5 or 4.6), if available) • ISAPI Extensions • ISAP filters
Performance (performance features)	<ul style="list-style-type: none"> • Static Content Compression
Security	<ul style="list-style-type: none"> • Request filtering • Basic authentication • Windows authentication
Integrity and diagnostics (system health and diagnostics)	<ul style="list-style-type: none"> • HTTP logging • Logging Tools • Request monitor • Tracing

Table 5-3 IIS functions
Activate the following:

Operating system	Services	Options
Windows Server 2012 R2	Administration tools	<ul style="list-style-type: none"> • IIS Management Console • IIS Management Scripts and Tools • Admin Service • IIS 6 Management Compatibility <ul style="list-style-type: none"> – IIS 6 Metabase Compatibility – IIS 6 WMI Compatibility
Windows 7 Windows 10	Web management tools	<ul style="list-style-type: none"> • IIS Management Service • IIS Management Console • IIS Management Scripts and Tools • IIS 6 Management Compatibility <ul style="list-style-type: none"> – IIS 6 Management Console – IIS 6 Scripting Tools – IIS Metabase and IIS 6 configuration compatibility – IIS 6 WMI Compatibility

5.3.8 How to Install a Multilingual User Interface Pack

Basic procedure

Install the required Multilingual User Interface Packs via the operating system.

You can find information in the section: "Notes on installing the operating system (Page 64); Operating system languages".

NOTICE
<p>Property of operating systems</p> <p>Installed language packs that are not used will be removed from the operating system after some time:</p> <ul style="list-style-type: none"> • Windows 10 • Windows Server 2012 R2

You can prevent the removal of language packages as follows:

- Add all languages to be retained to at least one user in the language list.
- Disable the task LPRemove (Language Pack Removal Task) in Computer Management > Task Scheduler.
This setting may change with an operating system update.
 - Default setting for LPRemove with PCS 7 Bundle PC station:
LPRemove **disabled**
 - Default setting for LPRemove after installation of the operating systems:
LPRemove **enabled**

Additional information

You can find additional information about performing LPRemove on the web pages of the operating system manufacturer:

5.3.9 How to install service packs for the operating system

Introduction

If you installed the operating system without a service pack, you will need to install the service pack before continuing.

Versions

Note

The version you need is listed in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)").

Requirement

Only install service packs, if you can reboot the PC station. A service pack may reboot the PC station automatically or you may have to reboot to use the modified function.

Procedure

1. Install the service pack.
2. Recommendation: Perform a reboot of the PC station after installation of the service pack.

Additional information

- Section "Installing security patches, hotfixes, service packs (Page 130)"

5.3.10 How to set the paging file

Introduction

The operating system requires additional disk space for the paging file (virtual memory; this is created by default on the operating system partition).

Rules for setting the size of the paging file

The size of the paging file depends on the memory configuration of the PC. We recommend the following setting:

"Swap file managed automatically"

Configuring virtual memory

Refer to the online help of the operating system to learn how to open the dialog for configuring virtual memory.

5.3.11 How to make additional system settings

Procedure

1. Set up local users and groups via the Control Panel. You can find additional information on this in the section "Setting up user groups and users (Page 89)".
2. We recommend the following display settings:
 - Select one of the following settings for PCS 7:
 - Use of standard monitors: Minimum resolution 1280 x 1024
 - Use of widescreen monitors: Minimum resolution 1680 x 1050
 - The higher resolution allows you to better utilize the display features of the PCS 7 software, for example, for the online operation of faceplates from the libraries. Please ensure that you have installed appropriate drivers and are using suitable monitors.
 - For PC stations that are involved in process mode, the power saving plan should be set as follows:
 - Turn off the monitor: Never
 - Put computer to sleep: Never
3. Disable the energy saving option for network adapters.
You can find additional information on this in the section "How to disable the power saving options of network adapters (Page 100)".
4. Use the Event Viewer to check that all services and drivers are functioning correctly.
5. Server for process mode: Optimize background services
Select the option to optimize the system performance for background services in the advanced system properties in the Control Panel. ("Advanced" tab; "Processor scheduling" section).

5.3.12 How to set the color scheme and font size

Introduction

The settings for the color scheme and font size can sometimes change automatically when other programs are installed.

Recommendations

The following recommendation increases the performance of the PC station. Correct the following setting, if necessary.

- Color scheme: Windows - Classic

5.3.13 How to install additional components

Virus scanners, updates and Microsoft Office products

Important information on the required software, versions and availability is available in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)").

You should install the following software after installing the operating system components:

- **Updates** for the operating system
- **Virus scanners** approved for the current PCS 7 version
- **Microsoft Office products** approved for the current PCS 7 version (if needed)
You must also install additional Microsoft components for some PC configurations.
 - Language versions:
Install the additional Microsoft component in the language version of the operating system.
The language version of the component can be distinguished by using a language-specific directory and/or the language code in the file name.
 - Procedure:
Install the components named in the *PCS 7 Readme* file.

Note

Please note that some updates will require you to restart your PC and cannot, therefore, be installed in process mode.

Installation at a later time

You can also install these components at a later time, especially for pre-configured PC stations (product bundles).

5.3.14 Installing additional services for SIMATIC BATCH

Introduction

If you want to transfer SIMATIC BATCH archives using FTP, then additional installations are required on the PC stations.

Additional services to be installed

PC station	Service or software that needs to be installed
PC station to which the BATCH archives are transferred	IIS service FTP service
PC station from which the transfer of BATCH archives will be activated	FTP service
PC station from which the transferred BATCH archives will be accessed	BATCH Control Center (BatchCC)

Additional information

- You can find additional information on configuring services in the manual *Process Control System PCS 7; SIMATIC BATCH*.

5.3.15 Creating a backup

Recommendation

After restarting and testing the installation, create a backup of the partitions on which the operating system/PCS 7 software is installed.

We recommend creating an image of the installation for backing up partitions and hard drive data. An image allows you to restore partition and hard drive data at any time or to prepare the PC for a software reinstallation.

Note

Please be aware that the license keys cannot and may not be included in the backup.

- Move the license keys to another medium (license key USB stick, partition etc.) before creating the image.
- In selecting image software, ensure that it is suitable for the operating system in use.
- To create an image, follow the image software manufacturer's instructions.

5.4 Installing the PCS 7 software

5.4.1 Notes on installing PCS 7

Introduction

The PCS 7 software contains applications that allow you to configure systems and operate and monitor them in runtime. In addition to the applications of the basic software, there are numerous optional packages and upgrade packages that you can install later and use for special applications.

Refer to the latest *ST PCS 7* catalog to learn about all of the software packages released for PCS 7 and how they can be used. You can also find a detailed introduction in the documentation *Process Control System PCS 7; Engineering System*.

The following describes the installation for the basic PCS 7 software.

Versions of the software package

You can find information about versions of software packages which you can install from the latest *Process Control System; SIMATIC PCS 7* DVD in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)").

Latest information about the installation

Note

Please note the following:

- When installing PCS 7 in a network, make sure that at least one DVD drive and one diskette drive are available.
 - Read the latest information about installation and the software and hardware requirements in the *Process control system PCS 7; PCS 7 Readme* file (see "Preface (Page 9)").
 - If you install PCS 7 in a domain, be aware of the group policies or other restrictions that may hinder the installation. Consult the appropriate Administrator as regards these settings and the required approvals and authorizations.
 - If you want to use the Windows firewall, you must wait until PCS 7 is installed before activating it.
-

Rules for the installation and use of PCS 7 and other software

Note

Only the software products listed in this manual should be installed on a PCS 7 PC. This applies in particular to PC stations used for process mode (OS, BATCH, Route Control).

Installing and simultaneously activating applications that are not approved by Siemens can adversely impact the PCS 7 system performance.

The user bears sole responsibility when third-party products are used.

If you nevertheless need to use third-party products, they should be installed before you install PCS 7. PCS 7 and these third-party products should not run at the same time.

Several PCS 7 applications on a single PC station

A PC station can not only be used to run a single PCS 7 application (such as OS server) with PCS 7, it can also be used to run several PCS 7 applications (such as OS server and BATCH client). You can find additional information on this in the appendix "Approved configurations (Page 150)".

Installing the Microsoft SQL Server for PCS 7

The Microsoft SQL Server is required in PCS 7 for the specific PC stations: for example, operator station, engineering station.

As of PCS 7 V7.1, the installation is performed within the PCS 7 system setup and is automatically selected when required by the configuration to be installed for the PC station.

You can find additional information on this in the section "Setting up user groups and users (Page 89)".

Using Microsoft Office

You can find information about this in the section "How to install additional components (Page 78)".

Security settings

Settings are required in the registry, in DCOM and in the Windows firewall exception list for trouble-free operation of the PCS 7 software.

Before PCS 7 setup program performs the installation, the "Security Controller" dialog box appears. This dialog box displays the system settings that Setup for PCS 7 will make on the PC station.

- The settings in the exception list of the Windows firewall are applied to the area of the local network (subnet). If your PC stations are located in different networks (subnets), you need to change this area.
 - The settings in the exception list of the Windows firewall are made when the Windows firewall is disabled.
 - You can call up the "Security Controller" dialog box again. To do so, open "**Security Controller**" using the search box in the start menu.
-

Note

The settings must be applied again if a change is made in the work environment, for example, if you change from a domain to a workgroup or vice versa.

Note

For PCS 7 product bundle PCs such as SIMATIC PCS 7 BOX and SIMATIC IPC, note the following:

- When in factory state, the settings are made in the registry, in DCOM and in the exception list for the Windows firewall.
 - The local Windows firewall for the PCS 7 product bundle PC is disabled in the factory state.
 - The log of firewall events is disabled.
-

Note

When the PCS 7 plant is operated in a domain, the security settings must match throughout the entire domain. Consult with your administrator to agree upon uniform security settings.

You can find more information on this subject in the following sections:

- Section "How to access PC stations outside a subnet (Page 120)"
- Section "How to configure encrypted communication between the PC stations (Page 124)"

Shutting down Windows, standby mode / hibernation

Whenever you shut down Windows on your PCS 7 computers, use the command "Shutdown" or "Restart". Do **not** use the following operating modes:

- Standby mode
- Hibernation

5.4.2 How to install on a network

Preparation

If you want to install several PCs via network connections, preparatory steps are required. To be able to install on multiple computers at the same time, you need to make the contents of both SIMATIC PCS 7 DVDs available in a separate storage location (shared network path).

The following rules apply to the storage.

Rules

- The folders must be called "DVD_1" or "DVD_2" and must be located within a shared folder.

Note

Create a network copy of the two SIMATIC PCS 7 DVDs with the following structure:

...\PCS7_Vxx\DVD_1\
...

...\PCS7_Vxx\DVD_2\
...

- The name of the access path to the network copy of the DVDs (including the folder "DVD_1" or "DVD_2") cannot contain more than 85 characters.
- Make sure the PC is set up to automatically restore the link to the directory containing the PCS 7 software after a PC restart.
- Set up a share for the directory (folder or drive) on which the PCS 7 software is available.
- Set up the following access rights for the share:
 - Operating user: Read
 - System: Read

Procedure

1. Copy the files of the DVD to the respective folder.
Then continue working on the PC on which you want to install PCS 7.
2. In Windows Explorer look for the folder in the network on which you saved the copy of the DVD.
3. Call up the setup.
You can find additional information on this in the section "How to install the PCS 7 software (Page 84)".

5.4.3 How to install the PCS 7 software

Introduction

The *Process Control System; SIMATIC PCS 7* DVD contains the complete software for the PCS 7 applications. Only certain program packages must be installed depending on the PCS 7 application itself. In this phase you are supported by the PCS 7 system setup.

Licensing

You can transfer the license keys required for the program package either before or after the PCS 7 installation. You can find information on transferring license keys in the documentation *SIMATIC; Automation License Manager*.

You can find a description of the license concept in the section "PCS 7 licenses and quantity structures (Page 106)".

Checking the installation requirements

The PCS 7 system setup automatically checks whether the program packages needed for the PCS 7 installation are already installed on the PC.

If program packages are missing, a message appears indicating the missing components. The setup program is terminated after the message is confirmed. Install the missing program packages. Then, restart the PCS 7 system setup.

Plant with Process Historian as long-term archive server

Select the following program package for the OS servers that are to export archives to a Process Historian: **OS-Server for Process Historian**.

The "Process Historian Ready Component" can be installed at a later point in time on an OS server, if it has not yet been installed on the OS server. You can find it using "User-defined Installation" in the "Archiving and Reporting" folder.

Installing an OS server for PCS 7 Maintenance Station Basic

You can install the basic diagnostics for asset management for **one** OS server in a PCS 7 system without a maintenance station.

- No additional license key is required in order to use these functions.
- Select in addition the program package for this OS server: "Maintenance Station" program package for this OS server.

You can find more information on this topic in the documentation *Process Control System PCS 7; Maintenance Station*.

Requirements

- The operating system is installed and all the steps described in the "Installation of the Operating System" section have been completed.
- All communications processors have been installed in the PC.
- You have administrator rights on the PC station.

Starting the PCS 7 setup

1. Insert the *Process Control System; SIMATIC PCS 7* DVD into the DVD drive.
2. Double-click on "Setup.exe" to start the setup.
Setup starts.

