SIEMENS

SIMATIC

PCS 7
PC Configuration (V10.0 SP1)

Installation Manual

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Valid for PCS 7 as of V10.0 SP1

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⚠ WARNING

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indicates that minor personal injury can result if proper precautions are not taken.

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Cybersecurity information

1

Siemens provides products and solutions with industrial cybersecurity 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 cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit
https://www.siemens.com/cybersecurity-industry.

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

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under
https://new.siemens.com/cert.

2 Industrial Security

This product is a part of SIMATIC PCS 7 and integrated into the overall plant security concept. Siemens strongly recommends setting up, operating, maintaining, and decommissioning the plant environment according to the SIMATIC PCS 7 Compendium Part F – Industrial Security: Technical documentation SIMATIC PCS 7 (https://support.industry.siemens.com/cs/ww/en/view/109815443).

Preface

3

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.

  For more information, refer PCS 7 Online readme (https://support.industry.siemens.com/cs/ww/en/view/109976468)

- **PUD Manager**
  The "PUD Manager" an innovative tool to access documentation, comes with PCS 7 USB flash drive.
  Some of the highlights:
  - Customize the documentation set according to your needs.
  - Efficient search engine to access your information.
    For more information on PUD Manager, refer *Process Control System PCS 7; PUD Manager Online Help*.
- **Technical Information and Solutions**
  For important technical information and solutions, refer to SIMATIC PCS 7 Overview (https://support.industry.siemens.com/cs/ww/en/view/63481413).
- **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.
- **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: PCS 7 Technical documentation (https://support.industry.siemens.com/cs/ww/en/view/109801081).

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.

Siemens SIMATIC programs is found in the "Start" menu under **Siemens Automation**.

Changes compared to the previous version

No changes compared to previous version.

4 PC components of a PCS 7 system

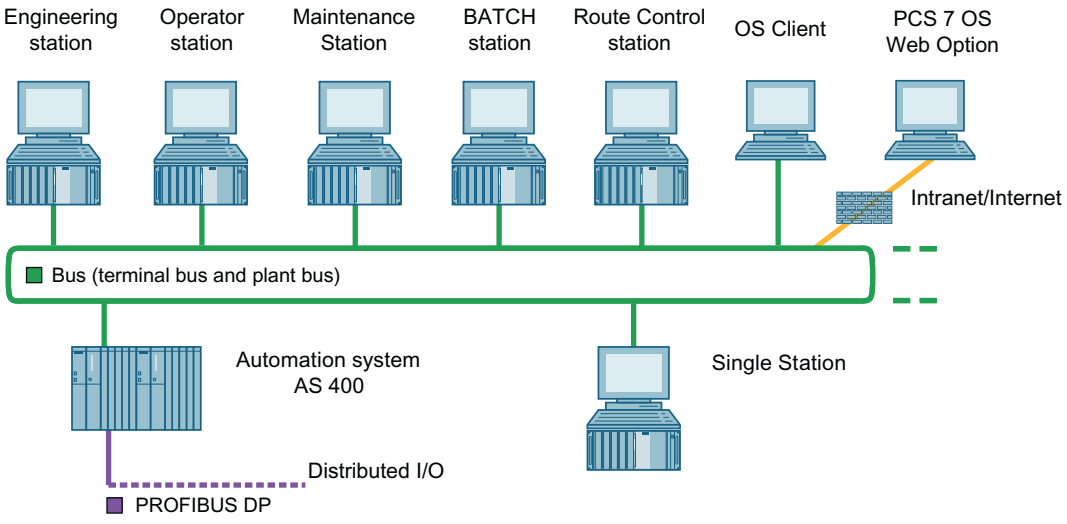
4.1 Basic configuration of the PCS 7 plant

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.



Legend for figure

Station	Function
Engineering station (Page 19)	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. Engineering stations are PCs on which the PCS 7 engineering software is installed for the configuration of a PCS 7 project.
Operator station (Page 20)	The operator station is used to operate and monitor the PCS 7 system in process mode. You connect the operator station to the plant bus to enable the required data communication with the automation system. Operator stations are PCs on which the PCS 7 OS software is installed. 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.
Maintenance Station (Page 20)	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. 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. Note: The Engineering Station is used as a Maintenance Client. The Maintenance Station accesses SIMATIC PDM when SIMATIC PDM is in use.
BATCH station (Page 20)	The BATCH station is used to operate and monitor batch process sequences in process mode. 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. BATCH stations are PCs on which the SIMATIC BATCH software is installed.
Route Control Station (Page 20)	You use a route control station (RCS) to automate the transport of materials and products in a PCS 7 plant. 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. Route Control stations are PCs on which the SIMATIC Route Control software is installed.
Bus system (terminal bus and plant bus) (Page 43)	The PCS 7 AS, OS, BATCH, RCS and ES components communicate (between and among each other) via a bus system (Industrial Ethernet and CP card). In PCS 7 plants, this bus is divided into: • A terminal bus for communication between the following components: – Operator control and monitoring systems (OS, BATCH, RCS) – Engineering station – Higher-level components (for example, MES, office networks) • A plant bus for communication between: – Servers (OS, RCS, BATCH) and automation systems – Automation systems (SIMATIC S7 Connection)
Automation system	The automation system performs the following tasks: • 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.
Single Station (Page 20)	A SIMATIC IPC 6xx is an industrial PC for small plants. It can encompass the functions of a PCS 7 process control system (engineering, operator control and monitoring) when used in conjunction with distributed I/O.

4.2 High availability (redundant) configurations

Introduction

The use of high availability components in a process control system minimizes the risk of a production downtimes. 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 20)".

- 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.
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)] : • Onboard network adapters [2)] • Standard network adapters (INTEL) [2)]

Property	Description
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]: • Onboard network adapters [2] • Standard network adapters (INTEL) [2] • Communications processors CP 162x [2]
Metrics for quality of redundant OS servers	The following metrics are supported in case of each OS server in an redundant configuration through system tags: • The current quality score • The quality score over last hour • Minimum score • Maximum score • Mean score

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 20)" section.
- You can find information on how to activate redundancy in the "Configuring redundancy for 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*.

4.3 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	• Medium-sized and large systems • Configuration phases • Spatially distributed configuration of engineering stations	• Small systems • Local operator stations • Training systems
Monitors	1 or 2 recommended	
Combination/ Method of operation	• PCS 7 project engineering with multiple engineering stations (Page 23)	• PCS 7 project engineering with a single PC (Page 24) • Combination of engineering station and operator station on a single PC (Page 24) • Engineering with SIMATIC PCS 7 BOX: You can find information on this in the manual *Process Control System PCS 7; SIMATIC PCS 7 BOX*

4.4 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 USB flash drive 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 USB flash drive 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	• Small systems • Local operator stations • Training systems
Configuration	Client-server architecture with multiple PCs: • Operator station multiple station system (Page 26) • BATCH station multiple station system (Page 27) • Route control station multiple station system (Page 28) • Maintenance station multiple station system (Page 29)	One PC for all functions of a PCS 7 application: • OS single station system (Page 34) • BATCH single station system (Page 37) • Route Control single station system (Page 38) • Maintenance station single station system (Page 38)

Property	Multiple-station system	Single station system
Workstations	• 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 • When operating on an OS server or redundant OS servers, a maximum of 4 OS clients can be connected. In this case, a total of 8 monitors (including the OS server monitors) should not be exceeded.	1 workstation with a maximum of 4 monitors (depending on the application)
	Maximum number of monitors that can be connected to a workstation:4 (depending on the hardware features of the PC) You can operate the resulting system areas with a single keyboard and mouse.	
Availability	To guarantee high availability of the PCS 7 plant, you can configure the server as redundant server pairs (PCs): • Operator station – OS server – MS server • BATCH station – BATCH server • Route Control station – Route Control server • Archive server – Process Historian You can find additional information on this in the section "High availability (redundant) configurations (Page 17)".	
Number of servers	Maximum number of servers or server pairs in the PCS 7 plant that can simultaneously access a project on the OS clients: 18 The following each count as **one** server: • Server for multiple station systems (see configuration) • Redundant server pair (see configuration) • Archive server	

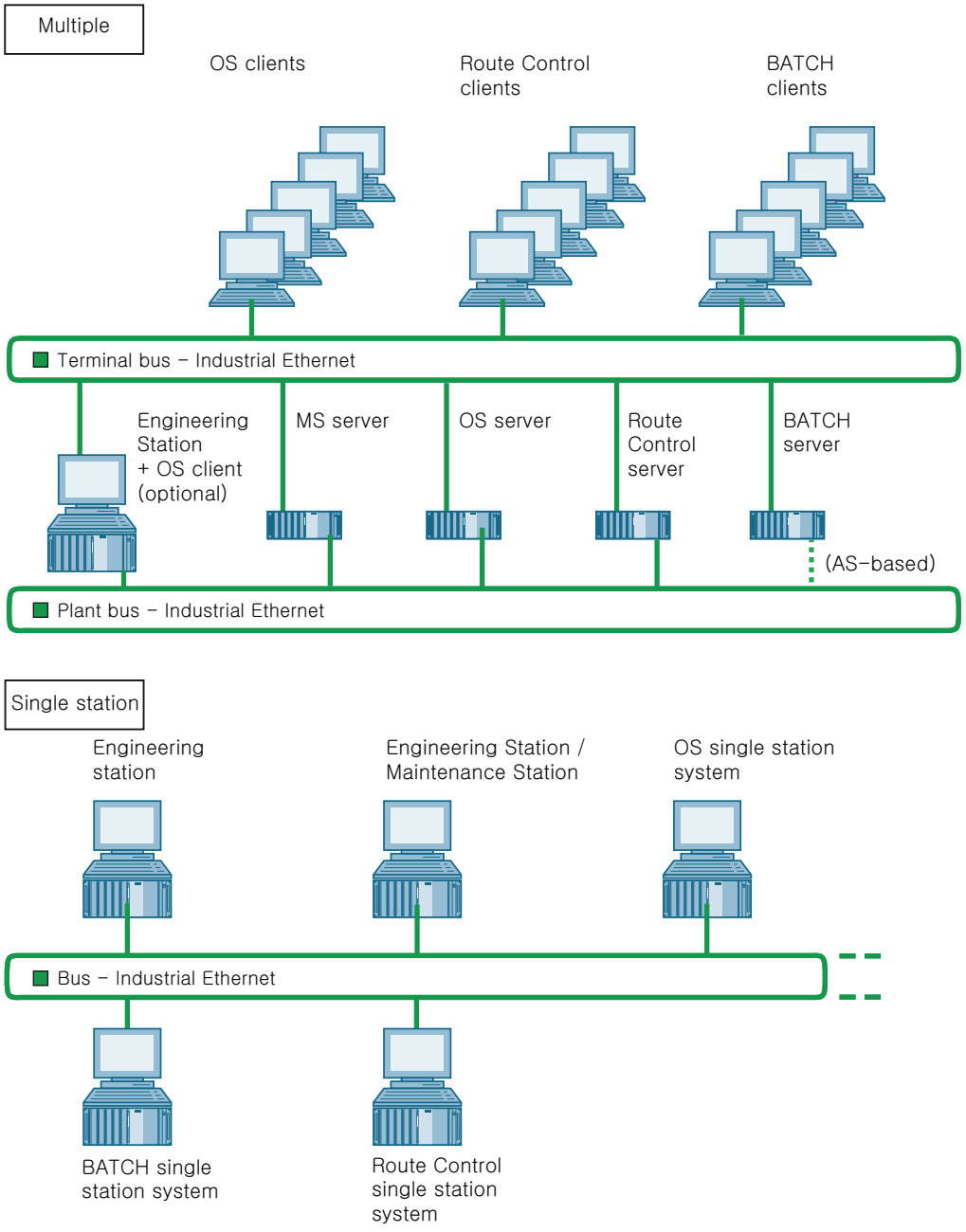
Intranet and Internet connection

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:



4.5 Solutions for engineering stations

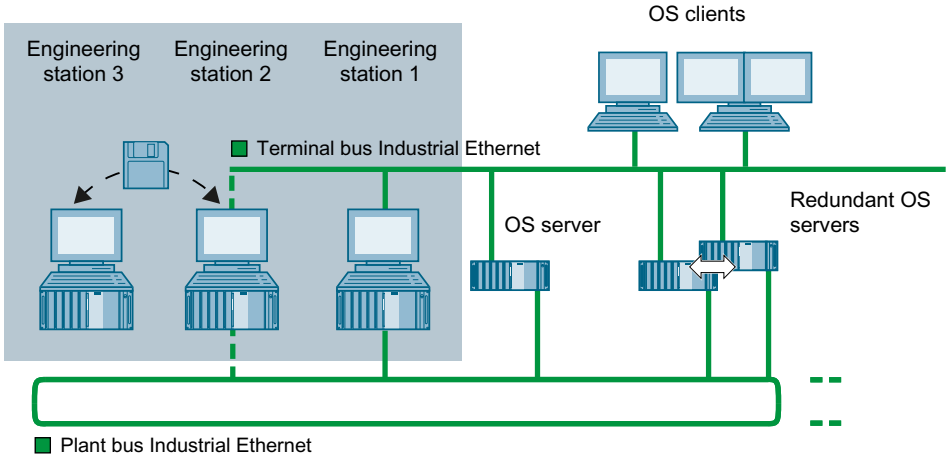
4.5.1 PCS 7 project engineering with multiple engineering stations

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*.

