

SIMATIC NET

PC software Commissioning PC Stations - Manual and Quick Start

Configuration Manual

Preface

Welcome to Advanced PC Configuration

1

Getting started

2

Examples

3

Tools

4

FAQs

A

References and literature

B

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

CAUTION

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

NOTICE

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

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions.

Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

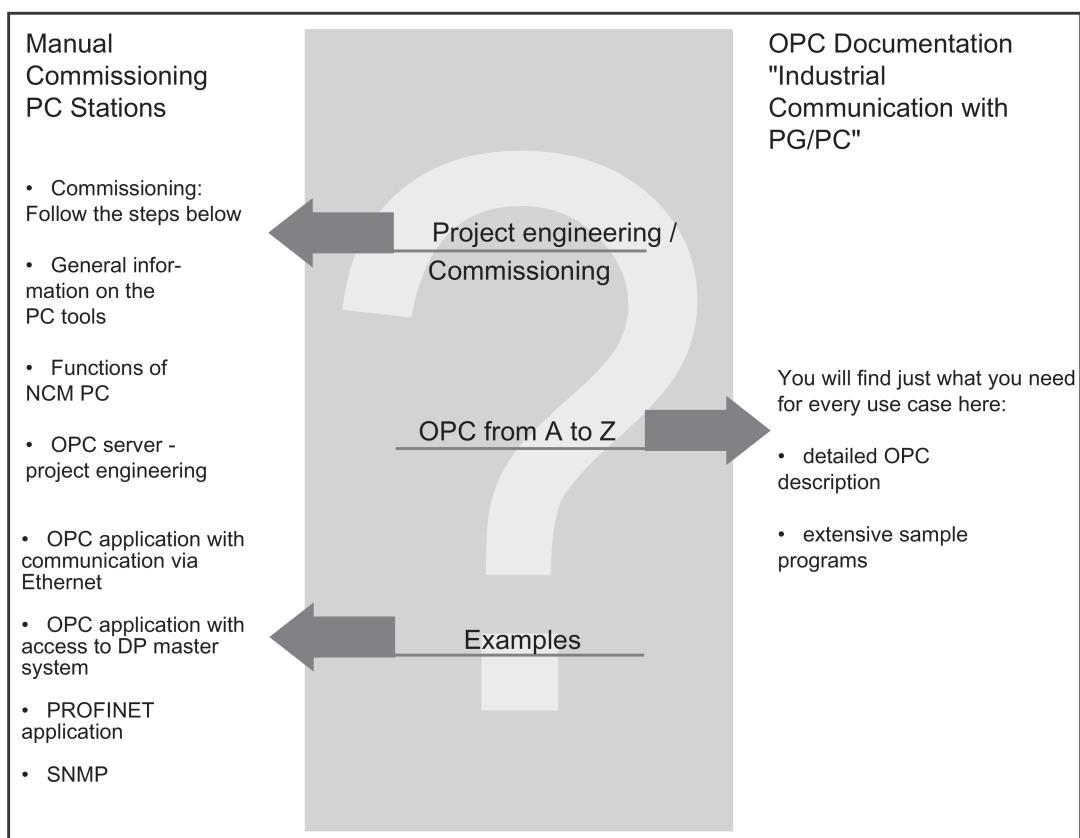
Preface

This manual...

... supports you when commissioning your SIMATIC NET PC modules in a PC station and helps you to use them successfully.

... introduces all the tools made available by the SIMATIC NET software for solving your communication tasks.

... along with the OPC documentation on the SIMATIC NET PC / Windows CD answers your questions on all aspects of communication:



Note

The information in this manual regarding calling applications using the Start menu applies to Windows 7 and Windows Server 2008 R2.

New in this release

- Expansion of the "Communication Settings" configuration program.

Documents on the Internet

You can obtain numerous documents from the Internet.

You will find the current version of this manual on the Internet.

Link to the manual: (<http://support.automation.siemens.com/WW/view/en/13542666>)

Additional information on SIMATIC S7 and STEP 7

The documentation on SIMATIC S7 and STEP 7 contains additional information on the STEP 7 basic software of the SIMATIC automation system. You can obtain this from your local Siemens office.

References /.../

References to other manuals and documentation are indicated by numbers in slashes /.../. These numbers refer to the titles of manuals listed in the References section at the end of the manual.

SIMATIC NET glossary

Explanations of the specialist terms used in this documentation can be found in the SIMATIC NET glossary.

You will find the SIMATIC NET glossary here:

- SIMATIC NET Manual Collection

The DVD ships with certain SIMATIC NET products.

- On the Internet under the following entry ID:

50305045 (<http://support.automation.siemens.com/WW/view/en/50305045>)

Security messages

Note

For its automation and drives product portfolio, Siemens provides IT security mechanisms to support secure operation of the plant/machine. Our products are continuously being further developed also taking into account the aspect of IT security. We therefore recommend that you regularly check for updates of our products and that you only use the latest versions. You will find information in:

(<http://support.automation.siemens.com/WW/lisapi.dll?func=cslib.csinfo2&aktprom=99&lang=en>)

Here, you can register for a product-specific newsletter.

For the secure operation of a plant/machine, it is also necessary to integrate the automation components in a full IT security concept for the entire plant/machine that represents the state of the art in IT technology. You will find information on this in:

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

Products from other manufacturers that are being used must also be taken into account.

Contents

Preface	3
1 Welcome to Advanced PC Configuration	13
1.1 A concept for your benefit	13
1.2 PC stations in SIMATIC	15
1.3 A brief introduction to tools and utilities	18
1.4 Guide to installation and commissioning	19
1.4.1 PG mode or configured mode - Considerations	19
1.4.2 Commissioning for PG mode - Overview	22
1.4.3 Commissioning for configured mode - Overview	23
2 Getting started	27
2.1 "Configured mode"	27
2.1.1 Steps in project engineering	28
2.1.2 Steps for initial configuration	33
2.1.2.1 Case a) Initial configuration using remote configuration with STEP 7 / NCM PC	34
2.1.2.2 Case b) Initial configuration with XDB file	38
2.1.2.3 Case c) Initial configuration using the "Station Configuration Editor"	41
2.2 "PG mode"	43
2.2.1 Configuration for PG mode - programming device (PG/PC)	44
2.2.2 Configuration for PG mode - HMI stations	47
2.3 Using additional functions - points to note	51
2.3.1 Checking the configuration and diagnostics	51
2.3.2 Testing with OPC Scout V10	51
2.3.2.1 Detecting errors in communication with the OPC Scout V10	52
2.3.3 Further functions / special features	53
2.3.3.1 Adopting the project engineering and symbols from PROFINET iMap and SIMOTION Scout	53
2.3.3.2 Configuring access points for STEP 7 and STEP 5	55
2.3.3.3 Points to note with SOFTNET Industrial Ethernet modules	56
2.4 Configuring the OPC server	57
2.4.1 Significance of project engineering	58
2.4.2 Configuring the properties of the OPC server	59
2.4.3 Specifying connection properties for the OPC server in project engineering	61
2.4.4 Using symbols for S7 connections	64
2.4.5 Configuring OPC properties for SNMP in project engineering	65
2.4.5.1 Significance in SIMATIC NET	65
2.4.5.2 SNMP traps	66
2.5 Using the CP 1616 as a PROFINET IO controller / IO device / IO router	67
2.5.1 Initialize CP 1616 (IP address and device name)	69
2.5.2 Configuring the CP 1616	70
2.5.2.1 Using the CP 1616 as a PROFINET IO controller	70
2.5.2.2 Using the CP 1616 as a PROFINET IO device	72

2.5.2.3	Using the CP 1616 as PROFINET IO controller and IO device	73
2.5.2.4	Using the CP 1616 as a PROFINET IO router	76
2.5.2.5	Copying a PROFINET IO router	87
2.5.2.6	Configuring prioritized startup of the CP 1616 in PROFINET IO	92
2.5.2.7	Configuring media redundancy of the CP 1616	93
2.5.3	Example: Installing Linux drivers (Suse Linux)	94
2.5.4	Installing the PROFINET IO sample program (Suse Linux)	95
2.6	Using CP 5613 A2/CP 5623/CP 5603 as a DP slave	96
3	Examples.....	103
3.1	OPC application for Industrial Ethernet	103
3.1.1	Overview	103
3.1.2	Hardware and software installation.....	104
3.1.3	Creating the STEP 7 project	105
3.1.3.1	STEP 7 project engineering on a central engineering station	105
3.1.3.2	Using symbol files	107
3.1.4	Configuring the PC station	110
3.1.5	Using the OPC Scout V10	113
3.1.5.1	Establishing a connection to the OPC server	113
3.1.5.2	Displaying and modifying values of variables	115
3.2	OPC application for PROFIBUS DP	119
3.2.1	Overview	119
3.2.2	Hardware and software installation.....	121
3.2.3	Configuring the PC station	122
3.2.4	Changing the configuration on the PC station	125
3.2.4.1	Inserting a DP master system.....	126
3.2.4.2	Inserting a DP slave	127
3.2.5	Using the OPC Scout V10	129
3.2.5.1	Establishing a connection to the OPC server	129
3.2.5.2	Displaying and modifying values of variables	131
3.3	Unspecified S7 connection from a PC application.....	132
3.3.1	Overview	132
3.3.2	Installing the software	132
3.3.3	Configuring the PC station	133
3.3.4	Creating, editing and downloading a STEP 7 project	137
3.3.4.1	Creating a new project	137
3.3.4.2	Editing the network and connection project engineering	138
3.3.4.3	Downloading the project engineering configuration.....	144
3.3.5	"Communication Settings" configuration program	146
3.4	Unconfigured S7 connection with the OPC Scout V10.....	148
3.4.1	Example 1 - Industrial Ethernet via TCP/IP	149
3.4.1.1	Engineering of the unconfigured S7 connection - Example 1.....	150
3.4.1.2	Entries in the OPC Scout V10 - Example 1	153
3.4.2	Example 2 - Industrial Ethernet over ISO	158
3.4.2.1	Engineering of the unconfigured S7 connection - Example 2.....	160
3.4.2.2	Entries in the OPC Scout V10 - Example 2	163
3.4.3	Example 3 - PROFIBUS	167
3.4.3.1	Engineering of the unconfigured S7 connection - Example 3.....	169
3.4.3.2	Entries in the OPC Scout V10 - Example 3	172
3.5	SNMP communication with OPC	177

3.5.1	Hardware and software installation.....	178
3.5.2	Configuration of the SNMP OPC server	179
3.5.2.1	Editing the plant configuration	181
3.5.3	Configuring the PC station.....	183
3.5.4	Using the OPC Scout V10	185
3.5.4.1	Establishing a connection to the OPC server	186
3.5.4.2	Add and monitor process variables	186
3.5.4.3	Setting the trap recipient based on the example of an OSM/ESM	188
3.5.5	Creating a device profile with the MIB compiler	190
4	Tools.....	195
4.1	"Station Configuration Editor"	195
4.1.1	Characteristics, functions and activation	195
4.1.2	Managing components: "Components" tab	198
4.1.3	Evaluating messages: "Diagnostics" tab	202
4.1.4	Setting the "Station Configuration Editor": "Properties" dialog	203
4.2	SIMATIC NCM PC project engineering tool.....	203
4.2.1	Characteristics, functions and activation	203
4.2.2	Relationship between SIMATIC NCM PC and STEP 7	207
4.2.3	Creating a PC station.....	208
4.2.4	Configuring a PC station with SIMATIC NCM PC Config	211
4.2.5	Creating the DP master system	214
4.2.6	Creating a PROFINET IO system.....	217
4.2.7	Configuring connections	220
4.2.8	Configuring a PC station as a DP slave.....	222
4.2.8.1	DP master is known in NCM / STEP 7	222
4.2.8.2	Configuration with a "thirdparty" DP master	228
4.2.9	Downloading project engineering data to the PC station (after initial configuration)	229
4.2.9.1	Online mode.....	229
4.2.9.2	Offline mode (engineering station and runtime PC separate) - XDB import.....	232
4.2.10	Adapting mismatched configurations	233
4.3	Configuration tool STEP 7 Professional (TIA Portal).....	233
4.3.1	Characteristics, functions and activation	234
4.3.2	Creating a PC station.....	235
4.3.3	Configuring the PC station in STEP 7 Professional (TIA Portal)	237
4.3.4	Creating a DP master system.....	241
4.3.5	Creating a PROFINET IO system.....	243
4.3.6	Configuring connections	245
4.3.7	Configuring a PC station as a DP slave.....	246
4.3.7.1	DP master is known to STEP 7 Professional (TIA Portal)	246
4.3.7.2	Configuration with a "third-party" DP master	249
4.3.8	Downloading the project engineering data to the PC station (after the initial configuration)	250
4.3.8.1	Online mode.....	250
4.3.8.2	Offline mode (engineering station and runtime PC separate) - XDB import.....	252
4.3.9	Adapting a configuration that does not match	253
4.3.10	Initial configuration using remote configuration with STEP 7 Professional (TIA Portal)	253
4.4	Symbol Editor.....	254
4.4.1	Characteristics, functions and structure	255
4.4.2	The meaning of symbols	258
4.4.3	Menus of the Symbol Editor in detail	259

4.4.4	Managing symbols	261
4.4.4.1	How to insert a new symbol	261
4.4.4.2	How to insert a new folder	262
4.4.4.3	How to change the name space prefix	263
4.4.4.4	How to delete folders or symbols.....	264
4.4.4.5	How to import a symbol file	265
4.4.4.6	How to export a symbol file	268
4.5	"Communication Settings" configuration program	269
4.5.1	Characteristics, function and activation	270
4.5.2	Support during commissioning and operation	271
4.5.2.1	Triggering a restart on the module.....	273
4.5.2.2	Forcing the OPC server to close down	274
4.5.2.3	Activating configured protocols step by step	275
4.5.2.4	Configuring OPC UA port.....	277
4.5.2.5	Setting a symbol file for OPC	278
4.5.2.6	Setting traces	283
4.5.2.7	Language setting.....	289
4.5.2.8	Automatic startup of applications and services.....	291
4.5.2.9	Security setting (as of Windows XP SP2).....	294
4.5.2.10	Managing OPC UA certificates	295
4.5.2.11	Configuration examples	306
4.5.3	Editing the configuration	306
4.5.3.1	General information on the configuration.....	307
4.5.3.2	COML S7	308
4.5.3.3	Changing the mode of a module.....	316
4.5.3.4	Displaying and setting the Industrial Ethernet network parameters for a CP 1613	318
4.5.3.5	Setting the Industrial Ethernet station addresses	320
4.5.3.6	Setting the PROFIBUS station address and network parameters in the "PROFIBUS" profile	322
4.5.3.7	Setting the PROFIBUS station address and network parameters in the "AUTO" profile	325
4.5.3.8	Setting the PROFIBUS station address and network parameters in the "MPI" profile	328
4.5.3.9	Set the IE PG access for SOFTNET IE modules.....	330
4.5.3.10	Assigning access points to the individual modules.....	331
4.5.3.11	Setting parameters for the memory card	334
4.5.3.12	Setting LLDP/DCP	335
4.5.3.13	Setting PNIO adapters	336
4.5.3.14	Setting the PROFIBUS DP slave of the CP 5614 A2 / CP 5624	337
4.5.4	Diagnostics with "Communication Settings"	339
4.5.4.1	Displaying the operability of a PROFIBUS module.....	340
4.5.4.2	Displaying the Industrial Ethernet network parameters for a CP 1613.....	340
4.5.4.3	Displaying PROFIBUS network nodes	341
4.5.4.4	Displaying PROFIBUS LSAP list	343
4.5.4.5	Displaying PROFIBUS bus statistics	344
4.5.4.6	Reading our the trace of the module firmware.....	345
4.5.4.7	Displaying operating data	346
4.5.4.8	SOFTNET IE - Show device details.....	347
4.5.4.9	Displaying USB connector parameters	347
4.5.4.10	Displaying version information of hardware and firmware.....	348
4.6	OPC Scout V10.....	349
4.6.1	Characteristics, functions and activation	349
4.6.2	Connecting the OPC Scout V10 to a local server.....	353

4.6.3	Connecting the OPC Scout V10 to a remote server.....	354
4.6.4	Browse the process space.....	355
4.6.5	Creating a new item	356
4.6.6	Add and monitor process variables	358
4.6.7	Properties for the views (DA, AE, Diagnostics)	359
4.6.8	Customize display	362
4.6.9	Display attributes	363
4.6.10	Change values	363
4.6.11	Menus of the OPC Scout V10 in detail	364
4.6.11.1	File menu	364
4.6.11.2	Edit menu	364
4.6.11.3	View menu	365
4.6.11.4	Server Explorer menu	365
4.6.11.5	Workbook menu.....	365
4.6.11.6	Tools menu	365
4.6.11.7	Window menu	366
4.6.11.8	Help menu.....	366
4.7	DCOM configuration OPC client/server operation.....	366
4.7.1	Enabling network discovery (as of Windows 7)	367
4.7.2	Enabling the DCOM configuration "Security" for OPC client/server operation.....	367
4.7.3	Configuration of the SIMATIC NET user group	369
4.7.4	Turning off a COM server	372
4.7.5	Functions of the "dcomcnfg" system program for the computer.....	375
4.7.5.1	Starting the "dcomcnfg" system program	375
4.7.5.2	"Default Properties" tab.....	377
4.7.5.3	"COM Security" tab	379
4.7.5.4	"Default Protocols" tab	383
4.7.6	Functions of the "dcomcnfg" system program for the DCOM configuration of the OPC server	385
4.7.6.1	"General" tab.....	387
4.7.6.2	"Location" tab	388
4.7.6.3	"Identity" tab	390
4.7.6.4	"Security" tab	394
4.7.7	Example - Windows domain mode	401
4.7.7.1	Example of a logged-on user in the domain, interactive mode.....	402
4.7.7.2	Example of a non logged-on user in the domain - server mode, service mode	415
4.7.7.3	Example of multiple logged-on users in the domain - multiterminal server mode	417
4.7.8	Example - Windows workgroups mode	420
4.7.8.1	General configuration of the client and server computer.....	421
4.7.8.2	Configuration of the server computer	424
4.7.8.3	Configuration of the client computer	425
4.7.9	Example - Client only computer mode	428
4.7.9.1	Example - Set client computer mode	428
4.7.9.2	Example - Setting up the OPC client for client-computer mode	432
4.7.9.3	Advanced firewall settings as of Windows XP SP2 and as of Windows Server 2003 SP1	433
4.7.9.4	Advanced DCOM settings	435
A	FAQs	437
A.1	General FAQs	437
A.1.1	Licenses	437
A.1.2	Windows versions	438

A.1.3	Miscellaneous	438
A.2	OPC server	439
A.2.1	Product characteristics.....	439
A.2.2	Operating and programming the OPC server	440
A.2.3	Project engineering and configuration	443
A.2.4	The Symbol Editor	445
A.2.5	Special features of the DP OPC server	445
A.2.6	Special features of the S7 OPC server.....	445
A.2.7	Special features of the SR OPC server	447
A.2.8	Special features of the FDL OPC server	448
A.2.9	DCOM configuration	448
A.2.10	SIMATIC NET OPC data OCX.....	449
A.2.11	OPC XML-DA.....	450
A.3	Hardnet Industrial Ethernet	452
A.3.1	General information on installation	452
A.3.2	Installation along with other modules.....	452
A.3.3	CP 1613 SNMP agent.....	452
A.3.4	Miscellaneous	453
A.4	SOFTNET Industrial Ethernet.....	454
A.5	Hardnet PROFIBUS.....	455
A.6	SOFTNET PROFIBUS	456
A.7	Programming instructions for the C interfaces.....	456
A.7.1	S7 protocols	456
A.7.2	DP slave	458
A.7.3	DP master	458
A.7.4	FDL protocol.....	460
A.8	Firewall and Security-CP CP 1628	463
A.8.1	Firewall settings in Windows and on the CP 1628.....	463
A.8.2	Order when downloading a VPN configuration.....	463
B	References and literature	465
	Index	469

Welcome to Advanced PC Configuration

1.1 A concept for your benefit

Advanced PC Configuration is the tool with which you can commission a PC station as part of an industrial communication network.

SIMATIC NET supports the option of using Advanced PC Configuration on a central engineering station (ES) to configure not only PC stations but also, for example, operator stations (OS). The engineering station is a PC with the SIMATIC NCM PC program or STEP 7 installed on it.

Characteristics - Comparison with previous products

The features of the SIMATIC NET software involve several changes to the previous configuration and project engineering procedures and these are summarized below:

- You can make all settings with one tool during project engineering and download them completely to the PC station.
The tool is SIMATIC NCM PC or STEP 7. Depending on your system configuration, you also use the "Station Configuration Editor" during the initial configuration.
- Properties that you configured in product versions prior to SIMATIC NET PC Software Edition 2005 using the "Set PG/PC Interface" program are now part of the project engineering and are downloaded to the PC station. These include, for example, the station address and the bus parameters. It is no longer necessary to create several databases.
- Properties that were previously specified in various project engineering programs are now configured in the project engineering in SIMATIC NCM PC / STEP 7. Examples of such project engineering tools include COML S7, COM PROFIBUS.
- Configuration parameters for the OPC server that were previously stored in "*.txt" files are now configured in the project engineering in SIMATIC NCM PC / STEP 7 and downloaded to the PC station.
- The OPC server can also handle communication on unconfigured S7 connections in PG mode. This function is, for example, required for use in HMI stations.

LDB databases no longer required

By configuring on a central station and with the option of local or remote downloading, LDB databases are no longer required for the DP, FMS, and S7 protocols. Configuration and project engineering data can be exported to XDB files in NCM PC / STEP 7; this is imported into the central data management on the PC station using the "Station Configuration Editor".

Note

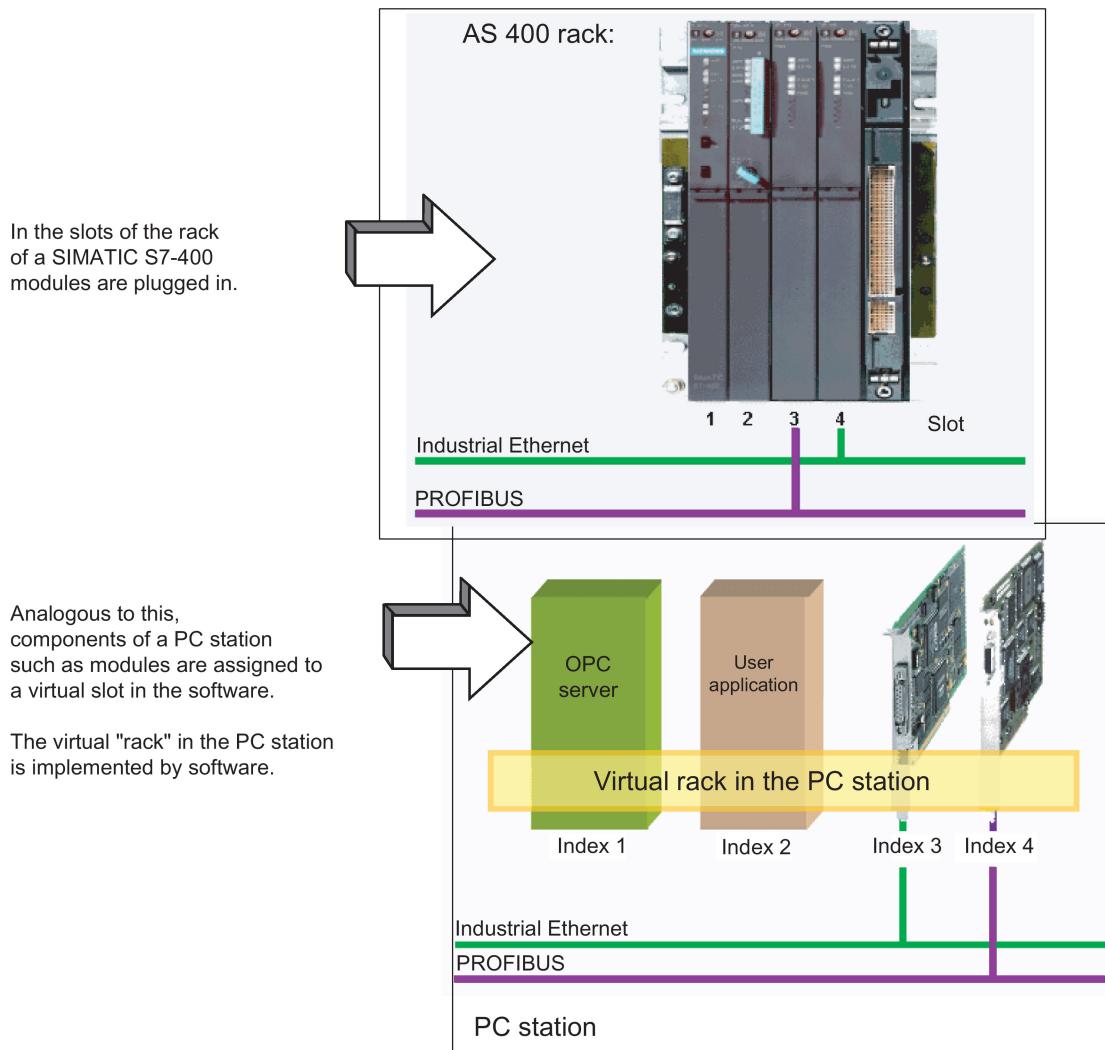
For more detailed information on the differences compared with the previous procedure and handling the software and modules, refer to Appendix "A (Page 465)".

1.2 PC stations in SIMATIC

Use of PCs in automation

A PC station is a PC with communications modules and software components within a SIMATIC automation solution.

The hardware configuration of a PC station can be compared with the configuration of an S7 controller in SIMATIC:



Software - The OPC server as central component

A PC station contains SIMATIC NET communications modules and software applications. The SIMATIC NET OPC server is a typical software application that allows other application programs to communicate.

Uniform engineering environment

During configuration with STEP 7 / NCM PC, you handle the PC station as you would a SIMATIC S7 controller: You connect S7 stations and PC stations to the networks in the network view and specify the communication connections.