Settings in the setup

Below, you will find information about the settings made in the setup dialog boxes, listed in the order in which they are processed:

1. Setup language
 - e.g. "English" and "Next"
2. Welcome
 - ... "Next"
3. Product information
 - ... Read this if needed and click "Next"
4. License agreement
 - ... Select the check box "I accept the conditions of the above license agreement as well as the conditions of the Open Source license agreement. I confirm that I have read and understood the security information".
 - ... "Next"
5. Setup type
 - ... Activate the "Install" or "Update" check box and click "Next".
6. User information
 - Enter the user information and "Next".
7. Installation type
 - ... Activate the "Package installation" check box to install the preselected program packages.
 - ... click "Browse" if you want to set a different destination folder.
 - ... "Next"

8. Program package
 - The program packages are shown. You can add additional PCS 7 packages. Activate the corresponding check boxes.
You can find approved combinations in the section "Approved configurations (Page 150)".
 - ... "Next"
9. Programs
 - Select the required packages.
 - ... "Next"
10. Selection of the programs to be installed
 - ... the selected programs are displayed. You can add additional software.
 - ... "Next"
11. If the installation of the Microsoft SQL server is required for the selected software component:
The displayed license agreement is valid for the installation of the SQL server. Enter the required and desired settings and operations:
 - ... "I accept the conditions of the license agreement" check box.
 - ... "Next"
12. System settings
Specific system settings and security settings are required for PCS 7. These settings apply, for example, to the registry, DCOM, OPC applications and the Windows Firewall exception list. An installation of PCS 7 is not possible without the required settings.
Select the "I accept the change to the system settings" check box.
13. Ready to install the selection.
 - The software installed on the PC for this PCS 7 application is listed in the display window.
 - ... "Install"

Note

Restart of the PC station required

Some of the PCS 7 program packages require a restart of the PC during installation.

14. Close the dialog box when the installation is complete.
15. Reboot the PC.

Setting the network connection to the terminal bus

If several network adapters are installed in the PC, network connections to the terminal bus must be set in order for the PC to be operated in the PCS 7 plant.

After a PCS 7 installation, a dialog appears in which the network adapter for the terminal bus must be selected. Once an adapter is selected, confirm it with "OK" and then confirm the "Reinitialize" dialog with "Yes".

- If several standard network adapters are used, the adapter for the terminal bus must appear first. (Network Properties: "Advanced > Advanced Settings").

Note

The above setting is not possible and not necessary for Windows 10.

- Network adapters with no functionality must be disabled.

You can find more information on this subject in the following sections:

- Section "How to set the communication module for connecting to the terminal bus (Page 115)"
- Section "How to access PC stations outside a subnet (Page 120)"

Display of installed software

You can check which program packages are installed on the PC station.

Open "**Inst. Software**" using the search box in the start menu.

You can find the installed software packages in the "Products" tab.

Virus scanners, updates and Microsoft Office products

You can find information about this in the section "How to install additional components (Page 78)".

PC station as a file server for storing projects for multiproject engineering

Note

An engineering station must be installed on a server operating system for a PC station to be used as a file server for multi-project engineering.

PCS 7 licenses are not required for this file server.

You can find more rules about storing projects on network servers in the online help for STEP 7.

5.4.4 How to prepare the engineering station for multi-user operation

Some of the STEP 7 configuration data is saved in a database. Access to this data is performed and coordinated via a Sybase server.

For this reason, a running Sybase server is an essential requirement. After the installation of STEP 7, this Sybase server runs in the context of the logged-on user and is started automatically when the user logs on.

For certain applications in multi-user operation, it may be necessary to maintain the project data on a central server computer and process the data from several client computers.

For the required Sybase server to run on the central server computer, a user must also be logged on to the central server computer in accordance with the specification above.

To remove this requirement, you can set up the Sybase server as a service with the "setsybserv.exe" application.

Setting up a Sybase server as a service

To set up the ES as a service, you must proceed as follows:

- Start the "setsybserv.exe" application with advanced rights (run as administrator) in the following directory:
 - For 32-bit operating systems: "C:/Program Files/Common Files/Siemens/S7UBTOOX/"
 - For 64-bit operating systems: "C:/Program Files (x86)/Common Files/Siemens/S7UBTOOX/"
- You will see the currently valid setting in the dialog box. By selecting the other option in each case, you can switch between the two configurations "Sybase server as service" and "Sybase server as user application".
- Then, set up the access rights to the shared folder in which you will make your project data available on the central server computer for multi-user operation:
 - Insert the "SYSTEM" user in the share permissions and allow "full access".
- Restart the computer in order for the settings to take effect.

Note

Operation of the "Configure SIMATIC Workstation" dialog

With the "Sybase server as service" configuration, the "Configure SIMATIC Workstation" dialog can no longer be operated in the context of a logged-on user.

5.4.5 How to install the Process Historian

Installing the Process Historian

You can find information on how to install the Process Historian in the *SIMATIC Process Historian* documentation.

5.4.6 Configuring redundancy for redundant servers

Introduction

You will need to configure the redundancy monitoring for redundant servers in PCS 7.

The following connections are available for redundancy communication:

- For OS servers and SIMATIC Route Control:
Null-modem cable to COM interface or network cable (cross-over cable) to an additional Ethernet network adapter.
- With BATCH servers:
Network cable (cross-over cable) to an additional Ethernet network adapter.
If using a PC as a BATCH server, this is the only type of redundancy connection permitted!

You can find additional information about configuring redundancy in the section " How to activate redundancy for high availability PCs (Page 133) ".

Additional information

- You will find information on configuring Updated as high availability components, redundancy and redundancy monitoring for redundant servers in the manual *Process Control System PCS 7; High Availability Process Control Systems*.

5.4.7 Installing a PC for Web Option for OS

Installation of PCS 7 Web server and PCS 7 Web client

You can find all the information and step-by-step instructions for installing the following PC stations in the *Process Control System PCS 7; Web Option for OS* manual:

- PCS 7 Web server
- PCS 7 Web client
- PCS 7 Web diagnostics server
- PCS 7 Web diagnostics client

Additional information

- *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)")

5.4.8 Setting up user groups and users

Some user groups and users are created automatically when PCS 7 software is installed.

The following table shows:

- The software installation on the PC station with which the user groups and users were created.
- The user group in which a user must be a member in order to use an installed application.

Note to the reader for the "User Groups and users" table

- The "Installation / Group in Setup" column defines the software that must be installed on the PC station in order for the user groups and users to be created.
- The "Component in setup" column defines the standard component in the PCS 7 setup which creates the user groups and users.
- The "User group / users" column lists the user groups and users which are automatically created when a software package is installed. The **user groups** are marked "bold".
- The "Members" column lists the users that are assigned to a user group in a PCS 7 plant.

User groups and users

Installation / Group in Setup	Component in the PCS 7 setup	User group / users	Members
Operating system	-	User	
Engineering	PCS 7 Engineering	SIMATIC HMI	OS project engineer Project administrators Operator Operator groups
	BATCH Engineering	SIMATIC BATCH	BATCH project engineer
	Route Control Engineering	RC_ENGINEER RS_MAINTENANCE RC_OPERATOR_L1 RC_OPERATOR_L2 RC_OPERATOR_L2	Route Control project engineer Route Control administrator (with all rights) Operators You can find additional information about operator authorization in the <i>Process Control System PCS 7; SIMATIC Route Control Manual</i> .
Runtime / Server	OS server	SIMATIC HMI	Project administrators Operator Operator groups
	BATCH server	SIMATIC BATCH	Operator
	Route Control server	RS_MAINTENANCE RC_OPERATOR_L1 RC_OPERATOR_L2 RC_OPERATOR_L2	Operator

Installation / Group in Setup	Component in the PCS 7 setup	User group / users	Members
Runtime / Single station	OS single station	SIMATIC HMI	Project administrators Operator Operator groups
	BATCH single station	SIMATIC BATCH	Operator
	Route Control single station	RS_MAINTENANCE RC_OPERATOR_L1 RC_OPERATOR_L2 RC_OPERATOR_L2	Operator
Runtime / Client	OS clients	SIMATIC HMI	Project administrators Operator Operator groups
	BATCH clients	SIMATIC BATCH	Operator Note: The Windows user of the BATCH client must be allocated on the BATCH server to users of SIMATIC BATCH.
	Route Control clients	RS_MAINTENANCE RC_OPERATOR_L1 RC_OPERATOR_L2 RC_OPERATOR_L2	Operator
SIMATIC Logon		LOGON_Administrator	Project administrators
SIMATIC Management Console	SIMATIC Management Console	SIMATIC Management Administrators	The required groups on each computer are created with the installation of the SIMATIC Management Console or the associated "SIMATIC Management Agent" service. You can find information about assigning users in the <i>Process Control System PCS 7; SIMATIC Management Console</i> documentation.
		SIMATIC Management Users	
SIMATIC NET	SIMATIC NET	SIMATIC NET	When the "SIMATIC NET" user group is created, all Windows users that work with PCS 7, PCS 7 OS or Route Control projects must be a member of this group.
Post-installation of STEP 7	STEP 7	Siemens TIA Engineer	Post-installation of STEP 7 products, e.g. service packs

User management options

Distinguish between the following:

- User management in Windows, without SIMATIC Logon:
 - User management on a single PC
 - User management performed from a central location in Windows (PCs in a domain)
- User management expanded to include SIMATIC Logon:

Many PCS 7 applications support central user management with the "SIMATIC Logon" software. SIMATIC Logon is based on the main mechanisms of Windows user management.

SIMATIC Logon provides the following enhancements for user management:

 - User management has been enhanced to include SIMATIC Logon from a central location in Windows (PCs in a domain).
 - User management is expanded to include SIMATIC Logon on a single PC.

Setup of Windows users for PCS 7

The user who installs the PCS 7 components is automatically entered as a user of these components in Windows management.

If you want to authorize other users to use a PCS 7 component, they must be set up in Windows and assigned to the relevant PCS 7 components (user groups).

Basic procedure

- Run the following functions centrally in Windows for all options for setting up users and user groups:
 - Definition of users and user groups that are available on the Windows Server in question.
 - Definition of passwords.
- The following applies to defining user roles with the SIMATIC Logon:

You can assign users and user groups particular roles within some PCS 7 applications (for example, SIMATIC BATCH).

Example: SIMATIC BATCH

 - User permissions in a user role (global)
 - Permitted user roles per computer (for each specific computer)
 - Permitted user roles per unit (for each specific unit)
- The PCS 7 applications are supplied with information about the logged on user via the central logon service and can be informed of any change of the logon, etc.

Basic procedure in a Windows domain

When operating in a domain, an additional global user group can be set up for the domain and made a member of the "SIMATIC HMI" user group.

- A domain administrator is responsible for creating users and groups in a domain. This administrator must have the necessary experience and authorization to administer the network.
- Domain administrators have special permissions in PCS 7 systems for managing the network, for example, for user management or for entering computer stations in a domain. We recommend you refrain from using these permissions when working in the PCS 7 project.

Requirements

- The domain administrator has created a global user group for the domain.
- The domain administrator has entered users within the domain into the global user group for the domain. These users can access WinCC when logged on.

Procedure

1. Use the search box in the start menu to open the "Local Users and Groups".
2. Select the entry "Groups". All groups are displayed in the data window.
3. Select the "SIMATIC HMI" group.
4. Open the "Add member" dialog using the shortcut menu and enter the global user group for the domain as a member of the "SIMATIC HMI" user group.

Setting permissions under the Windows Server

Users of the "Power user" user group have to be authorized to "Shutdown the system".

1. Use the search box in the start menu to open the file "gpedit.msc".
The "Local Group Policy Editor" dialog box opens.
2. In the tree view, select **Local Computer Policy > Computer Configuration > Windows Settings > Security Settings > Local Policies > User Rights Assignment**.
3. Double-click the "Shutdown the system" object in the detailed window.
The "Properties of shutdown the system" dialog box opens.
4. Click the "Add Users or Group" button.
The "Select Users or Groups" dialog box opens.
5. Enter the power users in this group.

Additional information

- Manual *SIMATIC; SIMATIC STEP 7*
- Online help *WinCC Information System*
- Manual *Process Control System PCS 7; SIMATIC BATCH*
- Manual *Process Control System PCS 7; SIMATIC Route Control*

- Manual *SIMATIC; SIMATIC Logon*
- Manual *SIMATIC; SIMATIC Management Console*

See also

How to authorize users to configure SIMATIC Logon (Page 113)

5.4.9 Installing PCS 7 libraries of older PCS 7 versions

If you install or remove an older version of the PCS 7 Library, PCS 7 Basis Library or PCS 7 Advanced Process Library following the installation of PCS 7 , you must re-install the current versions of PCS 7 Basis Library or PCS 7 Advanced Process Library by means of the PCS 7 general setup afterwards. Do not use the product setup of these libraries to do this.

You can find PCS 7 libraries of older versions of the PCS 7 Library, the PCS 7 Basis Library or the PCS 7 Advanced Process Library on Internet (<https://support.industry.siemens.com/cs/ww/en/view/109480136>).

5.4.10 Firewall in PC stations

Windows firewall

PCS 7 uses the operating system firewall (see "Preface (Page 9)": *Process Control System PCS 7; PCS 7 Readme* file). The required settings are made during the PCS 7 setup.

Requirement for using a firewall on the system bus

The CP 443-1 must have particular firmware versions installed if you intend to use a firewall on the system bus. You can find additional information on this in the section "Preconfigured PC systems for PCS 7 (product bundles) (Page 51)".

Additional information

- Section "Components for connection to the terminal bus/plant bus (Page 53)"
- Section "How to access PC stations outside a subnet (Page 120)"

5.4.11 Subsequent installation or updating

If a PCS 7 software package is already installed on the PC, a dialog box for the type of installation appears during the PCS 7 system setup. You can specify which type of installation you require in this dialog box:

- Installation
- Update

Installation

Subsequent installation allows you to use additional PCS 7 functions. You can find additional information on this in the section "Appendix B - Approved configurations on a PC station (Page 150)".