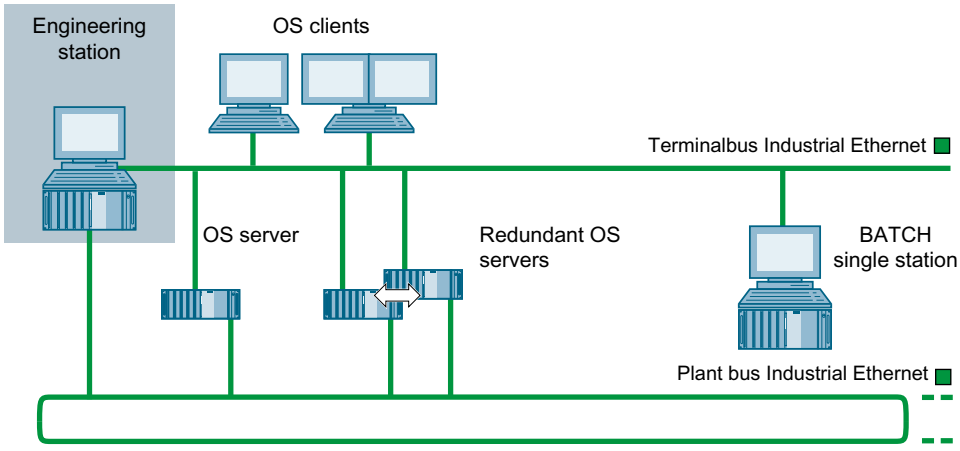
4.5.2 PCS 7 project engineering with a single PC

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



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

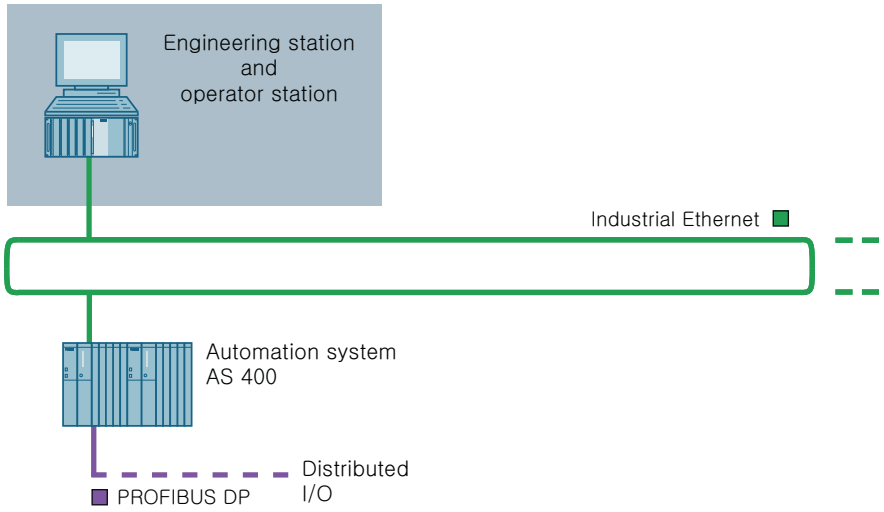
Engineering station and operator station on a single PC

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. In this case, the operator station is configured as a single station system.

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



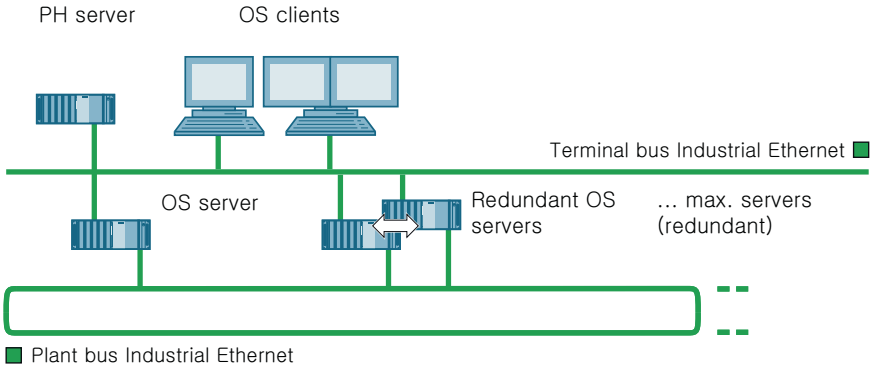
4.6 Solutions for multiple station systems

4.6.1 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 and alarms) 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 34)".

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 29)"
- 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/Microsoft Edge 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

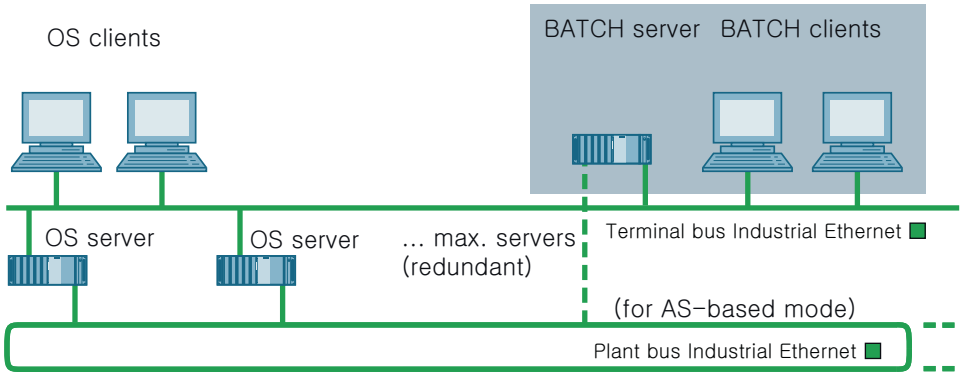
- You can find information on configuration limits in the section "Differences between multiple station systems and single station systems (Page 20)".
- You can find information about long-term archiving of plant data in the section "Process Historian and Information Server (Page 31)".
- You can find information on using the OS client in a virtual operating environment on the Internet "SIMATIC PCS 7 Virtualization (https://support.industry.siemens.com/cs/ww/en/view/51975791)".

4.6.2 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 plant bus.

Additional information

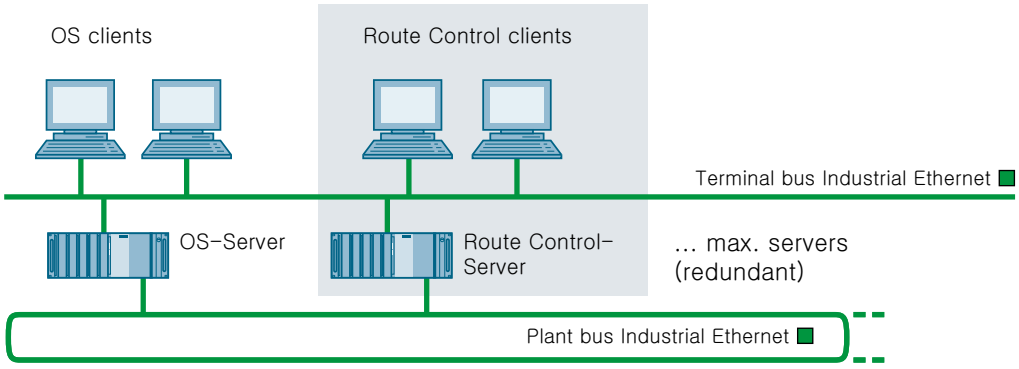
You can find information on configuration limits in the section "Differences between multiple station systems and single station systems (Page 20)".

4.6.3 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 and alarms) 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 20)".

4.6.4 Maintenance station multiple station system

Introduction

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

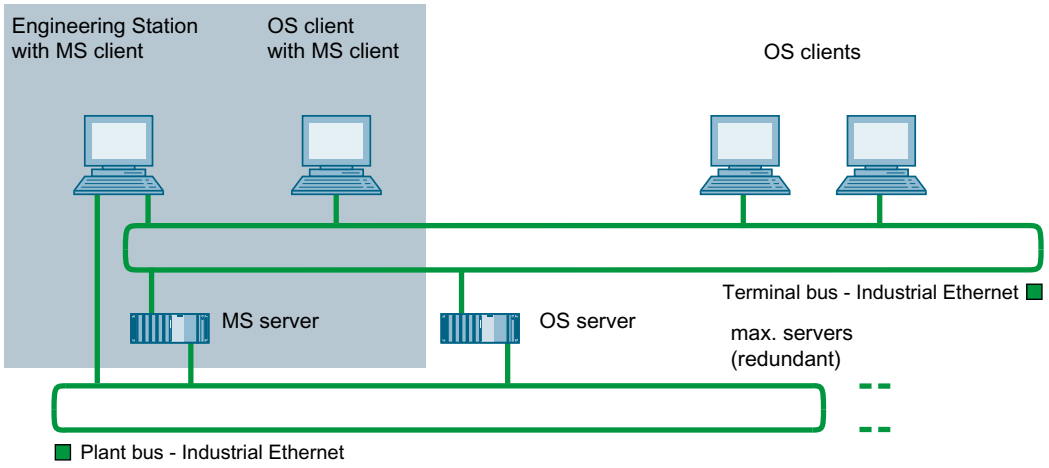
Maintenance Station as multiple-station system with client-server architecture

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 144)"
- Manual *Process Control System PCS 7; Maintenance Station*

4.6.5 External archive servers and reporting system

4.6.5.1 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.

Creating reports based on the data stored on a OS server system are also possible. However, an additional license key "Information Server - Datasource Access" is required in this case.