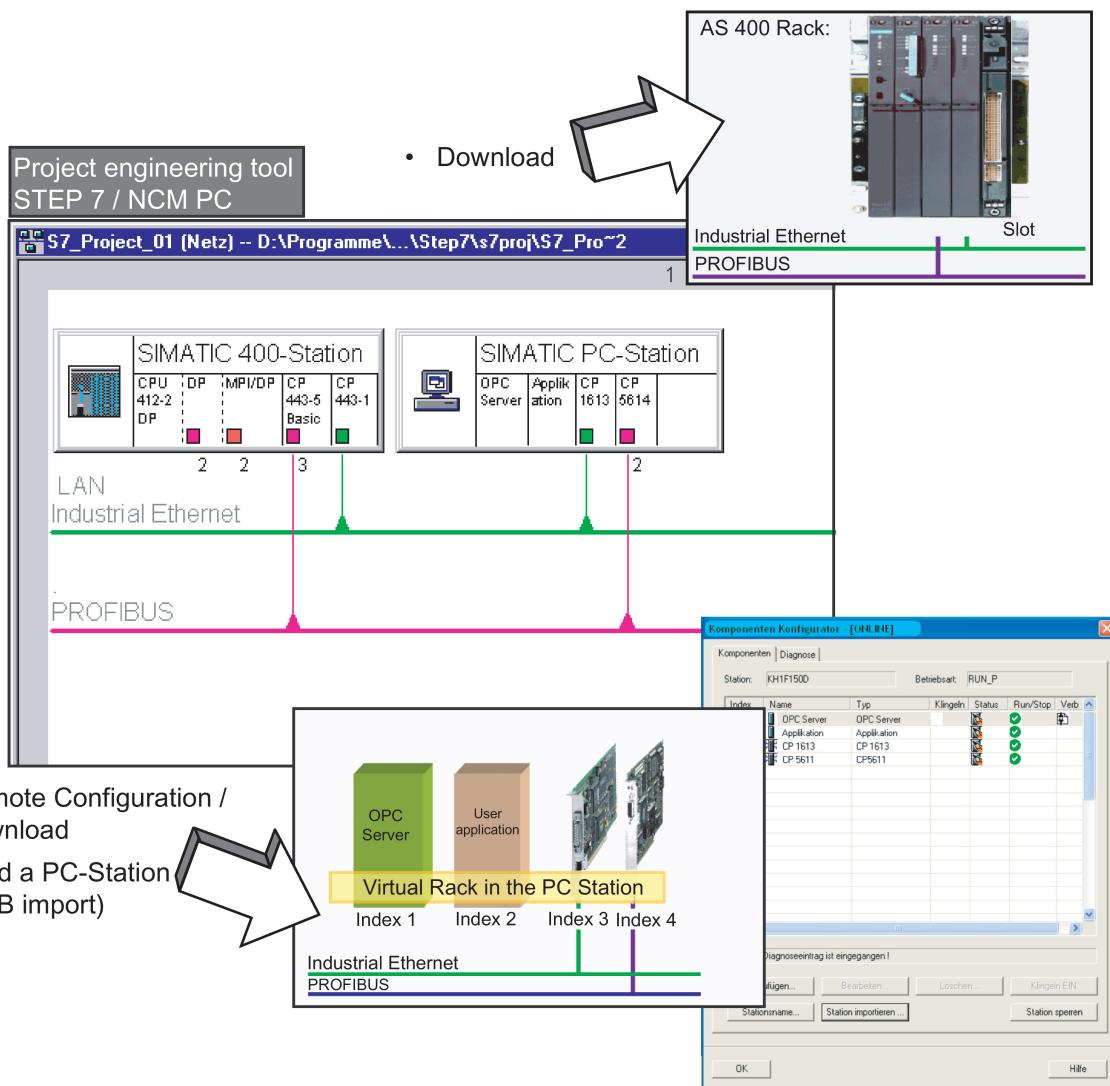
The project engineering data is downloaded to the stations at the touch of a button. With PC stations, you have 2 options:

- Remote configuration and download:

Direct initial configuration or modification of a configuration and transfer of the project engineering data to an (online) PC station available over an Ethernet adapter.

- Load a PC station (XDB import):

In this situation, project engineering data is saved to a file and can be imported into the PC station using any method of data transfer (applies to PROFIBUS and Ethernet).



Index for every component

To allow communication between the components in the PC station and to receive project engineering data, each component is assigned a unique identification number. The identification number for modules, applications, and other components in a PC station is the index. In much the same way as the slot of a module in an S7400 controller, the index corresponds to a virtual slot in a PC station.

Note

Be careful not to confuse this "index" with a hardware slot, for example on the PCI bus of the PC. The slot on the PCI bus is not relevant for commissioning and is not used at any point.

1.3 A brief introduction to tools and utilities

Once you have installed "SIMATIC NET PC Software", you have the following tools available:

Basic tools:	
	"Station Configuration Editor" With this tool, you insert the modules and components into the "virtual" slots of the PC station and assign them addresses and parameters.
	SIMATIC NCM PC project engineering tool SIMATIC NCM PC is a version of SIMATIC STEP 7 especially for configuring PC stations. It provides the full range of features of SIMATIC STEP 7 for PC stations. SIMATIC NCM PC is no longer supplied as of "SIMATIC NET PC Software" V12. PC configuration is performed with STEP 7 Professional V12. The STEP 7 Professional software ships with the "SIMATIC NET PC Software" as of V12. A STEP 7 Professional license is not required to configure the PC.
	Configuration tool STEP 7 Professional (TIA Portal) With STEP 7 Professional (TIA Portal) among other things, you can configure PCs. A STEP 7 Professional license is not required to configure the PC. The STEP 7 Professional software ships with the "SIMATIC NET PC Software" as of V12. If you read descriptions of the PC configuration with the SIMATIC NCM PC configuration tool in this document, remember that as of "SIMATIC NET PC Software" V12, you need to use the STEP 7 Professional (TIA Portal) configuration tool. You will find an introduction to PC configuration with STEP 7 Professional (TIA Portal) in the section "Configuration tool STEP 7 Professional (TIA Portal) (Page 233)" or in the documentation of STEP 7 Professional (TIA Portal).

Additional tools / utilities:	
	Symbol Editor With the Symbol Editor, you can create symbol files that allow you the option of access to symbolic variables over the SIMATIC NET OPC server.
	"Communication Settings" configuration program The "Communication Settings" configuration program provides a variety of options for configuration and diagnostics of PC hardware components and PC user programs as well as the OPC servers.
	SIMATIC NET Information Service The information service displays information on events that occurred due to activated trace requests. Trace requests can be made in the "Communication Settings" configuration program.
	OPC Scout V10 With the OPC Scout V10, you can test an OPC application or commission the OPC server.
	DCOM settings (Windows system program) To allow a client to use a COM object on another computer, the properties of the COM object must be configured on the client and on the remote computer.

1.4 Guide to installation and commissioning

Before you start commissioning, you should clarify the function of your PC station and select the required mode for your communications module. The steps involved in commissioning differ depending on the mode you select for your communications module.

Below, you can see an overview of the steps involved in commissioning. The sections following then describe the individual steps and tools in greater detail.

1.4.1 PG mode or configured mode - Considerations

When commissioning and operating a SIMATIC PC station, distinctions must be made between the following areas of application. Depending on the application, select the mode of the communications module.

- **PG mode**

This is the default mode for a programming device (PG/PC) and HMI station.

- **Configured mode**

This mode should be selected for productive communication between applications in the PC station and the automation systems, for example SIMATIC S7400.

The primary use of your PC station is:		Resulting area of application:		Selectable mode:
<ul style="list-style-type: none"> For diagnostics and maintenance and for programming and project engineering (STEP 7). 		Programming device (PG/PC)		PG mode (default)
<ul style="list-style-type: none"> For process control tasks (operator control and monitoring). The station is used independent of a STEP 7 project. For project engineering (STEP 7) in an automated plant operated with S7 stations For tasks in process control and visualization. 		Engineering station (ES)		Configured mode
As an automation system networked with programmable controllers.		Runtime PC		

Mixed operation is possible

- If you set the mode for individual communications modules, you can also use the PC station in "mixed operation".
- Mixed operation, in this sense, means the use of several communications modules, some in the configured and some in the PG mode.
- Depending on the selected mode, the information below applies to the individual modules of the PC station.

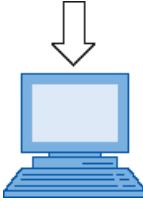
Characteristics of the selectable modes

The table below shows the differences between the two selectable modes and how this affects handling of the PC station during commissioning and operation.

Mode	Characteristics / advantages when commissioning and during operation
PG mode (default mode)	<p>A module in a PC station used in this mode is not included in the STEP 7 project. It is, however, possible to include it in the bus parameter calculation using the PG/PC station object.</p> <p>If your module in the PG or engineering station is configured for this mode, you must specify the interface on the PG or the engineering station explicitly with the "Set PG/PC Interface" or "Communication Settings" tool.</p> <p>With HMI stations, connections to communication partners are set up for process control over unconfigured S7 connections.</p>
Configured mode	<p>The PC station along with the modules planned in the project engineering is included in a STEP 7 project so that the communication relations with the stations can be planned in the project.</p> <p>This has the following advantages:</p> <ul style="list-style-type: none"> • Simple commissioning (initial configuration) by using this configuration. • Networking parameters stored in the project are adopted (PROFIBUS).

1.4.2 Commissioning for PG mode - Overview

PG mode is the default mode for programming devices (PG/PC) and HMI stations.

Step	How does it work?	Tool
1. Installing SIMATIC NET software	Install the SIMATIC NET software based on the installation instructions	SIMATIC NET CD / Windows
2. Installing hardware (PC modules)	Install the communications module in the PC station	
3. Configuration for PG mode	Assign addresses and interface parameters to the modules	Communication Settings / Set PG/PC Interface
		Result: PC station is ready for operation in PG/PC mode.
Next step for HMI stations only:		
4. Configuration for HMI stations	Specify the access points for the applications	Communication Settings / Set PG/PC Interface
		Result: The HMI station with its application are ready for operation. Communication via an unconfigured S7 connection is possible.
5. Check the configuration	Configuration Console	Communication Settings

1.4.3 Commissioning for configured mode - Overview

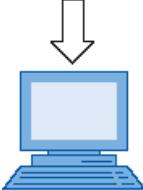
When commissioning in configured mode, 3 situations can be distinguished. The situation depends on whether or not project engineering data is already available in the form of an XDB file or whether commissioning is independent of project engineering (no XDB file).

Initial configuration means the step in commissioning at which the module is switched to "configured mode" and obtains addresses and network parameters.

- **Case a) Initial configuration using remote configuration with STEP 7 / NCM PC**

With this method, it is assumed that the PC station along with its components and applications is first created in project engineering in STEP 7 / NCM PC. The target PC station that can be reached over an Ethernet adapter (online) is then configured remotely using STEP 7 / NCM PC (applies to Ethernet and PROFIBUS).

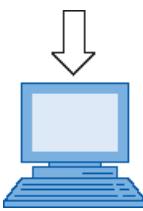
The advantage of this is that the project engineering data and the PC configuration are consistent and the total effort is minimal.

Step	How does it work?	Tool
1. Installing SIMATIC NET software on the engineering PC/PG and on the PC station	Install the SIMATIC NET software based on the installation instructions	SIMATIC NET CD / Windows
2. Installing hardware (PC modules)	Install the communications module in the PC station	Refer to the documentation on the CP
3. Project engineering for the PC station	Steps in project engineering for the PC station: <ul style="list-style-type: none"> • Create the PC station in NCM PC • Enter modules and applications • Create connections in NetPro • Use symbols (in the project engineering of the OPC server) 	NCM PC / STEP 7 <ul style="list-style-type: none"> • SIMATIC Manager • HW Config • NetPro • HW Config
4. Initial configuration	Remote configuration with the menu command "PLC" > "Configure"	NCM PC / STEP 7
5. Downloading the project engineering data to the PC station	Download the project engineering data with the menu command "PLC" > "Download"	NCM PC / STEP 7
	Result: PC station is ready for productive communication.	
6. Check the configuration	Configuration Console	Communication Settings

- **Case b) Initial configuration with existing project engineering data (XDB file)**

With this method, it is assumed that the PC station along with its components and applications is first created in project engineering in STEP 7 / NCM PC. This produces a database (XDB file) that is then available for the initial configuration of the PC station.

The advantage of this is that the project engineering data and the PC configuration are consistent and the total effort is minimal.

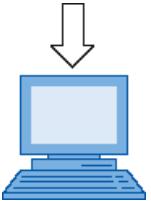
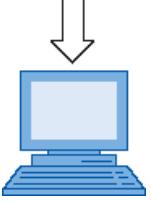
Step	How does it work?	Tool
Project engineering (as prerequisite for initial configuration)	Steps in project engineering for the PC station: <ul style="list-style-type: none"> • Create the PC station in NCM PC • Enter modules and applications • Create connections in NetPro • Use symbols (in the project engineering of the OPC server) • Configuration data of the PC station is stored in an XDB file. 	NCM PC / STEP 7 <ul style="list-style-type: none"> • SIMATIC Manager • HW Config • NetPro • HW Config • SIMATIC Manager
1. Installing SIMATIC NET software	Install the SIMATIC NET software based on the installation instructions	SIMATIC NET CD / Windows
2. Installing hardware (PC modules)	Install the communications module in the PC station	Refer to the documentation on the CP
3. Initial configuration	Import XDB Project engineering data is transferred to the PC station.	"Station Configuration Editor" (later download of project engineering data also possible with NCM PC / STEP 7)
	 Result: PC station is ready for productive communication.	
4. Check the configuration	Configuration Console	Communication Settings

- **Case c) Initial configuration without existing project engineering data (XDB file)**

This is, for example, the situation when the commissioning personnel do not have an XDB file but the devices need to be installed in a plant and their functionality checked.

Regardless of the initial configuration, the stations and their connections (PC and PLC) can be configured in STEP 7. The project engineering data is then transferred to the previously configured PC stations in the system. Depending on the availability of the station, this is achieved by download or loading the station (XDB import).

To ensure that the configuration on the PC station and the project engineering are consistent, it is advisable to import the configuration data from the PC station.

Step	How does it work?	Tool
1. Installing SIMATIC NET software	Install the SIMATIC NET software based on the installation instructions	SIMATIC NET CD / Windows
2. Installing hardware (PC modules)	Install the communications module in the PC station	Refer to the documentation on the CP
3. Initial configuration	Module configuration	"Station Configuration Editor"
	 <p>Result: The PC station with its modules and applications is configured and ready to receive project engineering data.</p>	
4. Check the configuration	Configuration Console	Communication Settings
5. Optional: Data export	Enter the configuration in a new (temporary) STEP 7 project "PC station".	NCM PC
6. Project engineering (this is not dependent on the previous steps but is necessary for step 7)	Steps in project engineering for the PC station: <ul style="list-style-type: none"> Create the PC station in NCM PC. Optional (see step 5): Adopt the configuration from the project created in step 5. 	NCM PC / STEP 7 <ul style="list-style-type: none"> SIMATIC Manager
	<ul style="list-style-type: none"> Enter modules in applications (identical to instructions in the Station Configuration Editor) 	<ul style="list-style-type: none"> HW Config
	<ul style="list-style-type: none"> Create connections in NetPro Use symbols (in the project engineering of the OPC server) 	<ul style="list-style-type: none"> NetPro
	<ul style="list-style-type: none"> For "offline mode": Save the project engineering data for the PC station in the XDB file. 	<ul style="list-style-type: none"> HW Config / NetPro
	Depending on how the PC station can be reached:	
7. Downloading the project engineering data to the PC station	<ul style="list-style-type: none"> online: (local or remote) load project engineering data on station 	<ul style="list-style-type: none"> SIMATIC Manager
	<ul style="list-style-type: none"> Import XDB 	<ul style="list-style-type: none"> "Station Configuration Editor"
	 <p>Result: PC station is ready for productive communication.</p>	
8. Check the configuration	Configuration Console	Communication Settings

Getting started

2.1

"Configured mode"

This chapter explains how to commission your PC station with communications modules for the "configured mode" the first time (initial configuration).

The "configured mode" is used for productive communication between applications in the PC station and the automation systems, for example SIMATIC S7400.

In conjunction with the project engineering, you will also see how data exchange between the PC station and the project engineering tool works.

Requirement: "SIMATIC NET PC software" and hardware are installed

Before you work through the steps described, first install the SIMATIC NET software and the hardware on your PC station.

- Installing "SIMATIC NET PC Software":

Follow the procedure described in the Installation Instructions that accompany every SIMATIC NET PC module to install the products of the "SIMATIC NET PC Software" DVD.

The installed products are described in detail in the section "Tools (Page 195)".

- Installing hardware (PC modules):

Install the hardware on your computer as described in the Operating Instructions that accompany every module.

2.1.1

Steps in project engineering



During project engineering, you use the SIMATIC NCM PC or SIMATIC STEP 7 tool.

Why do we need project engineering?

To allow the devices networked in a plant to communicate, these devices must be supplied with data relating to the components and the communication connections. Before devices can go over to productive operation, the project engineering data must first be created and loaded on the devices.

This project engineering includes not only the PLC such as SIMATIC S7 stations but also the PC stations so that the communication relations between all devices of the plant can be specified. This makes it possible to run a consistency check and synchronize the elements of the system.

Apart from specifying the PLC and PC stations and their properties on the LAN, project engineering also includes defining communication connections and symbols for process variables on the OPC server.

Result

Once the project engineering data has been downloaded to or imported into the PC station, the applications can communicate over the established communication networks with the stations reachable over the network.

Initial situation

- Case a) Initial configuration using remote configuration with NCM PC / STEP 7

To be able to make the initial configuration on the PC station (available online) in the next step, you must first create the project engineering data for the PC station with NCM PC / STEP 7.

- Case b) An XDB file is available for initial configuration

To be able to make the initial configuration in the next step, you must first create the project engineering data for the PC station with NCM PC / STEP 7 and then make this data available in an XDB file.

- Case c) The initial configuration has already been made on the PC station

Project engineering data is downloaded or imported as an XDB file following initial configuration.

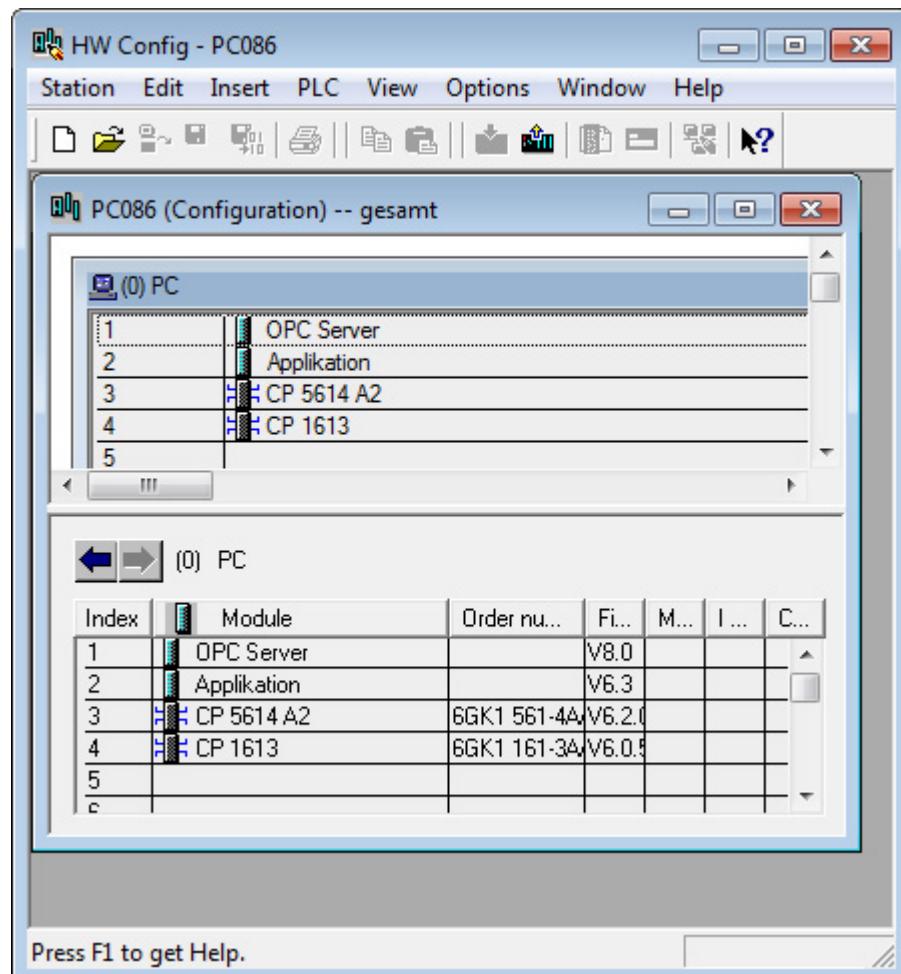
Follow the steps below:

1. Start SIMATIC NCM PC Manager.

Start menu "Start" > "..." > "SIMATIC" > "SIMATIC NCM PC Manager"

2. Create a PC station in an existing or new project.

3. Change to SIMATIC NCM PC Config / HW Config and enter the intended modules and applications (take them from the catalog).



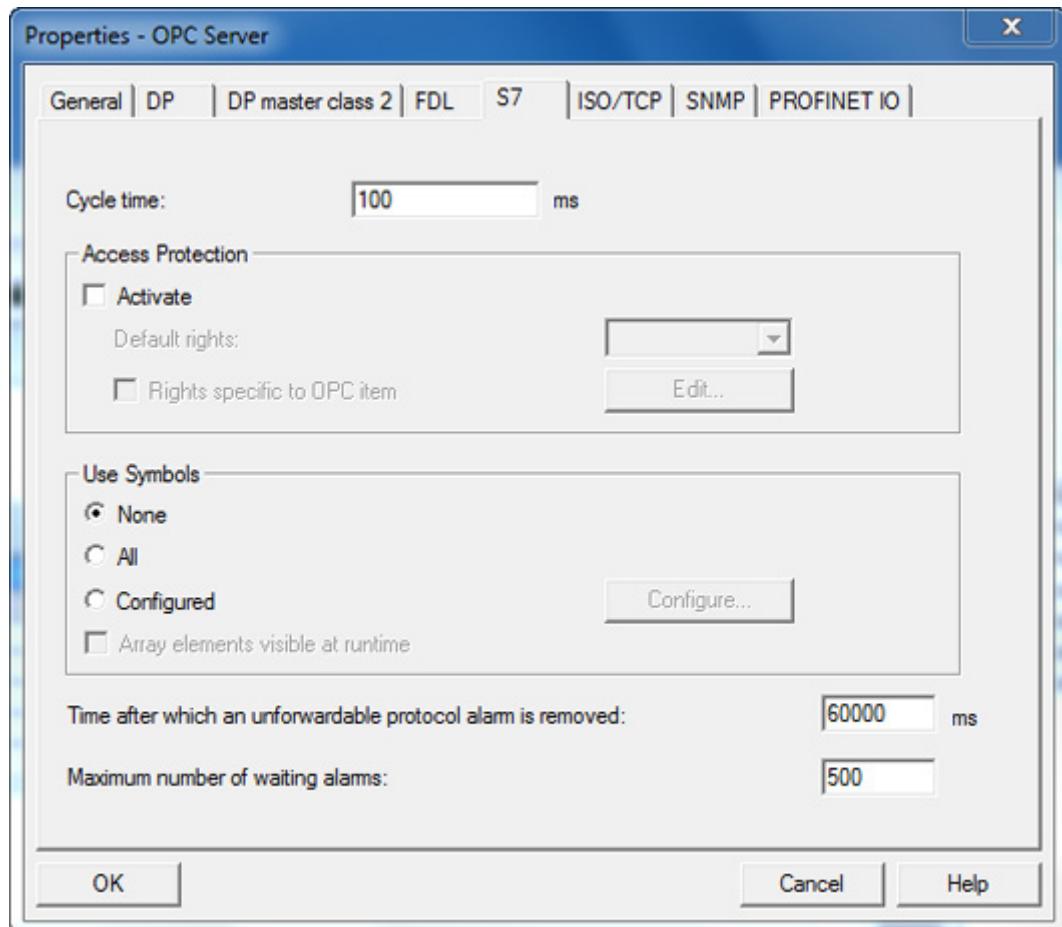
The software applications that use communication services directly must also be specified during project engineering. One direct use is calling the protocol-specific function libraries. The OPC server uses communication services directly and must be included in project engineering. OPC clients only require indirect access via the OPC server and do not need to be configured in project engineering.

4. Optional

If symbol tables were created for S7 stations in your project, you can make them accessible to the OPC server.

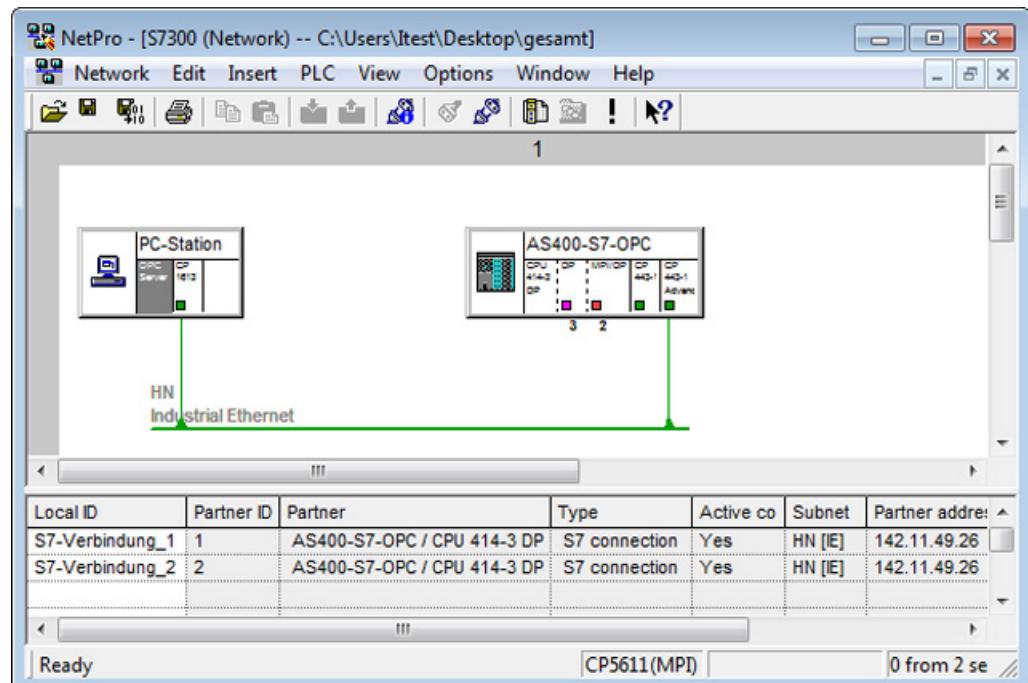
When you later import the XDB file or download the project engineering data to the PC station, these symbol tables are included.