Update

An update replaces existing software packages with newer versions of the software. Make sure that you select the latest software packages of the new version.

Recommendation:

Reboot the PC station before updating the PCS 7 software.

Note

Some of the PCS 7 software packages require the PC station to be restarted for the update.

Note

If you want to update a PCS 7 project of a previous PCS 7 version with a current PCS 7 version, then follow the descriptions provided in the software update manuals.

You can find additional information in the manual *Process Control System PCS 7; Software Update*.

Using the SIMATIC Management Console

The SIMATIC Management Console is software from the SIMATIC PCS 7 product line for central administration and management of SIMATIC software products. You can use the SIMATIC Management Console (hereafter "Management Console") to make software administration easier and define plant-specific rules and reproducible processes. Some of the advantages of using the Management Console are listed below:

- Cost and time savings through:
 - Reduced installation costs due to more efficient workflow
 - Significant reduction of administrative overhead due to centralized management of the software versions of all PC stations in a PCS 7 plant
- Easy and reliable use through:
 - Clear and self-explanatory representation of the action states of different PC stations in a PCS 7 plant
 - No unintentional negative impact on productive operation thanks to upstream security mechanisms
 - Secure communication due to the use of appropriate security mechanisms of the operating system
- Transparency and always up-to-date "as built" documentation:
 - Fast analysis of the installed components
 - Easier planning of plant updates/upgrades
 - Long-term support for plant life cycle services
 - Easy analysis of configurations and compatibility
 - Central monitoring of the security status (patches)

Additional information

- Section "Notes on installing PCS 7 (Page 80)"
- The Management Console software packages are available on the *Process Control System; SIMATIC PCS 7 DVD*.

5.4.12 Uninstalling PCS 7

If you no longer require PCS 7 on the PC station, you can remove the PCS 7 software by performing the steps described below.

Recommendation

- Remove the license keys.
- Backup the data which is still required, for example, the default folder with the PCS 7 projects.

Procedure

1. Insert the DVD and start Setup.
2. Select the "Remove" Setup option.
3. Select the components that are no longer are required on the PC station.

Follow the instructions to remove the PCS 7 software.

5.5 Installation of drivers for PCS 7

5.5.1 Drivers for communications processors

5.5.1.1 Drivers for communications processors

Introduction

The PCS 7 setup automatically installs the required drivers for the communications modules on computers approved for PCS 7. This is only possible when the communications modules have been inserted in the PC prior to installation of PCS 7.

If the type of communications module changes after a PCS 7 installation, you will have to reinstall the driver for the communications module ("SIMATIC NET PC Software" program package).

Plug-and-play capability

The communications processors used for PCS 7 support plug-and-play. The required settings are made automatically when the PC starts up.

Note

If plug-and-play components are not detected, check in the BIOS whether the detection of plug-and-play components is activated. You can find additional information on this in the documentation of the BIOS manufacturer.

Detection of plug-and-play components is activated as default for SIMATIC PCS 7 BOX.

Switching the logs on the bus (Industrial Ethernet)

If you need to change the protocol of a bus in a system, from TCP to ISO protocol for example, you will need to set a mixed protocol (TCP and ISO) briefly on the engineering station.

Now load the configuration data onto the AS and the operating and monitoring systems.

Note

Do not disable the TCP/IP or ISO protocol during operation since they are both needed for configured operation!

Data transmission rate and bus access procedure

Make sure there are no inconsistencies in Ethernet CPs, switches and network adapters in terms of their settings/properties for data transmission rate and bus access procedure.

We recommend using the default setting **Autonegotiation** (procedure for automatic negotiation for the best transmission mode for two directly interconnected network interfaces).

You can find additional information on this in the section "How to Change the Transmission Rate and Operating Mode in the PC Network (Page 128)".

Settings for the system bus

Make the following settings for the system bus:

- Disable "File and printer sharing"
- Disable "Client for Microsoft network"
- Enable the ISO protocol
- Disabling energy saving options

Read the relevant information on this in the following documentation:

- Configuration manual *Process Control System PCS 7; Engineering System*
- Configuration manual *Process Control System PCS 7; Operator Station*
- WinCC Information System: "Special features of communication using a server with several network adapters"

5.5.1.2 How to configure standard communication modules

Settings for BCE and SOFTNET CPs

Depending on which protocol is commonly supported by the devices on the system bus, the settings of the PC stations for communications have to be set.

If the automation device does not support the ISO-protocol, the TCP/IP protocol has to be activated.

Requirements

- PCS 7 has been installed.
- There is no communication.
- The user programs are closed.
- The network adapter is not a communication module of type CP 16xx.

Procedure

1. Select the protocol for communication via the respective network adapter in the properties dialog of the network connections. Recommended protocol:
 - Terminal bus: TCP/IP (Internet protocol version 4 (TCP/IPv4))
 - System bus: SIMATIC Industrial Ethernet (ISO)
2. For PCs with several network adapters:
 - Select the advanced settings.
 - Move the network connection to the terminal bus in the "Connections" area to the top position.

Note

The above setting is not possible and not necessary for Windows 10.

3. Reboot your PC to activate the settings.
4. Clear the following options for the communications processor on the system bus:
 - Client for Microsoft Network
 - File and Printer Sharing for Microsoft Networks

Note

Also refer to the notes in the *WinCC Information System*, under the topic "Special Communication Features for a Server with Several Network Adapters".

Additional information

You can find more information on redundant network connections in the documentation *Process Control System PCS 7; High Availability Process Control Systems*.

5.5.1.3 How to disable the power saving options of network adapters

Many modern network modules and network adapters support energy management features. You can reduce energy consumption with these features.

Energy saving options allow the PC to monitor the activity of input devices. If energy saving options are activated, they shut the PCS 7 PC down or trigger a restart if the PC is inactive for a set period of time.

We recommend that you disable all power-saving options for all PCs involved in the process mode.

5.5.1.4 How to prepare a PC station with CP 16xx for operation in PCS 7

Introduction

If a communication module is used in a PC station, the NDIS adapters needs to be configured in the following situations:

- You want to monitor the diagnostics of network components on the system bus with a maintenance station (MS).
A communication module is used on the PC of the maintenance station for access to the system bus.
- An automation system in a SIMATIC PCS 7 BOX is to be loaded using an external engineering station.
A communication module is used on the engineering station for access to the system bus.

You can learn which communication modules can be used in the product overview *Process Control System PCS 7; Released Modules*.

NDIS standard

The "Network Driver Interface Specification (NDIS)" standard enable operation of multiple communication modules or simple network adapters in a PC. It also allows the use of several protocols on a communication module or network adapter.

Configuring an NDIS Adapter

Note

Make these network settings on the PC station for each communication module of the PC station.

As of PCS 7 V7.1, the communication module is installed automatically with the NDIS adapter and only needs to be configured.

1. Open the dialog for setting the network connections.
2. Select the menu command **View > Details**.
3. With the right mouse button, select the communication module with one of the following names in the column "Device name:"
 - When using a CP 16xx:
Device name "SIMATIC Miniport <Type of released communication module ... > Adapter"Select the shortcut menu command **Properties**. The "<Network Connection> Properties" dialog opens.
Recommendation:
First, select the shortcut menu command **Rename**. Enter a descriptive name, for example, "CP_NDIS_Nr_1".
4. Select the connection "Internet Protocol (TCP/IP)" in the "General" registry. Click "Properties".
The "Internet Protocol (TCP/IP) Properties" dialog box opens.

5.5 Installation of drivers for PCS 7

5. Activate the "Use the following IP address" check box.
Configure the following fields for the specific plant:
 - IP address
 - Subnet mask
6. Click "OK".
7. Close the dialog box "<Network Connection> Properties" by clicking "OK".

Result

The network settings for the NDIS adapter are now applied.

5.5.2 Additional Devices and Drivers for PCS 7

5.5.2.1 Overview of additional devices and drivers for PCS 7

If you want to make use of specific properties of PCS 7, special drivers are required.

Note

Information on the required software and availability of the drivers is available in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)").

Overview of additional devices and drivers

Multi-monitor interfaces

Device	Additional information
Multi-display-connection	Section "Multi-display-connection in PC Stations (Page 103)" Up to a maximum of 4 monitors on a PC.
Connect monitors via internal interfaces	You can connect one monitor to one port. Up to a maximum of 2 monitors on a PC.

PC station on redundant network

Driver	Additional information
Network adapters	<ul style="list-style-type: none"> • Redundant, high availability terminal bus based on the Parallel Redundancy Protocol (PRP) • Redundant, high availability system bus based on the modular switches of the SCALANCE series • Redundant, high availability system bus with AS 410H Documentation <i>Process Control System PCS 7; High Availability Process Control Systems</i>

Time signal via DCF77

Driver	Additional information
Time reception service	Section "How to activate the DCF77 reception service (Page 105)" Documentation <i>Process Control System PCS 7; Time synchronization</i>

Acoustic or visual signal generator

Driver	Additional information
Horn module	The required drivers are automatically installed with PCS 7. Documentation <i>Process Control System PCS 7; Operator Station</i>

Acoustic signal generator

Driver	Additional information
Sound card	Installation medium for the sound card or Windows standard; Section "Assigning the driver to the sound card (Page 104)"

Smart cards

Driver	Additional information
Smart card reader	<i>WinCC Information System</i> ; Information on the suitable smart card reader and the required driver is available in the <i>Process Control System PCS 7; PCS 7 Readme</i> file (see "Preface (Page 9)").

Additional information

Section "Optional hardware components (Page 56)"

5.5.2.2 Multi-display-connection in PC Stations

If you want to connect multiple monitors to a computer, you should orient yourself using the configurations in the *ST PCS 7 catalog*.

The following includes information about computers that have been released as a bundle PC in PCS. 7

Released operating systems

You can find recommendations for this in the documentation *Process Control System PCS 7; PCS 7- Readme (online)*.

Note**Product notes for the bundle PC**

Read the product notes for the bundle PC. They include additional information on the drivers for various components and operating systems.

Note

Installation of the drivers

Make sure that you do not use the hardware wizard to install the drivers. Start the setup by means of the Windows Explorer.

Recommended multi-display-connection

You can find recommendations for this in the product overview *Process Control System PCS 7; Released Modules*.

Additional information

The recommended multi-display-connection are intended for use in OS stations. If you use ES stations, for example, all displays will be shown correctly on monitor 1 only.

Note

Setup and configuration

You can find additional information on installing and configuring the multi-display-connection approved for PCS7 in the WinCC Information System online help.

5.5.2.3 Assigning the driver to the sound card

Introduction

You can use standard sound cards to output acoustic messages.

The driver for the sound card must be assigned in Windows. For more information on the availability of the drivers approved for use with PCS 7, refer to the *PCS 7 Process Control System PCS 7 Readme* file (see "Preface (Page 9)").

Requirements

The sound card has been installed.

Procedure

1. If no driver is installed for the sound card, a "?" symbol appears in the right-hand window of the Device Manager.
Install the driver for the sound card via the setup program.
You will find information on the availability of the drivers in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)").
2. Reboot the PC.

Additional information

You can find additional information about configuring sounds and assigning them to events in the configuration manual *Process Control System PCS 7; Operator Station*.

5.5.2.4 How to activate the DCF77 reception service

DCF77 reception service

The DCF77 reception service performs the following tasks:

- Evaluation of time signals from the DCF77 transmitter of the Physikalisch-Technische Bundesanstalt in Mainflingen in Darmstadt, Germany.
- Comparison of the time signals with the system time of the PC station.
- Correction of the system time, if necessary.

A receiver module reads in the time signals in different ways. The reception service expects the time signals over one of the serial ports of the PC station.

Note

You can use the "DCF77 Reception Service" application as a client application to synchronize any number of PCs without the DCF77 module.

Requirement

- The DCF77 receiver module has been connected to an available serial port on the PC station.

Note

Information on the required software and availability of the drivers is available in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)").

Procedure

1. Install the driver.
2. If necessary, use the control panel to change the settings.

Additional information

- Documentation *Process Control System PCS 7; Time Synchronization*

5.6 Licensing

5.6.1 PCS 7 licenses and quantity structures

Important terms

The following table lists terminology that is important for licensing:

Term	Description
License	A license provides the right to use products. This right is in the form of: <ul style="list-style-type: none"> • CoL (Certificate of License) • License key
CoL (Certificate of License)	The CoL certifies the license. The product may only be used by the license owner or authorized persons.
License key	The license key is the "technical representative" of the license (also called an "electronic license stamp").

License properties

Each license consists of a basic license type and a license type.

The basic license type defines how many PC stations the associated software may be installed and used on. The license type defines any applicable restrictions on how the associated software may be used.

- The following basic license types are available to you:

Basic license type	Description
Single license	With this license, the software may be used on any single computer. The type of permissible usage is defined in the Certificate of License.
Floating license	With this license, the software may be used on any computer within a network. The software may be installed on several computers for this purpose.