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 and also reports based on the data stored on a OS server / OS single station.
Saving data	from various PCS 7 projects	
• Messages and process values	Archiving	
• BATCH reports	Archiving	
• PCS 7 Audit Trail data	Archiving	
Displaying data	possible at any time	possible at any time
• Visualize messages and process values via WinCC and Alarm controls	possible	possible in Information server
• Visualize messages or process values on PH TrendViewer	possible	
• Showing BATCH reports		Report as PDF file
• Filtering BATCH data		Using SQL functions
• Showing PCS 7 Audit Trail reports		Report as PDF file
Saving archive data to external media	manual and automatic saving possible	
Exporting process values		
• via WinCC controls	• CSV file	

	Process Historian	Information Server
• Report formats		• PDF • XML • MS Excel • MS Word • MS HTML
Importing process values and alarms		Import add-in for Excel on any computer. Insert reports (as images) in Excel, Word, and PowerPoint applications.
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 plant 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*

4.6.5.2 Archiving and reporting with 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
- Archiving PCS 7 Audit Trail data
- Transfer archive data to external storage media

Functions of the Information Server

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

Additional information

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

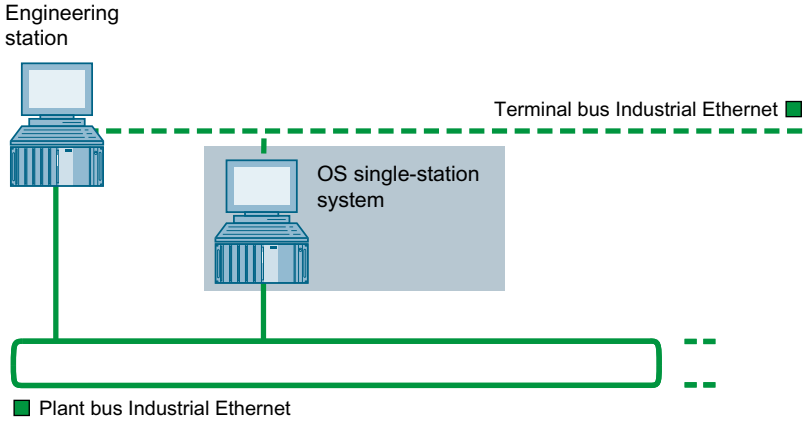
4.7 Solutions for single station systems

4.7.1 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 plant 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 24)".
- You can also use the OS single station system in combination with an engineering station.

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)
- 10 non-redundant OS single station systems (as reference OS from the OS single station system)
- Process Historian / Information Server
- Maintenance Station

Requirements:

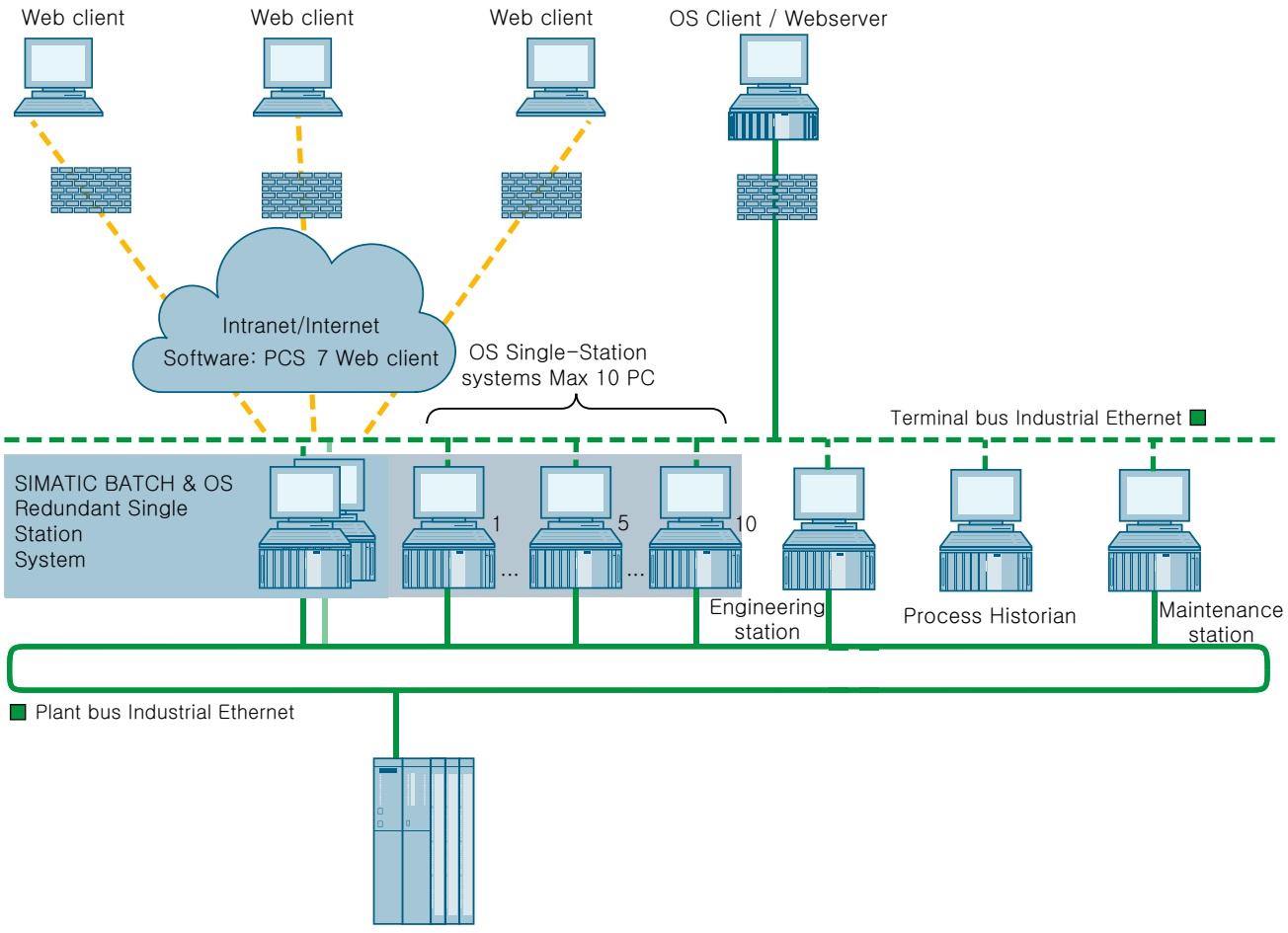
- Operating systems:
  - You can find information about this in the documentation *Process Control System PCS 7; PCS 7 Readme (online)*
  - When selecting operating systems, orient yourself with the configurations of the pre-configured PC stations in *ST PCS 7* catalog.
- Automation systems (depending 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/Microsoft Edge. 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

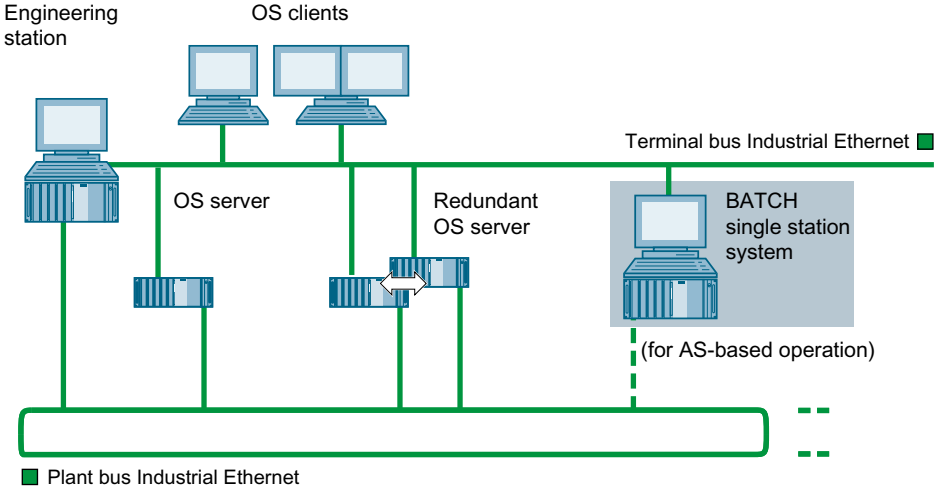
- Section "Combination of engineering station and operator station on a single PC (Page 24)"

4.7.2 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 27).
- 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



4.7.3 Route Control single station system

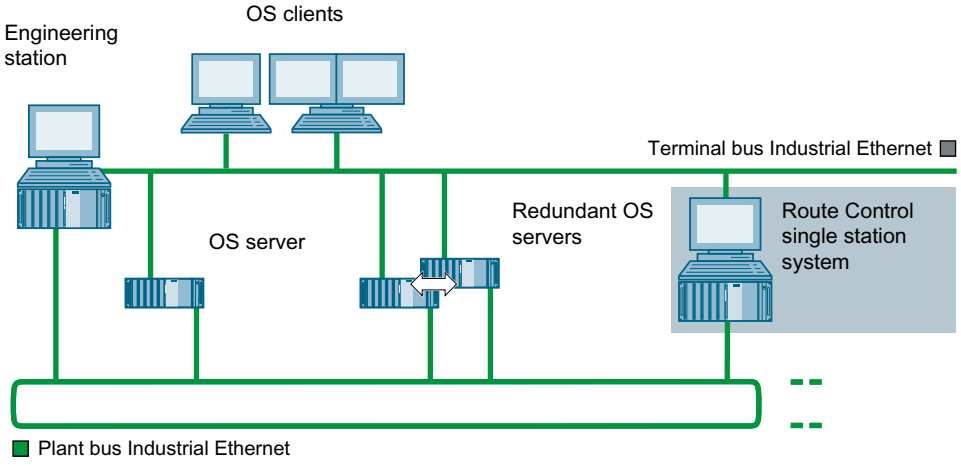
Route Control as a single station system on a single PC

- 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



4.7.4 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 29)"
- Section "OS single-station system (Page 34)"
- Section "Combination of Engineering Station and Operator Station on a Single PC (Page 24)"
- Appendix "Approved Configurations (Page 144)"
- *Process Control System PCS 7; Maintenance Station* Manual

4.8 Solutions for accessing PC stations

4.8.1 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:

- WinCCViewerRT (Recommended option)
  Installed with the installation of PCS 7 Web client/PCS 7 Web diagnostics client.

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

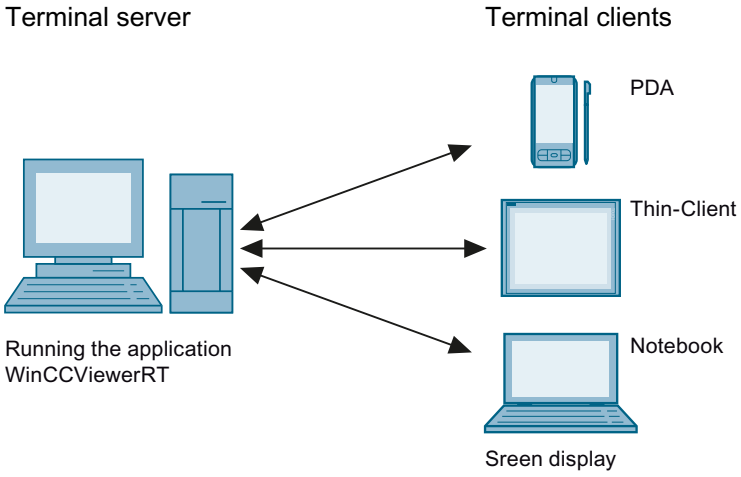
Additional information

- Manual *Process Control System PCS 7; Web Option for OS*
- How do I use WinCC/WebNavigator and WinCC/DataMonitor without Internet Explorer?
  Internet link (https://support.industry.siemens.com/cs/ww/en/view/109792981)

4.8.2 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 has 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.

4.8.3 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.

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

4.9 Connecting PC stations

4.9.1 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.