Open the properties dialog of the OPC server to make your selection.



5. Save the configuration.

Change to NetPro to network the station and to create the connections in the project engineering.



Note:

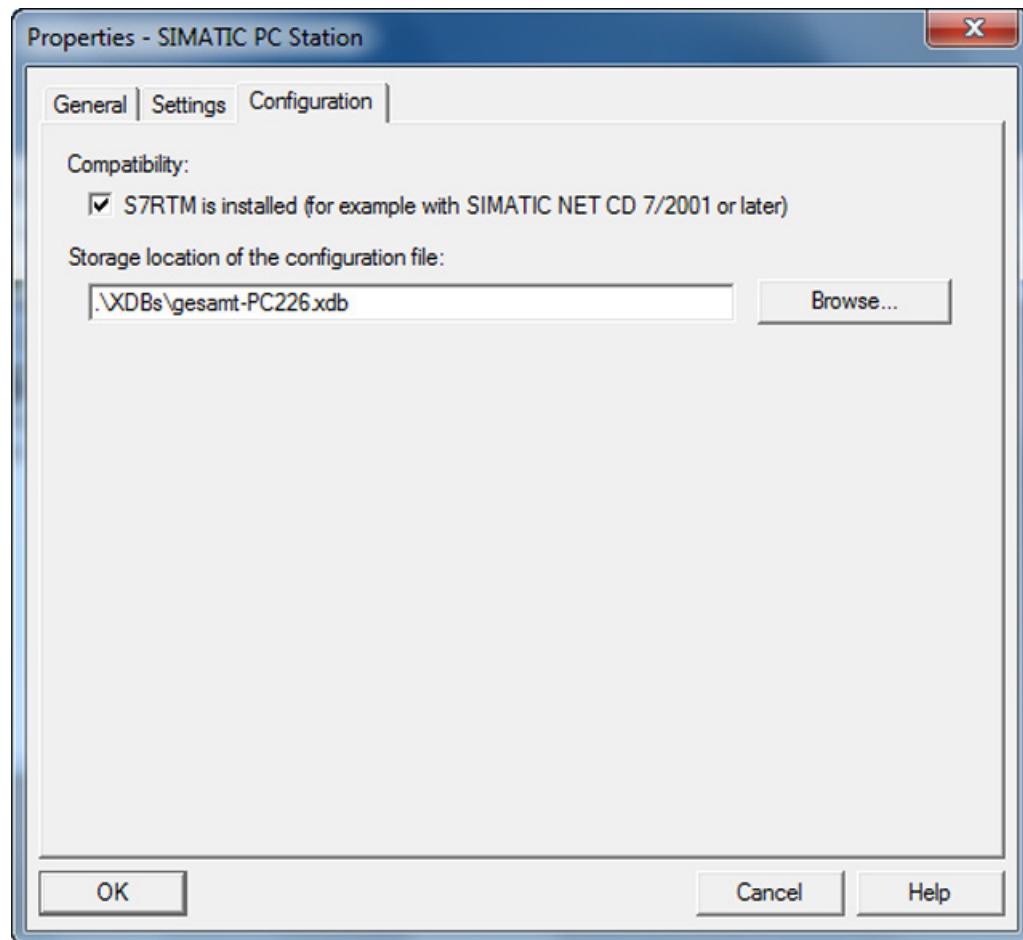
You can create the S7 station shown in the screenshot only with STEP 7/HW Config.

In the SIMATIC NCM PC Manager, you can open and edit a project containing S7 stations. You can, however, only create and download project engineering data for PC stations.

6. XDB export for "offline mode":

When you save and compile the project, the project engineering data of the PC station is saved in an XDB file.

You will find information on the storage location of the XDB file in the "Configuration" tab in the properties dialog of the PC station.



7. If the PC station can be reached online (local or remote), the next step is the initial configuration of the station.

Note

To load the project engineering data locally, set the access point S7ONLINE for the PC station to PCinternal (local).

Summary

In the "project engineering" step described here, the following activities were explained:

- Creating a STEP 7 project or using an existing STEP 7 project.
- Creating a PC station in the STEP 7 project (NetPro / HW Config).
- Inserting and networking PC modules in the PC station (HW Config/NetPro).

- Creating applications (here the OPC server).
- Configuring connections for the applications.
- Storing the project engineering data in an XDB database.

The XDB database is then available for offline mode and can be used to import the engineering data on the PC station.

Where to go from here - optional activities

Once the project engineering configuration has been accepted, the PC station is operational. The following steps allowing the use of symbols, diagnostics, and calling the OPC Scout V10 are optional. You should, however, check that the modules in your PC station are operational using the diagnostics functions.

2.1.2

Steps for initial configuration



For the initial configuration, use one of the following tools depending on the procedure:

- "Station Configuration Editor"
- STEP 7/NCM PC

Why do we need an initial configuration?

The initial configuration is necessary when a module is commissioned for the first time. This initial configuration is done for all newly installed modules.

After initial configuration of the modules, the PC station is set up to receive the project engineering data. This step is comparable with inserting components in the rack of an S7400 station.

Result

When you start the PC station, the PC module of the PC station is initially in PG mode.

By adding the communications module in the "Station Configuration Editor", the module is automatically switched to "configured mode" and the index (the "virtual slot number") of the module is set.

Relationship between initial configuration and project engineering

Depending on the area of application, two situations must be distinguished:

- Case a) Initial configuration using remote configuration with STEP 7 / NCM PC (Page 34)
- Case b) Initial configuration with XDB file (Page 38)
- Case c) Initial configuration using the "Station Configuration Editor" (Page 41)

2.1.2.1 Case a) Initial configuration using remote configuration with STEP 7 / NCM PC

Advantage of remote configuration

The target PC station that is available online is configured directly with STEP 7 / NCM PC remote.

The advantage of this is that the project engineering data and the PC configuration are consistent and the total effort is minimal. Address parameters are adopted from the project engineering.

You can also transfer project engineering data to the PC station later by downloading or loading the station (importing an XDB file).

Selecting the communications module for remote configuration ("SIMATIC Shell")

When?

You only need to select the communications module for remote configuration when there is more than one network module in a PC station.

It may be necessary to select the module both on the target computers and in the configuration station.

If there is only one communications module available on the PC, this is automatically used as the communications module for remote configuration.

Program for the selection

Use the "SIMATIC Shell" program to specify the communications module with which the remote configuration will be handled. The "SIMATIC Shell" program is installed with the SIMATIC NET PC software products.

Note

Change only the parameters described here in the "SIMATIC Shell" program.

Leave the defaults for all other settings.

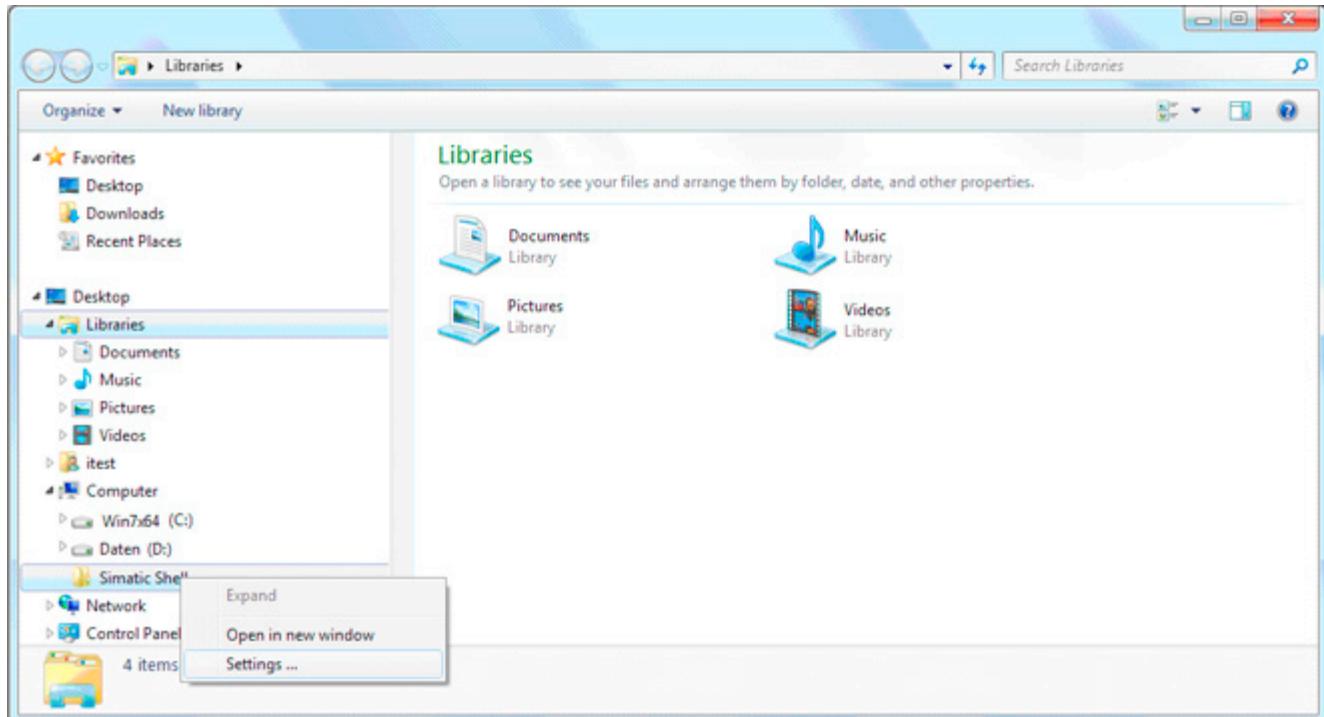
Follow the steps below:

1. Start the Explorer of the Windows operating system.

2. Start the "SIMATIC Shell" program.

"Computer" > right mouse button on the "Simatic Shell" directory > "Settings..." shortcut menu

Reaction: The "SIMATIC Shell" program is started, the "Select Terminal Bus" dialog appears.



3. Select network adapter intended for communication and confirm with "OK".

4. As soon as the "Reinitialize" dialog appears, confirm with "OK".

The name of the activated adapter is selected so that you can check it.

Note

Please note that a PC can only be configured via the network adapter that is initialized, in other words, selected in the "Network Adapters" list in the "SIMATIC Shell" program.

Note

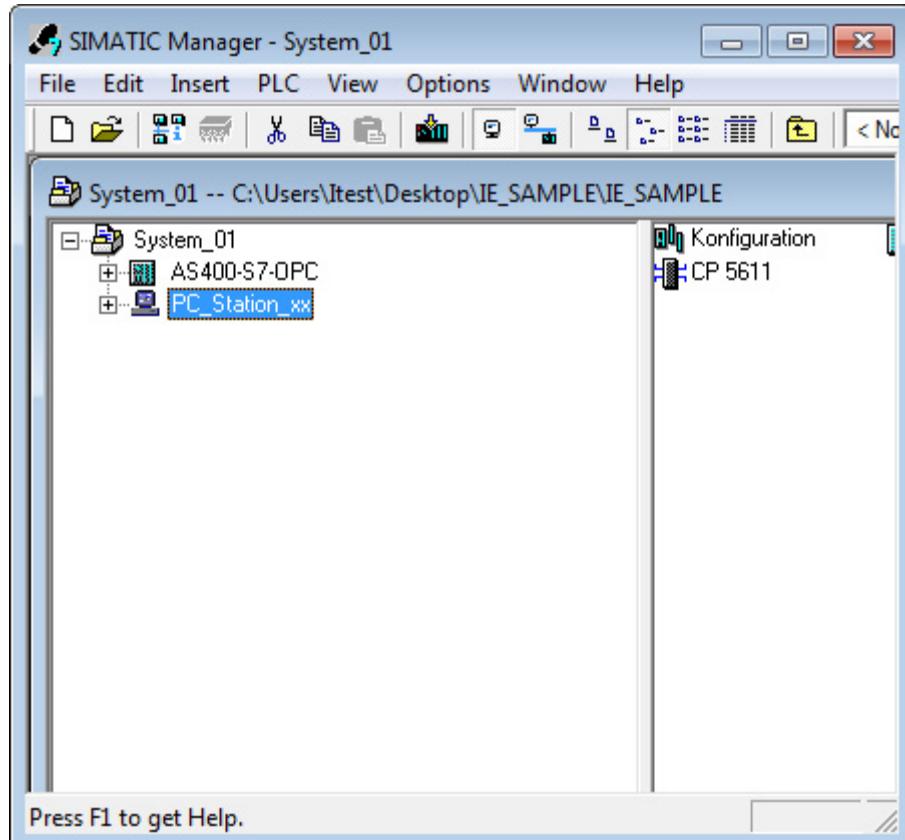
Make sure that the network cable is connected to the selected network adapter.

Initial configuration with STEP 7 / NCM PC

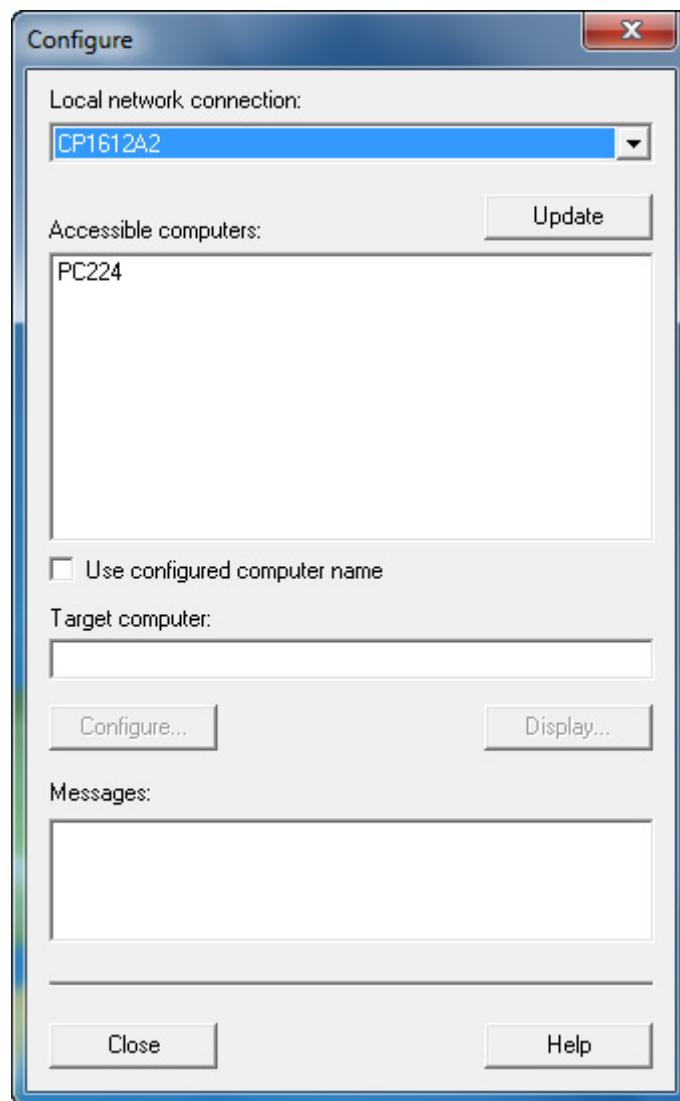
Once you have specified the communication paths in the destination computers and the configuration station, you can start the initial configuration.

Follow the steps below:

1. Select the PC station you configured in your STEP 7 project (STEP 7 / NCM PC project).



2. Select the menu command "PLC" > "Configure" to open the "Configuration" dialog.



3. Follow the instructions in the online help of the dialog to create and complete the remote configuration.

Result: The PC station with its modules and applications is configured and ready to receive project engineering data.

2.1.2.2 Case b) Initial configuration with XDB file

In this case, you can import the XDB file with the project engineering data for the PC station directly.

The advantage of this is that the project engineering data and the PC configuration are consistent and the total effort is minimal. Address parameters are adopted from the project engineering.

Follow the steps below:

1. Start the "Station Configuration Editor" by double-clicking on its icon on the desktop.

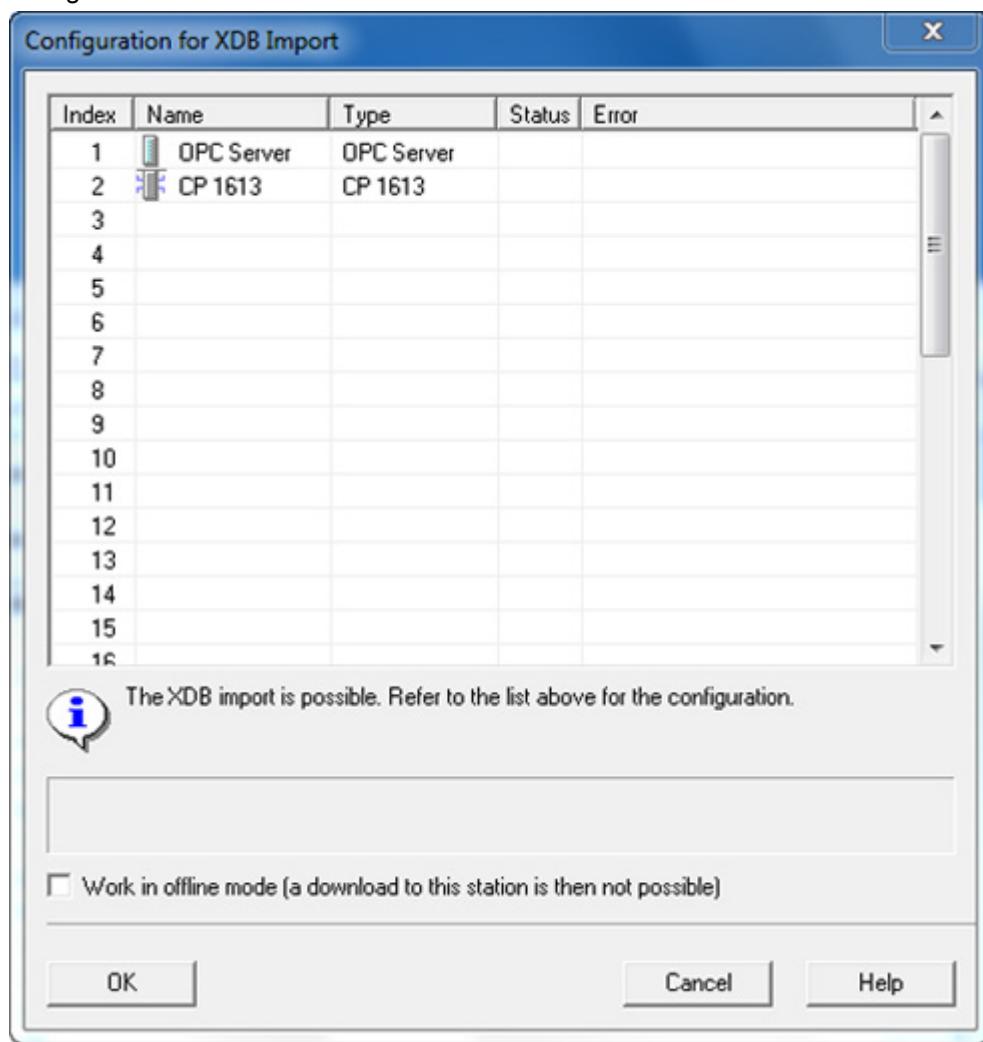
Reaction: You first see an empty configuration list.

2. Import the XDB file using the "Import Station..." button.

Reaction: All the modules and applications specified in the project engineering are entered and displayed in a window.

During import, all the project engineering data; in other words, device name, modules, applications, communication connections, and symbols are entered in the PC station.

Importing is possible only when the imported configuration matches the existing local configuration.



3. To prevent project engineering data from being transferred online at a later point in time, select the "Work offline..." option. With this default setting, you ensure that project engineering data can be transferred online.

Result: The PC station is ready for productive communication:

- Module addresses are set;
- Communication connections configured in the project engineering are established;
- Variables can be accessed using configured symbols.

Note

You can also follow this procedure in the example "OPC Configuration for Industrial Ethernet" in this manual; refer to the section "OPC application for Industrial Ethernet (Page 103)".

Where do we go from here?

You can now use the other tools from SIMATIC NET for diagnostics, commissioning, and testing.

See also the section "A brief introduction to tools and utilities (Page 18)".

2.1.2.3 Case c) Initial configuration using the "Station Configuration Editor"

In this case, you specify the modules during initial configuration in the "Station Configuration Editor".

You can transfer project engineering data to the PC station later by downloading or importing an XDB file.

You can also create project engineering data locally on the PC station and then import it later into the engineering system (NCM PC). This makes it extremely simple to create a configuration in the project engineering system that matches the configuration on the real PC station.

Follow the steps below:

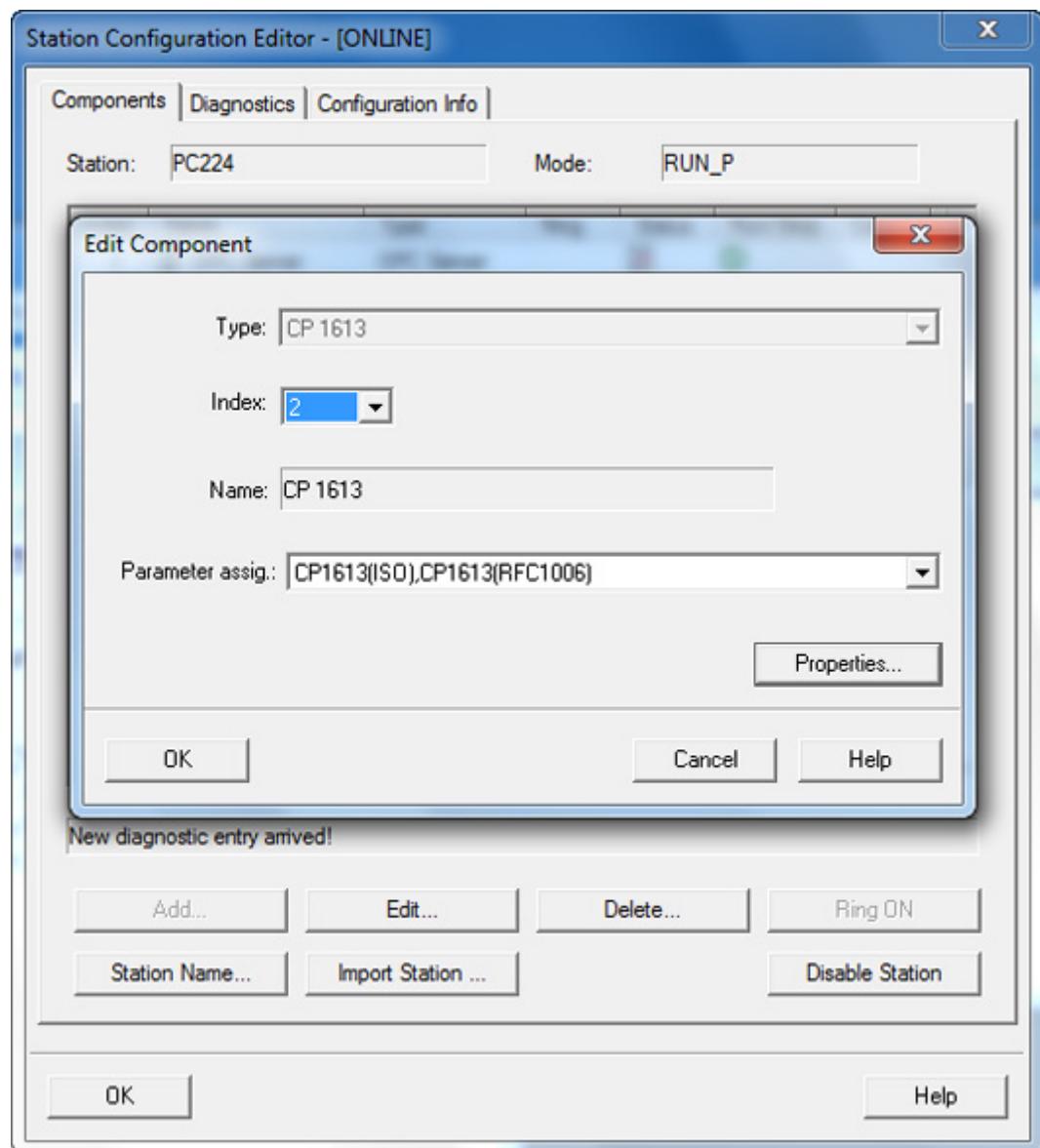
1. Start the "Station Configuration Editor" by double-clicking on its icon on the desktop.
Reaction: You first see an empty configuration list.
2. Assign the station name using the "Station Name..." button.

3. In the next step, you enter the components.

Using the "Add..." button, select the module that will be put into configured mode. All the modules installed in the local station that are not yet configured are displayed for selection.

Note

If there are several SOFTNET PROFIBUS modules, only one can be configured in project engineering.



4. In the properties dialog that opens, give the module an address.

In some cases, you can also set further module parameters, for example bus parameters, (mandatory with PROFIBUS).

5. Repeat the steps for all other modules that exist in the local station and that you want to operate in configured mode.
6. Using the "Add..." button, add the applications to be operated on the station.
7. Repeat the steps for all other applications you want to use for the configured mode.

Result: The PC station with its modules and applications is configured and ready to receive project engineering data (select online mode!).

Note

You will also find this procedure in our example "Configuration Example for PROFIBUS"; refer to the section "OPC application for PROFIBUS DP (Page 119)".

Where do we go from here?

In the next step, you supply the PC station with project engineering data.