- The following license types are available to you:

License types	Description
Unlimited license	With this license, the software may be used without restriction.
Count relevant license	With this license, software usage is restricted to: <ul style="list-style-type: none"> • The number of process objects, archive tags, process tags ("tags") defined in the contract, depending on the licensed software. <p>Display: The licensed number is displayed in the Automation License Manager under "Scope."</p>

License types	Description
Countable Objects License	<p>With this license, software usage is restricted to:</p> <ul style="list-style-type: none"> The number of process objects defined in the contract. <p>Display: The values are displayed in the Automation License Manager under "Validity" in the format: "X(Y)" Value "X" = number of licenses still available for process objects. Value "Y" = maximum licensed number of process objects.</p> <p>Calculation: The number of process objects loaded into the AS is calculated by the executing application and is subtracted from the available process objects in the value "X". The value "X" is always updated by the executing application. The value for reducing configured process objects can therefore increase again. The value "Y" always indicates the maximum licensed number of process objects and is therefore not changed.</p>
Upgrade license	<p>Specific system status requirements may have to be met for an upgrade to be performed:</p> <ul style="list-style-type: none"> With an upgrade license, a license of an "old" version x can be converted to a version >x+.... An upgrade may become necessary due to an increased configuration limits, for example.
Rental license	<p>With this license, software usage is restricted to:</p> <ul style="list-style-type: none"> The number of operating hours defined in the contract The number of days after first use defined in the contract <p>Note: The information area of the task bar will display tooltips telling you how long the rental license has left to run.</p>
Pay per use license	<p>With this license, software usage is restricted by the terms of use defined in the contract.</p>
Contract license	<p>With this license, the software may be used without restriction.</p>
Trial license	<p>With this license, software usage is restricted to:</p> <ul style="list-style-type: none"> A maximum of 14 days, for example A certain number of days after first use Test and validation purposes (disclaimer of liability)
Demo license	<p>With this license, software usage is restricted to:</p> <ul style="list-style-type: none"> The number of operating hours defined in the contract The number of days after first use defined in the contract <p>Note: The information area of the task bar will display tooltips telling you how long the demo license has left to run.</p>

Note

Not all products support all license types. In the *Automation License Manager* you can see which license form is valid for a specific product.

PCS 7 without a license key

You can use the *SIMATIC PCS 7* software package for up to 14 days as a trial version.

Note

You can activate the trial (demo) mode the first time the software is used.

Missing license key

When a software program requests a license key, but it cannot be located on the network in a "valid" format, it is described as a "missing license key".

Automation License Manager

You can manage license keys centrally with the software *Automation License Manager*. When you use the package installation for PCS 7, the *Automation License Manager* is automatically included in the installation.

Virus-free

Note

Check that your PC is virus-free prior to each installation/uninstallation of a license key.

Viruses may pass between the hard disk and storage medium (license key USB stick, license key diskette) when using this method.

Write protection must not be activated when transferring license keys.

Additional information

- Documentation *SIMATIC; Automation License Manager*
- Installation manual *Process Control System PCS 7; Licenses and Configuration Limits*

5.6.2 How to transfer license keys

Introduction

The following license keys are transferred with the *Automation License Manager* software:

- License keys belonging to licenses purchased at a later date.
- License keys stored at locations which cannot be accessed by a computer's applications

Possible license key storage locations

- License key USB stick
- License key diskettes
- Local storage media
- Storage media on connected computers
- Removable disks (for example USB stick, but not CDs or DVDs)

Note

Authorizations (licenses for older versions of software packages) cannot be backed up on a license key USB stick or another USB stick.

Options for transferring license keys

The *Automation License Manager* gives you the following options for transferring license keys between the various possible storage locations:

- Drag-and-drop
- Cut and paste
- Offline transfer

Requirement

The *Automation License Manager* has been started up.

Procedure - drag-and-drop

1. Select the appropriate view using the menu command **View > Manage**.
2. On your own or the connected computer, open the storage location to where you wish to copy the license keys.
3. On your own or the connected computer, open the storage location from where you wish to remove the license keys.
4. Select the license keys, hold down the left mouse button and drag the license keys to the folder where you wish to insert them.
The license keys are transferred.

Procedure - Cut and paste

1. Select the appropriate view using the menu command **View > Manage**.
2. On your own or the connected computer, open the storage location from where you wish to cut the license keys.
3. Select the menu command **Edit > Cut**.

5.6 Licensing

4. On your own or the connected computer, open the storage location to where you wish to copy the license keys.
5. Select the menu command **Edit > Paste**.
The license keys are transferred.

Procedure – Offline transfer

The *Automation License Manager* online help describes how to perform an offline license key transfer.

Defective cluster on hard disk

Note

As part of the license key safety system, when license keys are transferred, clusters identified as "defective" are created on the target drive. You must not reconstruct these clusters, as this will destroy the license keys.

Backing up license keys

You can use the *Automation License Manager* to backup **all** license keys.

Read the information under "Possible license key storage locations" provided above.

5.7 Preparing PC stations

5.7.1 Preparing the PC stations (overview)

Introduction

After installing the PCS 7 software, configure and set up the communication interfaces.

Requirements

- The PCS 7 software and PCS 7 hardware have been installed.
- The communications processors have been installed.

Note

To commission SIMATIC PCS 7 BOX, use the manual *Process Control System PCS 7, SIMATIC PCS 7 BOX*.

Overview of the individual steps

The following settings must be performed on all PC stations to allow all automation systems (AS) and PC stations (for example OS, BATCH) of a PCS 7 project to be configured, loaded and tested from one central engineering station (ES).

These settings first have to be made on the central engineering station.

Step	What?
1	Creating the "Logon_Administrator" user group for SIMATIC Logon (Page 113)
2	Setting the language for a user (MUI) (Page 114)
3	Setting the communication module for connecting to the terminal bus (Page 115)
4	Setting up the connection between the PC station and plant bus (Page 117)
5	Setting the standard network adapters (Page 119)
6	Changing the transfer rates and operating modes in the PC network (Page 128)
7	Installing security patches, hotfixes, service packs (Page 130)
8	How to activate redundancy for high availability PCs (Page 133)
9	Downloading the network configuration to the PC stations (Page 135)

5.7.2 SIMATIC Logon

Note on the use of chip cards

- **USB chip card readers**

When using a USB chip card reader or the serial chip card reader, use the chip card driver. You can find information on the availability of the drivers in the *Process Control System PCS 7; PCS 7 - Readme* file (see "Preface (Page 9)"). You can find a description of the chip card readers in the section "Overview of additional devices and drivers for PCS 7 (Page 102)".

- **Using chip cards**

Make sure that you reformat all chip cards that were formatted with SIMATIC Logon prior to V1.3. As of version V1.3, SIMATIC Logon uses improved security algorithms. If you attempt to logon with a chip card that is not updated, the attempt will fail. However, you can always log on with your user name and password via the keyboard.

If you have logged on with a chip card and remove this chip card during configuration in the SIMATIC Logon role management, all the changes that you have not saved up to this point are discarded. Reinserting the card will not solve this problem.

Notes on the Windows workgroup

If you require high availability, you need to work in a domain structure, since no redundancy is offered by SIMATIC Logon in a Windows workgroup.

Notes on the SIMATIC Logon Event Log Viewer

If you want to print the events in the event log, proceed as follows:

- Click "Export" and export the events in PDF format.
- Print out the exported file.

Instead of the file size of the event log, the number of recorded events is displayed based on the configured filter.

The filter dialog always shows the date and time based on the settings you have selected for the date and time in Windows. Display in conformity to ISO 8601 is not possible.

5.7.3 How to authorize users to configure SIMATIC Logon

Introduction

SIMATIC Logon and SIMATIC Electronic Signature simplify the validation of plants in accordance with FDA 21 CFR Part 11. In plants in which SIMATIC components are used, the validation of the plant can be performed using the following components:

- **SIMATIC Logon**
Assign user-specific permissions
- **SIMATIC Electronic Signature**
Query and archive the required documentation

If you want to use the SIMATIC Logon for access protection in a PCS 7 plant, you need to add users who want to configure SIMATIC Logon to the "Logon_Administrator" user group. Enter these users in one of the following groups:

- On the local PC -
In the local Windows "Logon_Administrator" group
- In a domain that is accessible from the local PC -
In the "Logon_Administrator" Windows group in the Active Directory

Note

The local Windows group "Logon_Administrator" is created automatically when you install SIMATIC Logon.

Basic procedure

1. Open the user management.
2. Select the "Logon_Administrator" group in the list.
3. Assign all users who want to work with the "Configure SIMATIC Logon" dialog box to the "Logon_Administrator" group.

Note

You should only assign users to the "Logon_Administrator" Windows group. If you assign subgroups to the "Logon_Administrator" Windows group, the members of the subgroups will be blocked from accessing the "Configure SIMATIC Logon" dialog box. It is not possible to authenticate any members of a subgroup.

Users in a Windows domain

Note

SIMATIC Logon users must be direct members of a Windows group. These users may not be members of a subgroup of a Windows group.

Requirements for defining user roles with SIMATIC Logon

- SIMATIC Logon is installed on every PC with a PCS 7 application.
- The group "Logon_Administrator" is created on one PC (logon computer).

Information on the next steps

- You will find instructions on how to use SIMATIC Logon to set-up user roles and assign them to the defined Windows user groups in the manual *SIMATIC; SIMATIC Logon*.
- You will find information on the additional settings you need to make in the documentation relating to the applications that use SIMATIC Logon for access management purposes.

Additional information

- Manual *SIMATIC; SIMATIC Logon*

5.7.4 Setting the user language (MUI)

Introduction

To work with PCS 7 optimally, we recommend that you make all the language settings to meet the needs for the specific system.

In PCS 7 you can set the interface language to one of the following for the engineering system and for process mode (depending on the languages installed):

- Chinese
- German
- English
- French
- Italian
- Spanish

Requirement

An operating system with a multilanguage user interface is installed.

Note

When installing the central archive server and StoragePlus, set the same language for the logged on user and the default user.

Settings of the region and language options

- Regional settings
Recommendation: Make these settings in accordance with your PCS 7 plant.
- Language for menus and dialog boxes
Select the required language.

Note

The drop-down list only contains languages which are installed.

- Advanced settings for standard users (all new users):
Recommendations:
 - Language for programs that do not support Unicode:
The language in which you want to install PCS 7.
 - Code page conversion tables
The language in which you want to install PCS 7.
 - Select the default settings for user accounts so that all settings are applied to the current user account and the standard user profile.

Note

Once the central archive server and StoragePlus have been installed, you can change the language for the default user.

Reboot

Reboot the PC station if you are prompted by Windows to do so after you have changed the language.

5.7.5 How to set the communication module for connecting to the terminal bus

Introduction

Below you can find information about how to select the communication modules for connecting to the terminal bus you will use to configure the PC stations.

Note

If you use a PC station as a single-station system with no connection to other PC stations, the following steps do not need to be taken.

Setting the network connection to the terminal bus

1. Select the PC station (My Computer) in the tree view of Windows Explorer.
2. Select the "Simatic Shell" folder.
(Windows 10: "This PC" folder, "Devices and Drives" area)

3. Select the "Settings..." command from the shortcut menu.
The "Communication Settings" dialog opens.
4. In the "Network Adapter Selection" group, select the communication module via which you want to communicate on the terminal bus.
5. Click "OK".

Note

If you confirm the dialog box that follows, the network connection to this PC station will be temporarily interrupted.

6. Confirm the dialog box that follows.
The network adapter is reinitialized.

Configure connection sequence for several network adapters

1. Open the advanced settings in the "Network Connections" dialog.
2. Select the "Adapters and Bindings" tab.
3. Check that the connection via which the PC station on the terminal bus is to communicate is at the top of the "Connections" list. If necessary, move this connection to the top.

Note

Once new network adapters have been installed, the most recently entered connection appears at the top of the list.
Ensure that the connection via which the PC station on the terminal bus communicates is at the top of the list.

Note

The above setting is not possible and not necessary for Windows 10.

4. Click "OK".

Specifying the network type

1. Use the search box in the start menu to open the file "gpedit.msc".
The "Local Group Policy Editor" dialog box opens.
2. In the tree view, select the folder **Local Computer Policy > Computer Configuration > Windows Settings > Security Settings > Network List Manager Policies**
3. Double-click the "Unidentified Networks" object in the detail window.
The "Properties of unidentified networks" dialog box opens.
4. In the "Location Type" area, select the "Private" option button.

See also

How to activate redundancy for high availability PCs (Page 133)

5.7.6 How to set up a work group for connection to the terminal bus

If you want to operate PC stations of PCS 7 in a work group, you have to check the settings of the network configuration.

After installation of the operating system, the network profile "Public network" is configured by default for the network connections. The network profile "Public network" is not approved for the terminal bus in PCS 7.

Procedure

1. Select the menu command "Change adapter settings" in the Network and Sharing Center.
2. Select the network adapter that is to establish the connection to the terminal bus.
3. Use the shortcut menu to open the "Properties ..." dialog.
4. Make the following adjustments:
 - Click "Configure". Select the "Power Management" tab and clear the "Allow the computer to turn off this device to save power" check box. Click "OK".
 - Assign a gateway address for the terminal bus in the properties for "Internet Protocol Version 4 (TCP/IPv4)".
5. In the Network and Sharing Center, select the menu command "Change advanced sharing settings".
The "Change sharing options for different network profiles" dialog box opens.
6. Expand the displayed information for the "Home or Work" network profile.
7. Select the following check boxes:
 - Turn on network discovery
 - Turn on file and printer sharing
 - Disable "Public folder sharing"

Result

The active networks are displayed in the Network and Sharing Center.

- The network profile "Home or Work" has been selected for the terminal bus. A gateway address has been entered in the properties of the network adapter.
- PC stations with several network adapters:
No changes are required for the system bus.

5.7.7 How to set up the connection between the PC station and plant bus

Introduction

You next check or assign the addresses on the system bus and the access point for downloading and configuring the PC stations.

Perform the following steps:

- PC stations on the system bus
Check or assign addresses of the network adapters:
 - PC station connected to system bus via CP 16xx communications processor.
 - PC station on system bus connected via standard network adapter (only if the ISO protocol is used on the system bus).
- All PC stations:
 - Check the access point for each PC station.