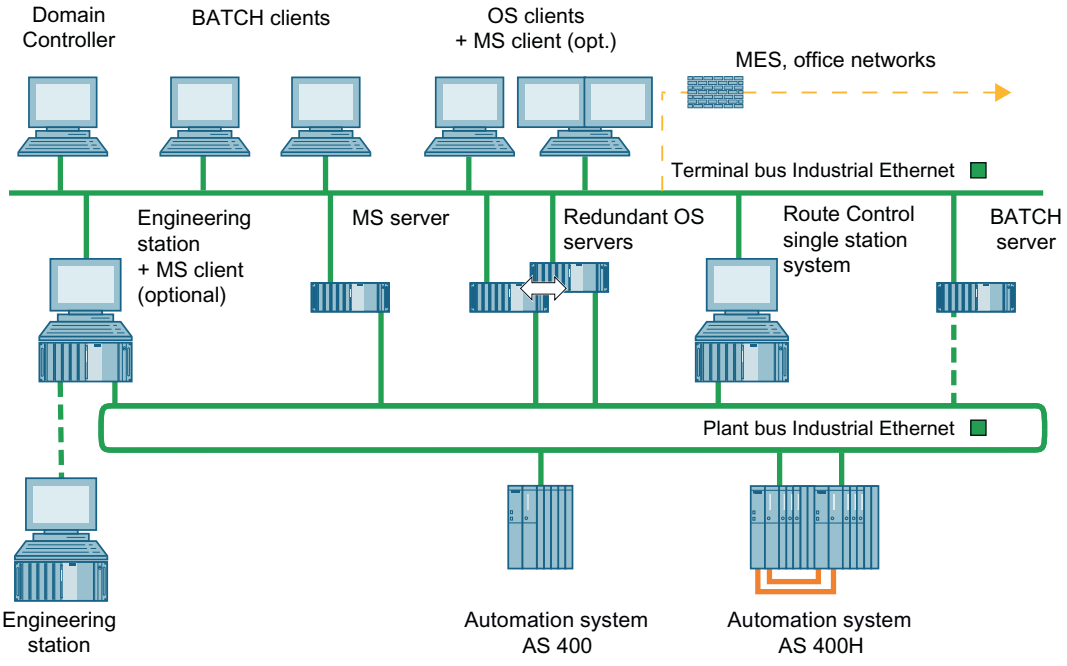
The bus system in PCS 7 consists of:

- Terminal bus
- Plant bus

You can find additional information on this in the section "Differences between multiple station systems and single station systems (Page 20)".

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 24) ".

Example configuration



Topology

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

- As Industrial Ethernet (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: • 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	• 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)	• OS server and OS clients • BATCH server and BATCH clients • Route Control server and Route Control clients

- Plant 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 plant/terminal bus

When using PCS 7 for process controlled plants, we recommend you to separate the terminal bus and plant 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 communication 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 a disadvantage with regards to availability and network failures. 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 availability and 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 15)"
- Section "Components for connection to the terminal bus/plant bus (Page 54)"
- 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*.

4.9.2 Connection to the terminal bus/plant bus

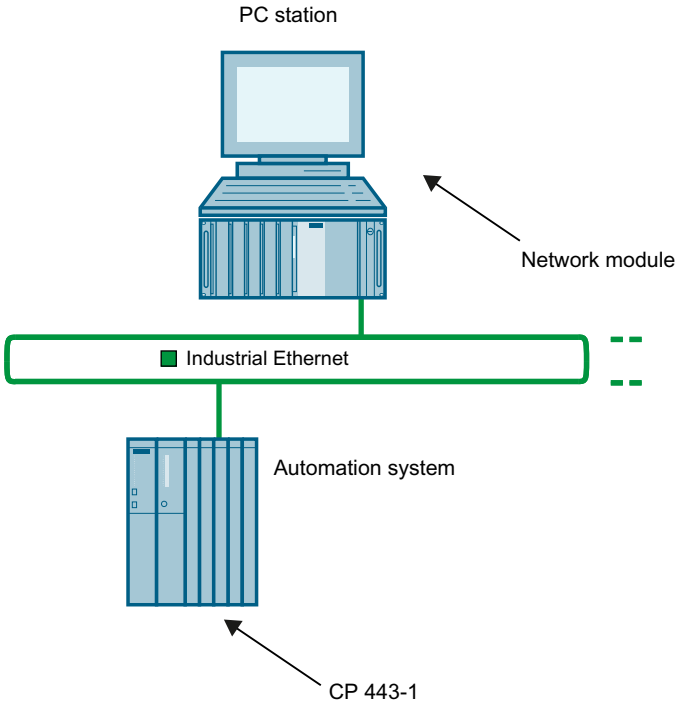
Connection of OS, BATCH, Route Control and ES

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 54) ".

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*.

4.9.3 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 131)".

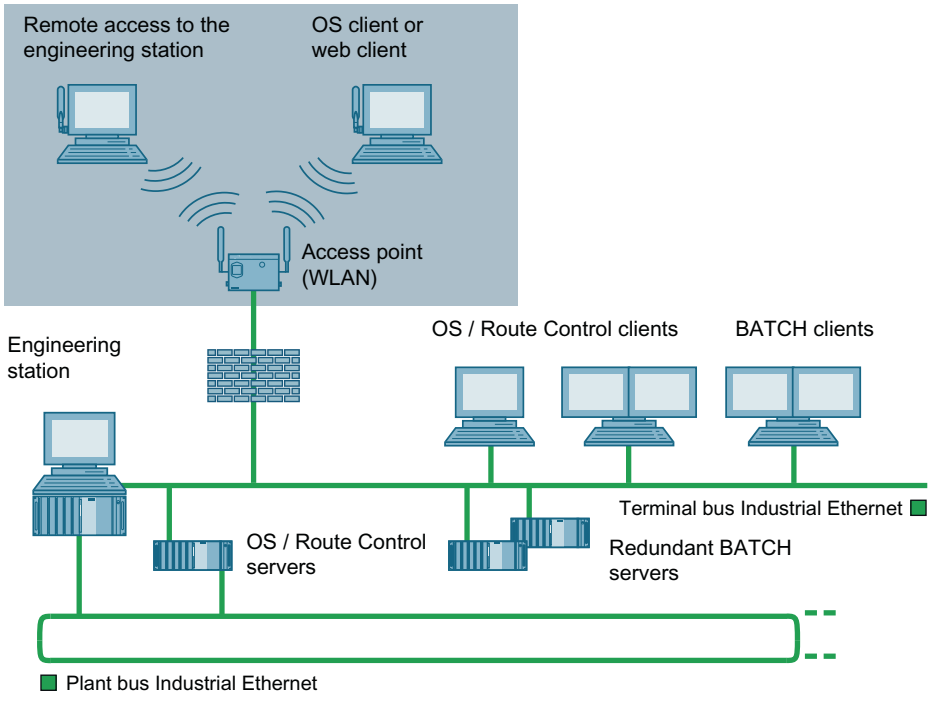
Components for WLAN in PCS 7

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 11)"):

- 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*

4.9.4 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 central plant clock 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: • 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: • Synchronization via the domain controller as the time master on the terminal bus
AS	• Synchronization via the plant bus
Domain	• Synchronization via the domain controller as the time master on the terminal bus
Time master	• 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. (for example, a NTP time server).

Setting the time format in a system

Ensure you set the same time format (12 hour format / 24 hour format) and time zone 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

5

5.1 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".

If you use other types of PCs for PCS 7, you can find the relevant hardware requirements in the "Basic hardware configuration (Page 53)" section.

Note

Bundle Product Information is delivered with the IPC bundle.

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.

Note

The default setting for "size of text, apps, and other items" may require adjustment in the operating system's display settings, as it can affect the display of the runtime. The settings should be set to 100%, regardless of the operating system's recommendation based on resolution.

Network connection

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

If you add these PCs to Active Directory (Windows domain), you need to reactivate the security settings using the SIMATIC "Security Controller" in the Start menu.

You can find more detailed information on security settings in the "Notes on installing PCS 7 (Page 81)" section.

Additional information

Note

Refer to the bundle product information that is delivered with the IPC bundle.

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

5.2 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 11)".

Additional information

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

5.3 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 communication 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 11)").

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)
- Solution for the redundant connection of the PC station to a terminal bus:
  - Parallel Redundancy Protocol
  You 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.

Connection to the plant bus

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

- Standard communication modules:
  - If you connect up to 8 communication partners per PC station (single automation systems).
  - 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 162x) are required in the following cases:
  - If you connect between 9 and a maximum of 64 communication partners per PC station (single automation systems).
  - 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 162x on the plant bus and configure in NetPro, you will require additionally a IE license. Similarly if you use an Intel or a similar network card on the plant bus and configure in NetPro, you will require additionally a BCE license.

Firewall on the plant bus

If you need to use a firewall on the plant bus, you will need a SCALANCE SC-600 module suitable to your requirement.

Driver

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

Time synchronization

The communication processors of type CP 162x support time synchronization on Industrial Ethernet (Fast Ethernet). A PC with communication processors can receive time frames from the following time transmitters:

- Master clock (Usage of BUERK MOBATIME time server is recommended. For the supported models, refer PCS 7 Released modules (https://support.industry.siemens.com/cs/ww/en/view/109973563). Select the latest version from the "Edition" dropdown list.)
- SIMATIC NET time transmitters for Industrial Ethernet
  For additional information see catalog *IK PI*
- PC with CP 162x

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)

5.4 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	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.
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.
Master clock	This is used for time synchronization of 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	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: • An engineering station • A client for an operator station or SIMATIC Route Control This allows you to connect up to four monitors to a PC (for clients and engineering stations).
Redundant network adapters	These allow you to connect PC stations to the respective bus system: • 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 103)"

5.5 Configuring and ordering

Station configuration software

You can find the configuration editor software that will support you in building your PC networks on the USB *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 (https://support.industry.siemens.com/aspa_app/).

Installing PC stations

6

6.1 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.

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
3	Setting the location where the swap file is to be stored (Page 76)
4	Making system settings (Page 77)
5	Installing the Message Queuing service (Page 73)
6	Installing additional components (Page 78)
7	Installing the Internet Information Service (IIS) (Page 74)
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 89)
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 96)
16	Installing additional communication modules and PCS 7-specific settings (Page 99)
17	Licensing the PCS 7 software
18	Preparing the PC stations (overview) (Page 108)
19	Creating a backup (Page 79)

6.2 Workgroup and Windows 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

	Active Directory (AD; Windows Domain)	**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 database (for example, device management)	Local 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 set-up 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 as domain controllers 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	• The users and groups set up in the AD are used. • High availability through the use of redundant domain controllers.	• The users can be managed at a central PC station. • No redundancy is available for the central logon station to be set up.

Windows domain example

Changes can be made centrally, fast and conveniently in the domain structure. However, the administration of a Windows 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 Windows domain and providing extra training for the operating personnel is not required.

DHCP server

Note

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

DNS / WINS server

The recommended solution for name resolution is the use of a DNS / WINS server. In case of using a DNS server, it is mandatory to configure a forward and reverse lookup zone that takes into account all components connected to the managed network.

Scenarios

Scenarios (examples)	Active Directory (AD; Windows Domain)	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.
One user uses multiple computers.	The user profile can be saved centrally. This applies the settings to all PC stations at log-on.	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 or network components based on Windows using the tool "set_mtu_size_to_1494.exe".
  - You can find the "set_mtu_size_to_1494.exe" tool on the PCS 7 USB 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: PCS 7 documentation (https://support.industry.siemens.com/cs/ww/en/view/109801081)
  You can find the following manuals via the link:
  - PCS 7 Security Concept; Recommendations and Notes
  - SIMATIC Process Control System PCS 7; Security concepts of PCS 7 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

6.3 Installing the operating system

6.3.1 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 11)"). 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.
- Ensure that you use a released 64-Bit Operating System for SIMATIC PCS 7.
- 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 housing of the PC station (COA label)
  - 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 or via SIMATIC Management Console. The description below assumes that the installation is performed from a SETUP USB flash drive.

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 11)"). • 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)"

  Note

  For non-unicode programs, Unicode UTF-8 for worldwide language support should remain unchecked.

- 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).
- Setup only allowed in standard languages like German, English, French, Italian, Spanish and Chinese. Installation of PCS 7 via toolset not possible with Turkish language settings.

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.

6.3.2 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 128 GB, see the "Example" section. Memory requirement changes based on the system settings, for example:
  - Swapfile location and size
  - System error file location and size
  - Windows system files
- 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 USB flash drive 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:	128*	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

* Memory requirement changes based on the system settings.

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 11)").

6.3.3 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.

Rules for computer names:

The selection of the computer name is critical for the entire project configuration:

- Illegal characters: . , ; : ! ? " ' ^ ´ ` ~ - + = / \ ¦ @ * # $ % & § ° ( ) [ ] { } < > space, hyphen ("-"), underscore ("_")
- Max. 15 characters
- Uppercase letters only
- The first character must be a letter.

It is always advisable that only alphanumeric characters are used for the computer name. You should choose a name consisting of uppercase Latin letters (A-Z) and digits (0-9) only, starting with a letter and containing a maximum of 15 characters.