2.2 "PG mode"

This chapter shows you how you can configure your PC module in PG mode. In this situation, we distinguish two modes:

- Programming device (PG/PC)
- HMI stations

The default setting for the PC modules is PG mode.

Requirement: "SIMATIC NET PC software" and hardware are installed

Before you work through the steps described here, first install the SIMATIC NET software and the hardware on your PC station.

- Installing "SIMATIC NET PC Software"

Follow the procedure described in the Operating Instructions that accompany every SIMATIC NET PC module to install the products of the SIMATIC NET PC Software DVD.

- Installing hardware (PC modules)

Install the hardware on your computer as described in the Operating Instructions that accompany every module.

2.2.1 Configuration for PG mode - programming device (PG/PC)

You configure a module using the "Set PG/PC Interface" tool.

Note

You can also create the configuration using the "Communication Settings" tool.

When configuring for PG mode, we recommend that you use the "Set PG/PC interface" tool.

Follow the steps below:

1. You can start the configuration program from the Windows Start menu:
Start menu "Start" > "..." > "SIMATIC NET" > "Set PG/PC Interface".

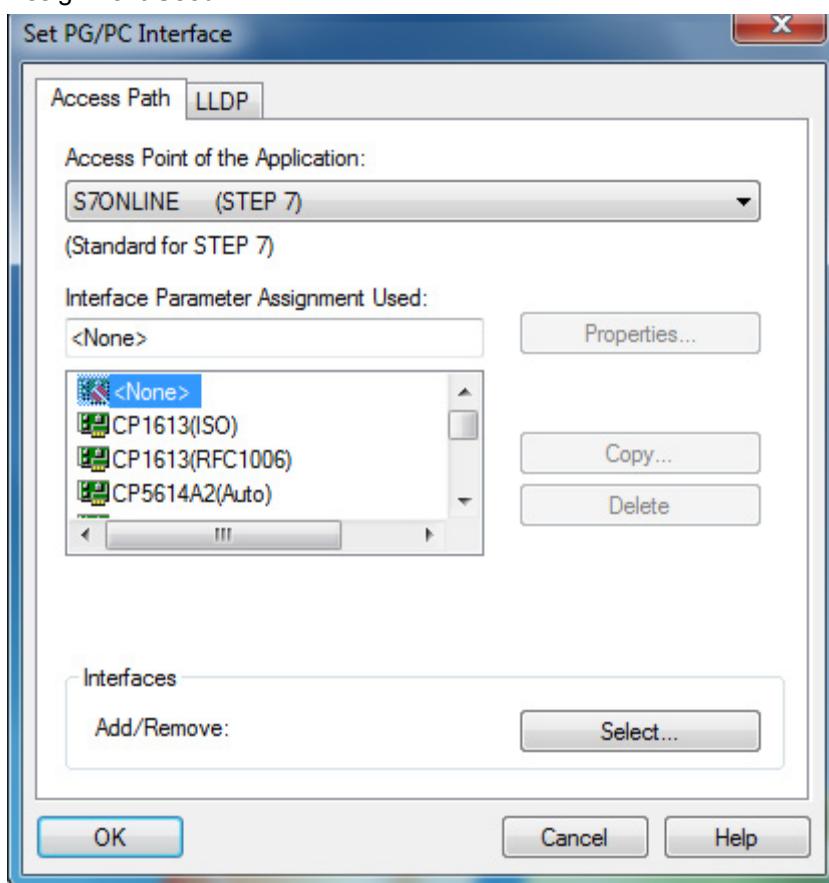
As an alternative you can also start it from the Control Panel:
"Start" > "Settings" > "Control Panel" > "Set PG/PC interface".

2. Assign the access point suitable for your application to the module.

To make your module usable for STEP 7, follow the steps outlined below in the "Set PG/PC Interface" configuration program:

Select the access point "S7ONLINE" in the "Access Point of the Application" list box.

Reaction: The current assignment appears in the list box "Interface Parameter Assignment Used".



Select the required entry in the "Interface Parameter Assignment Used" list box. Some modules offer alternatives, for example the CP 1613 as follows:

- If you use the TCP protocol - "CP1613(RFC1006)",
- If you use the ISO protocol - "CP1613(ISO)"

or CP 5613/CP 5614 as follows:

- Normal situation - "CP5613_5614(PROFIBUS)"
- on an MPI chain - "CP5613_5614(MPI)".

For further details on setting access points, refer to the section "Tools (Page 195)".

1. Set the required communication parameters.

With your module selected, you can click on "Properties..." and then set the communication parameters. In normal situations, the parameter settings do not need to be modified (for more detailed information on the parameters, refer to the online help that you can display by clicking the "Help" button in the Settings dialog).

For more information on certain module types, see below.

- 2. When you close the settings window, you return to the start dialog of the "Set PG/PC Interface" communication program.**
- 3. Close the configuration program with the "OK" button.**

Result: The module is now set up for PG mode.

Note

Remember that by clicking on a module to make settings, it is possible to change the assignment. If you have accidentally changed an assignment, make sure you correct it again.

Setting communication parameters - extra information

Prior to operation, the following communications parameters must be set:

- For PROFIBUS modules (for example, CP 5613, CP 5511, CP 5611, CP 5512):
 - Programming device / PC is the only master on the bus
 - Address
 - Transmission rate
 - Profile (depending on application: DP for the DP protocol, otherwise the fast setting "Standard" or the safe setting "Universal")
- For CP 1613 TCP:
The IP address, subnet mask, and gateway address in the "Ethernet (MAC) and IP Addresses" tab
- For SOFTNET TCP (for example CP 1512, CP 1612):
The IP address, subnet mask and gateway address must be set. You can do this directly in the Windows Control Panel in "Network" or here using the "Network Properties" button in the "TCP/IP Network" tab.

For CP 1613 ISO and SOFTNET ISO it is not normally necessary to make any communication parameter settings.

Please note that you can also use diagnostics functions by clicking the "Diagnostics" button in the start dialog of "Set PG/PC Interface".

2.2.2 Configuration for PG mode - HMI stations

You configure a module using the "Set PG/PC Interface" tool.

Note

You can also create the configuration using the "Communication Settings" tool.

When configuring for PG mode, we recommend that you use the "Set PG/PC interface" tool.

Initially the procedure is identical to configuration for PG mode - programming device (PG/PC) as described in the section "Configuration for PG mode - programming device (PG/PC) (Page 44)".

The communications module remains in "PG mode"; it is then configured so that applications can communicate over communication interfaces without further connection configuration in the project engineering.

The applications access the communications module using access points. If new access points need to be entered, this can also be done with the "Set PG/PC Interface" tool.

Finally, you use the OPC Scout V10 to assign the required items and connection parameters to the user program.

Setting access points

Follow the steps below:

You start in the same way as described for commissioning for PG mode in the previous section.

1. Start the configuration program from the Windows Start menu:
Start menu "Start" > "..." > "SIMATIC NET" > "Set PG/PC Interface".

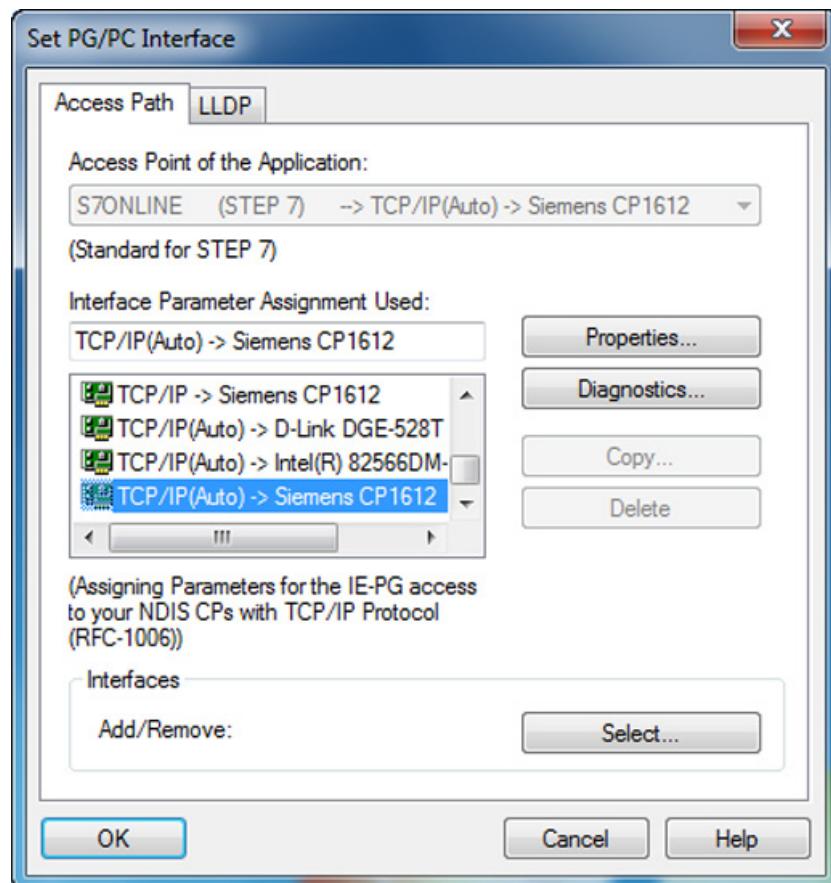
As an alternative you can also start it from the Control Panel:
Start menu "Start" > "Settings" > "Control Panel" > "Set PG/PC interface".

2. Assign the access point suitable for your application to the module.

Note:

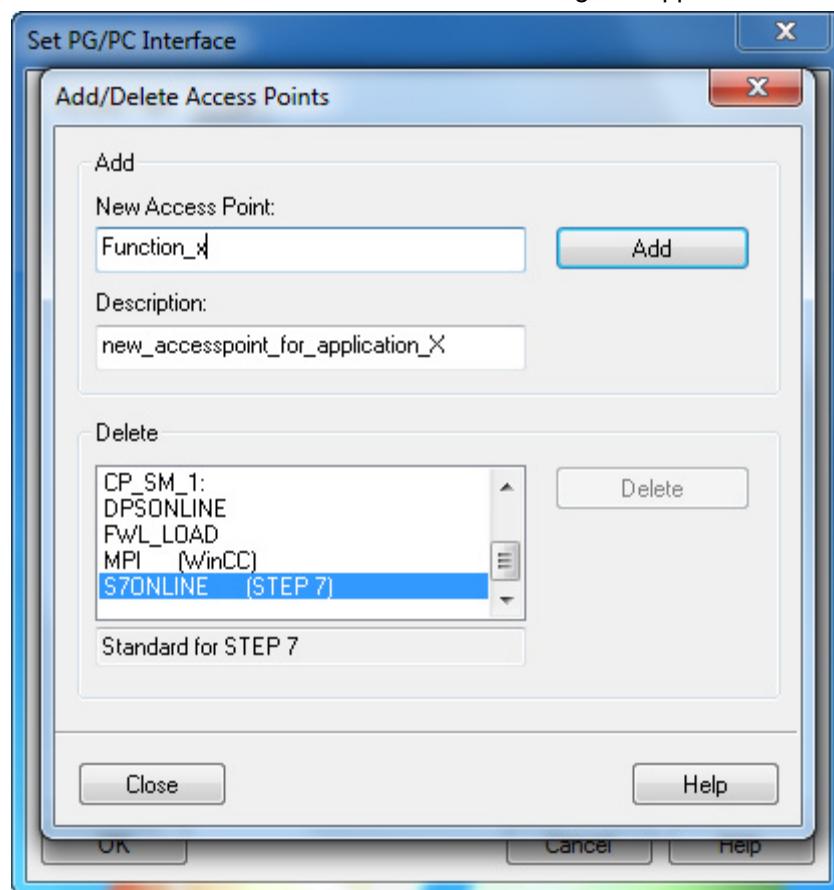
You can generally also select the "S7ONLINE" access point here.
Select the access point in the "Access Point of the Application" list box. off.

Reaction: The current assignment appears in the "Interface Parameter Assignment Used" list box.

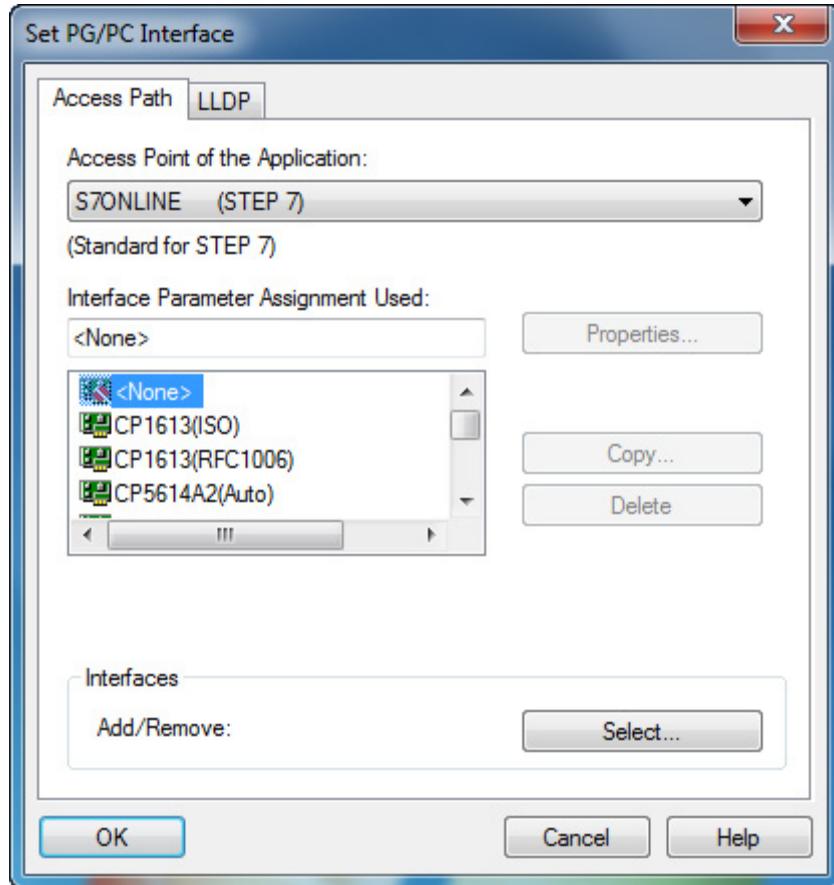


3. If the suitable access point for your application is not present, select the "Add/Remove" entry.

Reaction: The "Add/Delete Access Points" dialog box appears.



4. Confirm your entries.



As an alternative, you can also specify new access points in the "Communication Settings" tool. For more detailed information, see section "Configuration for PG mode - programming device (PG/PC) (Page 44)".

5. In the "Interface Parameter Assignment Used" list box (or "Assigned Interface Parameter Assignment"), select the required entry.

Some modules offer alternatives, for example the CP 1613 or CP 5613/CP 5614.

Example with the CP 1613:

- If you use the TCP protocol: "CP1613(RFC1006)"
- If you use the ISO protocol: "CP1613(ISO)"

Example with the CP 5613 / CP 5614:

- Normal situation: "CP5613_5614 (PROFIBUS)"
- On an MPI chain: "CP5613_5614 (MPI)"

For further details on setting access points, refer to the section ""Communication Settings" configuration program (Page 269)".

6. Set the required communication parameters.

For details of the module-dependent settings, refer to the previous section "Configuration for PG mode - programming device (PG/PC) (Page 44)".

7. When you close the settings window, you return to the start dialog of the "Set PG/PC Interface" configuration program.
8. Close the configuration program with the "OK" button.

Note

Remember that by clicking on a module to make settings, it is possible to change the assignment. If you have accidentally changed an assignment, make sure you correct it again.

2.3 Using additional functions - points to note

2.3.1 Checking the configuration and diagnostics

The "Communication Settings" tool is a central tool for access to the components and data of the PC station during the following tasks:

- Commissioning and operation
- Editing the configuration
- Diagnostics

For more detailed information on the available functions, refer to the description in the section ""Communication Settings" configuration program (Page 269)".

2.3.2 Testing with OPC Scout V10

If you use one of the OPC interfaces, Data Access or XML Data Access, in other words, you have used the OPC server in the project engineering, you can check the functionality of your communications system as the last step.

You have access to all process variables that you can reach via the configured protocols and connections:

- With the OPC Scout V10 via the OPC server
For more detailed information on the available functions, refer to the description in the section "OPC Scout V10 (Page 349)".
- With the OPC Scout V10 via the OPC XML DA server (among other things)
(available as of CD "SIMATIC NET PC Software, Edition 2008")
For a detailed description of the available functions, refer to the integrated online help.

2.3.2.1 Detecting errors in communication with the OPC Scout V10

Introduction

The OPC Scout V10 shows you the status of the communication connections. To do this, it makes use of the properties of the process variables or uses information variables. You can then recognize when a partner device is not accessible.

Errors when connecting with the OPC server

- The locally installed OPC server cannot be started.

Possible causes for this are as follows:

- The PC station is currently receiving a new configuration.
- By installing an OPC server of another manufacturer that has not kept to the guidelines laid down by the OPC Foundation common files have been corrupted.

- The remote OPC Server is not accessible.

This can occur when using DCOM and can have various causes:

- The network connection is down.
- The DCOM configuration of the local and remote server is not correct.
- The remote server is not correctly installed or configured.

- The firewall settings have not been made or have been made incorrectly.

Use the "Communication Settings" program for this.
"Communication Settings" > "..." > "Security".

Errors when adding variables

- Variable cannot be added

Adding some or all variables is denied in the Navigator of the OPC Scout V10. Possible causes for this are as follows:

- The variable name entered does not have the correct syntax.
- When using symbolic variables: The symbol file does not match the configuration.
- Access rights for the variables are restricted: Neither read nor write permissions.

- A protocol or connections are not visible

No protocols are visible in the lefthand window of the navigator or protocols or connections are missing. Possible causes for this are as follows:

- Some of the required connections were not created during configuration in the project engineering.
- A module configured in the project engineering does not exist or was not correctly initialized.
- The configuration data created in the project engineering has not yet been transferred or transfer was unsuccessful.
- The relevant protocol was not selected in the OPC protocol selection.

Checking the status of process variables

- Quality of the variables is "bad"

In the table view of the process variables, the value "bad" is entered for some or all variables in the "Quality" column. Possible reasons for this are as follows:

- The network connection to the partner device is down.
 - The partner device is not configured in the project engineering.
 - The bus parameters of the PC station and partner device do not match.
- The value of the information variable for the connections status is "Down"
The information variable has the quality "good", however, the value is not "Up".
These variables are generated by the OPC Server and always have the quality "good".
The possible reasons for the value on the variable identical to those for quality = "bad".

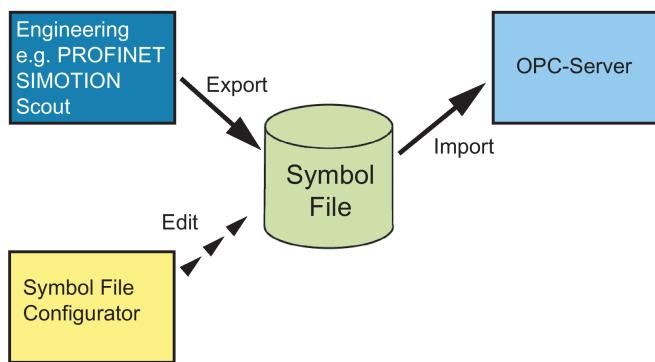
2.3.3 Further functions / special features

2.3.3.1 Adopting the project engineering and symbols from PROFINET iMap and SIMOTION Scout

You can also use the symbols from PROFINET iMap and SIMOTION Scout with the OPC Server. These symbol files include not only the symbols but other project engineering information so that additional connection configuration for the PC station is not necessary.

Adopting the project engineering and symbols

Call the relevant export functions for SIMATIC NET OPC symbol files in the engineering programs PROFINET iMap or SIMOTION Scout. Follow the instructions in the corresponding documentation.



Transfer the created symbol file to your PC station. You can specify the required symbol file in the "Communication Settings" configuration program.

To use the symbols for PROFINET iMap and SIMOTION Scout, you must also select the PC module and with it the subnet via which the PROFINET or SIMOTION partner stations are connected. You make this setting in an extra dialog when selecting the symbol file in "Communication Settings".

You can check the selected module with the "Communication Settings" program using the "Access points" function:

- Fixed access point SIMOTION CP_SM_1: e.g. "CP_SM_1:" > "CP5613(PROFIBUS)"
- Fixed access point PROFINET CP_PN_1: e.g. "CP_PN_1:" > "CP1613(RFC1006)"

For further information on PROFINET and SIMOTION, please refer to the documentation of the PROFINET iMap or SIMOTION Scout engineering programs.

2.3.3.2 Configuring access points for STEP 7 and STEP 5

How access points are used

Many user programs require an "access point" to be specified to allow an assignment to the communications module.

The access point is a symbolic name with which the user program can access the assigned communication interface / module.

Applications that handle communication over connections configured in the project engineering do not require the access points described here.

For example, for local PG mode, STEP 7 works with the access point "S7ONLINE", whereas STEP 5 uses the access point "CP_H1_1:" for Industrial Ethernet and the access point "CP_L2_1:" for PROFIBUS.

By reconfiguring an access point, you can for example, control the interface over which STEP 7 communicates.

Tools

In the description of the steps "Configuration for PG mode - programming device (PG/PC) / HMI stations", we showed you how to specify and assign access points using the Set PG/PC Interface tool.

The following section describes how you can manage access points with the "Communication Settings" tool (see also ""Communication Settings" configuration program (Page 269)).

Viewing and setting access points

Follow the steps outlined below to display the existing access points (Steps 1 and 2) and to create a new access point (Steps 3 and 4):

Follow the steps below:

1. Start the "Communication Settings" program
Start menu "Start" > "..." > "SIMATIC NET" > "Communication Settings".
2. In the navigation area, go to the branch "SIMATIC NET Configuration" > "Access points".
3. After rightclicking on the branch end "Access points", select the menu "New" > "New access point" > "New Access Point" dialog.
4. Enter the name of the new access point.

Changing an access point

The access point is assigned to the network card using the "Communication Settings" program.

Follow the steps outlined below to assign an access point to a network card.

Follow the steps below:

1. Start the "Communication Settings" program
Start menu "Start" > "..." > "SIMATIC NET" > "Communication Settings".
2. In the navigation area, select the "Access points" branch under "SIMATIC NET Configuration".
3. Doubleclick on the required access point in the righthand list box, for example, "S7ONLINE".
Reaction: The "Properties of S7ONLINE" dialog box opens.
4. Select the interface over which you want to communicate in the "Associated interface parameter assignment" list box and click "OK".

2.3.3.3 Points to note with SOFTNET Industrial Ethernet modules

Introduction

Modules operated with the "SOFTNET Industrial Ethernet" software product are integrated in Windows just like a standard network adapter but with additional protocols. The station parameters for such modules can only be set with the standard mechanisms of Windows.

Parameter

The parameters to be set with Windows mechanisms are as follows:

- IP address
- Subnet mask
- Gateway address

Even when changing the station parameters during the initial configuration, the Windows configuration program must be used. During the initial configuration, you are prompted to start this tool.

Transferring the project engineering data

Note

Make sure that the network parameters of the PC station match the information entered in the configuration in your project. If this is not the case, it is not possible to establish connections.

When a configuration is transferred from the project engineering system to a PC station and the transferred configuration contains different network parameters from those configured locally on the PC station, a warning is displayed. In this case, you will need to adapt the project engineering configuration in your project or set the local parameters according to the project engineering configuration.

2.4 Configuring the OPC server

OPC server

With the SIMATIC NET OPC Server described here, SIMATIC NET offers you a convenient tool with which your PC applications can write and read process data and receive notification of process events.

By creating a project engineering database, you can specify the behavior of the OPC Server. You then download the project engineering data to the PC station with NCM PC.

This chapter describes the options available to you when creating the project engineering data for the OPC server with the NCM PC project engineering tool.

- Using default settings or project engineering parameters

The parameters you can set with NCM PC all have default settings so that in most cases problemfree communication is possible.

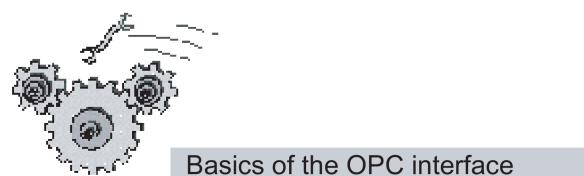
This chapter is only relevant for you if you want to change settings.

Where to find further information

- Using the interface to the OPC server in PC applications.

How you address the OPC Server in your PC application and how the PC application reacts to the behavior of the OPC server is not described in this documentation.

For more information on this topic, please read the detailed OPC documentation provided by SIMATIC NET /1/. You will find information on the basic aspects of OPC indicated by the graphic shown below:



2.4.1 Significance of project engineering

The OPC server application type

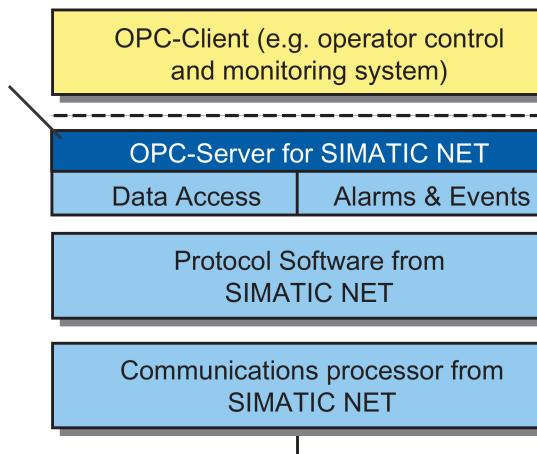
The OPC server can be configured as an interface to all available communication protocols. You can create this object only once in a PC station.

You can then use this OPC server for communication from user programs (OPC clients).

What can be configured?

You can configure the following:

- Protocol and service-dependent properties
- Properties for specific connections



Standard situation: Using the default settings

In the simplest case (in other words, the standard situation), you simply need to create the OPC Server in the PC station. You must also create the communications modules used in the PC station and configure the communication connections.