Requirement

The "Set PG-PC Station" Configuration Console is open.
(Use the search box in the Start menu to open "Set PG-PC-Station")

PC station connected to system bus via CP 16xx communications processor

If the PC station on the system bus is to communicate via the CP 16xx, perform the following steps for all CP 16xx:

Note

If you have reinstalled the PCS 7 software on the PC station, the first two steps preceded by "Standard" are not required.

1. "Standard": In the tree view, select "Modules > <Name of Network Adapter for Communication with the System Bus> > General".
2. "Standard": Set the operating mode to "PG mode" for **every** PC network module you want to configure.
3. In the tree view, select "Modules > <Name of Network Adapter for Communication with the System Bus> > Address".
4. Set the addresses (either TCP/IP address or MAC address, depending on the protocol).

PC station on system bus connected via standard network adapter

If you want to use the ISO protocol on the system bus, but you do not know the MAC addresses of the network adapters, perform the following steps for all standard network adapters:

1. In the tree view, select "Modules > <Name of Network Adapter for Communication with the System Bus> > Address".
2. Make a note of the MAC address, which you will need when configuring the PC station.
3. Select the menu command "Change advanced sharing settings" in the Network and Sharing Center.
The "Change sharing options for different network profiles" dialog box opens.

4. Expand the displayed information for the "Home or Work" network profile.
5. Select the following check boxes:
 - Disable "File and printer sharing"
 - Disable "Client for Microsoft network"
 - Enable the ISO protocol

Note

Special features of communication using a server with several network adapters

Read the information on this in the following documentation:

- Configuration manual *Process Control System PCS 7; Engineering System*
 - Configuration manual *Process Control System PCS 7; Operator Station*
 - *WinCC Information System*.
-

Check the access point for each PC station

Perform the following steps on all PC stations:

1. In the tree view, select the "Access Points" folder.
2. In the list, select "S7ONLINE".
3. Select **Properties** in the shortcut menu.
The "S7ONLINE properties" dialog box opens.
4. Check the entry in the "Assigned interface parameter assignment" box. "PC internal (local)" must be set. Change the settings, if necessary.
5. Click "OK".

Additional information

You can find information about suitable standard network adapters and (CP 16xx) communications processors in the product overview *Process Control System PCS 7; Released Modules*.

5.7.8 How to make settings for standard network adapters

Procedure

If you want to use the TCP/IP protocol on the plant bus, you will need to perform the following tasks for all standard network adapters on the plant bus:

1. Open the dialog for setting the Network Connections.
2. Select the plant bus in the "Network Connections" dialog box.
3. Select the menu command **File > Properties**.

5.7 Preparing PC stations

4. Select the "Internet Protocol (TCP/IP)" item from the displayed list.
5. Click "Properties".
6. Configure the TCP/IP address:
Typical: "Use the following IP address:" check box
 - Enter the IP address.
 - Enter the subnet mask.
7. Click "OK".
The TCP/IP addresses are set.

5.7.9 How to access PC stations outside a subnet

Communication beyond network limits

PC stations can be located in different subnets in a network. The Subnets can, for example, be connected by routers and protected by a firewall.

You need to configure the communication paths so that the PC stations in different subnets can communicate with each other.

- Make the settings for the configuration of the PC stations in the "SIMATIC Shell".
- If a firewall protects the networks, you need to adapt the firewall rules.

Simatic Shell

"Simatic Shell" is part of PCS 7 and is used for central maintenance and diagnostics of all PC stations integrated in the client-server system.

Select the PC stations that should as a gateway to another subnet. In these PC stations, you need to register a PC station of the other subnet in Simatic Shell. You need to configure the appropriate settings on the PC station of the other subnet. The logon of the PC stations is described in the following procedure.

After mutual logon, all participating PC stations of the subnet can communicate beyond the subnets boundaries. In Simatic Shell, each PC station of a group is informed about the current status of the other PC stations in the group.

When the status of a PC station changes, a message is sent to all stations, for example:

- When a PC station has archived a project
- When a PC station is shut down.
- When a PC station is started up and thus enters the group.

Adapting the firewall

A firewall can block communication between networks. In order for the PC stations to communicate with each other beyond network boundaries, you need to adapt the local Windows firewall to the firewall rules for the PC station. Enter the range with the IP addresses of the PC stations from other networks or the entire IP range of the other networks as described below:

1. Use the search box in the start menu to open the "Windows-Firewall".
The "Windows Firewall with Advanced Security" dialog opens.
2. Under "Inbound Rules", select one by one all affected firewall rules, e.g. CCAgent, WinCC ProjectManager.
3. In the "Scope" tab in the properties, add the IP addresses or IP scopes of the communication partners to "Remote IP address".

Requirement

Make the following settings as an administrator.

Procedure

1. In the tree view of Windows Explorer, select the "SIMATIC Shell" folder on the PC station. (Windows 10: "This PC" folder, "Devices and Drives" area)
2. Select the "Settings..." command from the shortcut menu.
The "Communication Settings" dialog opens.
3. Check the setting in the field "Multicast Time to Live (TTL)".
The value gives the maximum number of transitions between various subnets (IP parameters TTL).
4. In the "Multicast Proxy" area, the network address of the PC station of the other subnet in the mask for the connection to the other subnet.

Note

Number of PC stations that make a network-spanning connection

Only enter a "Multicast Proxy" for PC stations if they require cross-network communication.

- If higher availability is required, you can enter the network addresses of multiple PC stations (recommendation: two).
- Do not enter too many network addresses, because this will cause a high load on the network by broadcast frames.

-
5. Add the addresses to the list of network partners using the "Add" button.

6. Check if the communication between the subnets needs to be protected. If you want to set up encrypted communication for a PC station, you can enable this.

Note

Using encrypted communication

If you use encrypted communication, the only PC stations that can communicate with each other are those that have registered a shared key for the communication connection. Encrypted communication makes it difficult for potential attackers to determine information about the process mode or to interfere with process mode.

You can find information on the procedure in the section "How to configure encrypted communication between the PC stations (Page 124)".

Recommendation:

Enable encrypted communication when communication is to be performed across the boundaries of the subnet.

7. Confirm your entries with "OK".

See also

Changing settings for encrypted communication (Page 122)

5.7.10 Changing settings for encrypted communication

As of PCS 7 V8.1, you can use encrypted communication between the PC stations (OS and OS or ES and OS) that are involved in process mode. Encrypted communication makes it difficult for potential attackers to determine information about the process mode or to interfere with process mode.

When this method is used, PC stations in process mode exchange a **PSK (Pre Shared Key)** for encrypted communication.

- The pre-shared key is an application-specific, shared network key that has been agreed to beforehand.
- The protection only involves the connection frames required for process mode. The PSK has no effect on the connection frames from other applications.




You configure encrypted communication in "Simatic Shell".

You can find information on the procedure and PC stations in the section "How to configure encrypted communication between the PC stations (Page 124)".

Icons in Simatic Shell

You can see the status of the PC stations in "Simatic Shell". You can see icons on the name of the PC stations in Simatic Shell.

The following table shows the meaning of icons:

Status	Meaning of the icons	PC stations shown in Simatic Shell
	The PC station communicates only through encrypted connections.	PC stations for which encrypted communication is enabled with the same pre-shared key (PSK). If the encrypted communication is enabled on a PC station, this PC station can only establish communication connections to PC stations on which the same PSK is configured. Note: Environments with separate pre-shared keys can be specified within a network.
	The PC station communicates through encrypted and unencrypted connections (migration mode).	PC stations for which the unencrypted connection is enabled or the encrypted communication with the same pre-shared key. If communication is required through both encrypted and unencrypted connections for a PC station, you can enable migration mode. Note: Only use migration mode as a temporary solution. Recommended objective for the plant: encrypted communication between all PC stations of the plant.
	The PC station communicates only through unencrypted connections.	PC stations for which communication is unencrypted.

Changing settings for encrypted communication (situations)

If you change settings for encrypted communication, you must always perform the changes for all PC stations in the entire plant.

You can find information about the procedure in the section "How to configure encrypted communication between the PC stations (Page 124)".

The following are typical situations in which you change the settings for encrypted communication:

- **When a plant experiences a standstill**
It is assumed that the communication can fail between any PC stations.
- **During ongoing operation of the plant**
It is assumed that process mode must always be continually running.
Typical situations:
 - Changing settings for encrypted communication
 - Software update

Note

Communication between computers with encrypted and unencrypted communication is only possible in migration mode. You can find additional information on migration mode in the section "How to use migration mode for changing encrypted communication (Page 127)".

- **Changing password for encrypted communication** (changing a PSK in a plant)
You can find information on this in the section "How to change the PSK for encrypted communication (Page 125)".

Additional information

- Section "How to access PC stations outside a subnet (Page 120)"

5.7.11 How to configure encrypted communication between the PC stations

You can enable encrypted communication for the stations that actively engage in process mode:

- Operator station
- Engineering station
- SIMATIC Route Control
- SIMATIC BATCH

Requirements

- If you want to change settings for encrypted communication in process mode of the plant, read the following section: "Changing settings for encrypted communication (Page 122)".
- For redundant servers, the redundancy synchronization is completed before each step.
- Process mode is ended on the relevant PC station.

Using encrypted communication for a PC station

1. Select the PC station (My Computer) in the tree view of Windows Explorer.
2. Select the "Simatic Shell" folder.
(Windows 10: Folder "This PC", area "Devices and Drives")
3. Select the "Settings..." command from the shortcut menu.
The "Communication Settings" dialog opens.
4. Enable the "Encrypted communication" check box.
The "Set PSK" dialog box opens.

Note

Changing the PSK

Read the section "How to change the PSK for encrypted communication (Page 125)";
Changing the PSK.

When a pre-shared key is active, you can change it. Click "Set".

5. Enter characters with a high password strength for the PSK.
The key must be at least 8 characters long and include numbers and symbols in addition to uppercase/lowercase letters.
6. Confirm your entries. Click "OK".
7. If you want to use an available port instead of the port allocated by default, you can specify the assignment of incoming ports.
8. Check setting for the "Migration mode" check box.
Read the section "How to use migration mode for changing encrypted communication (Page 127)".
9. Click "OK".

Additional information

- Section "How to access PC stations outside a subnet (Page 120)"
- Online help "Simatic Shell"

5.7.12 How to change the PSK for encrypted communication

The following procedure is only required if you want to change the PSK during ongoing operation.

Requirements

- **Always perform each individual step for all PC stations in the entire plant.**
You can find information on the procedure in the section "How to configure encrypted communication between the PC stations (Page 124)".
- For redundant servers, the redundancy synchronization is completed before each step.
- Process mode is ended on the relevant PC station.

Basic procedure

Note

If the encrypted communication is enabled on a PC station, this PC station can only establish communication connections to PC stations on which the same PSK is configured.

Note the following example: Communication with inconsistent settings for encrypted communication in a plant

1. Switch on migration mode for all PC stations:
Leave the PSK unchanged and select the "Migration mode" check box.
2. Disable encrypted communication for all PC stations:
Clear the "Encrypted communication" check box.
3. Enable new PSK for all PC stations:
Select the "Encrypted communication" check box, enter the new PSK and select the "Migration mode" check box.
4. Switch off migration mode for all PC stations:
Leave the PSK unchanged and clear the "Migration mode" check box.

Example: Communication with inconsistent settings for encrypted communication in a plant

Example of an initial situation

System	Communication	PSK
Server_A	Encrypted, migration mode enabled	AAA
Client_1	Encrypted, migration mode enabled	AAA
Server_B	Encrypted, migration mode enabled	111
Client_2	Unencrypted	-

Reaction

Type of communication between the PC stations	Server_A	Client_1	Server_B	Client_2
Server_A	-	Encrypted	No connection	Unencrypted
Client_1	Encrypted	-	No connection	Unencrypted
Server_B	No connection	No connection	-	Unencrypted
Client_2	Unencrypted	Unencrypted	Unencrypted	-

Additional information

- Section "How to access PC stations outside a subnet (Page 120)"

5.7.13 How to use migration mode for changing encrypted communication

You use migration mode when you want to change the settings for encrypted communication during ongoing operation of a plant.

You can find information on the procedure in the section "How to configure encrypted communication between the PC stations (Page 124)".

Note

Using migration mode only temporarily

You should use migration mode only as a temporary solution when you want to change the settings for encrypted communication throughout the plant.

Communication between PC stations with encrypted and unencrypted communication:

- Communication between computers with encrypted and unencrypted communication is only possible when migration mode is enabled.
 - Encrypted communication between PC stations is only possible when the same pre-shared key is configured. Read the section "How to change the PSK for encrypted communication (Page 125)"; Reacting to an inconsistent setting for encrypted communication.
-

Enabling encrypted communication in a plant

Make sure that the following requirements are met:

- For redundant servers, the redundancy synchronization is completed before each step.
- Process mode is ended on the relevant PC station.

Perform each step for all PC stations in the entire plant before performing a further step.

1. All PC stations in the plant:

Select the following options in the properties of the PC station in Simatic Shell

- "Encrypted communication" check box:
 - "Migration mode" check box:
-

Note

Encrypted communication in a plant

Before you exclusively enable encrypted communication, you need to ensure the following for all required PC stations:

- Encrypted communication is enabled and migration mode is allowed.
 - The same pre-shared key is configured.
-

2. All PC stations in the plant:

Clear the "Migration mode" check box in the properties of the PC station in Simatic Shell.

Disabling encrypted communication in a plant

Make sure that the following requirements are met:

- For redundant servers, the redundancy synchronization is completed before each step.
- Process mode is ended on the relevant PC station.