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.

Note

Note the following:

- If you want to change the computer name for a bundle PC, perform a new installation with the Restore medium.
- 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.

6.3.4 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 *SIMATIC Process Control System PCS 7 Compendium Part F - Industrial Security* 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 Windows 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, firewalls 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 121)"
- Section "How to set up the connection between the PC station and plant bus (Page 114)"

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 11)"):

- **Virus scanners**
  As of now, Microsoft Defender Antivirus is supported.
- **Updates**
  You can find additional information on this in the section "Installing security updates, hotfixes (Page 127)".

Additional information

- Section "Notes on installing the operating system (Page 63)"
- You can find additional information about the security settings in the following section:
  - Section "Installing security updates, hotfixes (Page 127)"
  - For more information about security, refer "Network Security" chapter in Process Control System PCS 7; Compendium Part F - Industrial Security manual
- Document *Security concept PCS 7 and WinCC - Basic Document*
- *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 11)")
- *SIMATIC Process Control System; PCS 7 Compendium Part F - Industrial Security*

6.3.5 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 76) website:
  - Assign a secure password for the local administrator.
  - You should only make connections to secure networks when using 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. The CALs in the text paragraph are so called "Standard" CALs of the operating system.

Note

In terms of licensing law, standard CALs must be purchased from Microsoft as "paper certificate" for the intended number of users and produced in the event of an audit. These standard CALs - as properly described - are NOT entered or registered in the operating system. However, besides standard CALs, Windows Server also knows RDS CALs (formerly TS CALs) for remote-desktop-access licensing. The RDS CALs are, however, fee-based AND MUST be entered in the operating system and registered with a key. The RDS CALs are administered via **Start Menu > Administrative Tools > Remote Desktop Services > Remote Desktop Licensing Manager.**

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 76)".

Recommendations for PC stations (Windows 10)

- **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 73)"
- Section "How to configure the Microsoft Internet Information Service (IIS) for the server (Page 74)"

6.3.6 How to install Microsoft .NET Framework

Microsoft .NET Framework

The Microsoft .NET Framework 3.5 feature must be enabled prior to the installation of the PCS 7 software.

Note

Microsoft .NET Framework 3.5 is required only for Engineering Stations.

Enabling the Microsoft .NET Framework 3.5 on Windows 10 Enterprise LTSC 2019 / 2021 and Windows Server 2019 / 2022

Read the information from Microsoft:

- Internet (https://msdn.microsoft.com/en-us/library/hh506443(v=vs.110).aspx)

If you enable the ".NET Framework 3.5" feature without an internet connection, you can use the Windows installation medium as the file source:

1. Insert the Windows installation medium.
2. Run the following command in the command prompt with higher-level rights: *Dism.exe /online /enable-feature /featurename:NetFx3 /All /Source:<DVD driveletter>:\sources\sxs /LimitAccess*

The other required parts of the Microsoft .NET Framework are automatically installed with the PCS 7 system setup.

6.3.7 How to install the Message Queuing Service

Introduction

PCS 7 uses the Microsoft Message Queuing Service. This component is part of the operating system. You need the installation medium of the operating system for the installation.

Note

With PCS 7 V 10.0, the Microsoft Message Queuing Service is now installed automatically. If Microsoft Message Queuing Service/IIS is already installed, it is recommended not to manually uninstall it.

Requirement

- You are logged on as an Administrator.

Procedure for Windows 10

1. Use the search box in the start menu to open "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

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:
   – 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 > Windows Logs > Application".

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".

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

Introduction

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

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

Do not install the service for all other installations.

Note

IIS will be installed automatically by the SIMATIC PCS 7 setup, if it is not available.

Requirement

- You are logged on as an Administrator.

Installing IIS

Table 6-1 Activating services and options:

Windows 10	Windows Server
1. Activate the "Internet Information Services" via the "Windows Features": – "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: – "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 6-2 Web services
Activate the following:

Services	Options
Common HTTP Features	• Default Document • Directory Browsing • HTTP Errors • Static Content
Application Development (Application Development Features)	• .NET Extensibility (all available versions/entries) • ASP • ASP.NET (all available versions/entries) • ISAPI Extensions • ISAP filters
Performance (performance features)	• Static Content Compression
Security	• Request filtering • Basic authentication • Windows authentication
Integrity and diagnostics (system health and diagnostics)	• HTTP logging • Request monitor

Table 6-3 IIS functions
Activate the following:

Operating system	Services	Options
Windows Server	Management Tools	• IIS Management Console • IIS Management Scripts and Tools • Management Service • IIS 6 Management Compatibility – IIS 6 Metabase Compatibility – IIS 6 WMI Compatibility
Windows 10	Web management tools	• IIS Management Service • IIS Management Console • IIS Management Scripts and Tools • IIS 6 Management Compatibility – IIS Metabase and IIS 6 configuration compatibility – IIS 6 WMI Compatibility

6.3.9 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 63); Operating system languages".

NOTICE
Property of operating systems Installed language packs that are not used will be removed from the operating system after some time.

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:

6.3.10 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.

6.3.11 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 90)".
2. We recommend the following display 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.

     Note

     The default settings of size of text, apps and other items must not be altered in the operating systems display settings as it can have an impact on the display of faceplates during the runtime.

   - 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
     - Turn off the hard disk: 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 101)".
4. Disable configurable energy saving options in the BIOS.
5. Use the Event Viewer to check that all services and drivers are functioning correctly.
6. 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).

6.3.12 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

Note

For operating system Windows 10 and Windows Server, the Color scheme to be selected are:

- Windows
- Windows 10

6.3.13 How to install additional components

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 11)").

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

- **Updates** for the operating system, refer link (https://support.industry.siemens.com/cs/ww/en/view/18490004).
- **Microsoft Office products** approved for the current PCS 7 version (if needed). To custom install Microsoft Office version 2019 and later, refer "How do you custom install Microsoft Office version 2019 and later and receive updates?" (https://support.industry.siemens.com/cs/de/en/view/109808232)
- 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 therefore cannot 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).

6.3.14 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*.

6.3.15 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.

Note

For online backups, we recommend "SIDSI Backup & Restore" (https://www.siemens.com/sidsi) product. However, for offline backups, use SIMATIC IPC Image and Partition Creator.

6.4 Installing the PCS 7 software

6.4.1 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 USB flash drive in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 11)").

Latest information about the installation

Note

Please note the following:

- 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 11)").
- If you install PCS 7 in a Windows 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.
- Uninstalling PCS 7 software via the system setup is not supported. The uninstallation of single software components via the Windows control panel is not recommended.

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 144)".

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 scope of the local network (subnet). If your PC stations are located in different networks (subnets), you need to change the default scope setting.
- As long as no PCS 7 application like OS runtime or SIMATIC Manager is active, 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 Windows domain to a workgroup or vice versa.

Note

When the PCS 7 plant is operated in a Windows 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 117)"
- Section "How to configure encrypted communication between the PC stations (Page 121)"

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

6.4.2 How to install via 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 content of SIMATIC PCS 7 USB flash drive available in a separate storage location (shared network path).

The following rules apply to the storage.

Rules

- The folders must be located within a shared folder.
- The name of the access path to the network copy of the USB 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 USB 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 USB.
3. Call up the setup.

Note

You can check the integrity of your copy with the help of "SoftwareIntegrityCheck" tool located under "Additional_Products\SoftwareIntegrityCheck" on the installation media.

See also

How to install the PCS 7 software (Page 84)

6.4.3 How to install the PCS 7 software

Introduction

The SIMATIC PCS 7 USB flash drive 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 quality structures".

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 stations (OS Single station, OS Server, Maintenance Server....) that are to export archives to a Process Historian: <Appropriate Station> for Process Historian. For example: OS-Server for Process Historian.

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

Using Maintenance station in a plant

The "Maintenance Functions for OS" package must be installed through package selection during the PCS 7 setup for each PCS 7 Station to establish communication with the maintenance station. Please note that if you perform an update installation of PCS 7, this package should be installed separately through the PCS 7 setup afterward.

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 the "PCS 7 Maintenance Station" program package for this 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 communication 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* USB flash drive into the USB port.
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 Notice
   – ... Read this if needed and click "Next".

4. License agreements
   - ... Select the check box to accept the displayed license agreements.
   - ... "Next"
5. Setup type
   - ... Select the "Install" or "Update" radio button and click "Next".
6. User information
   - ... Enter your user information and "Next".
7. Product languages
   - ... "Next"
8. Installation type
   - ... Select the "Package installation" radio button to install the preselected program packages.
   - ... "Next"
9. Program packages
   - ... 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 144)"
   - ... "Next"
10. Programs
    - ... 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 license agreement for the installation of the SQL server gets displayed.
    - ...Select the check box to accept the displayed license agreements
    - ... "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.
    - ... Select the check box to accept the displayed changes
    - ... "Next"

13. Ready to install the selection.
    - ... The software to be installed on the PC for this PCS 7 application is listed
    - ... "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.

The PCS 7 installation writes the installed products to a log file in the path "C:\ProgramData\Siemens\Automation\Logfiles\Setup\RS", for example "SIMATIC PCS 7 Vx.x SPx.txt". If you run several PCS 7 installations, the information is inserted in the file with the same PCS 7 Version.

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".

- 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 112)"
- Section "How to access PC stations outside a subnet (Page 117)"

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.

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.

See also

How to install additional components (Page 78)

6.4.4 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:
  "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.

6.4.5 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.

6.4.6 Configuring redundancy for 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 128)".

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*.

6.4.7 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 11)")

6.4.8 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	-	**Users**	All user accounts used for PCS 7
Engineering	PCS 7 Engineering	**SIMATIC HMI**	OS project engineer Project administrators
		Siemens TIA Engineer	Only Windows user accounts who work with SIMATIC PCS 7 ES projects must be members of this group. **Note:** The user account used during the ES installation is added to the "Siemens TIA Engineer" group by default and this local user group is added to the Windows group management during the installation of the engineering station (ES) via the SIMATIC PCS 7 setup program.
	BATCH Engineering	**SIMATIC BATCH**	BATCH project engineer
	Route Control Engineering	**RC_ENGINEER**	Route Control project engineer
		RC_MAINTENANCE	Route Control administrator (with all rights)
		RC_OPERATOR_L1	You can find additional information about operator authorization in the *Process Control System PCS 7; SIMATIC Route Control* Manual.
		RC_OPERATOR_L2	
		RC_OPERATOR_L3	
	PCS 7 Audit Engineering	**Siemens TIA Engineer**	Only Windows user accounts who work with SIMATIC PCS 7 ES projects must be members of this group.