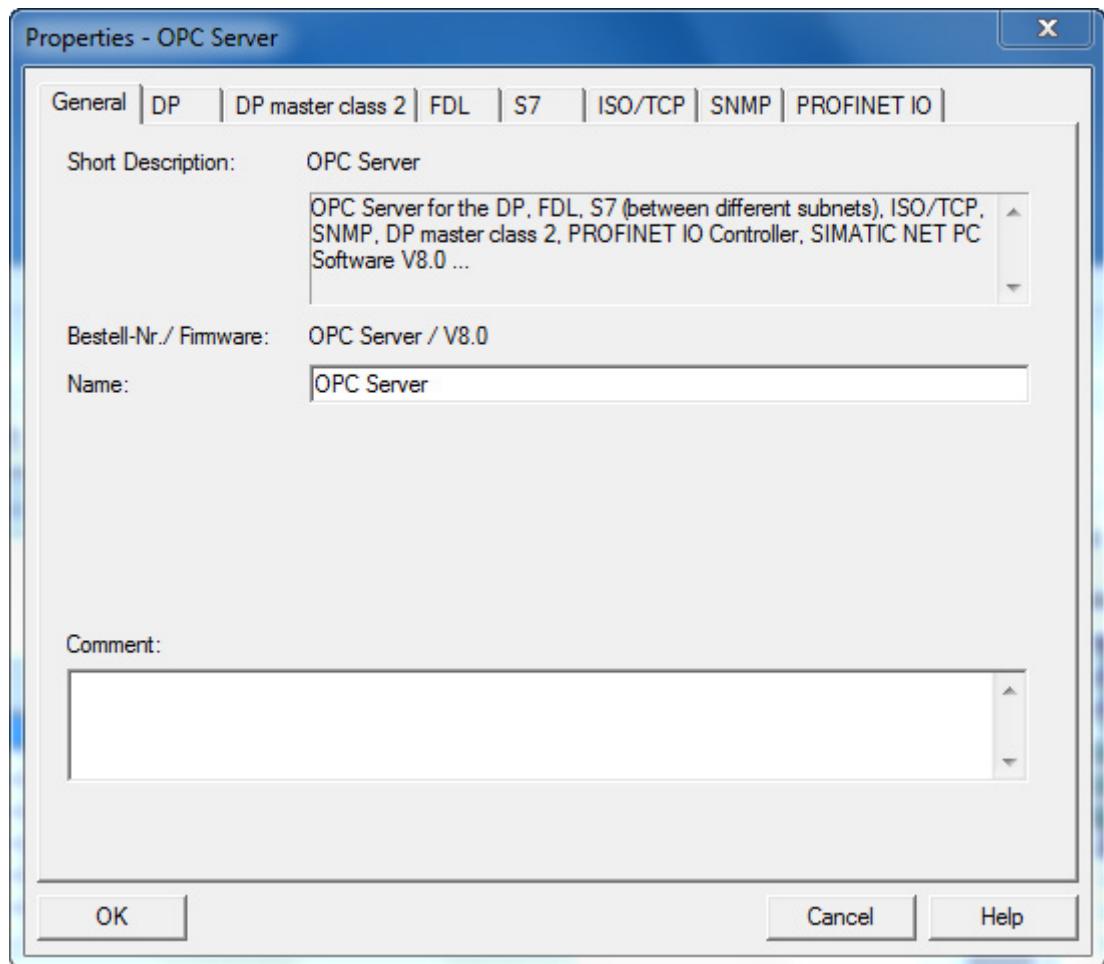
This is described in detail in the section "SIMATIC NCM PC project engineering tool (Page 203)".

Using default settings or project engineering parameters

The parameters you can set with NCM PC all have default settings so that in most cases problemfree communication is possible.

2.4.2 Configuring the properties of the OPC server

To check the properties of the OPC Server or to modify parameters, open the Properties dialog of the OPC server object in STEP 7 / NCM PC.



The "General" tab contains the formal parameters for identifying the OPC Server and in the other tabs, you can make parameter settings for the OPC server related to the specific protocols.

These parameters are independent of the communication connections of a DP master system that you configure separately in project engineering.

The table below provides you with an overview of the possible parameter settings depending on the protocol or service type.

Parameter / function	Possible settings / significance	Can be set for a specific protocol ...							
		DP	FDL	S7	ISO/TCP	DP class 2	PROFINET	PROFINET IO	SNMP
Scan cycle time	Here, you make the settings to control updating by the OPC Server. The scan cycle time decides how often the OPC server updates the values the OPC items.	x	x	x	x	x	x	x	x
Access protection	You can specify the access rights to individual variables or variable groups for each specific protocol. You can, for example, prevent variables calculated internally by the controller from being overwritten. As default, no access protection is activated.	x	x	x	x	x	x	x	x
VFD	VFD (Virtual Field Device) is the neutral description of a device used in FMS. Communication connections (FMS connections) are then configured for the VFDs in project engineering. Here, you inform the OPC server of the required VFDs. During project engineering, you then assign the VFD to the FMS connection. When accessing variables in the PC application, you also reference the VFD. Extra function: Creating the object dictionary Here, you can also create the object dictionary (OD) belonging to a VFD. The FMS variables (name and structure) are defined in the object dictionary.								
Connection parameters	Here, you can make the communication settings for services that do not require specific connections to be configured in project engineering.			x					
Segmentation	Special settings for providing the data buffers independent of specific connections.				x				
Use symbols	The symbols of the STEP 7 project are used for the OPC server.			x					

Please note that the parameters are described in detail in the online help for each individual dialog in NCM PC.

2.4.3 Specifying connection properties for the OPC server in project engineering

If you use OPC, communication connections are established and managed by the OPC Server. As a result, you create the communication connections only for the "OPC Server" application.

How to create a connection for PC applications is described in the section "Creating a PROFINET IO system (Page 217)".

If a connection is created for the OPC Server, the properties dialog for the connection includes an additional tab, "OPC - Properties".

The dialogs shown below for the various protocols provide you with an overview of the possible settings; in these examples, the parameters have their default settings.

Please note that the parameters are described in detail in the online help for each individual dialog in NCM PC.

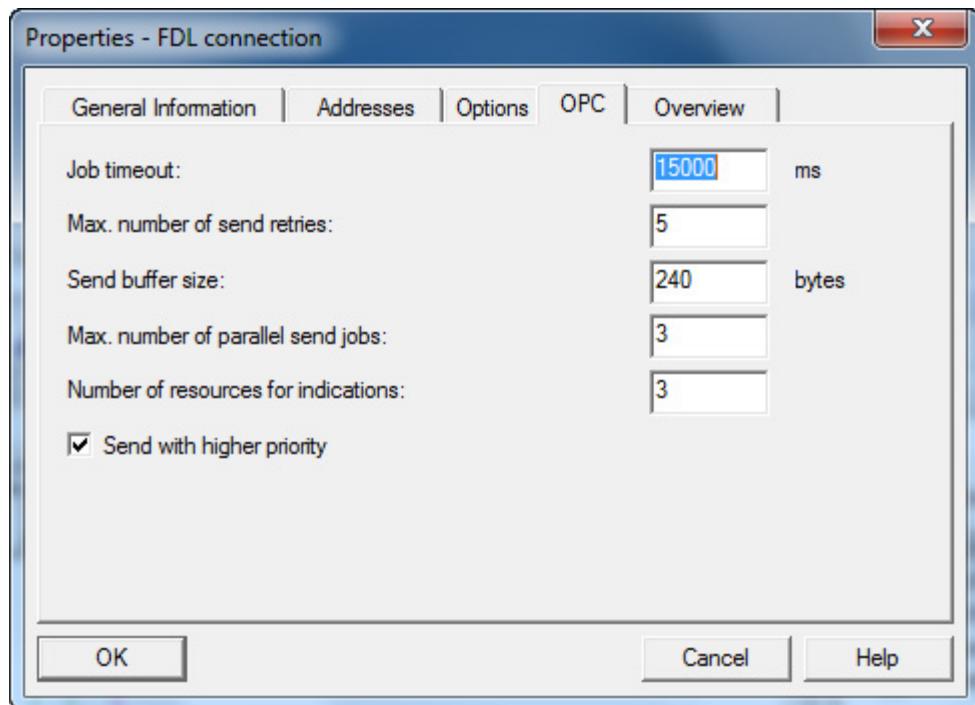
Note

Changes to the default parameter settings should only be made by specialists. Changes can lead to unexpected situations and cause major system disruption.

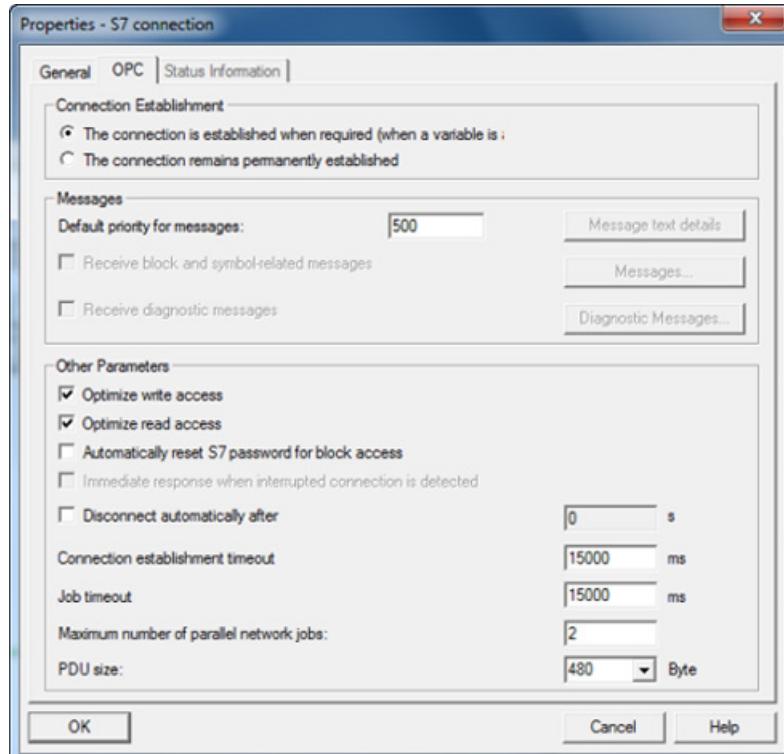
After changing parameters, they must be downloaded or exported and the import of an XDB started.

Connections

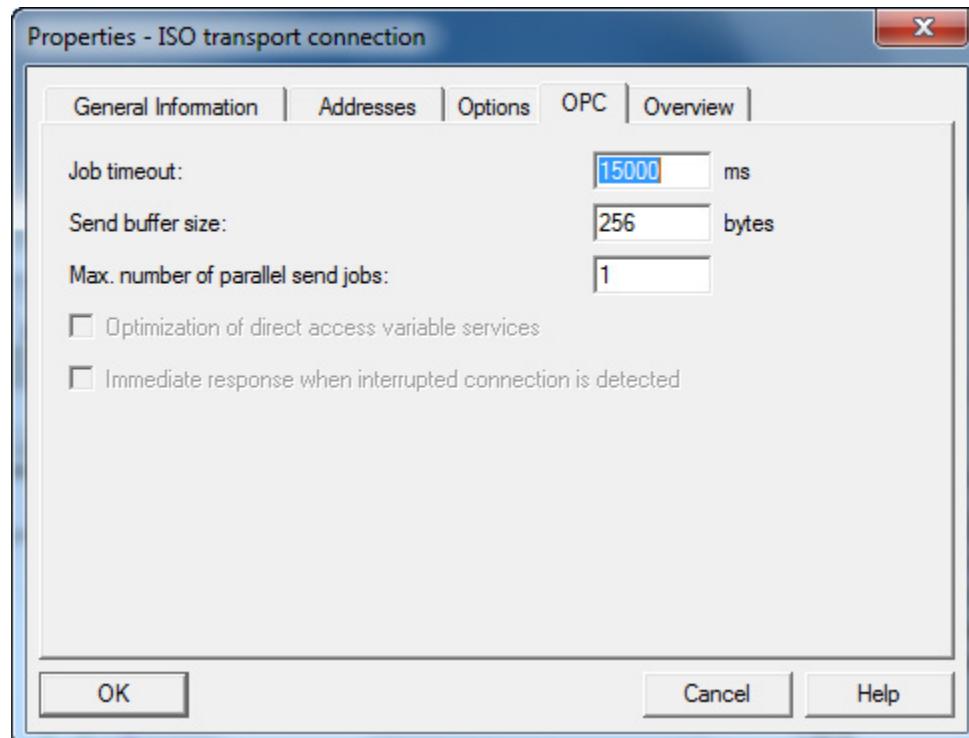
- FDL connection (SEND/RECEIVE interface)



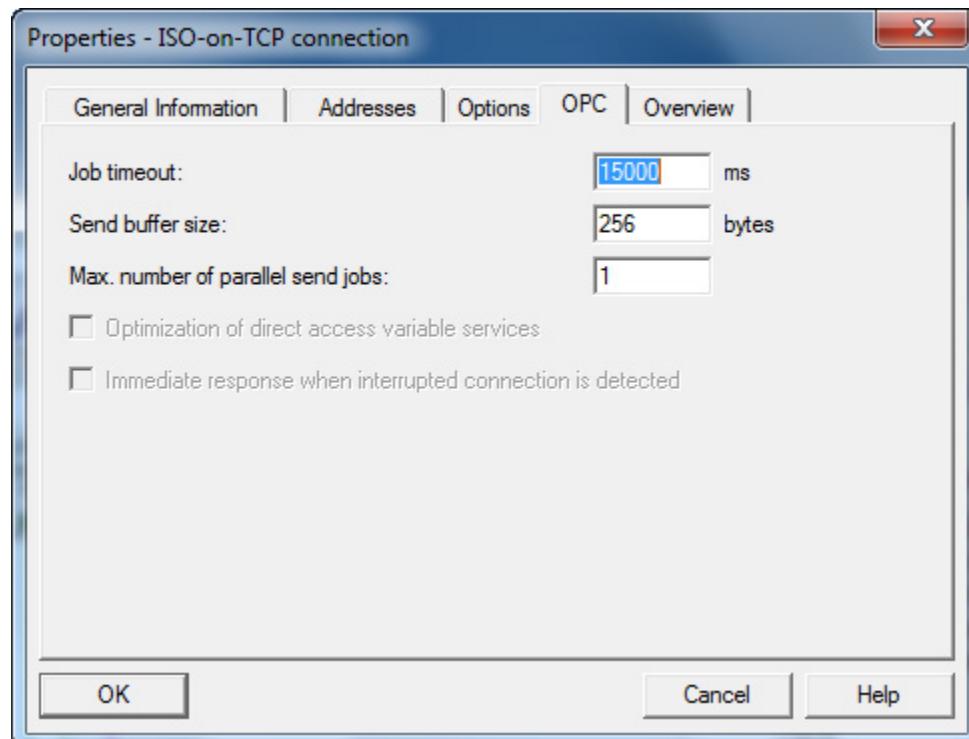
- S7 connection (S7 communication)



- ISO transport connection (SEND/RECEIVE interface)



- ISO-on-TCP connection (SEND/RECEIVE interface)



2.4.4

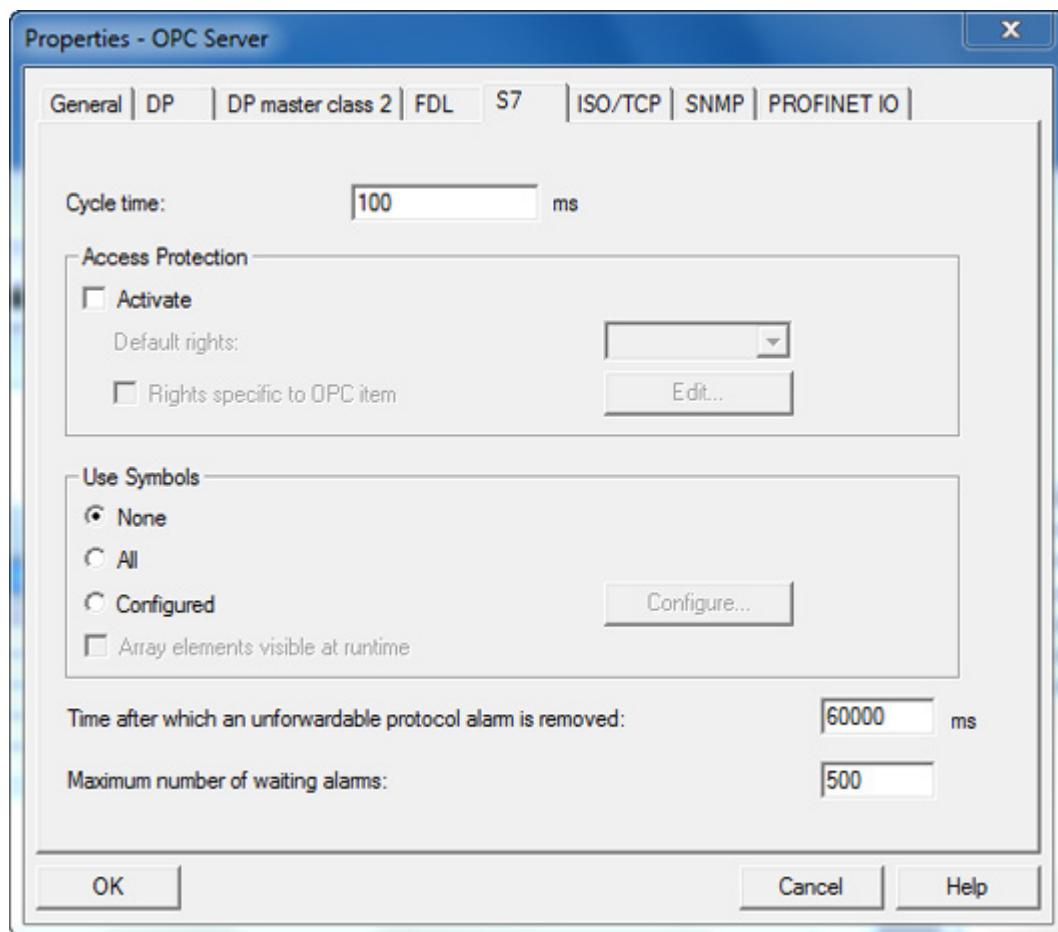
Using symbols for S7 connections

Symbol tables are created during project engineering with STEP 7 on a central engineering station in the form of "ATI" files.

You can continue to use the symbol definitions specified in the STEP 7 configuration in OPC. This is necessary if user applications (OPC clients) are to access symbolic variables via the OPC server.

The symbol tables used are those of the CPUs for which S7 connections are planned for the OPC server. The symbols in the symbol table, that relate, for example, to data blocks (DB), inputs and outputs are taken into account.

In the "S7" tab of the properties dialog of the OPC server, you can specify which STEP 7 symbols you want to use on the OPC server.



2.4.5 Configuring OPC properties for SNMP in project engineering

2.4.5.1 Significance in SIMATIC NET

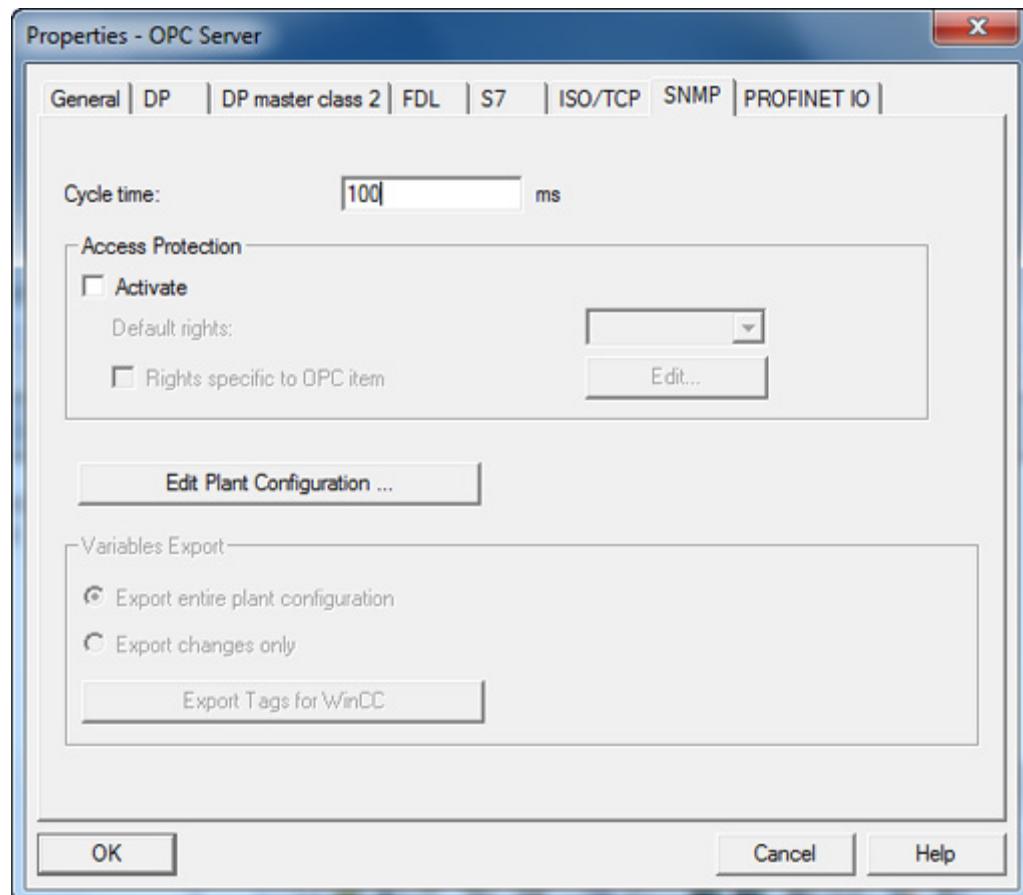
You configure the OPC server as SNMP client in the "SNMP" tab. Here, you specify the protocol properties for SNMP for the transfer and a node list for the SNMP queries.

Note

For more detailed information on the use of SNMP over the OPC Server, refer to the documentation on OPC /I or the Quick Start in the section "SNMP communication with OPC (Page 177)".

You will also find valuable information on the Internet at:

SNMP OPC server: (<http://www.automation.siemens.com/mcms/industrial-communication/en/ie/software/network-management/snmp-opc-server/Pages/snmp-opc-server.aspx>)



Using the "Edit Plant Configuration" button, you obtain a list with all the devices registered with the OPC server.

You can add others to this list or edit the parameters of the entered devices.

Device profiles on the SIMATIC NET Software CD

Device profiles are available for the following modules on the SIMATIC NET Software CD:

- CP 1613 → "MIBII_V10.txt" (supports only MIBII objects)
- OSM → "Profil_OSM_V10.txt"
- ELS → "Profil_ELS_TP40_V10.txt"

You will find these files in the following folder:

"<installationdrive>\Program Files\Siemens\simatic.ncm\S7data\SNMP\Profile"

Note

You should also refer to the detailed parameter description in the online help on the dialog in STEP 7/NCM PC.

2.4.5.2 SNMP traps

Introduction

Traps are messages that can be sent to the OPC server without it requesting them. There are seven generic traps available on every SNMP-compliant device. There are also device-specific traps that are described in the MIB file.

Generic traps

Parameter	Meaning
warmStart	This is sent after a warm restart on the device.
coldStart	This is sent after a cold restart on the device.
linkDown	This is sent when a connection from the device was terminated.
linkUp	This is sent when a connection from the device was established.
authenticationFailure	This is sent when there was unauthorized access to the device.
egpNeighborLoss	The EGP neighbor (EGP = Exterior Gateway Protocol) of the device is not operational. The Exterior Gateway Protocol is used to exchange routing information between two neighboring gateway hosts.
enterpriseSpecific	This is sent when a device-specific trap was sent.

2.5 Using the CP 1616 as a PROFINET IO controller / IO device / IO router

Note

As of STEP 7 V5.3 SP3, the CP 1616 is part of the hardware library.

If you want to operate the CP 1616 with an earlier version of STEP 7, you can install an HSP update.

You will find information on this in the online help of STEP 7 under the keyword "Hardware update".

Note

No simultaneous operation

Use of a "CP 1616" PCI module or a PCI-104 CP 1604 module alongside a CP 1616 onboard communications processor of the Microbox 427 B / 427 C does not work.

Introduction

The CP 1616 communications processor is a PCI module for connecting PCs or SIMATIC PGs/PCs to PROFINET IO.