Perform each step for all PC stations in the entire plant before performing a further step.

1. **All PC stations in the plant:**

Select the "Migration mode" check box in the properties of the PC station in Simatic Shell".

Note

Migration mode is enabled

Before you disable encrypted communication, you need to ensure the following for all required PC stations:

Encrypted communication is enabled and migration mode is allowed.

2. **All PC stations in the plant:**

Disable the "Encrypted communication" option in the properties of the PC station in Simatic Shell.

Additional information

- Section "How to access PC stations outside a subnet (Page 120)"
- Section "Changing settings for encrypted communication (Page 122)"
- Online help "Simatic Shell"

5.7.14 How to Change the Transmission Rate and Operating Mode in the PC Network

Introduction

For communication in a network, ensure the following parameters are set consistently for all network nodes:

- Transmission rate
 - Operating mode
-

Note

The factory settings for Siemens devices are set so that parameters for the transmission rate and operating mode are identified **automatically** (autonegotiation).

This setting **only** needs to be changed if nodes which do not have access to the "Autonegotiation" setting must be communicated with in the network.

Automatic identification of the transmission rate and operating mode

Make sure there are no inconsistencies in Ethernet CPs, switches and network adapters in terms of their settings/properties for data transmission rate and bus access procedure.

We recommend using the default **Autonegotiation** setting (procedure for the automatic negotiation of the best transmission mode between two network interfaces which are directly connected to one another).

The term autonegotiation denotes the automatic identification and negotiation of transmission rate and operating mode (full duplex/half duplex).

- Full duplex is an operating mode with bidirectional data communication, where the communication partners can send data on the transmission link independently of one another.
- Half duplex is an operating mode with bidirectional data exchange, in which only one communication partner at a time can send data on the transmission link.

Requirement

The "Autonegotiation" setting needs to be changed if nodes which do not have access to this setting must be communicated with in the network.

Configuring network nodes

Location of use	Network node	Opening the configuration dialog window	Parameter setting
PC	Communication module e.g. CP 16xx	For automatic negotiation of the configured network parameters (autonegotiation).	Activate option buttons for duplex mode and transmission rate.
PC	Set INTEL network adapter (or similar standard network adapter)	<ol style="list-style-type: none"> 1. Use the search box in the start menu to open the "Device Manager". 2. Select network adapter. 3. File > Properties 4. "Advanced" tab 	Set values for the property. Typical name for the property (depends on the network adapter used): <ul style="list-style-type: none"> • Speed and duplex mode • Link speed & duplex
Switches	SCALANCE X ... e.g.: SCALANCE X-400	<ul style="list-style-type: none"> • Configuration via Telnet or Web Based Management (WBM) • Open the configuration dialog box for the switch via Internet Explorer: http: \\<TCP-IP address> 	Port configuration

Location of use	Network node	Opening the configuration dialog window	Parameter setting
AS	Communication module E.g.: CP 443-1	HW Config: CP 443-1 properties > "Options" tab > "Individual Network Settings" group	In the "Transmission medium/Duplex" drop-down list (default setting: "Automatic setting")
AS	Network adapter to Ethernet e.g.: PROFINET connection for a CPU 410-5H	<ol style="list-style-type: none"> 1. HW Config 2. Select port 3. Object properties 4. "Options" tab 	Default setting: "Automatic setting" (Autonegotiation)

You can find information on approved hardware in the product overview *Process Control System PCS 7; Released Modules*.

5.7.15 Installing security patches, hotfixes, service packs

Introduction

Security patches, hotfixes, and service packs are software packages, which serve to eliminate security vulnerabilities, unwanted software properties, and similar.

Information is provided with the software package explaining the properties that need to be changed and the requirements for its installation.

Note

You will find information on the software version for the current PCS 7 version in the pcs7 readme file.

Microsoft security patches

Siemens tests the compatibility of Microsoft security patches for the Microsoft operating system, the SQL server and Internet Explorer. You can find information on security patches for PCS 7 online in the SIMATIC Customer Support under the entry ID: 18490004 (<https://support.industry.siemens.com/cs/ww/en/view/18490004>).

Additional information

- Section "How to install service packs for the operating system (Page 76)"

5.7.16 Enable and configure SNMP

Introduction

You can monitor SNMP-enabled components with the maintenance station. SNMP-enabled components include:

- PC stations - SIEMENS Industrial PC (IPC)
- Network components
 - Switches (SCALANCE X...)
 - Communications processors
- Other devices
 - Network adapters
 - Switches
 - PC stations (PCs from third parties - reduced information)

The OPC server is used for diagnostics of SNMP-enabled components. SNMP must be enabled and configured on the components that are to be monitored with the maintenance station.

Enabling SNMP (enabling Windows function)

Enable only the protocol or the service listed in the table.

Operating system	SNMP or SNMP service
Windows 7 Windows 10	Simple Network Management Protocol
Windows Server 2012 R2	SNMP service

Configuring SNMP

1. Open "Services" under Computer Management.
2. Select the item "Simple Network Management Protocol" or "SNMP Service".
3. Select the shortcut menu command **Properties**.
4. Open the "Security" tab.

5. Select one of the following options:

Option	Setting
"Accept SNMP packages from any host"	No additional settings required
"Accept SNMP packages from this host"	<ul style="list-style-type: none">• The local address or the local PC name and the address of the maintenance station must be entered for the station being monitored. Both addresses are needed for a redundant MS server.• The local address or the local PC name must be entered for the maintenance server.

Note

Recommendation for domain controller

Select the "Accept SNMP packages from this host" option. Enter the system-specific settings.

6. Check the settings for the "Send authentication trap" option:
Enter the name used in the configuration under "Accepted community names" with read/write authorizations if you do not install the following software on this system:
"DiagMonitor (Page 139)"

Additional information

- Setting up cross-network communication links
You should follow the recommendations in the following document if you wish to set up cross-network communication links:
 - White paper *Process Control System PCS 7; Security Concept PCS 7 and WinCC - Basic Document*
 - You can find information on availability in the *Process Control System PCS 7; PCS 7 - Readme* file (see "Preface (Page 9)").
- You can find information on use of SNMP and DiagMonitor for monitoring PCs in the following section "DiagMonitor (Page 139)".

5.7.17 How to activate redundancy for high availability PCs

Principle

The following basic steps are required to configure redundant stations.

1. Redundancy cable for PC stations:
You need to establish a connection through a redundant cable for redundant PC stations. The redundant stations are the PC stations of a pair (server and single station systems).
2. Select the redundancy interface:
For the redundancy connection between two PC stations, you need to configure the connection path directly on the redundant PC stations.
3. With a server-client architecture, you will need to assign the clients to the servers.

Redundant cable for PC stations

The following redundancy connection options exist:

- With BATCH servers:
Network cable (cross-over cable) to an additional Ethernet network adapter.
If using a PC as a BATCH server, this is the only type of redundancy connection permitted!
- With OS servers and Route Control servers:
Null-modem cable to COM interface or network cable (cross-over cable) to an additional Ethernet network adapter.

Selecting the redundancy interface

If you want to establish a redundancy connection between two PC stations, OS servers for example, you need to select the connection path to the redundant partners.

A redundancy connection can be established via the "serial port" or a "network adapter".

- BATCH server (redundancy connection only possible through an additional network adapter!)
- OS server
- Route Control server
- Maintenance server
- Single station systems

You can make the following settings directly on each of the mutually redundant servers and single station systems.

1. Select the PC station (My Computer) in the tree view of Windows Explorer.
2. Select the "Simatic Shell" folder.
(Windows 10: "This PC" folder, "Devices and Drives" area)
3. In the shortcut menu, select the menu command **Redundancy Settings**
The "Redundancy Settings" dialog box opens.

4. In the "Optional connection to redundant partner" area, configure the connection path.
For a serial connection:
 - Select the item "COM1" or "COM2" " " in the "Serial port" drop-down list.
 - Select the "-----" item in the "Network adapter" drop-down list.For connection via an additional network adapter:
 - Select the "-----" item in the "Serial port" drop-down list.
 - Select the desired network adapter in the "Network adapter" drop-down list.
5. Click "OK".

Additional steps for servers and single station systems (OS, BATCH)

After connecting the PC stations with a redundancy cable and selecting the redundancy interface:

1. Follow the instructions in the function manual *Process Control System PCS 7; High Availability Process Control Systems*.

Additional steps for clients (OS, BATCH)

Connect the clients with the redundant servers:

1. Follow the instructions in the function manual *Process Control System PCS 7; High Availability Process Control Systems*.

Additional steps for SIMATIC Route Control

1. Follow the corresponding instructions contained in the manual *Process Control System PCS 7; SIMATIC Route Control*.

See also

How to set the communication module for connecting to the terminal bus (Page 115)

5.7.18 How to disable user switching

Introduction

For PCS 7, the use of the Windows functionality "Fast user switching" is not permitted for changing the Windows user.

The administrator should disable the application of this function by means of a group policy.

NOTICE

Fast user switching

The application of this function can trigger unwanted reactions, e.g. the restart of a PC station.
--

Requirement

- Execution with Administrator login

Procedure

1. Use the search box in the start menu to open the file "gpedit.msc".
The "Local Group Policy Editor" dialog box opens.
2. In the tree view, select "**Local Computer Policies > Computer Configuration > Administrative Templates > System > Logon**".
3. Enable the option "Hide entry points for fast user switching".
4. Apply the settings.
The "Fast user switching" function is no longer available in the Windows Start menu after logoff.

5.7.19 Downloading the network configuration to the PC stations

Introduction

To allow you to configure, download and test all automation systems and PC stations (OS, BATCH, RCS) of a PCS 7 project from a central engineering station (ES), make the following network settings and download the configuration to all PC stations.

Additional information

The required steps are described in the configuration manual *Process Control System SIMATIC PCS 7; Engineering System*.

5.8 Notes on add-ons and utilities

5.8.1 Overview of additional programs and utilities for PCS 7

Introduction

This section provides you with information on additional programs and utilities for PCS 7.

Overview

- Additional programs:
 - Remote diagnostics functions (Page 136)
 - Virus scanners (Page 139)
 - Burner software (Page 139)
 - DiagMonitor (Page 139)
- Utilities:
 - Screen savers (Page 142)
 - Defragmentation programs (Page 142)

5.8.2 Remote diagnostics functions

Security requirements

If you want to perform remote diagnostics on a PCS 7 plant, you must protect that plant against unauthorized access.

Several steps have to be taken in order to implement a security concept. Only when taken together as a whole will these security measures offer the plant optimum protection.

Transmission paths

Data can be transmitted on the following paths:

- Telephone line (modem)
- Network connection (e.g. in-plant network TCP/IP connection)

Remote service and remote operation

For PC stations, we recommend the following tools for remote diagnostics and administrative access to PCS 7 plants:

- **VNC**

The "RealVNC" Enterprise Edition software has been approved for use for remote service access as of PCS 7 V8.0 .

You can find regularly updated information about the version compatible with your PCS 7 version and about using RealVNC under Entry ID 55422236 in Industry Online Support: Internet link Internet (<http://support.industry.siemens.com/cs/ww/en/view/19292127>)

Note

Disabling the keyboard shortcut "Ctrl+Alt+Del" when using RealVNC

A software emulation of the RealVNC software allows the keyboard shortcut "Ctrl+Alt+Del" to remain operable when a key lock is active.

If you want to prevent users from using this keyboard shortcut in active process mode, you must adapt a group policy. You can find information about this on the Internet on the support pages of RealVNC under the following keyword:

"Secure Attention Sequence"

Activate the policy describe there with the "None" option.

- **RDP**

The use of the Remote Desktop Protocol (RDP) is only permitted for remote maintenance of PCS 7 clients. No server services (for example, Web Navigator Server, Data Monitor Server, OPC server) should be running on these computers.

The reason for this lies in the handling of remote desktop sessions with the Microsoft operating system. The RealVNC software should be used for remote access to other computers in a distributed PCS 7 plant (for example, OS servers, engineering stations).

Note

Activated key lock prevents local operation in the case of a locked system

You can cancel the key lock on the computer by performing the following steps:

1. Using a remote connection, connect to the session that is currently active on the computer.
 2. Log on as a user who is authorized to exit process mode.
 3. Exit process mode. The key lock is deactivated.
 4. Use the keyboard shortcut "Ctrl+Alt+Del" locally on the computer and take over the active session. The remote connection is automatically disconnected.
 5. Restart process mode.
-

Using the Remote Desktop Protocol (RDP)

- Access via RDP may only be gained by means of console takeover with the same user, or initial login ("/admin" or "/console" parameter when connecting)
- Administrator rights are required for initial login on a PC with a server operating system.

- The user must be member of the appropriate "HMI group" of the target computer (see section "Setting up user groups and users (Page 89)"). A **maximum of 1** user is permitted per target computer.
 - Actions via RDP:
 - Hot restart/restart of the PC with corresponding logon
 - Setting up/configuration of computer
-

Note

Non-supported functions

The following actions are not supported via RDP:

- Operator control and monitoring process mode
 - Multiple logons to the operating system
-
- Access to computers via RDP should only be temporary and not static.
-

Note

PCS 7 Web client

The above restrictions do not apply when using a PCS 7 Web client as terminal service.

Additional information

- Section "Subsequent installation or updating (Page 94)"
- White paper *Process Control System PCS 7; Security Concept PCS 7 and WinCC - Basic Document*
You can find information on availability in the *Process Control System PCS 7; PCS 7- Readme* (see "Preface (Page 9)").
- Operating system online help

5.8.3 Automatic logon to the operating system

A PC station with password protection is enabled by default after the operating system starts in the logged out state.