Installation / Group in Setup	Component in the PCS 7 setup	User group / users	Members
Runtime / Server	OS server	**SIMATIC HMI**	Project administrators "nonpersonalized", device-specific user accounts
	BATCH server	**SIMATIC HMI**	Project administrators "nonpersonalized", device-specific user accounts
		SIMATIC BATCH	BATCH project engineer "nonpersonalized", device-specific user accounts
	Route Control server	**SIMATIC HMI**	Project administrators "nonpersonalized", device-specific user accounts
		RC_MAINTENANCE	Route Control administrator (with all rights) "nonpersonalized", device-specific user accounts
		RC_OPERATOR_L1	"You can find additional information about operator authorization in the *Process Control System PCS 7; SIMATIC Route Control* Manual."
		RC_OPERATOR_L2	
		RC_OPERATOR_L3	
Runtime / Single station	OS single station	**SIMATIC HMI**	Project administrators "nonpersonalized", device-specific user accounts
	BATCH single station	**SIMATIC HMI**	Project administrators "nonpersonalized", device-specific user accounts
		SIMATIC BATCH	BATCH project engineer "nonpersonalized", device-specific user accounts
	Route Control single station	**SIMATIC HMI**	Project administrators "nonpersonalized", device-specific user accounts
		RC_MAINTENANCE	Route Control administrator (with all rights) "nonpersonalized", device-specific user accounts
		RC_OPERATOR_L1	"Operators You can find additional information about operator authorization in the Process Control System *PCS 7; SIMATIC Route Control* Manual."
		RC_OPERATOR_L2	
		RC_OPERATOR_L3	

Installation / Group in Setup	**Component in the PCS 7 setup**	**User group / users**	**Members**
Runtime / Client	OS clients	**SIMATIC HMI**	Project administrators "nonpersonalized", device-specific user accounts
	BATCH Clients	**SIMATIC HMI**	Project administrators "nonpersonalized", device-specific user accounts
		SIMATIC BATCH	BATCH project engineer "nonpersonalized", device-specific user accounts Note: The Windows user of the BATCH client must be allocated on the BATCH server to users of SIMATIC BATCH.
	Route Control clients	**SIMATIC HMI**	Project administrators "nonpersonalized", device-specific user accounts
		RC_MAINTENANCE	Route Control administrator (with all rights) "nonpersonalized", device-specific user accounts
		RC_OPERATOR_L1	"Operators You can find additional information about operator authorization in the *Process Control System PCS 7; SIMATIC Route Control* Manual."
		RC_OPERATOR_L2	
		RC_OPERATOR_L3	
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 *Process Control System PCS 7; SIMATIC Management Console* 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 Windows 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. 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 Windows 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 Windows administrators have special permissions in PCS 7 systems for managing the network, for example, for user management or for adding computer stations to a domain. We recommend you to refrain from using these permissions when working in the productive PCS 7 project.

Requirements

- The domain administrator has created a global user group for the domain.
- The domain administrator has added users within the domain into the configured global user group. These users can later on 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 configured global user group from the domain as a member of the "SIMATIC HMI" user group.

Setting permissions under the Windows Server

All users who should be able to initiate a system shutdown or reboot must be authorized for this functionality.

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. Select all desired users or groups.

   Note

   As of Windows Server 2019, the local Administrators group can no longer be used in this context.

6. Click the "OK" button to apply the settings.

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 109)

6.4.9 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).

6.4.10 Firewall in PC stations

Windows firewall

PCS 7 supports the use of the operating system based local firewall (see "Preface (Page 11)": *Process Control System PCS 7; PCS 7 Readme* file). The required settings are made during the PCS 7 setup.

Additional information

- Section "Components for connection to the terminal bus/plant bus (Page 54)"
- Section "How to access PC stations outside a subnet (Page 117)"

See also

Preconfigured PC systems for PCS 7 (product bundles) (Page 51)

6.4.11 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 144)".

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*.

Note

In case of using a maintenance station in your project, refer to "Using Maintenance station in a plant" section in the How to install the PCS 7 software (Page 84) chapter.

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 81)"
- The Management Console software packages are available on the *Process Control System; SIMATIC PCS 7* USB flash drive.

6.5 Installation of drivers for PCS 7

6.5.1 Drivers for communications processors

6.5.1.1 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 be 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.

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 125)".

Additional information

You can find more information on the relevant 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"

6.5.1.2 How to configure standard communication modules

Settings for BCE and SOFTNET CPs

Depending on which protocol is commonly supported by the devices on the plant 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 on ISO-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 162x.

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))
   - Plant bus: SIMATIC Industrial Ethernet (ISO)
2. Reboot your PC to activate the settings.
3. Clear the following options for the communications processor on the plant 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*.

6.5.1.3 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.

6.5.1.4 Deactivating unused protocols

Introduction

This topic describes in general about the deactivation of unused protocols.

Type	Protocol name	Default [1]	Terminal bus	Plant bus	Redundancy bus
Windows	Client for Microsoft Networks	enabled		disabled	
	File and printer sharing for Microsoft Networks	enabled		disabled	
	QoS Packet Scheduler	enabled			
	Internet Protocol Version 4 (TCP/IPv4)	enabled			
	Microsoft Network Adapter Multiplexor Protocol	disabled			
	Microsoft LLDP Protocol Driver	enabled			
	Internet Protocol Version 6 (TCP/IPv6)	enabled			
	Link-Layer Topology Discovery Responder	enabled			
	ISO protocol	enabled			
	Energy saving options	disabled			
	Link-Layer Topology Discovery Mapper I/O Driver	enabled			
SIMATIC	PROFINET IO protocol (DCP/LLDP)	enabled	disabled	enabled	disabled
	SIMATIC Industrial Ethernet (ISO)	enabled	disabled	enabled	disabled
	PROFINET IO RT Protocol V2.3	enabled	disabled	enabled	disabled

[1] Default: After installing Windows or SIMATIC NET

6.5.1.5 How to prepare a PC station with CP 162x 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 plant bus with a maintenance station (MS).
  A communication module is used on the PC of the maintenance station for access to the plant 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. 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 162x:
   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. 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.

6.5.2 Additional Devices and Drivers for PCS 7

6.5.2.1 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 11)").

Overview of additional devices and drivers

Multi-monitor interfaces

Device	Additional information
Multi-display-connection	Section "Multi-display-connection in PC Stations (Page 104)" 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	• 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 *Process Control System PCS 7; High Availability Process Control Systems*

Acoustic or visual signal generator

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

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 105)"

Smart cards

Driver	Additional information
Smart card reader	*WinCC Information System* ; Information on the suitable smart card reader and the required driver is available in the *Process Control System PCS 7; PCS 7 Readme* file (see "Preface (Page 11)").

Additional information

Section "Optional hardware components (Page 57)"

6.5.2.2 Multi-display-connection in PC Stations

If you want to connect multiple monitors to a computer, you should inform yourself using the described 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; PCS7- 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 PCS7; 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 PCS 7 in the WinCC Information System online help.

6.5.2.3 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 11)").

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 11)").
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*.

6.6 Licensing

6.6.1 PCS 7 licenses and quantity structures

For a detailed information regarding different types of SIMATIC PCS 7 licenses and quantity structures, refer to *Process Control System PCS 7; Licenses and Configuration Limits* installation manual.

6.6.2 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 flash drive
- Local storage media
- Storage media on connected computers
- Removable drives (for example USB flash drive, but not CDs or DVDs)

Note

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

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**.
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.

For more information, refer *Process Control System PCS 7; PCS 7 Licenses and configuration limits* manual.

6.7 Preparing PC stations

6.7.1 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 communication processors have been installed.

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 109)
2	Setting the language for a user (MUI) (Page 110)
3	Setting the communication module for connecting to the terminal bus (Page 112)
4	Setting up the connection between the PC station and plant bus (Page 114)
5	Setting the standard network adapters (Page 117)
6	Changing the transfer rates and operating modes in the PC network (Page 125)
7	Installing security patches, hotfixes, service packs (Page 127)
8	How to activate redundancy for high availability PCs (Page 128)
9	Downloading the network configuration to the PC stations (Page 130)

6.7.2 SIMATIC Logon

Note on the use of chip cards

- **USB chip card readers**
  When using a USB 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 11)"). You can find a description of the chip card readers in the section "Overview of additional devices and drivers for PCS 7 (Page 103)".
- **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 Windows 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.

6.7.3 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 Windows 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.

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*

6.7.4 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.

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.

Reboot

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

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

Introduction

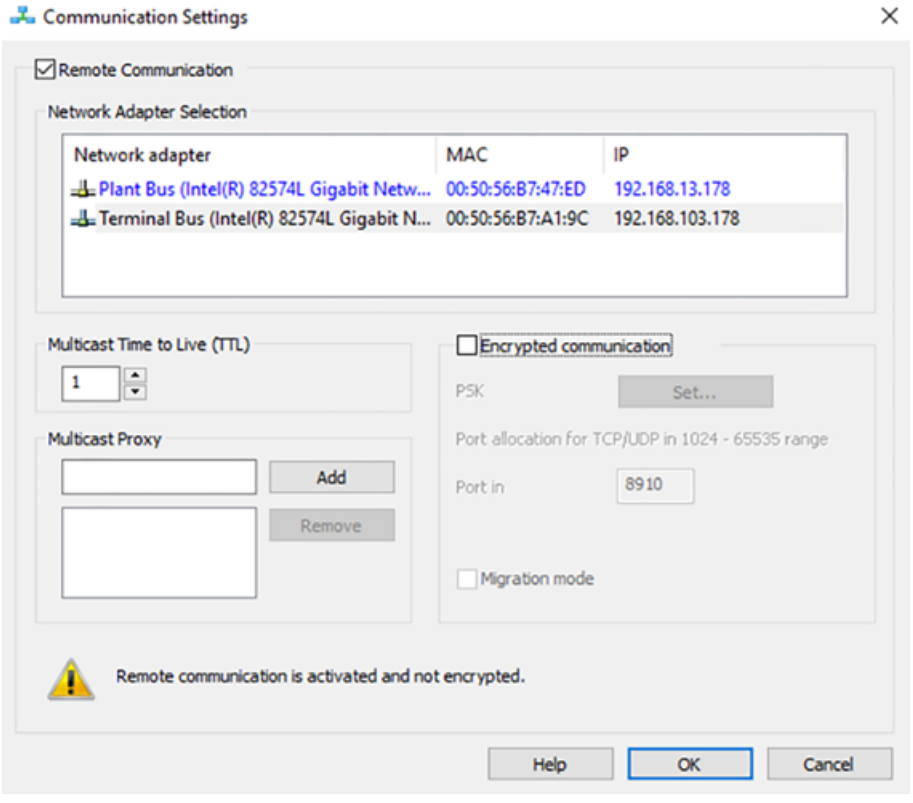
Below you can find information about how to select the communication modules for connecting to the terminal bus you will use to configure the PC stations.

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 (This PC) in the tree view of Windows Explorer.
2. Select the "Simatic Shell" in "Devices and Drives" area.
3. Select the "Settings..." command from the shortcut menu.
   The "Communication Settings" dialog opens.



4. Enable "Remote Communication", within this the dialog to setup the Pre-Shared Key (PSK) for encrypted communication gets opened.

5. In the "Network Adapter Selection" group, select the communication module via which you want to communicate on the terminal bus.

   Note

   - The "Multicast Time to Live (TTL)" area provides time required for the communication to be live. It is the maximum permitted number of routing jumps between various subnets (IP parameter "TTL").
   - Multicast Proxy: IP address or name of a computer that is located in another subnet and is used as a proxy for distribution of the multicast packages, e.g. for a project publication. Use the IP address if the network consists of several subnets that are interconnected by routers and these routers do not transmit multicast communication. Proxy address can be added or removed using Add/Remove under "Multicast Proxy".
   - Encrypted communication: This means that only those computers in which the jointly specified key is known prior to communication will communicate with each other.
     To enter the PSK key, click the "Specify" button. Specify the port for the remote access.
     "Migration mode" option:
     Unencrypted communication with certain computers is possible for compatibility reasons and for "Upgrade during operation". When the operation is complete, disable the option again.

6. Click "OK".

   Note

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

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

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 128)

6.7.6 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".
   - Configure the home/private network profile.
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.
- PC stations with several network adapters:
  No changes are required for the plant bus.

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

Introduction

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

Perform the following steps:

- PC stations on the plant bus
  Check or assign addresses of the network adapters:
  - PC station connected to plant bus via CP 162x communications processor.
  - PC station on plant bus connected via standard network adapter (only if the ISO protocol is used on the plant 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 plant bus via CP 162x communications processor

If the PC station on the plant bus is to communicate via the CP 162x, perform the following steps for all CP 162x:

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 plant bus connected via standard network adapter

If you want to use the ISO protocol on the plant 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 in the network card settings for the plant bus:
   – Disable "File and printer sharing"
   – Disable "Client for Microsoft network"
   – Enable the ISO protocol

Note

These settings must be checked in the network card settings for the plant bus.

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 communication processors (CP 162x) in the product overview *Process Control System PCS 7; Released Modules*.

6.7.8 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**.
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.

6.7.9 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 act 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".

Note

List of firewall rules required for installation across different subnets, please refer "Network Security" chapter in Process Control System PCS 7; Compendium Part F - Industrial Security manual.

Requirement

Make the following settings as an administrator.