Its essential characteristics are:

- Optimized for PROFINET IO
- With Ethernet realtime ASIC ERTEC 400
- 4 x RJ45 ports
- Integrated 4port realtime switch
(If used with an external power supply, the integrated realtime switch can also operate when the PC is turned off.)
- Relieves the PC due to event mechanisms
(automatic detection of data changes)
- Automatic hardware detection is supported.
- Extensive diagnostics options

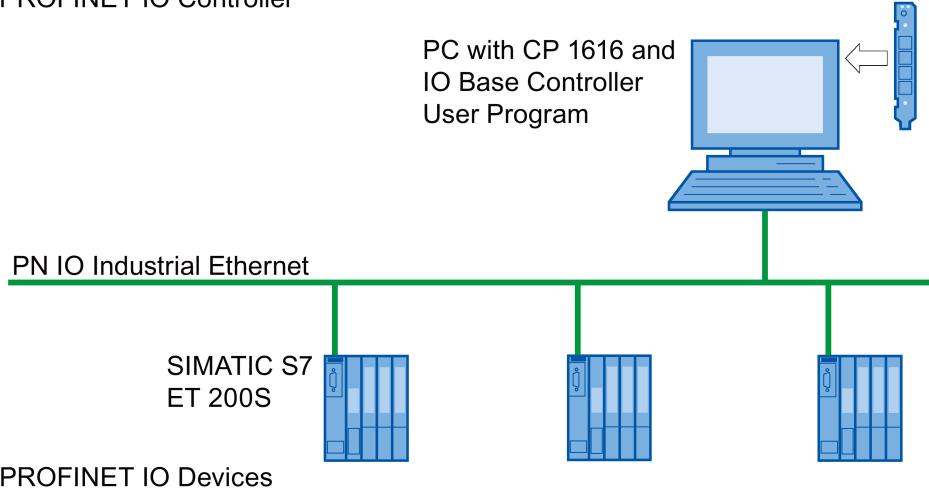
The chapter describes the configuration of the CP 1616 for the following four use cases:

- IO controller
- IO device
- Use as IO controller and IO device at the same time
- IO router

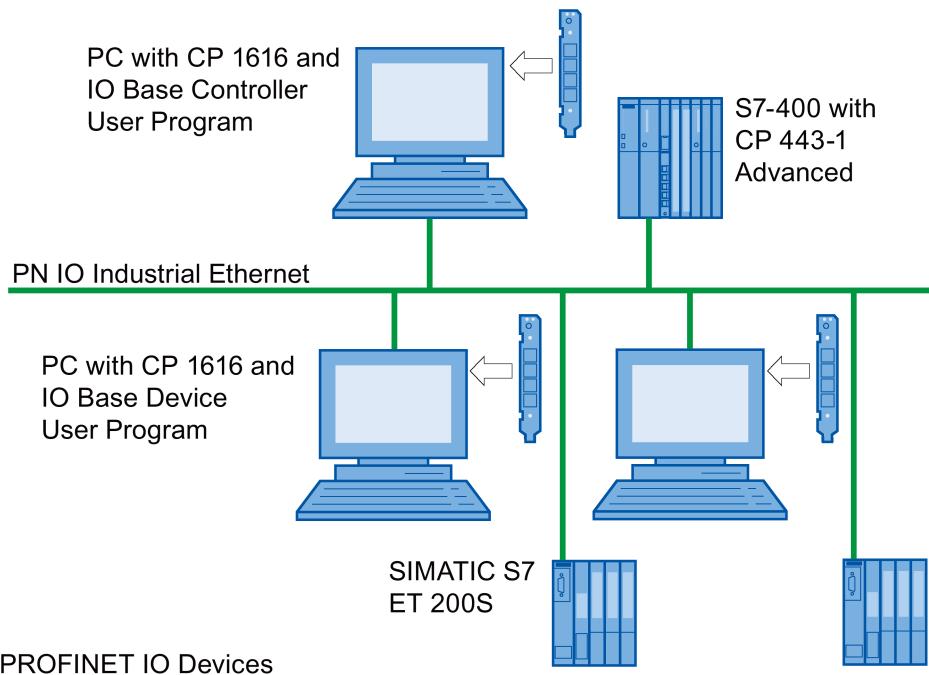
CP 1616 as IO controller

A PC communicates over Industrial Ethernet with PROFINET IO devices.

In the following example, the user program runs on the PC. Data traffic is handled over the CP 1616 with several SIMATIC S7 PROFINET IO devices (for example the ET 200S) over Industrial Ethernet.

PROFINET IO Controller**CP 1616 as IO device**

In this example, the IO Base device user program runs on a PC with a CP 1616 installed in it. The data exchange with the controller is handled over the CP 1616 and Industrial Ethernet.

PROFINET IO Controller

2.5.1 Initialize CP 1616 (IP address and device name)

When a CP 1616 communications processor ships, only the MAC addresses are set up. If you require an IP address and a PROFINET IO name for your application, you will have to set these manually. This is known as "node initialization of the CP 1616".

Assigning the IP address

Follow the steps below:

1. Open the SIMATIC Manager.
2. Select the menu command "PLC" > "Edit Ethernet Node".
Reaction: The "Edit Ethernet Node" menu opens.
3. Click on "Browse" under "Nodes accessible online" and select the CP 1616 named "S7-PC".
4. In the "Set IP configuration" area, set the IP address of the CP 1616 and the subnet mask and click "Assign IP Configuration".
The IP address entered here must match the configured address.
5. In the "Assign device name" area, enter the device name of the CP 1616 and click "Assign Name".

The device name entered here must match the configured device name because when the CP 1616 is configured as a device, only the device name is relevant (not the IP address).

Note

If the CP 1616 was configured previously as a controller, you must first run a complete memory reset before the device name can be changed.

Following every complete memory reset, the CP must be restarted (from STEP 7) otherwise device mode is not possible!

Note

When loading the firmware or commissioning the module, please remember that the CP 1616 has two MAC addresses (always consecutive).

The first address printed on the module is used for layer 2 communication, the second for the PROFINET protocol (the first address plus one).

Example:

The address "08.00.06.93.DA.76" printed on the communications processor is the address for layer 2 communication. This means that "08.00.06.93.DA.77" is the MAC address for Ethernet/PROFINET communication.

2.5.2 Configuring the CP 1616

2.5.2.1 Using the CP 1616 as a PROFINET IO controller

Note

Remember the version!

In the procedure described below, for example, the CP 1616 Version 1.0 (V1.0) is used.

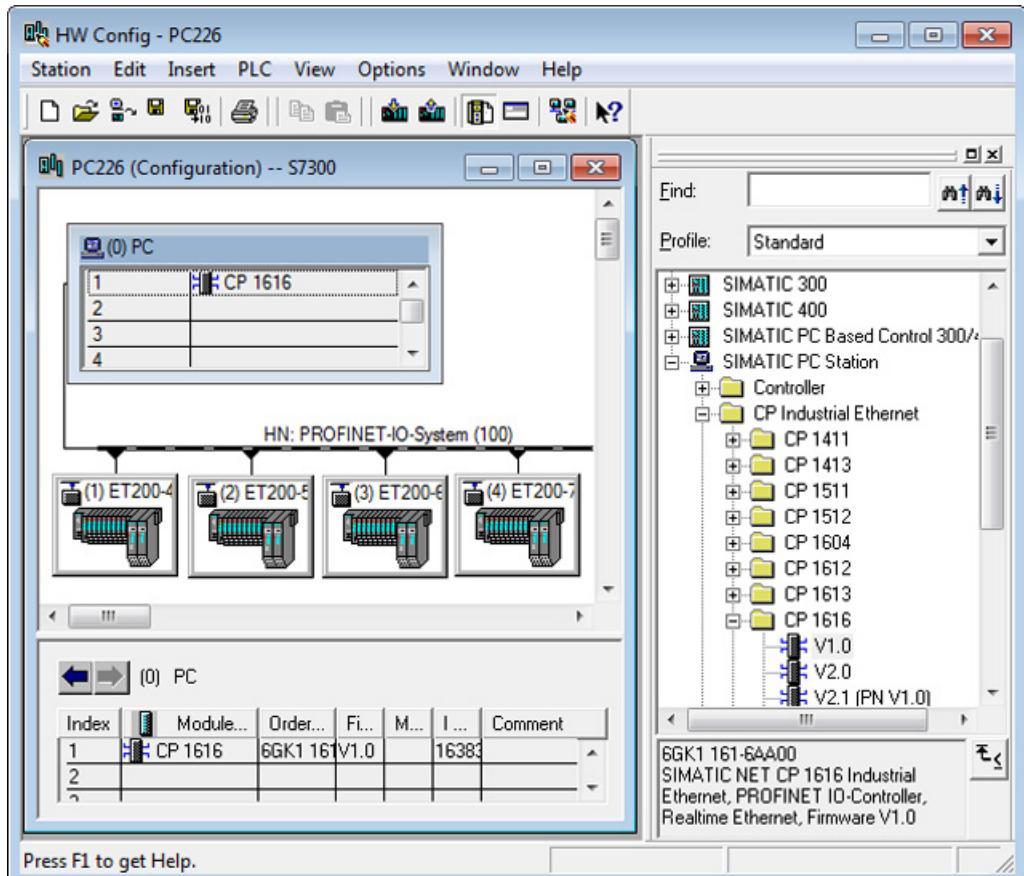
Follow the steps below:

1. Create a new project in the SIMATIC Manager with the "File" > "New" menu command.
2. Using the "Insert" > "Station" > "SIMATIC PC Station" menu command, insert a PC station in the project.
3. In HW Config, open the configuration of the PC station in which you want to install the CP 1616.
4. In the hardware catalog ("SIMATIC PC Station" > "CP Industrial Ethernet") select the CP 1616 (V1.0) and position it in slot 1 (index 1) of the PC station.
Confirm with "OK".
5. Select the CP 1616 and then select "Edit" > "Object Properties", to set parameters for the CP 1616.
6. In the "General" tab, click the "Properties..." button.
7. In the "Parameters" tab, you can select the IP address, subnet mask, subnet and gateway.
Then confirm your entries with "OK".
Reaction: You return to the properties dialog of the CP 1616.
8. In the "PROFINET" tab, you set the mode of the CP 1616.
Select only the option "PROFINET IO Controller" for the configuration described above.
Assign a device name.
Then confirm your entries with "OK".

9. Select the CP 1616 and, if necessary, select the "Insert" > "PROFINET IO System" menu command.

Reaction: Following your confirmation, the PROFINET IO system is inserted automatically.

10. Now configure the IO devices in the PROFINET IO system to meet your requirements.



When engineering is completed, (for example, CP 1616 as PROFINET IO controller and ET 200S as PROFINET IO device), the project can be compiled and downloaded (to the PC) with "PLC" > "Download to Module".

2.5.2.2 Using the CP 1616 as a PROFINET IO device

To use the CP 1616 as PROFINET IO device, select (or create) a project containing a PROFINET IO controller, a PROFINET IO system and possibly also IO devices (for example ET 200S).

Note

Remember the version!

In the procedure described below, for example, the CP 1616 Version 1.0 ("V1.0") is used.

Follow the steps below:

1. Open the project in the SIMATIC Manager.
2. Open the configuration (HW Config) of the station containing the PROFINET IO controller.
3. In the hardware catalog ("PROFINET IO" > "I/O" > "SIMATIC PC CP") select the CP 1616 (V1.0) and position it in the network (PROFINET IO system).
Reaction: This configures the CP 1616 (V1.0) as an IO device in the network.
4. Select the CP 1616 and then select "Edit" > "Object Properties".
5. Enter the device name in the "Device name" input box.
6. If the "Assign IP address via IO Controller" option is selected, deselect it..

Result: The CP 1616 is configured in the PC station. This means that the IP address can be assigned during compilation based on the device name.

Note

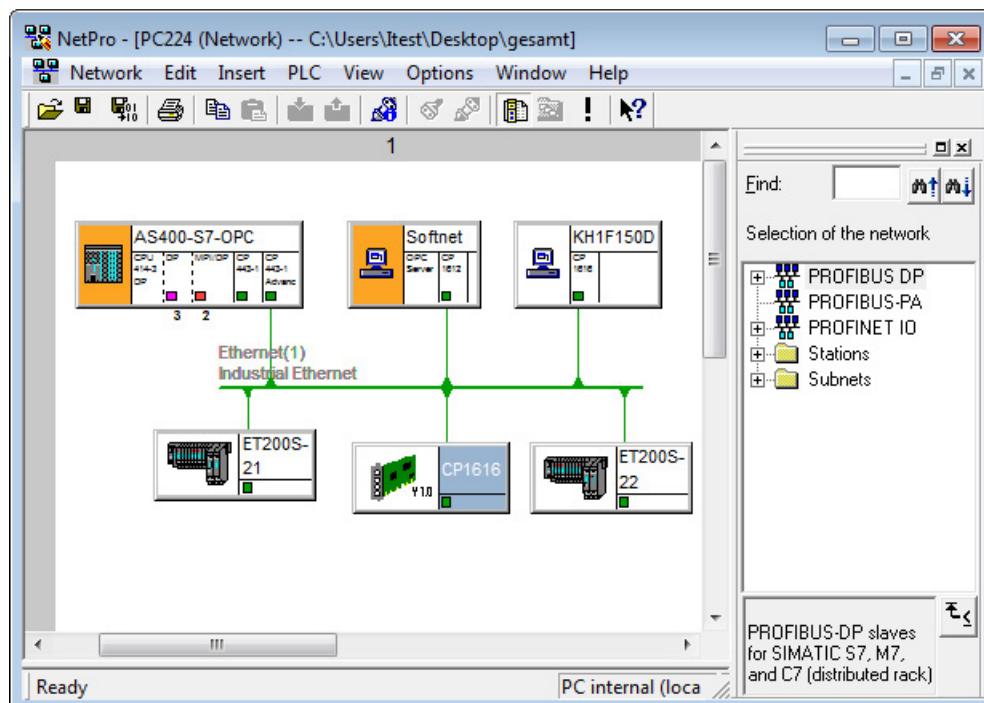
If the CP 1616 was configured previously as an IO controller, you must first run a complete memory reset before the device name can be changed.

Following every complete memory reset, the CP must be restarted (from STEP 7) otherwise IO device mode is not possible!

2.5.2.3 Using the CP 1616 as PROFINET IO controller and IO device

You can also use the CP 1616 as an IO controller and IO device at the same time. This means that the same CP 1616 has the function of an IO controller and an IO device.

The following figure shows such a sample configuration with CP 1616 as IO controller and IO device.



The CP 1616 in the PC station "KH1F150D" is the IO controller, the two ET 200S are IO devices. The same CP 1616 is in the PC station "SOFTNET" IO device of a CP 1612 IO controller.

Note

Remember the version!

In the procedure described below, for example, the CP 1616 Version 1.0 ("V1.0") is used.

Follow the steps below:

1. The CP 1616 is configured as IO controller in the PC station "KH1F150D" as described in the section "Using the CP 1616 as a PROFINET IO controller (Page 70)" (step 1 to 10).
2. Select the CP 1616 and then select "Edit" > "Object Properties".
3. In the "PROFINET" tab, you can set the mode of the CP 1616.
Here, also select the "Enable PROFINET IO device operation" option.
Then confirm your entries with "OK".
4. Create a "SOFTNET" SIMATIC PC station. Insert a CP 1612 and an OPC server in it.

5. Select the CP 1612 and then select "Edit" > "Object Properties".
6. In the "PROFINET" tab, you can set the mode of the CP 1612.

Select the "PROFINET IO Controller" mode. The inserted OPC server is automatically assigned to the CP 1612 as a user application.

Then confirm your entries with "OK". This inserts a PROFINET IO system.

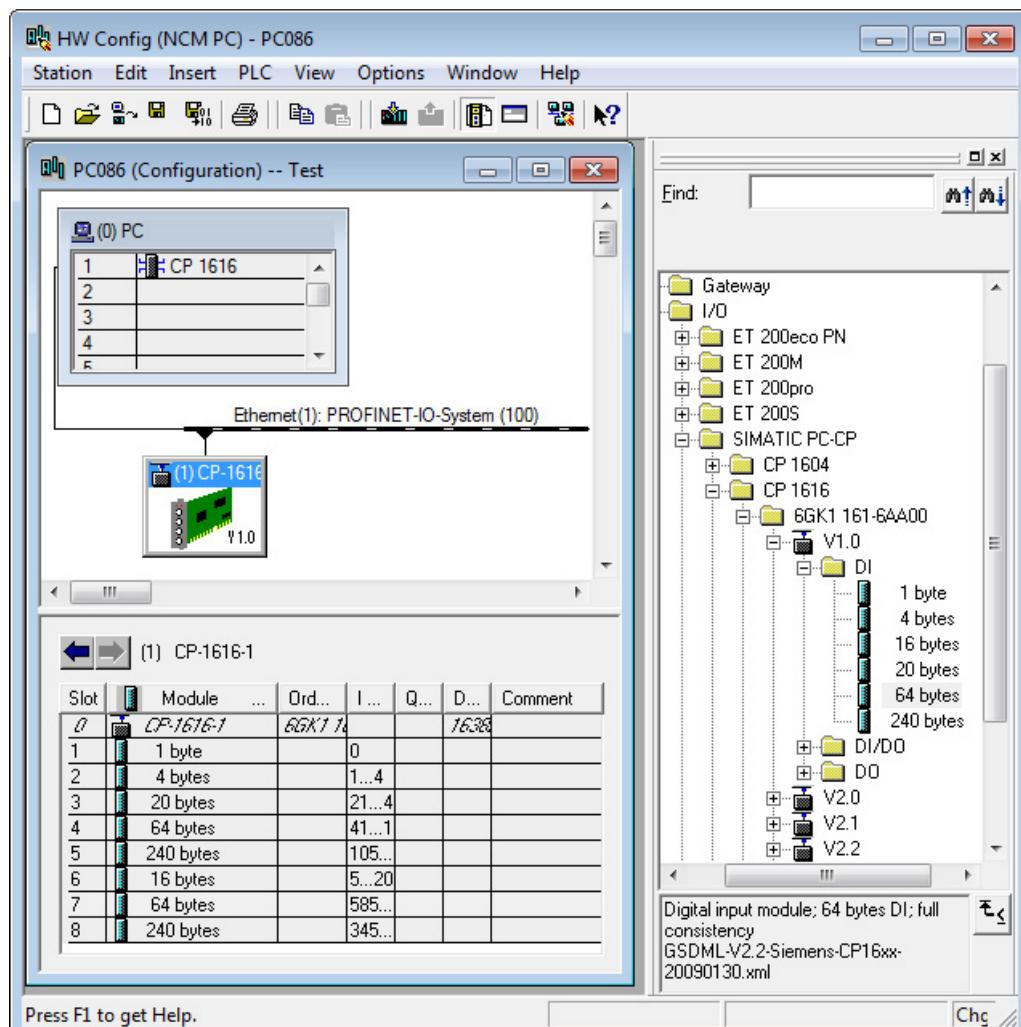
7. With "PROFINET IO" > "I/O" > "SIMATIC PC CP" in the hardware catalog, select the CP 1616 (V1.0) and position it in the network (PROFINET IO system).

Result: This configures the CP 1616 as an IO device in the network.

Note

Readme file

You will find information on the combinations of controller and device one module in the readme file of the DK-16xx product.



8. Select the CP 1616 and then select "Edit" > "Object Properties".
9. Enter the device name in the "Device name" input box.

10. Disable the "Assign IP address via IO Controller" option.

Based on the device name, the IP address of the CP 1616 in PC station "KH1F150D" is then assigned during compilation.

Confirm completion of the assignment in the dialog box with "OK".

11. Open the "KH1F150D" PC station.

Reaction: PC station appears in "HW Config".

12. Couple the device in the "IO Device Coupling" dialog.

Open "Index 1" with the "Object Properties" menu command.

Reaction: The "Properties" dialog box opens.

Click the "IO Device Coupling" button in the "PROFINET" tab.

Reaction: The "IO Device Coupling" dialog box opens.

Click the "Couple" button.

Reaction: The entry in the "Active Coupling" group box changes.

Confirm twice with "OK".

13. Once the configuration is completed, the project can be compiled and downloaded to the two stations, for example with HW Config ("PLC" > "Download to Module").

2.5.2.4 Using the CP 1616 as a PROFINET IO router

Requirements

The following description assumes that you are familiar with the basic functions of the IO router as described in the operating instructions "CP 1616/CP 1604".

Description of the configuration example

Configuration is described below based on two examples.

The automation system "SIMATIC 400" station and the PC station "Router" are involved:

- "SIMATIC 400" station

The "SIMATIC 400" station contains a CP 443-1 as PROFINET IO controller.

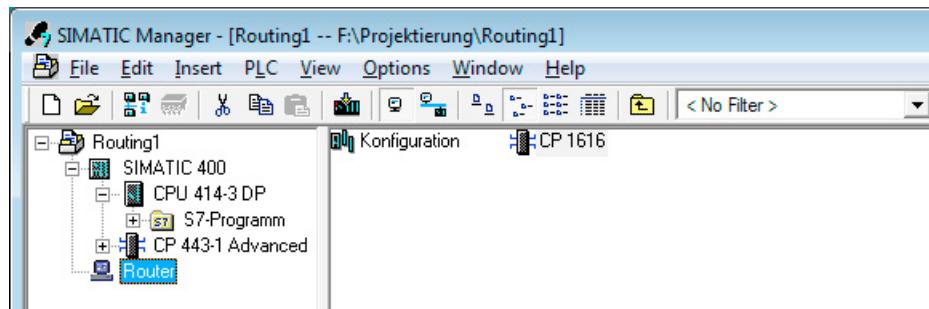
The PROFINET IO system configured for this CP is called IO system for the control level in the following description.

- PC station "router"

The "router" PC station contains a CP 1616 communications processor as IO controller.

The PROFINET IO system configured for this CP is called IO system for the robot level in the following description.

The main feature of the configuration of an IO router is that the CP 1616 communications processor is used both as an IO device in the IO system for the control level and at the same time as an IO controller in the IO system for the robot level.



Outline of the procedure

The following description outlines the procedure for using the CP 1616 as an IO router:

1. Configure the CP 1616 in 2 IO systems:

- In the IO system for the control level as an IO device.
- In the IO system for the robot level as IO controller.

How to do this is described in this manual in the section "Using the CP 1616 as PROFINET IO controller and IO device (Page 73)".

2. Configure the IO router:

- If you want to read input modules, move on to example 1 below.
- If you want to write outputs bit-by-bit, move on to example 2 below.

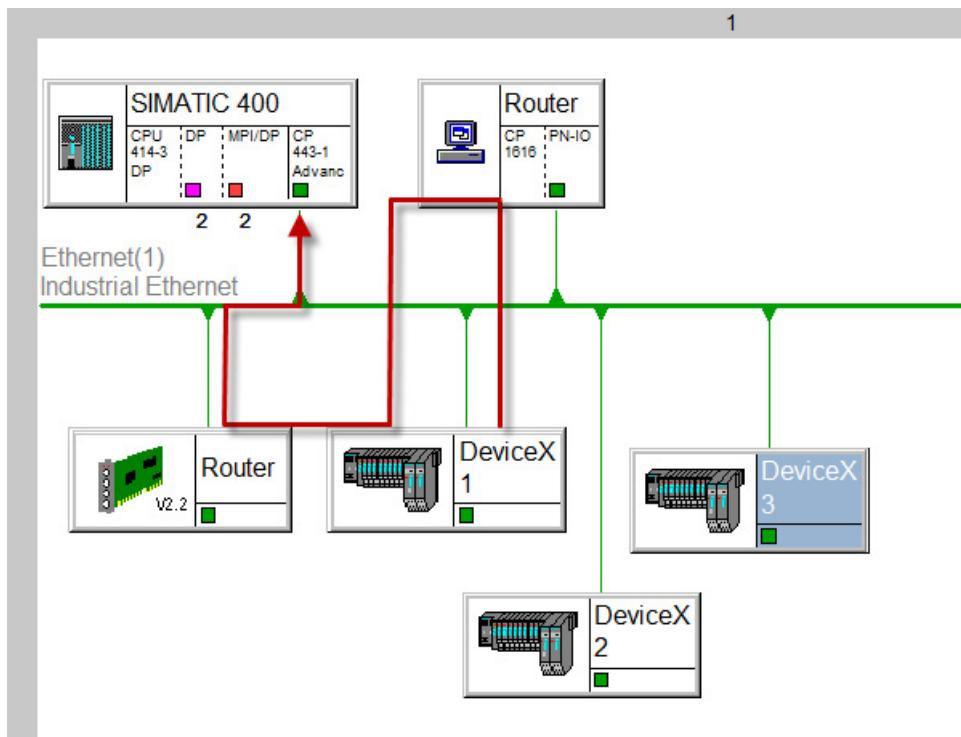
Example 1: Read input module

Example 1 describes the configuration of the IO router ("router"). In the example, the IO router is configured so that the IO controller of the management level ("SIMATIC 400") can read a module of the IO device "DeviceX1" in the IO system for the robot level.

Note

Whenever possible, you should configure bit-oriented writing sparingly. It makes the configuration complicated and increases the likelihood of application errors.

The data path from the IO device "DeviceX1" through the IO router to the "SIMATIC 400" automation system is indicated at the bottom of the schematic by a red arrow (the red arrow simply illustrates the text in this document and is not visible in the original STEP 7 view).



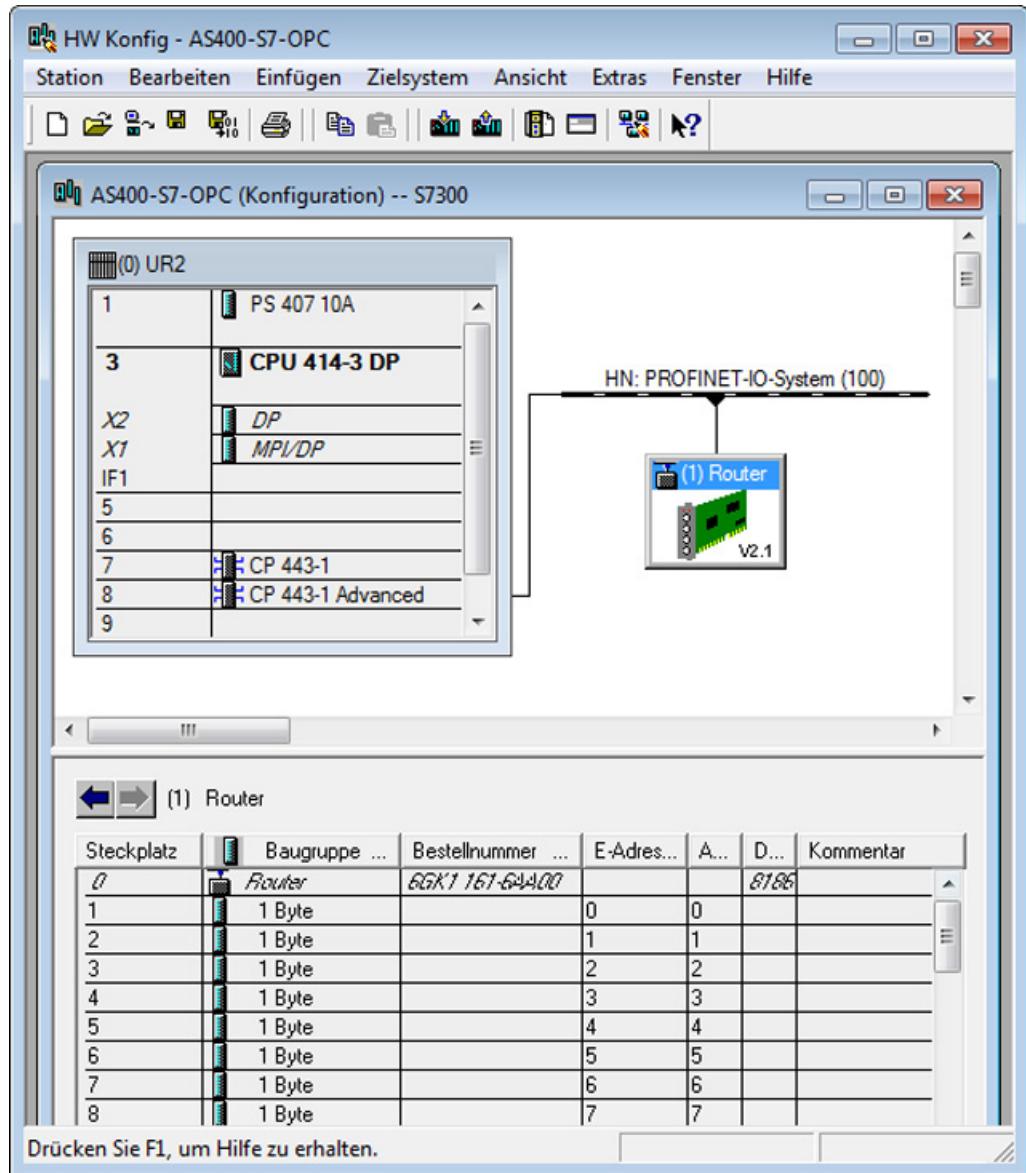
Follow the steps below:

1. Open "HW Config" (for example by double-clicking on the "router" IO device) and the "catalog" (click on the "Catalog" icon in the toolbar at the top).
2. Click on the "(1) Router" IO device.