If a PC station should go immediately to the state for logon of the operator or to process mode after startup, the logon procedure must run automatically on the operating system. This is permitted in PCS 7.

Recommendation

Password-protected logon, for example, is made available by the Microsoft tool offered on the Internet: „Autologon“. This tool stores the password in encrypted form.

NOTICE
Downloads
Always check for malware when installing downloads.

5.8.4 Virus scanners

You can find information about this in the section "How to install additional components (Page 78)".

5.8.5 Burner software

Introduction

In the interest of maintaining performance levels, data archiving devices should not be used on PC stations in process mode. We recommend that you only use data archiving devices (for example CD/DVD burners) on the engineering station.

Usage

If you have purchased an engineering station as part of a product bundle, this package will include burner software. This burner software can be installed after the main installation. During installation, follow the instructions of the burner software manufacturer.

5.8.6 DiagMonitor

Introduction

The DiagMonitor software is used for early detection and reporting of hardware and temperature problems on the SIMATIC PC. Messages can appear via:

- Ethernet (SNMP)
- Internet/telephone
 - E-mail
 - SMS
- OPC (forwarded to the SIMATIC software applications)
- Web browser

The DiagMonitor software monitors, reports, alarms and visualized application-specific operating states on SIMATIC PCs.

Requirements

Observe the requirements for the hardware and software.

Note

You can find detailed, up-to-date information about approved PC hardware and operating systems in the manuals *DiagMonitor Getting Started* and *PC DiagMonitor Software*.

The SNMP service is enabled. You can find additional information on this in the section "Enable and configure SNMP (Page 131)".

Restrictions

Note

Remote monitoring is only possible with the TCP/IP Internet protocol since the required SNMP protocol is available in this protocol family.

Installing and configuring DiagMonitor software (overview)

Information on the software version of the latest PCS 7 version is available in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)").

Note

Version of DiagMonitor software already installed

Check the Control Panel to see if a version of the "DiagMonitor" software is already installed. If an older version of DiagMonitor is installed, remove it.

Perform the following steps for the installation and configuration:

1. Install the operating system-specific DiagMonitor: software for your PC:
 - DiagMonitor on PCS 7 PC stations (standard version)
 - DiagMonitor on domain controllers
2. Configuring SNMP
3. Configure DiagMonitor

DiagMonitor on PCS 7 PC stations

1. Run the following file: DiagMonitor_Silent_Install.bat
Wait until the installation process is complete.
2. Run the following file: CM_Activate.exe
3. Reboot the computer.

DiagMonitor on domain controllers

Note

Stricter security policies have to be observed for domain controllers.

Installation of a web server on a domain controller is not compatible with the security settings for PCS 7.

This is why the "Diagnostics Monitor" button on a faceplate (PCs stations in the diagnostic area of a maintenance servers) for monitoring the domain controller is disabled.

1. Run the following file: Start.exe
2. Select the "WebServer" option.
3. Confirm the license conditions.
4. Confirm the security settings.
5. Wait until the installation process is complete.
6. Run the following file: CM_Activate.exe
7. Reboot the computer.

Configuring SNMP

Configure SNMP. Follow the procedure described in section "Enable and configure SNMP (Page 131)".

Note**Domain controller on SIMATIC IPC with DiagMonitor**

Make the following settings:

- For Community "SOL": "Read" rights.
 - Remove all unknown communities.
-

Configure DiagMonitor

Note

The diagnostic monitor's "Management Station" configuration tool can only be started by a user with administrator rights.

Perform the configuration on all monitored stations.

1. Use the search box in the start menu to open "**Management Explorer**".
The SIMATIC PC DiagMonitor is started.
2. Make the following settings:
 - Select the menu command **Station > Add...** and select "Local station".
 - Optional:
Configure any additional events, for example, cyclic operating hours alarms.

Optional setting

If you want to stop the "SIMATIC PC DiagMonitor" Management Station from automatically starting up each time someone logs on, deselect the item "Start with Windows session" under **Tools > Settings....**

5.8.7 Screen savers

Using screen savers

It is **not** recommended to use a screen saver on the PC with PCS 7 for the following reasons:

- The screen saver uses CPU time and may therefore cause the system to be overloaded.
- The screen saver reduces the amount of RAM that can be used continuously. There are screen savers with which the amount of RAM used by the screen saver is not freed up.

If you use a screen saver, you should deactivate it when operating PCS 7.

5.8.8 Defragmentation programs

Information about authorizations

Authorizations cannot be saved on a license key USB stick. In this section, we only use the term "license key", even if a product uses "authorizations".

Using defragmenters

Defragmentation programs are used to optimize the time it takes to access a hard disk.

Note

Defragmentation programs that move fixed blocks can destroy the license key code.

Recommendation:

Always exclude the license keys from processing before using the defragmentation program.

Excluding license keys from editing

You can exclude the license keys from editing as follows:

- Transfer all license keys to another storage medium, for example license key USB stick/ license key diskette.
- Transfer all license keys to a partition that is not defragmented, for example the security partition.

5.8.9 WinCC/DataMonitor

The SIMATIC WinCC/DataMonitor provides WinCC process data to all functional levels of a company via intranet/Internet with standard tools.

Current process states and historical data are displayed and evaluated with powerful tools. The production can then be efficiently monitored and analyzed. Information prepared and presented in the form of Web pages and reports can be prepared and made available for specific target groups. The DataMonitor client, an office PC for example, accesses the data on the DataMonitor server, which is installed on a WinCC server, for example.

WinCC/DataMonitor includes the following functions and analysis tools that can be optionally used depending on application:

- The "Process screens" function is used purely for monitoring and navigation via WinCC process pictures with MS Internet Explorer as a so-called "view-only client". The DataMonitor here uses at the server end the same mechanisms as WinCC Web Navigator, for example, for communication, user management and display of graphical data.
- The "Web Center" function serves as a central information portal for user-specific views. On a Web Center page, the user can assemble and save the displayed objects of the DataMonitor, the so-called Web parts, as screen views. In addition, the user manages access to the DataMonitor and process data in the "Web Center".
- The "Trends and Alarms" function is used to display and analyze historical data from the WinCC Runtime / Central Archive Server or from the WinCC long-term archive servers. The data is displayed in predefined Web pages in tables and charts. The user only needs to link the tables and charts with the desired WinCC archive data. The data created in this way can be exported to a CSV file for further processing.
- The "Excel Workbooks" function is a reporting tool that integrates messages, archive data and current process values from WinCC in MS Excel and thereby provides supports for online analysis. The created Excel workbooks can be published and then be made available on the intranet/ Internet. Excel workbooks can be published as templates for the "Reports" function to create reports with WinCC data.
- Using the "Reports" function, users can trigger the time-driven or event-driven reports. The reports can be generated from WinCC print jobs, or from published Excel workbooks. This makes available statistics and analysis of specific process data or historical data, for example. The reports are stored in PDF format and can be forwarded by e-mail, if desired.

Additional information

You can find information on SIMATIC WinCC/DataMonitor in the online help for SIMATIC WinCC/DataMonitor.

Appendices

6.1 Appendix A - Applying the software package

6.1.1 Software packages for basic engineering

Brief description of the basic engineering applications

The following applications are installed during the PCS 7 system setup from the Process Control System; SIMATIC PCS 7 DVD for basic engineering. License keys are required for use.

You can find additional information on this in the section "PCS 7 licenses and quantity structures (Page 106)".

Applications	Brief description
Automation License Manager	For transferring and managing license keys
STEP 7	PCS 7 basic engineering: <ul style="list-style-type: none"> • SIMATIC Manager for managing project objects • HW Config for the hardware configuration • NetPro for the network configuration
SCL	Structured Control Language (S7 SCL) High-level language for programming user function blocks in accordance with IEC 61131-3
CFC	Continuous Function Chart (CFC) - For the graphical configuration of continuous automation functions in accordance with IEC 61131-3, with test and commissioning functions
SFC	Sequential Function Chart (SFC) - For the graphical configuration of sequential production sequences (step sequencers), with test and commissioning functions
PH	Plant Hierarchy (PH) - For displaying a project in a plant view; which enables the user to gain a quick overview of project resources
IEAPO	<ul style="list-style-type: none"> • Process Object view (PO) - For providing a process-control oriented view of basic automation data • Import Export Assistant (IEA) You will find more information on this topic in the section "Optional software packages (Page 148)".
PCS 7 Library	Standardized process-control libraries with preconfigured and tested blocks and drivers for hardware (e.g., blocks for I/O modules)
WinCC	Visualization and configuration software containing standards for the fast implementation of simple to complex visualization tasks in single or multiple station operation
AS-OS Engineering	AS/OS connection for faceplates, messages, and tags

6.1 Appendix A - Applying the software package

Applications	Brief description
PV InsInfo-Server	Tool which supplies the WinCC variable browser with ES variables
SIMATIC NET PC Software	Software components for configuring and identifying network adapters installed in the PC
BATCH Engineering	Components for BATCH Engineering: BATCH Base, BATCH Builder, BATCH Blocks, BATCH WinCC Client Options, BATCH WinCC Server Options, BATCH Getting Started You will find more information on this topic in the section "Software packages for SIMATIC BATCH (Page 147)".
Route Control Engineering	Components for Route Control Engineering: Route Control Base, Route Control Engineering, Route Control Library, Route Control Faceplates You will find more information on this topic in the section "Software packages for SIMATIC Route Control (Page 148)".
PDM	Components for engineering field devices You will find more information on this topic in the section "Optional software packages (Page 148)".

6.1.2 Software packages for operator stations

Brief description of the operator station applications

The following applications are installed during the PCS 7 system setup from the Process Control System; SIMATIC PCS 7 DVD for operator stations. License keys are required for use.

You can find additional information on this in the section "PCS 7 licenses and quantity structures (Page 106)".

Program name	Brief description
Automation License Manager	For transferring and managing license keys
WinCC	Visualization and configuration software for visualization in single or multiple station operation Additional information <ul style="list-style-type: none"> • License key levels: Installation manual <i>Process Control System PCS 7; Licenses and Configuration Limits</i> • Section "Licensing (Page 106)"
SFC Visualization	Allows you to display and operate sequence control systems.
PCS 7 Faceplates	Contains standardized libraries with pre-produced and tested blocks (connection to AS and faceplates).
SIMATIC NET PC-Software	The software components included can be used to configure and detect the network adapters fitted in the PC.

6.1.3 Software packages for SIMATIC BATCH

Brief description of SIMATIC BATCH applications

The following applications are installed during the PCS 7 system setup from the Process Control System; SIMATIC PCS 7 DVD for SIMATIC BATCH. License keys are required for use.

You can find additional information on this in the section "PCS 7 licenses and quantity structures (Page 106)".

Program name	Brief description
Automation License Manager	For transferring and managing license keys
BATCH Base	Basis for all BATCH installations Contains installation of the client database You will need a license key for BATCH API to interface to a higher-level information system.
BATCH Builder	Software package that is installed on the PCS 7 ES and is used to configure BATCH project data.
BATCH Fastobjects	For installing a database server
BATCH client	<ul style="list-style-type: none"> • The Batch Control Center (BatchCC) is the central component in SIMATIC BATCH for batch scheduling and batch control. BatchCC manages all the data of relevance for SIMATIC BATCH, enabling you to also log all data in the BatchCC. • The BATCH recipe editor is responsible for creating simple graphics and managing any number of recipes. • BATCH REPORT - The convenient BATCH printing function
BATCH Server	<ul style="list-style-type: none"> • BATCH sequence control system and allocation of units • Batch data management records, saves, logs and exports batch data • Additional information <ul style="list-style-type: none"> – License key levels: Installation manual <i>Process Control System PCS 7; Licenses and Configuration Limits</i> – Section "Licensing (Page 106)"
BATCH Blocks	BATCH interface blocks
BATCH WinCC Client Options	Faceplates for the PCS 7 OS
BATCH WinCC Server Options	Faceplates for the PCS 7 OS
BATCH Getting Started	Sample project for SIMATIC BATCH

6.1.4 Software packages for SIMATIC Route Control

Brief description of the applications for SIMATIC Route Control

The following applications are installed during the PCS 7 system setup from the Process Control System; SIMATIC PCS 7 DVD for SIMATIC Route Control. License keys are required for use.

You can find additional information on this in the section "PCS 7 licenses and quantity structures (Page 106)".

Program name	Brief description
Automation License Manager	For transferring and managing license keys
Route Control Base	Basis for all Route Control installations Contains documentation on SIMATIC Route Control.
Route Control client	For in-depth diagnostics of the route and its elements
Route Control Engineering	For producing and managing any number of sub-routes with elements
Route Control server	For searching for routes and as an interface between the Route Control center and/or PCS 7 OS and the automation systems Additional information <ul style="list-style-type: none"> • License key levels: Installation manual <i>Process Control System PCS 7; Licenses and Configuration Limits</i> • Section "Licensing (Page 106)"
Route Control Library	Contains interface blocks for interconnection with user and other process blocks and faceplates for monitoring and operating routes on the Route Control client.
Route Control Faceplate	Faceplates for the PCS 7 OS

6.1.5 Optional software packages

Introduction

The following applications can be used for engineering special applications. You will need additional license keys.

You can find additional information on this in the section "PCS 7 licenses and quantity structures (Page 106)".

Note

Information on the software version of the latest PCS 7 version is available in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 9)").

Add-ons in the PCS 7 setup

You install these applications via the PCS 7 system setup.