Procedure

1. In the tree view of Windows Explorer, select the "SIMATIC Shell" in "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 is configured to allow encrypted communication for a PC station.

   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 pre-shared key (PSK) 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 121)".

7. Confirm your entries with "OK".

See also

Changing settings for encrypted communication (Page 119)

6.7.10 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** (**P**re **S**hared **K**ey) 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 121)".

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 121)".

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 124)".

- **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 122)".

Additional information

- Section "How to access PC stations outside a subnet (Page 117)"

6.7.11 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
- OpenPCS 7
- SIMATIC Route Control
- SIMATIC BATCH
- PCS 7 Webserver

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 119)".
- 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 (This PC) in the tree view of Windows Explorer.
2. Select the "SIMATIC Shell" in "Devices and Drives" area .
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 122)"; 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 124)".
9. Click "OK".

Additional information

- Section "How to access PC stations outside a subnet (Page 117)"
- Online help "SIMATIC Shell"

6.7.12 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 121)".
- 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 117)"

6.7.13 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 121)".

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 122)"; 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 117)"
- Section "Changing settings for encrypted communication (Page 119)"
- Online help "SIMATIC Shell"

6.7.14 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 162x	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)	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): • Speed and duplex mode • Link speed & duplex
Switches	SCALANCE X ... e.g.: SCALANCE X-400	• Configuration via Telnet or Web Based Management (WBM) • Open the configuration dialog box for the switch via web browser: https://<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	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*.

6.7.15 Installing security updates, hotfixes

Introduction

Security updates and hotfixes 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 PCS 7 readme file.

Microsoft security updates

Siemens tests the compatibility of Microsoft security updates for their products. You can find information on tested security updates for PCS 7 in the online SIMATIC Customer Support under the entry ID: 18490004 (https://support.industry.siemens.com/cs/ww/en/view/18490004).

6.7.16 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 (This PC) in the tree view of Windows Explorer.
2. Select the "SIMATIC Shell" in the "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 112)

6.7.17 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.

6.7.18 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*.

6.8 Notes on add-ons and utilities

6.8.1 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 131)
  - Virus scanners (Page 134)
  - Burner software (Page 134)
  - SIMATIC IPC ORCLA diagnostics (Page 134)
- Utilities:
  - Screen savers (Page 136)
  - Defragmentation programs (Page 137)

6.8.2 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 use of VNC software is authorized 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 in Industry Online Support:
  Compatibility tool (https://support.industry.siemens.com/cs/document/64847781)

  Note

  Disabling the keyboard shortcut "Ctl+Alt+Del" when using VNC

  A software emulation of the VNC 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.
  Computer > Administrative Template > Windows Components >Windows Logon Options > Disable or enable software Secure Attention Sequence

  Activate the policy with the "None" option.

- **RDP**
  The use of the Remote Desktop Protocol (RDP) is only permitted for remote maintenance of PCS 7 clients (except PCS 7 clients in the virtual environment). 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 VNC 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 90)"). 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 97)"
- 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 11)").
- Operating system online help

6.8.3 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.

6.8.4 Virus scanners

As of starting with PCS 7 V9.1, the Microsoft Defender Antivirus is the only released antivirus solution. For more information on virus scanners, refer to the *Using antivirus software and whitelisting protection mechanisms* section in the PCS 7 ReadMe (Online) (https://support.industry.siemens.com/cs/ww/en/view/109813959)

6.8.5 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.

6.8.6 SIMATIC IPC ORCLA diagnostics

Introduction

SIMATIC IPC DiagMonitor functionality is no longer supported as of SIMATIC PCS 7 V10.0. Instead, IPC diagnosis is conducted through SIMATIC IPC ORCLA. Uninstall SIMATIC IPC DiagMonitor when SIMATIC IPC ORCLA is not used.

SIMATIC IPC ORCLA operates on an IPC and retrieves diagnostic data such as temperatures, fan speeds and so on.

Note

In the case of an update, the SIMATIC IPC DiagMonitor must be uninstalled before installing SIMATIC IPC ORCLA.

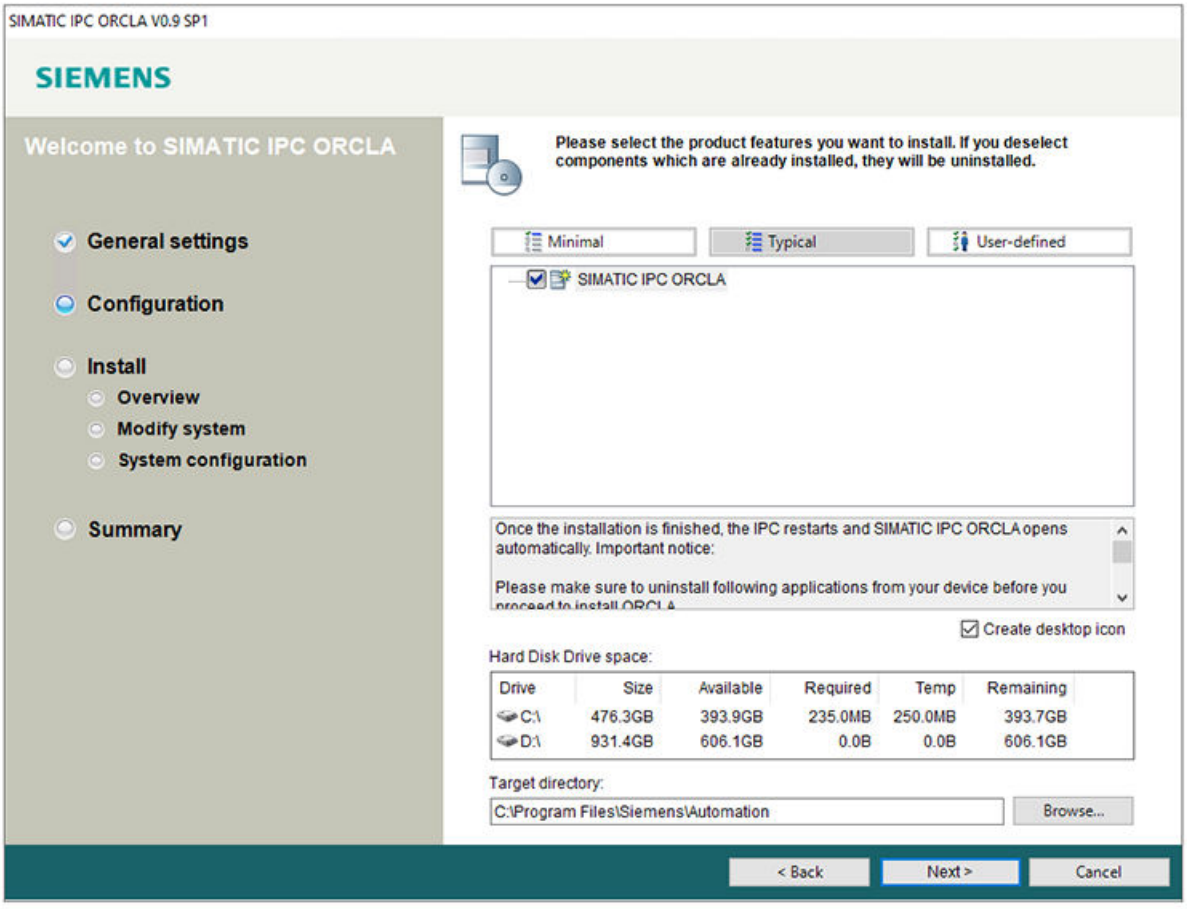
Requirements

You can find detailed, up-to-date information about approved PC hardware and operating systems in the *PCS 7: PCS 7 ReadMe (Online)* (https://support.industry.siemens.com/cs/us/en/view/109813959).

Installing SIMATIC IPC ORCLA software

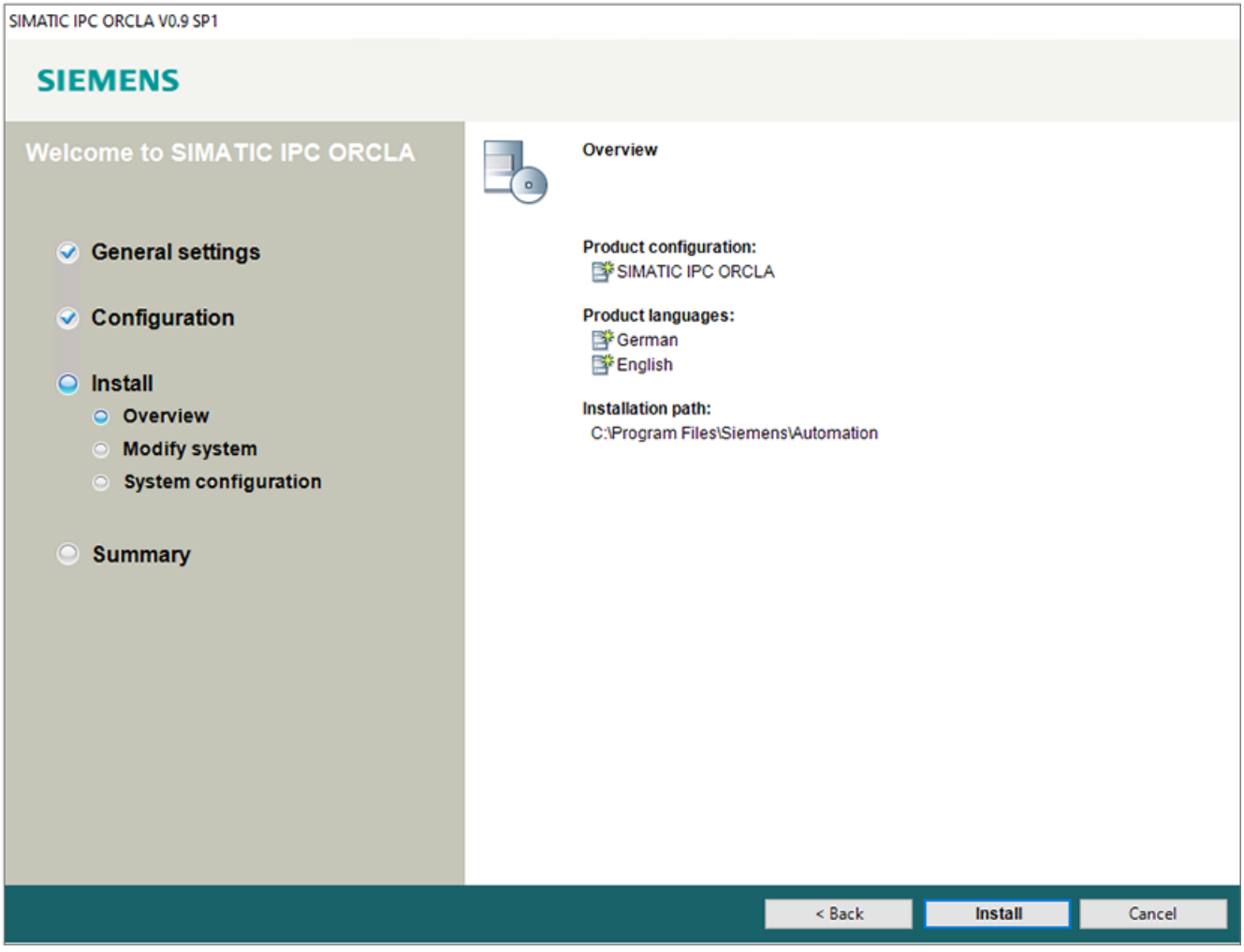
Execute the following steps to install SIMATIC IPC ORCLA software:

1. Open the SIMATIC IPC ORCLA software from the PCS 7 software and double click on "Start.exe".
2. Select the appropriate language and click "Next".
3. In the configuration screen, click "Browse" provide the path under "Target directory" where the project needs to be stored.



4. Click "Next".

5. After accepting the license agreement, click "Next". You will be taken to the final screen.
6. Click "Install".



SIMATIC IPC ORCLA software is installed on your system.