3. Select the 1 byte DI transfer module and place it on the first slot of the IO device "(1) Router".

Catalog "PROFINET IO" > "I/O" > "SIMATIC PC-CP" > "CP 1616" > "Migration" > "V2.1" > "Transfer module" > "DI" > "1 Byte".

Reaction: The transfer module is given the "I-address" (input address) "0".



Note

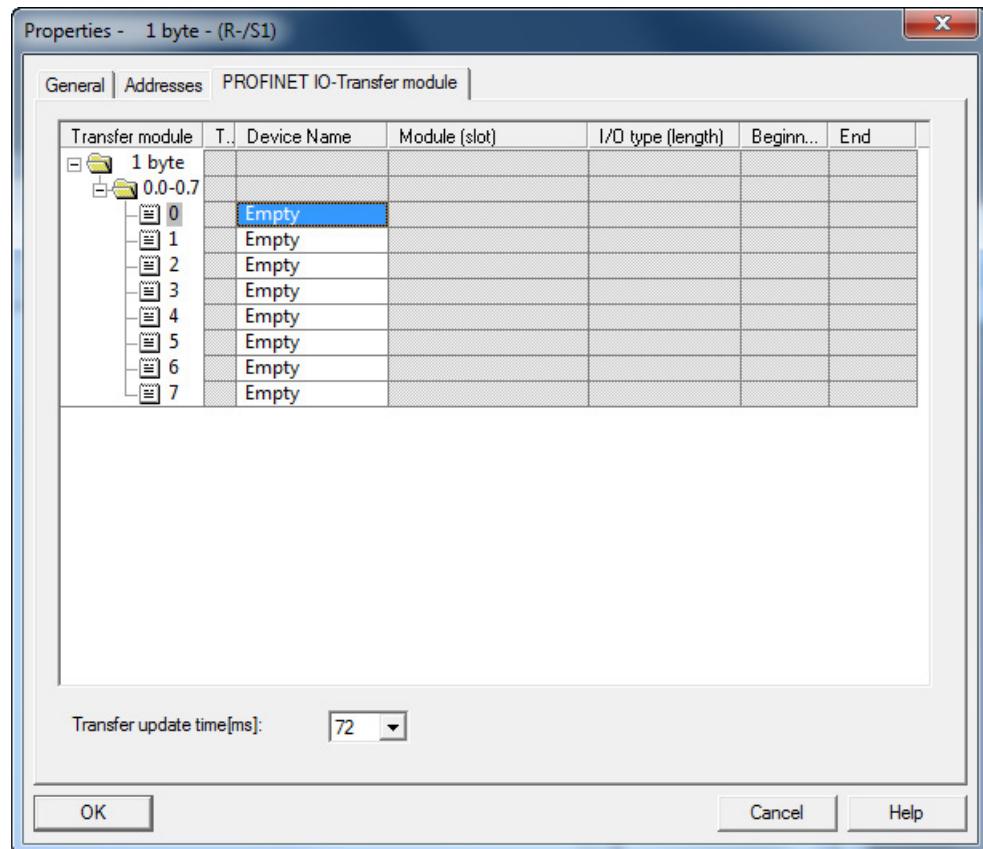
The IO modules in the "Migration" folder are intended for use with PROFINET Version V1.0 IO controllers. You will find the possible combinations in the readme file.

4. Interconnect the transfer module with the real IO module in the IO system for the robot level:

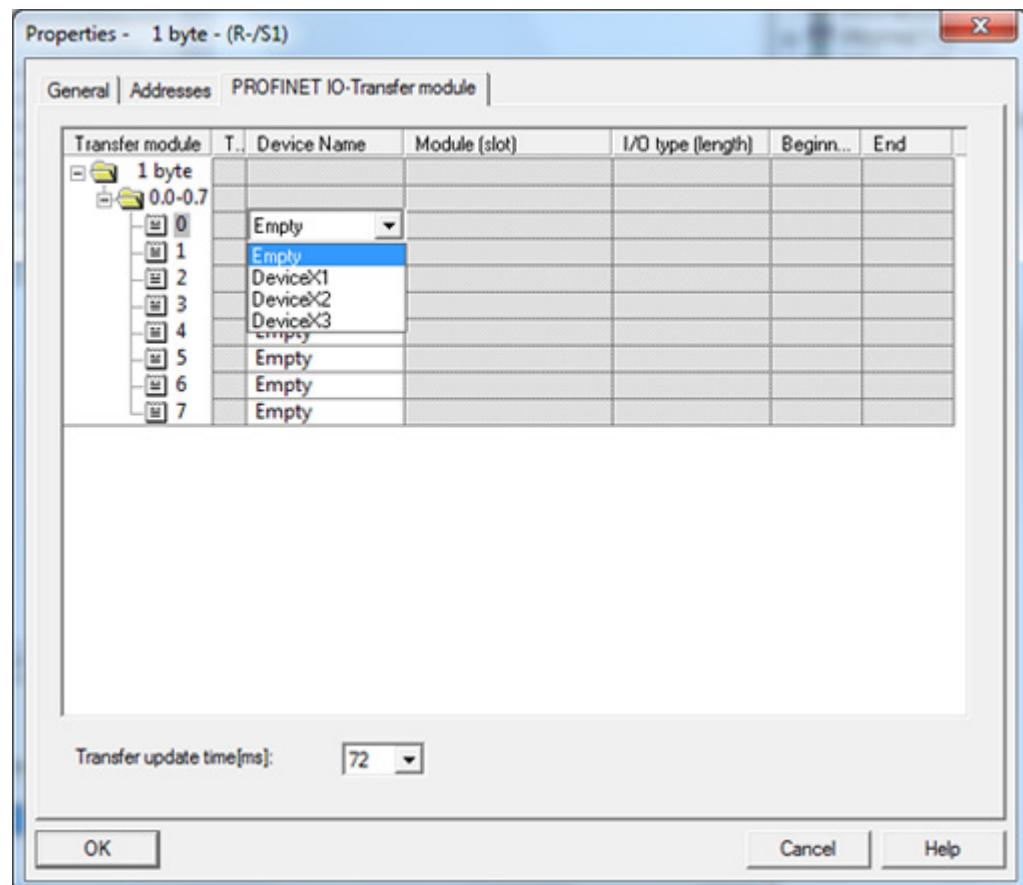
Open the "Properties" dialog of the 1-byte module, for example by double clicking on the row of slot 1.

Reaction: The "Properties - 1 byte - (R-/S1)" dialog appears.

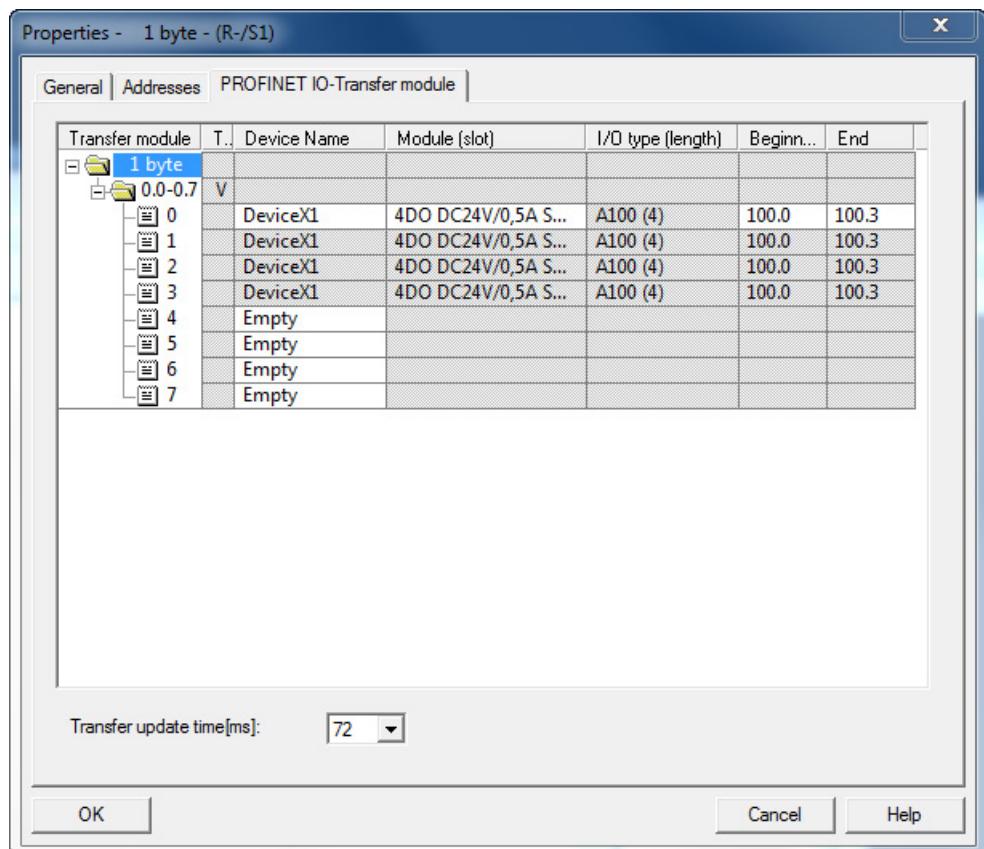
5. Open folder "0.0-0.7" of the transfer module in the "PROFINET IO Transfer Module" tab. The folder name corresponds to the I/O address being used.



6. Open the drop-down list box in the "Device name" column in byte 0 and select the "DeviceX2" IO device.



7. Open the "Module (slot)" drop-down list box in byte 0 and select the "4DI DC24V HF" module in slot 2.



You can see that bits 0 to 3 of the transfer module were assigned to the four bits of this module.

8. In the "Transfer update time [ms]" drop-down list box in the lower part of the dialog, set the interval at which the data of this module is transferred to the IO controller of the management level. The default is 72 ms which means that a change at an input of the "4DI DC24V HF" module is detected in the IO controller of the management level at the latest after 72 ms.

Select a value less than 72 ms if you want the IO system for the control level to access the IO system for the robot level faster.

Note

Note that the time must not be shorter than the following times:

- Update times of the PROFINET IO systems in the IO system for the control level and IO system for the robot level.
- A CP 1616-specific transfer time of 8 ms.

9. Confirm the configuration of the IO router with "OK".

When you have completed the configuration, the project must be compiled and downloaded (to the CP 1616 with "Download to Module - Target System").

Note

Remember that the configuration must also be downloaded to the automation system "SIMATIC 400" (IO controller of the IO system for the control level).

The input data of the "4DI DC24V HF" module in the "DeviceX2" IO device of the IO system for the robot level can now be read by the IO controller of the management level at address 0.

Example 2: Writing outputs bit-oriented

Example 2 describes the configuration of the IO router ("router"). In this example, the IO router is configured so that bit 0 of an output module is written by the IO controller of the management level, the remaining bits by the IO controller of the robot level.

Note

Whenever possible, you should configure bit-oriented writing sparingly. It makes the configuration complicated and application errors are more likely to occur.

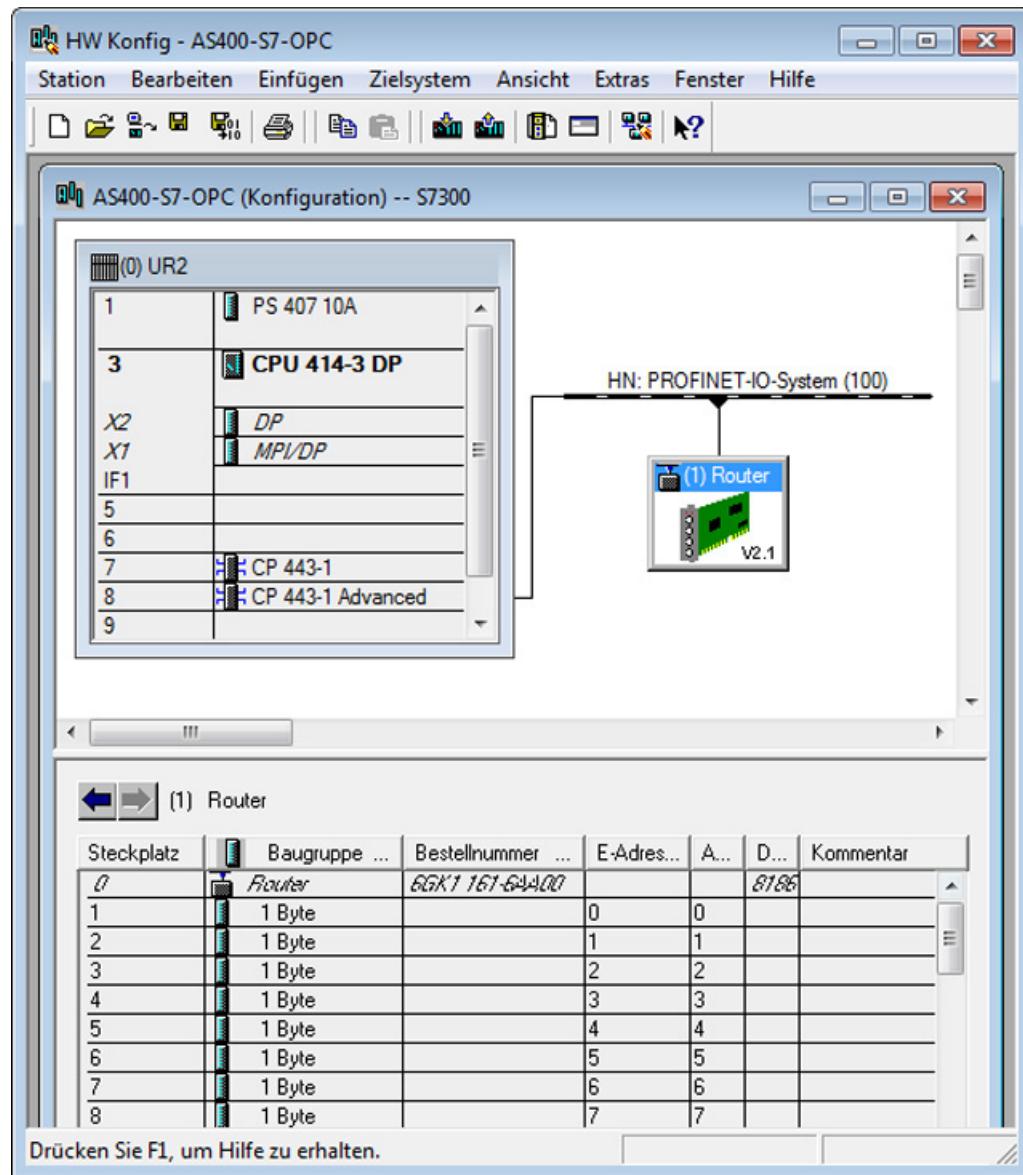
Follow the steps below:

1. Open HW Config (for example by double-clicking on the "router" IO device) and the "catalog" (for example by clicking on the "Catalog" icon in the toolbar at the top).
2. Click on the "(1) Router" IO device.

3. Select the 1 byte DI transfer module and place it on the first slot of the IO device "(1) Router".

Catalog "PROFINET IO" > "I/O" > "SIMATIC PC-CP" > "CP 1616" > "Migration" > "V2.1" > "Transfer module" > "DI" > "1 Byte".

Reaction: The transfer module is given the "O address" (output address) 100.



Note

The IO modules in the "Migration" folder are intended for use with PROFINET Version V1.0 IO controllers. You will find the possible combinations in the readme file for PROFINET IO.

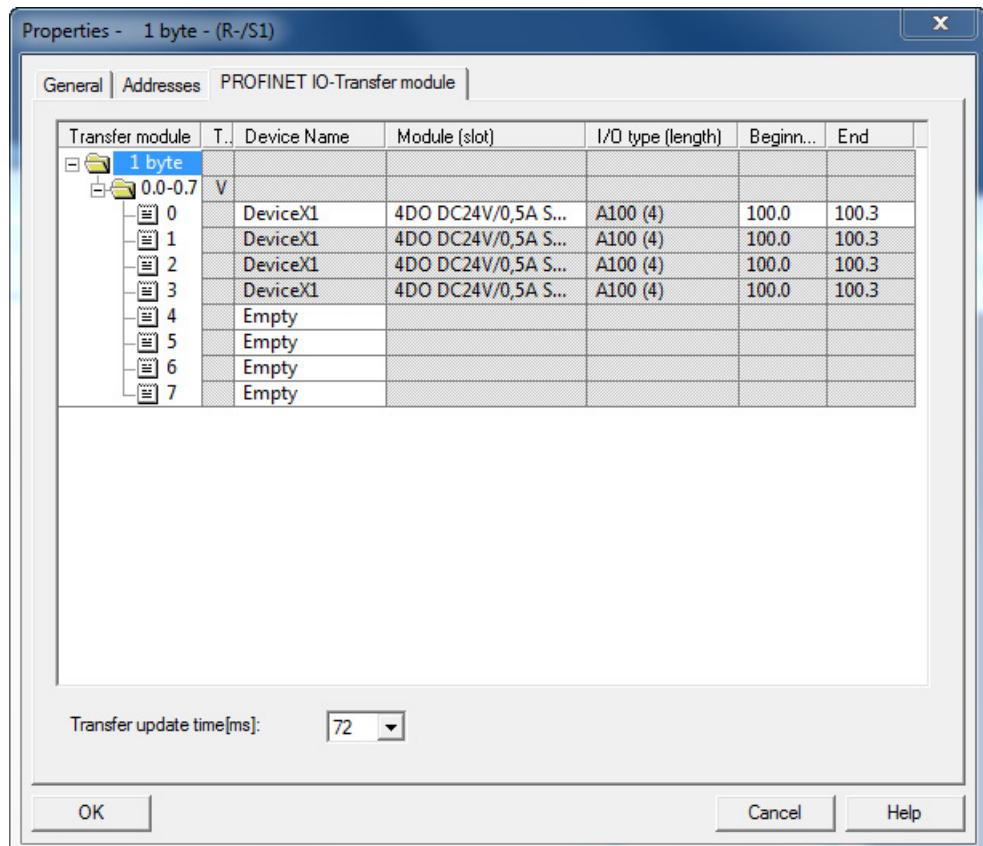
4. Interconnect the transfer module with the real IO module in the IO system for the robot level:

Open the "Properties" dialog of the 1-byte module, for example by double clicking on the row of slot 1.

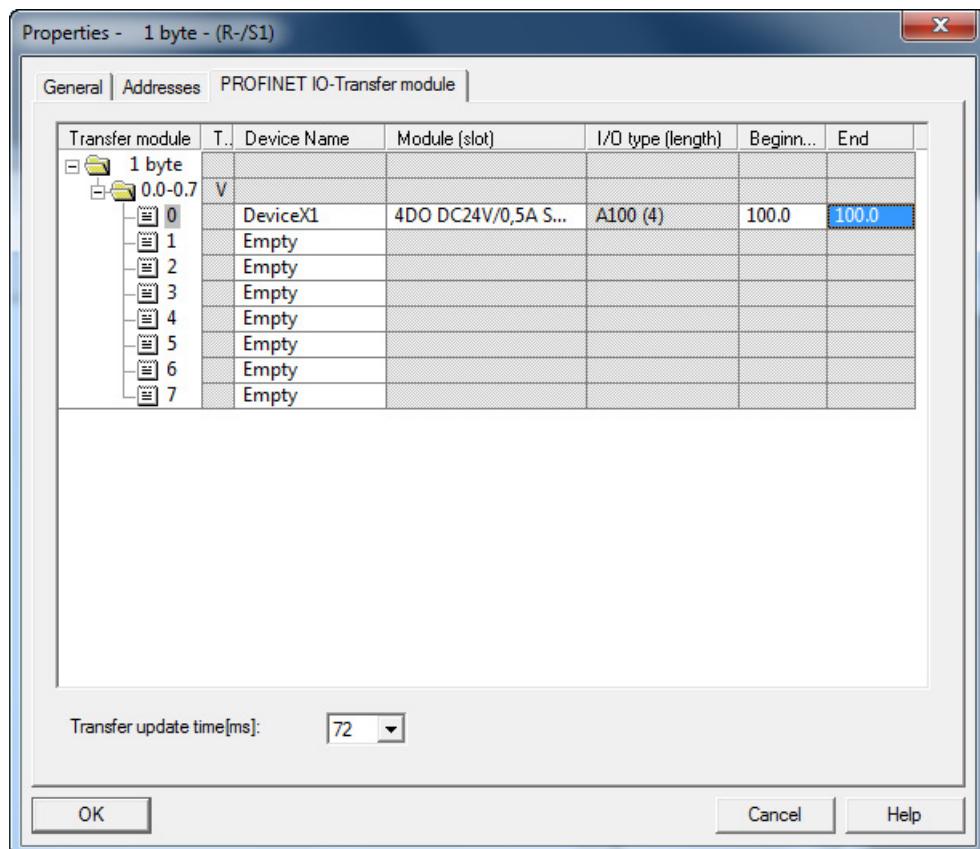
Reaction: The "Properties - 1 byte - (R-/S1)" dialog appears.

5. Open the "0.0-0.7" folder of the transfer module in the "PROFINET IO Transfer Module" tab and select "DeviceX1" in the drop-down list box of the "Device name" column in byte 0.

You will see that all four bits of the "4DO DC24V/0.5A ST (3)" module have automatically been assigned to the transfer module.



6. To control only the first bit of the module from the IO controller of the management level, enter the address 100.0 in the "End" box of the "Byte 0" row.



You will see that only bit 0 of the "4DO DC24V/0.5A ST (3)" module has been assigned to the transfer module. As a result, bits 1 to 3 of the module are controlled by the IO controller of the process level.

7. In the "Transfer update time [ms]" drop-down list box below the large table, set the interval at which the data of this module is transferred to the IO controller of the management level. The default is 72 ms which means that a change at an input of the "4DI DC24V HF" module is detected in the IO controller of the management level at the latest after 72 ms.

Select a value less than 72 ms if you want the IO system for the control level to access the IO system for the robot level faster.

Note

Note that the time must not be shorter than the sum of the following times:

- Update time of the PROFINET IO systems in the IO system for the management level;
- Update time of the PROFINET IO system for the robot level;
- A CP 1616-specific transfer time of 8 ms.

8. Confirm the configuration of the IO router with "OK".

When you have completed the configuration, the project must be compiled and downloaded (to the CP with "PLC - Download to Module").

Note

Remember that the configuration must also be downloaded to the automation system "SIMATIC 400" (IO controller of the IO system for the control level).

The first bit of the "4DO DC24V/0.5A ST (3)" module in the "DeviceX2" IO device of the IO system for the robot level can now be written by the IO controller of the management level at address 100.

Note

- Although the IO controller of the process level writes in bytes, its bit 0 is irrelevant for the output status of the "4DO DC24V/0.5A ST (3)" module because it is assigned to the IO controller of the management level.
 - Although the IO controller of the management level writes byte-oriented, bits 1 to 7 are irrelevant for the output status of the "4DO DC24V/0.5A ST (3)" module. They can be written by the IO controller of the process level.
-

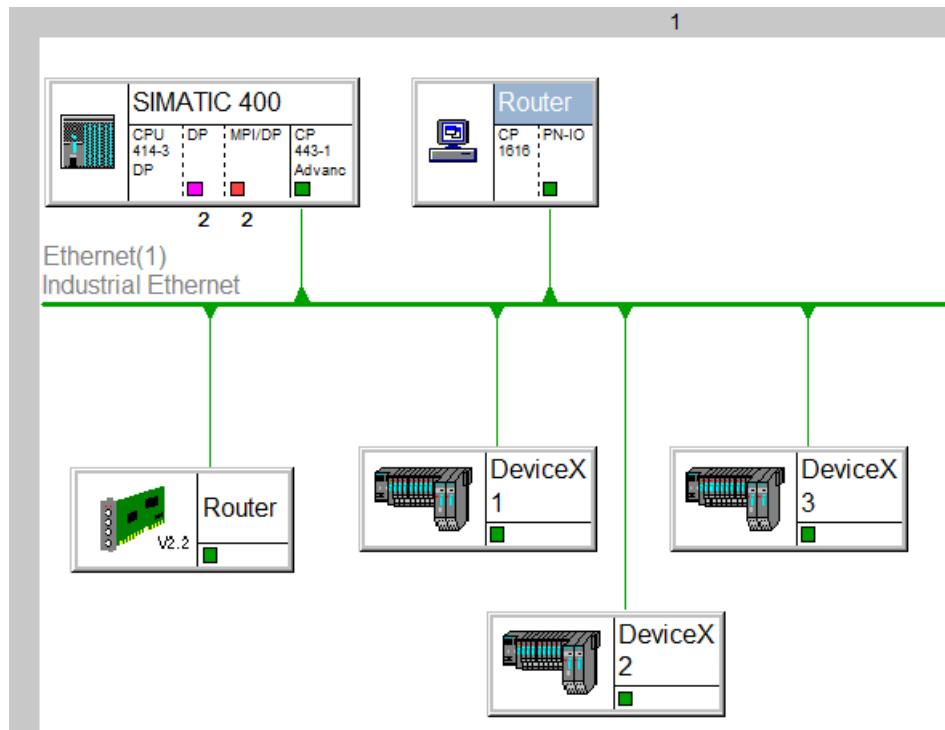
2.5.2.5 Copying a PROFINET IO router

Purpose

If you are already using a router, you can copy this along with its entire functionality.