Applications	Brief description
IEAPO Note: License needed for IEA	Import-Export-Assistant (IEA) - Tool for fast bulk engineering (e.g. importing models and process tags)
S7-PLCSIM	Simulate CPU of the automation system
SFC Visualization	Display and operate sequential control systems
VXM (Version Cross Manager)	Version comparison of engineering data, including graphic differential display
PCS 7 PID Tuner	Optimize control loops
PCS 7 Basic Faceplates; PCS 7 Advanced Faceplates	Faceplates for the operator station
SIMATIC Logon	<ul style="list-style-type: none"> Assign roles defined for the PCS 7 applications to the Windows users/user groups along with the corresponding administrator rights Activate user dialogs for applications managed with SIMATIC Logon. Enable and log functions
SIMATIC PDM	Configuration, parameter assignment, commissioning and diagnostics of intelligent process devices. SIMATIC PDM allows a number of process devices to be configured under one common user interface.
SIMATIC Logic Matrix Editor	Realize logic operations for control signal Note: The Logic Matrix is delivered as a part of PCS 7 V9.0 DVD and should be installed via the PCS 7 setup.
Web Navigator ...	For remote publishing of images and other relevant data for a PCS 7 Web server.
SIMATIC Management Console	<ul style="list-style-type: none"> Central administration and management of SIMATIC software products Determine inventory data
DOCPRO	Create plant documentation and circuit books
OpenPCS 7	Interfaces based on OPC and OLE DB for data exchange

Additional information

For information about the software packages and how to use them, please refer to the brief description *SIMATIC PCS 7 process control system* or the catalog *ST PCS 7*.

6.2 Appendix B - Approved configurations on a PC station

6.2.1 Approved configurations

Introduction

You can use a PC station for PCS 7 not only in the standard configuration. By installing additional program packages or taking advantage of special properties, you can use a PC station for several purposes, for example:

- as an engineering station with BATCH client installation (Configurations with engineering station, clients and single station system (Page 154))
- as an OS server and operator station (client installation on server (Page 156))
- as an OS server and BATCH server (server on server (Page 155))

Standard configurations

The following program packages are offered in the PCS 7 system setup when a PC station is installed:

- Engineering
 - For an engineering PC
PCS 7 Engineering, BATCH Engineering, Route Control Engineering, PDM

or

- Runtime (process mode)
 - For a single station PC
OS Single Station, BATCH Single Station, Route Control Single Station
 - For a server PC:
OS Server, OS Server for BATCH, OS Server for Route Control, OS Server for BATCH and Route Control, Maintenance Station, BATCH Server, Route Control Server
 - For a client PC:
OS Client, OS Client for BATCH, OS Client for Route Control, OS Client for BATCH and Route Control, BATCH Client, Route Control Client
 - For a PC for archiving, log management, reporting and report creation
Process Historian, Information Server
 - For an OpenPCS 7 PC:
OpenPCS 7, OS client with OpenPCS 7
 - For a PC for Web stations:
PCS 7 Web Server, PCS 7 Web Client, PCS 7 Diagnostics Client, DataMonitor Server, DataMonitor Client

Note

Installation of an ES on an OS PC

If you wish to install an engineering system (ES) on an existing OS, it is absolutely essential to remove the installed PCS 7 OS version first and then perform the "Engineering Station" installation.

Notes for the reader on this section

Note

In this section the activation of a standard configuration refers to the activation of an application, for example, activation of a BATCH client's process mode.

Optimum performance

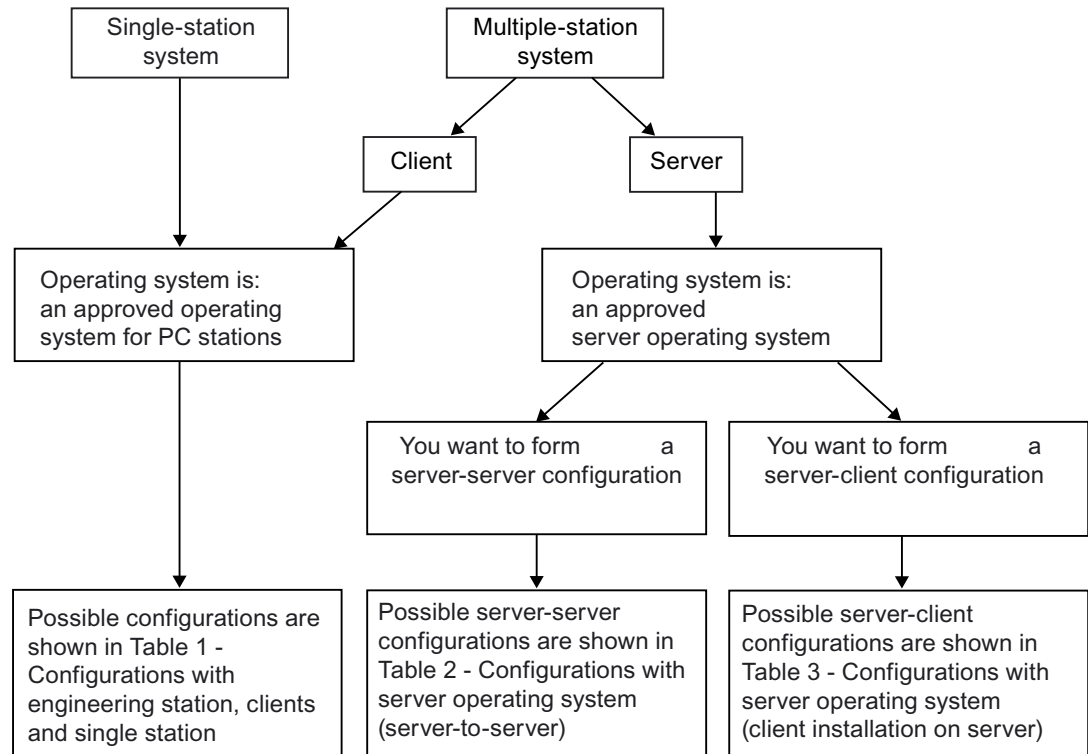
To ensure that PCS 7 performs at its optimum level, we recommend that you use only standard configurations on a PC station. However, system-specific conditions may mean that you have to equip a PC station with several program packages for standard configurations. If this is the case, you must observe the rules described below.

Rules

Concerns	Rules	
PCS 7 project	Only use the PC configurations described here within a PCS 7 project.	
Program packages	Several program packages may be installed on a PC station. However, these stations may only be used simultaneously in exceptional cases (see the configuration tables below).	
Performance	Activating several program packages will impair the performance of the individual applications.	
Configuring the PC station	More powerful equipment may be required for the PC configurations described here (for example, larger work memory, operating system). You can find information about the minimum performance requirements of the individual standard configurations in the catalog <i>ST PCS 7</i> .	
Using the PC station (installation)	You can activate the properties of several standard configurations on a PC station if: <ul style="list-style-type: none"> • Other program packages have been installed in addition to the standard configuration (for example, BATCH client on engineering station) or • You activate special properties of the standard configuration (for example, OS workstation on OS server). 	
Number of monitors on a PC station	If you use a server as a workstation also, you can connect a maximum of five workstations (monitors) to that server (workstation on server + workstations on assigned clients).	
Maintenance station	The maintenance station can be configured as a single station or multiple station system. You can configure the MS server with PCS 7 servers on a PC-station in accordance with Table 2 below. The engineering station or an OS client can be used as MS-client.	
External archive server	Process Historian (Information Server)	The Information Server can be installed on a Process Historian.
	Information Server	
OpenPCS 7	OpenPCS 7 can be installed on the following PC stations: <ul style="list-style-type: none"> • Separate PC station • OS client • OS server • OS single station system 	
Configurations with several servers	In the interests of maintaining performance levels, you must not use more than two server applications on a PC station.	
Starting and stopping a PCS 7 server application on redundant servers with several PCS 7 server applications	If several PCS 7 server applications are active in process mode on one server of a pair (for example, BATCH server and Route Control server), we recommend the following: Make sure that you always start or stop all of a server's PCS 7 server applications. This will allow you to avoid faults should a redundant server fail. Note: Should a PCS 7 server application on a PC of a PCS 7 server pair fail, all PCS 7 applications for this PC's process mode will be terminated automatically.	

Approved configurations - PC station for several PCS 7 applications

The tables below show the approved configurations of PC stations for several PCS 7 applications. The flow chart below displays how the configurations are assigned to the operating systems:



Example configuration:

Example configuration for a redundant small system with five workstations:

- 1 PC = 1 engineering station = 1 workstation
- + 2 PCs = 1 redundant OS server = 2 workstations
- + 2 PCs = 1 redundant BATCH server = 2 workstations

Note

Each workstation can be designed as an OS client and/or a BATCH client.

Notes for the reader on the tables below

Note

Read Tables 1 - 3 carefully from left to right. This means that a PC with a standard installation can also be used for an additional purpose (by using properties or an additional installation by means of the PCS 7 system setup).

Example:

If you also use a PC station with the standard configuration "engineering station" as an "OS single station system", the notes and restrictions defined under "A" (configuration type "A") will apply.

Notes and restrictions:

You can find information on this in the following sections:

- Section "Information on configuration type "X" (Page 156)"
- Section "Information on configuration type "-" (Page 157)"
- Section "Information on configuration type "A" (Page 157)"
- Section "Information on configuration type "B" (Page 157)"

6.2.2 Configuration tables

6.2.2.1 Configurations with engineering station, clients and single station system

Table 1 – Configurations with Engineering Station, Clients and Single Station System

Purpose	Engineering station	OS single-station system	OS client	BATCH single station system	BATCH client	Route Control single station system	Route Control Client
Standard configuration							
Engineering station		A (Page 157)	B (Page 157)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)
OS single-station system	--- (Page 157)		--- (Page 157)	X (Page 156)	X (Page 156)	X (Page 156)	X (Page 156)
OS client	--- (Page 157)	--- (Page 157)		X (Page 156)	X (Page 156)	X (Page 156)	X (Page 156)
BATCH single station system	--- (Page 157)	X (Page 156)	X (Page 156)		--- (Page 157)	X (Page 156)	--- (Page 157)
BATCH Client	--- (Page 157)	--- (Page 157)	X (Page 156)	--- (Page 157)		--- (Page 157)	X (Page 156)

6.2 Appendix B - Approved configurations on a PC station

Purpose	Engineering station	OS single-station system	OS client	BATCH single station system	BATCH client	Route Control single station system	Route Control Client
Standard configuration							
Route Control single station system	--- (Page 157)	X (Page 156)	X (Page 156)	X (Page 156)	--- (Page 157)		--- (Page 157)
Route Control Client	--- (Page 157)	--- (Page 157)	X (Page 156)	X (Page 156)	X (Page 156)	--- (Page 157)	

6.2.2.2 Configurations with server operating system (server to server)

Table 2 - Configurations with server operating system (server to server)

Purpose	OS server	Redundant OS server	Maintenance server	Redundant maintenance server	BATCH server	Redundant BATCH server	Route Control server	Redundant Route Control server
Standard configuration								
OS server			X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)
Redundant OS server			--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)
Maintenance server	X (Page 156)	--- (Page 157)			X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)
Redundant maintenance server	--- (Page 157)	X (Page 156)			--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)
BATCH server	X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)			X (Page 156)	--- (Page 157)
Redundant BATCH server	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)			--- (Page 157)	X (Page 156)
Route Control server	X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)		
Redundant Route Control server	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)		

Process Historian and Information Server (archive server)

You can install the Process Historian and Information Server on a single PC station.

6.2.2.3 Configurations with server operating system (client installation on server)

Table 3 - Configurations with server operating system (client installation on server)

Purpose	Engineering station	OS single-station system	OS client	BATCH single station system	BATCH client	Route Control single station system	Route Control Client
Standard configuration							
OS server	--- (Page 157)	--- (Page 157)	X (Page 156)	X (Page 156)	X (Page 156)	X (Page 156)	X (Page 156)
Redundant OS server	--- (Page 157)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)
Maintenance server	--- (Page 157)	--- (Page 157)	X (Page 156)	X (Page 156)	X (Page 156)	X (Page 156)	X (Page 156)
Redundant maintenance server	--- (Page 157)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)
BATCH Server	--- (Page 157)	X (Page 156)	X (Page 156)	--- (Page 157)	X (Page 156)	X (Page 156)	X (Page 156)
Redundant BATCH server	--- (Page 157)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)
Route Control server	--- (Page 157)	X (Page 156)	X (Page 156)	X (Page 156)	X (Page 156)	--- (Page 157)	X (Page 156)
Redundant Route Control server	--- (Page 157)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)	--- (Page 157)	X (Page 156)

6.2.3 Information on the configurations

6.2.3.1 Information on configuration type "X"

No restrictions

Read the configuration notes for the respective standard configurations.

6.2.3.2 Information on configuration type "-"

Restriction

This configuration is not approved.

6.2.3.3 Information on configuration type "A"

Restriction

If process mode is activated for an OS on the ES, simultaneous OS engineering can only be performed for this activated OS.

6.2.3.4 Information on configuration type "B"

Restrictions

- No additional installation of an OS client is necessary because the OS workstation is already included in the standard configuration "Engineering Station".
- A PC station cannot be concurrently used as an engineering station and an OS client. During configuration, process mode of the OS client must be terminated and vice versa.

Notes on configuration

- You need to configure a separate OS client in SIMATIC Manager for this OS workstation.
- You cannot and do not have to load the OS client project.

Notes on process mode

- The SIMATIC Manager must be closed when the client project is opened. Otherwise the OS client takes its server data from the engineering station.
- Activate the OS client:
 1. Open WinCC Explorer.
 2. Select the OS client project.
 3. Activate process mode.

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