For more information on the configuration of SIMATIC IPC ORCLA software, refer *to Process Control System PCS 7; PCS 7 Maintenance* manual.

6.8.7 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.

6.8.8 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.

6.8.9 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 "WebViewer" function is used as a standard browser. Internet Explorer will no longer be supported or integrated into new operating systems as an alternative solution, WebViewer can be used.
- 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

7

7.1 Appendix A - Applying the software package

7.1.1 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 USB flash drive 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" of *Process Control System PCS 7; Licenses and Configuration Limits* manual.

Applications	Brief description
Automation License Manager	For transferring and managing license keys
STEP 7	PCS 7 basic engineering: • SIMATIC Manager for managing project objects • HW Config for the hardware configuration • NetPro for the network configuration
SCL	**S**tructured **C**ontrol **L**anguage (S7 SCL) High-level language for programming user function blocks in accordance with IEC 61131-3
CFC	**C**ontinuous **F**unction **C**hart (CFC) - For the graphical configuration of continuous automation functions in accordance with IEC 61131-3, with test and commissioning functions
SFC	**S**equential **F**unction **C**hart (SFC) - For the graphical configuration of sequential production sequences (step sequencers), with test and commissioning functions
PH	**P**lant **H**ierarchy (PH) - For displaying a project in a plant view; which enables the user to gain a quick overview of project resources
IEAPO	• **I**mport **E**xport **A**ssistant (IEA) You will find more information on this topic in the section "Optional software packages (Page 142)". • **P**rocess **O**bject view (PO) - For providing a process-control oriented view of basic automation data
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
PV InsInfo-Server	Tool which supplies the WinCC variable browser with ES variables

Applications	Brief description
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 141)".
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 142)".
PDM	Components for engineering field devices You will find more information on this topic in the section "Optional software packages (Page 142)".

7.1.2 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 USB flash drive 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" of *Process Control System PCS 7; Licenses and Configuration Limits* manual.

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 • License key levels: Installation manual *Process Control System PCS 7; Licenses and Configuration Limits* • 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.

7.1.3 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 USB flash drive 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" of *Process Control System PCS 7; Licenses and Configuration Limits* manual.

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	• 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	• BATCH sequence control system and allocation of units • Batch data management records, saves, logs and exports batch data • Additional information – License key levels: Installation manual *Process Control System PCS 7; Licenses and Configuration Limits* – 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

7.1.4 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 USB flash drive 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" in *Process Control System PCS 7; Licenses and Configuration Limits* manual.

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 • License key levels: Installation manual *Process Control System PCS 7; Licenses and Configuration Limits* • 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

7.1.5 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" of *Process Control System PCS 7; Licenses and Configuration Limits* manual.

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 11)").

Options in the PCS 7 setup

You install these applications via the PCS 7 system setup.

Applications	Brief description
IEAPO	**I**mport-**E**xport-**A**ssistant (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	• 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.
Web Navigator	For remote publishing of images and other relevant data for a PCS 7 Web server.
SIMATIC Management Console	• Central administration and management of SIMATIC software products • Determine inventory data
OpenPCS 7	Interfaces based on OPC and OLE DB for data exchange
PUD	Plant and User Documentation (PUD) Manager is a content delivery platform through which the documents are delivered and handed over to our customers. • Some of the highlights of the PUD Manager are listed below: Customize the documentation set according to the customers needs. • Efficient search engine to access your information. • Own manual collection can be created.

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*.

7.2 Appendix B - Approved configurations on a PC station

7.2.1 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 148))
- as an OS server and operator station (client installation on server (Page 150))
- as an OS server and BATCH server (server on server (Page 149))

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, PCS 7 Engineering Audit, BATCH Engineering, Route Control Engineering, SIMATIC PDM Basic, SIMATIC PDM Server and Logic Matrix Engineering.

or

- Runtime (process mode)
  - For Single Station
    OS Single Station, OS Single Station for Process Historian, BATCH Single Station, Route Control Single Station
  - For Server:
    OS Server, OS Server for BATCH, OS Server for Route Control, OS Server for BATCH and Route Control, OS Server for Process Historian, BATCH Server, Route Control Server
  - For Client:
    OS Client, OS Client for BATCH, OS Client for Route Control, OS Client for BATCH and Route Control, BATCH Client, Route Control Client
  - For Archiving and Reporting:
    Process Historian, Information Server, Process Historian and Information Server.
  - For OpenPCS 7 Station:
    OpenPCS 7, OS client with OpenPCS 7
  - For Logic Matrix:
    Logic Matrix Viewer
  - For Web Components:
    PCS 7 Web Server, PCS 7 Web Client, PCS 7 Diagnose Client, DataMonitor Server, DataMonitor Client

  Note

  Installation of an ES on an OS PC

  Installation of an engineering system (ES) on an existing OS is not possible as complete OS uninstallation is not supported. Therefore, you must perform a new installation of PCS 7 ES via system setup.

or

- ASSET Stations
  PCS 7 Maintenance Station, PCS 7 Maintenance Station for Process Historian, SIMATIC PDM Maintenance Station.

or

- Options
  Maintenance functions for OS, SIMATIC Logon, SIMATIC Management Console, System Hardening, VersionTrail, PCS 7 Trial Mode

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

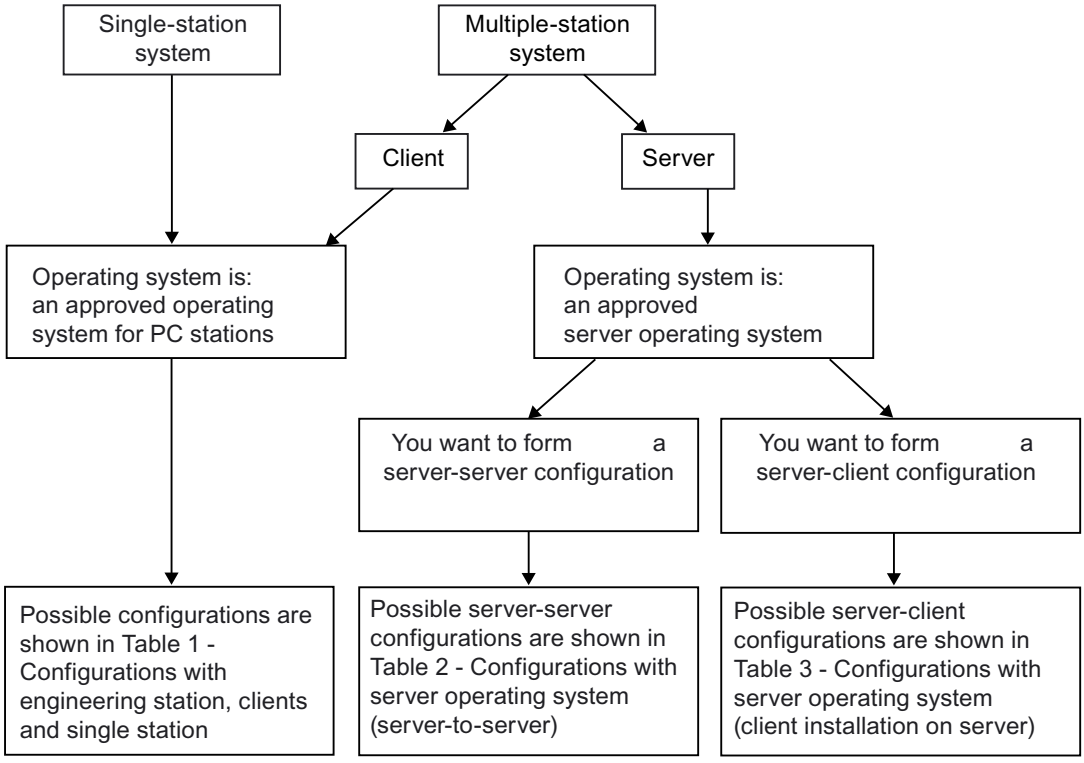
To ensure that PCS 7 performs at its optimum level, we recommend that you use only standard configurations on a PC station. However, system-specific conditions may mean that you have to equip a PC station with several program packages for standard configurations. If this is the case, you must observe 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 impact 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 *ST PCS 7*.	
Using the PC station (installation)	You can activate the properties of several standard configurations on a PC station if: • 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 operator station also, a total of 8 monitors (including the OS server monitors) should not be exceeded.	
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: • 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 150)"
- Section "Information on configuration type "-" (Page 151)"
- Section "Information on configuration type "A" (Page 151)"
- Section "Information on configuration type "B" (Page 151)"

7.2.2 Configuration tables

7.2.2.1 Configurations with engineering station, clients and single station system

Table 1 – Configurations with Engineering Station, Clients and Single Station System

Purpose / Standard configuration	Engineering station	OS single-station system	OS client	BATCH single station system	BATCH client	Route Control single station system	Route Control Client
Engineering station		A (Page 151)	B (Page 151)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)
OS single-station system	--- (Page 151)		--- (Page 151)	X (Page 150)	X (Page 150)	X (Page 150)	X (Page 150)
OS client	--- (Page 151)	--- (Page 151)		X (Page 150)	X (Page 150)	X (Page 150)	X (Page 150)
BATCH single station system	--- (Page 151)	X (Page 150)	X (Page 150)		--- (Page 151)	X (Page 150)	--- (Page 151)
BATCH Client	--- (Page 151)	--- (Page 151)	X (Page 150)	--- (Page 151)		--- (Page 151)	X (Page 150)

Purpose / Standard configuration	Engineering station	OS single-station system	OS client	BATCH single station system	BATCH client	Route Control single station system	Route Control Client
Route Control single station system	--- (Page 151)	X (Page 150)	X (Page 150)	X (Page 150)	--- (Page 151)		--- (Page 151)
Route Control Client	--- (Page 151)	--- (Page 151)	X (Page 150)	X (Page 150)	X (Page 150)	--- (Page 151)	

7.2.2.2 Configurations with server operating system (server to server)

Table 2 - Configurations with server operating system (server to server)

Purpose / Standard configuration	OS server	Redundant OS server	Maintenance server	Redundant maintenance server	BATCH server	Redundant BATCH server	Route Control server	Redundant Route Control server
OS server			X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)
Redundant OS server			--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)
Maintenance server	X (Page 150)	--- (Page 151)			X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)
Redundant maintenance server	--- (Page 151)	X (Page 150)			--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)
BATCH server	X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)			X (Page 150)	--- (Page 151)
Redundant BATCH server	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)			--- (Page 151)	X (Page 150)
Route Control server	X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)		
Redundant Route Control server	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)		

Process Historian and Information Server (archive server)

You can install the Process Historian and Information Server on a single PC station.

7.2.2.3 Configurations with server operating system (client installation on server)

Table 3 - Configurations with server operating system (client installation on server)

Purpose Standard configuration	Engineering station	OS single-station system	OS client	BATCH single station system	BATCH client	Route Control single station system	Route Control Client
OS server	--- (Page 151)	--- (Page 151)	X (Page 150)	X (Page 150)	X (Page 150)	X (Page 150)	X (Page 150)
Redundant OS server	--- (Page 151)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)
Maintenance server	--- (Page 151)	--- (Page 151)	X (Page 150)	X (Page 150)	X (Page 150)	X (Page 150)	X (Page 150)
Redundant maintenance server	--- (Page 151)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)
BATCH Server	--- (Page 151)	X (Page 150)	X (Page 150)	--- (Page 151)	X (Page 150)	X (Page 150)	X (Page 150)
Redundant BATCH server	--- (Page 151)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)
Route Control server	--- (Page 151)	X (Page 150)	X (Page 150)	X (Page 150)	X (Page 150)	--- (Page 151)	X (Page 150)
Redundant Route Control server	--- (Page 151)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)	--- (Page 151)	X (Page 150)

7.2.3 Information on the configurations

7.2.3.1 Information on configuration type "X"

No restrictions

Read the configuration notes for the respective standard configurations.

7.2.3.2 Information on configuration type "-"

Restriction

This configuration is not approved.

7.2.3.3 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.

7.2.3.4 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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