Requirement

The following description is based on the example described in the previous section "Using the CP 1616 as a PROFINET IO router (Page 76)".



Procedure

Copying a PROFINET IO router involves 3 steps:

1. Copying the PC station (in this example: "Router").
2. Copying the IO device (in this example: "Router").
3. Coupling the new PC station with the new IO device.

Stage 1 - Copying the PC station "Router"

Before you can copy, there must be a PC station that is already operating as an IO router. When you copy this, all connected IO devices of this "IO system for the robot level" are also copied.

Follow the steps below:

1. Open the project in the "SIMATIC Manager".
2. Copy the PC station "Router" ("Copy" shortcut menu command).

3. paste the copied PC station into the project:

With the right mouse button, select the project in the directory tree and select the "Paste" menu command.

Reaction: The PC station "Router(1)" appears.

4. If necessary, rename the new PC station ("Rename" shortcut menu command).

5. Assign a different IP address to the copied PC station ("Router(1)"):

- Right-click on "Router(1)".

Reaction: The shortcut menu opens.

- Click the "Open Object" menu item.

Reaction: The new PC station appears in "HW Config".

- Open "Index X1" by clicking on the "Object properties" entry in the shortcut menu.

Reaction: The "Properties" dialog box opens.

- In the "General" tab, click the "Properties" button.

Reaction: The "Properties" dialog box opens.

- Enter a different IP address in the "IP address" box.

6. Connect the new PC station with the existing subnet:

- Select the subnet in the "Subnet" box and confirm with "OK".

Reaction: The following warning appears: "Address conflicts were found. Do you want the IP addresses of the IO Devices to become unique again?".

- Confirm with "Yes".

Reaction: The configuration system now selects new free IP addresses for the IO devices. You can change these later if necessary.

- Confirm with "OK".

7. Change the device names of the IO devices one after the other:

With the right mouse button, select "O-device" in "HW Config" > menu command "Object properties" > "Device name" box.

Stage 2 - Copying IO device "Router" of the SIMATIC S7-400

Once you have copied the PC station along with the connected IO devices, it is then the turn of the IO device of the SIMATIC-S7-400.

Follow the steps below:

1. Open the SIMATIC 400 station "SIMATIC 400" in the "SIMATIC Manager":
 - Right-click on "SIMATIC 400".
Reaction: The shortcut menu opens.
 - Click the "Open Object" menu item.
Reaction: "HW Config" appears with the message: "The data is read-only.".
 - Confirm with "OK".
2. Copy the IO device "Router" ("Copy" shortcut menu command).
3. Paste the copied IO device in the existing PROFINET IO system:
 - Select the "PROFINET IO system" with the right mouse button and click the "Paste" shortcut menu entry.
Reaction: The following warning appears: "You want to edit the configuration of an additional station.".
 - Confirm with "OK".
Reaction: The IO device "Router-1" is added to the PROFINET IO system.
4. If necessary, change the device name of the copied IO device.

Stage 3 - Coupling PC station "Router(1)" with IO device "Router-1"

In the last step, the transfer relations between the PC station, in this example, "Router(1)" of the "IO system for the robot level" and the IO device, in this example, "Router-1" of the "IO system for the management level" are adopted.

Follow the steps below:

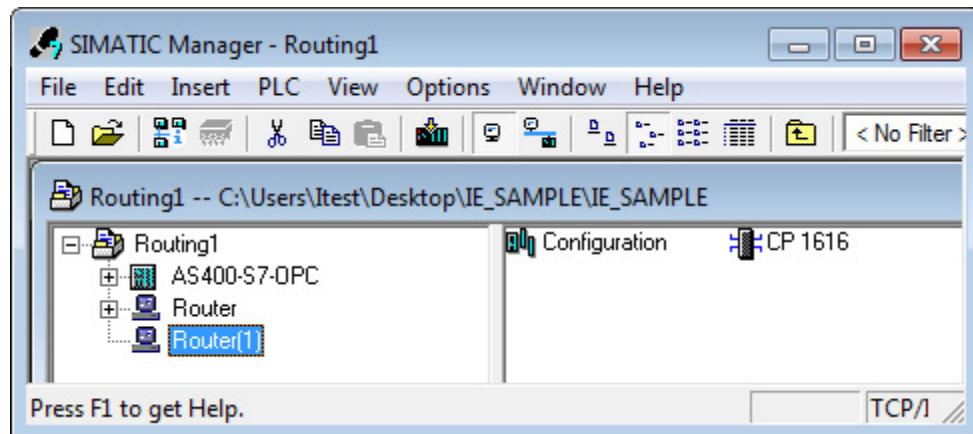
1. Open the PC station "Router(1)" in the "SIMATIC Manager":

- Right-click on "Router(1)".

Reaction: The shortcut menu opens.

- Click "Open Object" in the shortcut menu.

Reaction: A new PC station appears in "HW Config".



2. Couple the device in the "IO Device Coupling" dialog

- Open "Index 1" by clicking on the "Object properties" entry in the shortcut menu.

Reaction: The following warning appears: "You want to edit the configuration of an additional station."

- Confirm with "OK".

Reaction: The "Properties" dialog box opens.

- Click the "IO Device Coupling" button in the "PROFINET" tab.

Reaction: The "Device Coupling" dialog box opens.

- Click the "Couple" button.

Reaction: The entry in the "Active Coupling" group box changes.

- Confirm twice with "OK".

Reaction: The following message appears: "You have now connected the device with another device using a PROFINET device name and now you can modify.....".

- Confirm with "No" (!).

3. Save and compile the project.

2.5.2.6 Configuring prioritized startup of the CP 1616 in PROFINET IO

Functions

- Prioritized startup is used in fast processes when IO devices change quickly, for example changing the tools of a robot. A CP 1616 communications processor supports prioritized startup of SIMATIC S7 IO devices in RT or IRT communication. Depending on the device, this allows a time < 0.5 s to be achieved following completion of a restart to the beginning of user data exchange.

Note

To achieve short communication times, the Ethernet connections must have fixed settings so that no time is lost in "negotiation" when establishing the connection.

To achieve a stable Ethernet connection, both ports of an Ethernet connection must be set to "100 Mbps full duplex" and autonegotiation disabled (click on the port -> "Object Properties" -> "Options").

- As a PROFINET IO controller, the CP 1616 can establish communication with prioritized startup with a maximum of 5 IO devices.

Project engineering

The configuration of prioritized startup in STEP 7/NCM PC is only necessary and only possible for SIMATIC S7-IO devices. Follow the steps below:

1. Open the hardware configuration (HW Config) of the PROFINET IO system.
2. Select the relevant IO device in the PROFINET IO system.
3. Open the object properties of slot "X1".
4. In the "General" tab, select the "Prioritized Startup" option.

For more detailed information on configuration, and, in particular, on the cabling rules, refer to the STEP 7/NCM PC online help for the "General" tab described above.

After reconfiguring an IO device for prioritized startup, the first startup takes place in the normal time without being prioritized. All subsequent startups will then be completed in the reduced time of < 0.5 s.

Note

Including an IO device with prioritized startup in a ring with media redundancy serves no practical purpose since the ring is interrupted at each IO device change.

2.5.2.7 Configuring media redundancy of the CP 1616

Functions

You can use the CP 1616 communications processor in a media redundancy ring topology. As PROFINET IO controller, the CP 1616 itself can be the redundancy manager.

If you use IRT communication, media redundancy is not supported.

Project engineering

This is configured in STEP 7/NCM PC in the "Media Redundancy" tab of the CP 1616 ("HW Config → select IO controller "CP 1616" > open "Index X1" in the "Object Properties" shortcut menu > "Media Redundancy" tab). Then configure the required properties:

- Domain - Name of the IRT domain
- Role
 - Not node in the ring - media redundancy is disabled.
 - Manager - the CP 1616 as a PROFINET IO controller is redundancy manager.
 - Client - the CP 1616 as a PROFINET IO device is redundancy client.

For more detailed information on configuration, refer to the online help of the "Media Redundancy" tab.

If a CP 1616 is used as an IO device in the media redundant ring topology, the media redundancy is handled in the same way.

2.5.3 Example: Installing Linux drivers (Suse Linux)

The CD "DK 16xx PN IO" contains the drivers for a Linux PC.

Follow the steps below:

1. Copy the driver file "host-xxx.tar.gz" (xxx = versionspecific) from the CD to any directory of your choice.
2. Extract the file and change to the current directory.
3. Run the "make" command in the "/host-xxx/" path.
4. Log on as the root user with the "su" command.
5. Install the driver with the "make install" command.
6. Start the driver with the "make load" command in the path of the driver.

Note

The driver is stopped again with the "make unload" command.

2.5.4 Installing the PROFINET IO sample program (Suse Linux)

The "pniotest" sample program is restricted to the use of the CP 1616 as controller.

Follow the steps below:

1. Run the "make test" command in the "/host-xxx/" (xxx = versionspecific) directory.
2. Run the "./pniotest" command in the "/host-xxx/testapps/" directory to start the program.
3. Set the number of modules in "pniotest.c in the /host-xxx/testapps/".

Setting	
<pre>const PNIO_UINT32 g_deviceInputCount=3; volatile PNIO_IOXS g_deviceInputState[g_deviceInputCount]= {PNIO_S_BAD,PNIO_S_BAD,PNIO_S_BAD}; PNIO_UINT32 g_deviceInputLength[g_deviceInputCount]={ 1, 1, 1}; PNIO_ADDR g_deviceInputAddress[g_deviceInputCount]= { { PNIO_ADDR_LOG, PNIO_IO_IN, 0}, { PNIO_ADDR_LOG, PNIO_IO_IN, 1}, { PNIO_ADDR_LOG, PNIO_IO_IN, 2} };</pre>	<ul style="list-style-type: none"> ▶ Number of input modules ▶ One PNIO_S_BAD per input module ▶ One "1" per input module ▶ Address 1st input module ▶ Address 2nd input module ▶ Address 3rd input module

These settings must also be made for the output modules.	
<pre>const PNIO_UINT32 g_deviceOutputCount=3; volatile PNIO_IOXS g_deviceOutputState[g_deviceOutputCount]= {PNIO_S_BAD,PNIO_S_BAD,PNIO_S_BAD}; PNIO_UINT32 g_deviceOutputLength[g_deviceOutputCount]={ 1, 1, 1}; PNIO_ADDR g_deviceOutputAddress[g_deviceOutputCount]= { { PNIO_ADDR_LOG, PNIO_IO_IN, 0}, { PNIO_ADDR_LOG, PNIO_IO_IN, 1}, { PNIO_ADDR_LOG, PNIO_IO_IN, 2} };</pre>	<ul style="list-style-type: none"> ▶ Number of output modules ▶ One PNIO_S_BAD per output module ▶ One "1" per output module ▶ Address 1st output module ▶ Address 2nd output module ▶ Address 3rd output module

2.6 Using CP 5613 A2/CP 5623/CP 5603 as a DP slave

General information

Note

In this subsection, the communications processors

- CP 5603
- CP 5613 A2
- CP 5623

are called simply CP 56x3. The following instructions apply to all three communications processors.

It is assumed that STEP 7 (as of V5.4 SP 5) is installed and that the configuration of the DP master already exists (project "S7300" in the example).

If the DP master is a PC station instead of an S7 controller, you can also create the configuration with NCM PC.

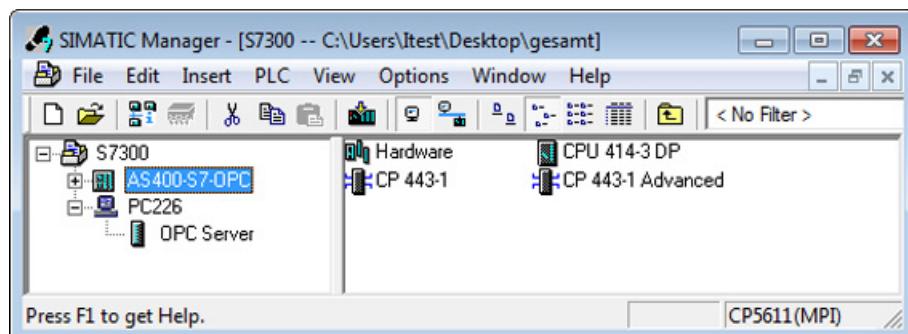
Note

A DP configuration created for a CP 56x3 is not compatible with that of a CP 5614 A2 / CP 5624 slave and vice versa. For this reason, the configuration must be adapted and downloaded again if a CP 5614 is physically replaced by a CP 56x3 or vice versa.

Configuration of the SIMATIC S7 station

1. After successfully installing the SIMATIC NET products and the configuration tool, restart the computer.
2. Then start STEP 7 with "Start" > "All Programs" > "SIMATIC" -> "SIMATIC Manager" or using the icon with the same name on the desktop.
3. Create a new project in STEP 7 with a SIMATIC S7 controller (in the example "S7300") and a PC station. The SIMATIC S7 controller is the DP master in this example and the CP 56x3 is the DP slave.

A CPU 315-2 DP is inserted in the SIMATIC 300 station and an OPC server in the PC station.



4. Open the hardware configuration of the PC station and insert the CP 56x3 that will function as the DP slave.

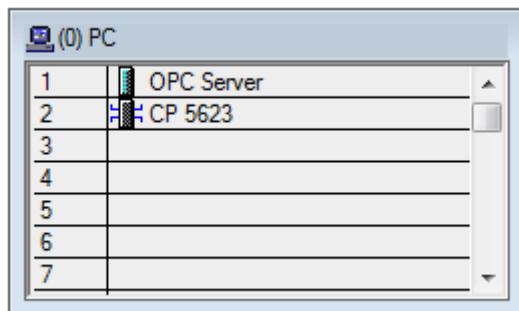
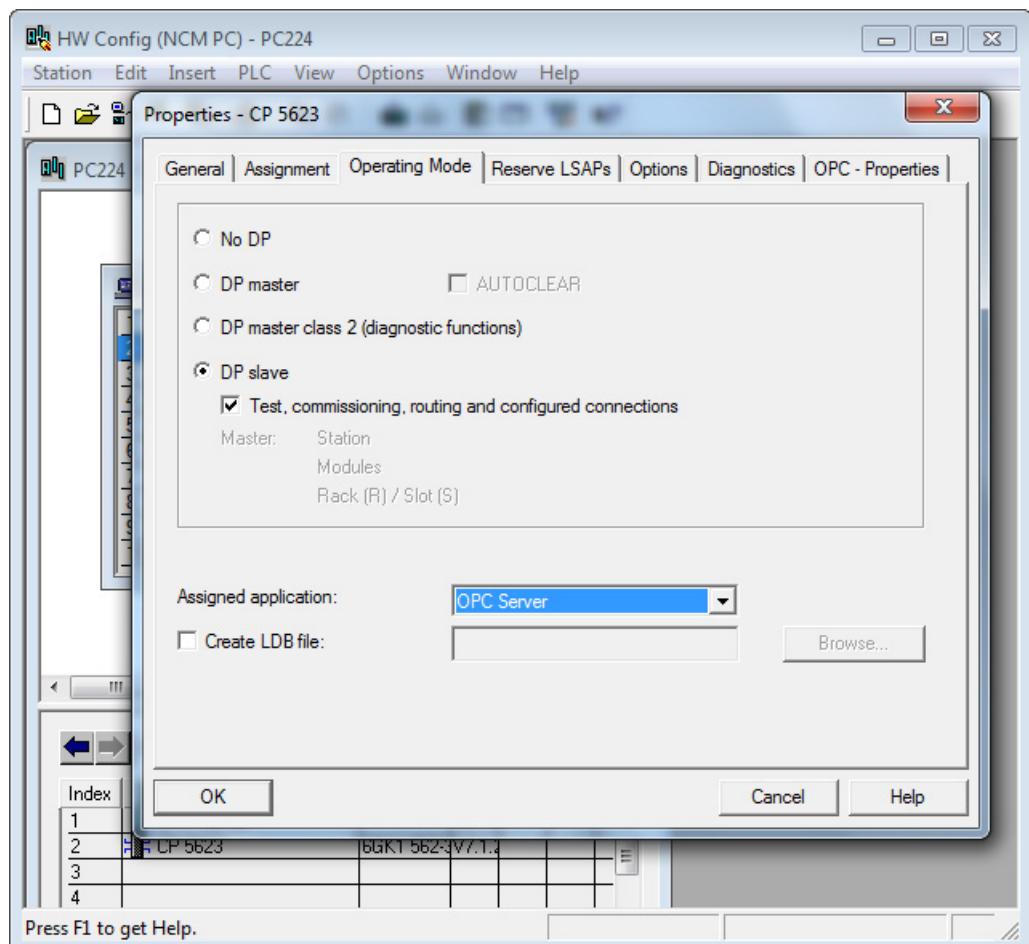


Figure 2-1 PC station in HW Config

5. Open the object properties of the CP 56x3 and change the mode to "DP slave" and assign an application (in the example, the OPC server).



6. Exit the dialog with "OK".

7. Open the hardware configuration of the S7 controller.

Note

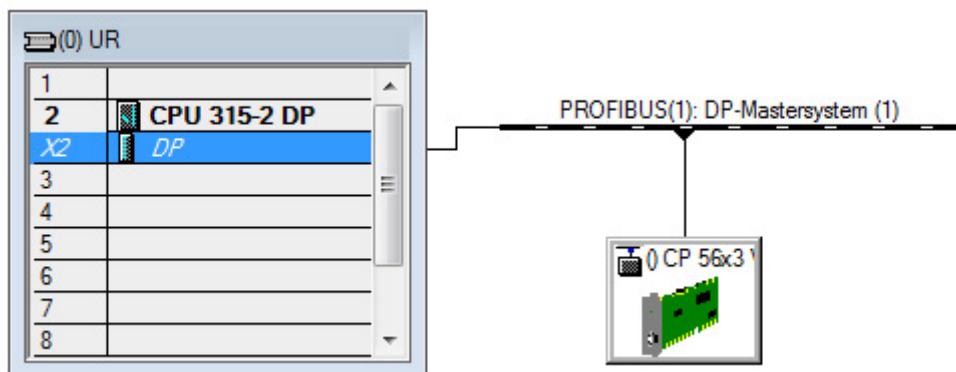
In this example, an S7 -300 was used as the master. The procedure for using an S7 -400 or a PC station as the master is the same.

8. Double-click on "DP".

Reaction: The properties dialog of the DP interface is displayed.

9. Change to the "Mode" tab and select the "DP Master" option.

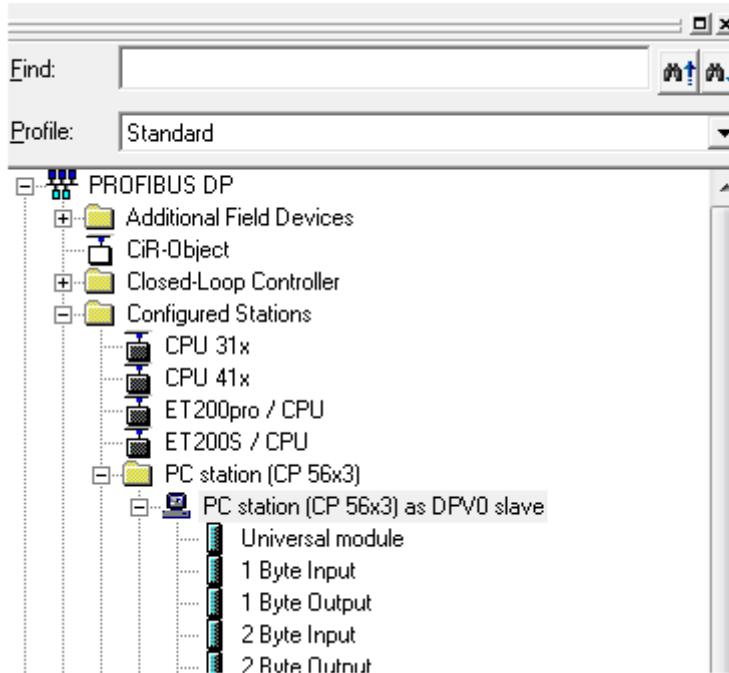
Then insert a master system.



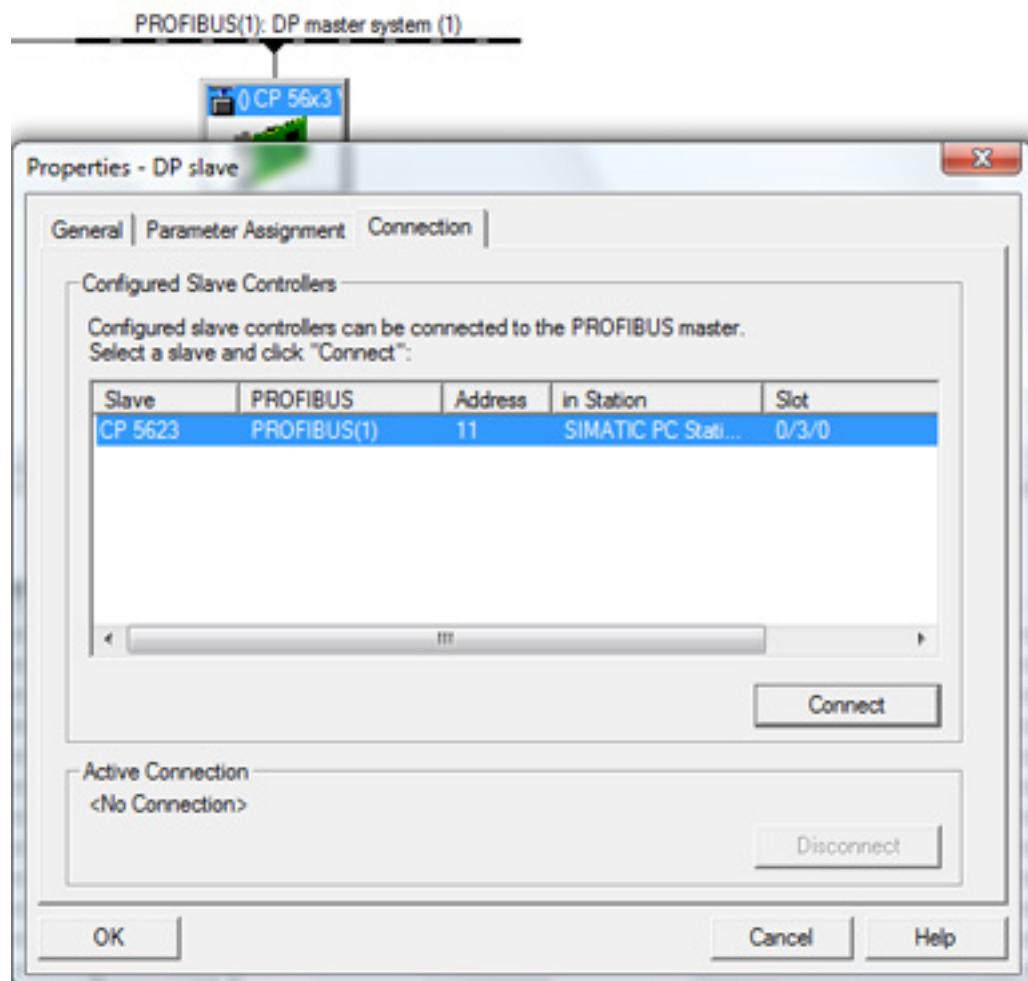
10. Exit the dialog with "OK".

11. Insert one of the existing entries for the CP 56x3 as the slave from the hardware catalog branch "Configured Stations" > "PC station (CP 56x3)".

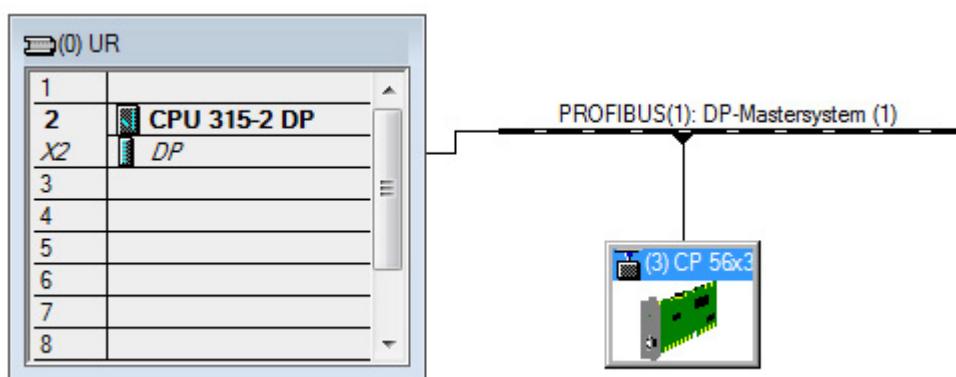
Select "PC station (CP 56x3) as DP V0 slave" or "PC station (CP 56x3) as DP V1 slave" to suit your particular situation.



Reaction: A dialog opens automatically to allow you to couple the slave with the previously configured PC station.



12. Click "Couple" and then "OK".



13. Now select the slave and insert the modules.

The modules must already be configured to suit your requirements, otherwise use the universal module as shown in the example and set the input and output areas to meet your requirements in the properties dialog of the module.

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	63	Universal module	0...15	0...15	

14. Save and compile the configuration with "Station" > "Save and Compile".

15. Download to the S7-300 station and the PC station with "PLC" > "Download to Module".

16. Now create an application suitable for the PC station as a slave.

The calls required for this are described in the manual "DP-Base Programming Interface for CP 5613/CP 5614".

Note

If you want to connect the CP 56x3 as a slave to a third-party DP master or if no coupling dialog is possible, you will have to import the supplied GSD files "SLV80b4.GSD" or "SLV180b4.GSD" into the configuration tool of the DP master.

You configure the CP 56x3 as described in this section. Do not use coupling for this! The bus parameter settings are important (in particular the node address and baud rate).

You will find more detailed information on using the GSD files mentioned above in the manual "DP-Base Programming Interface for CP 5613/CP 5614", Section "Meaning of GSD files".

Examples

3.1 OPC application for Industrial Ethernet

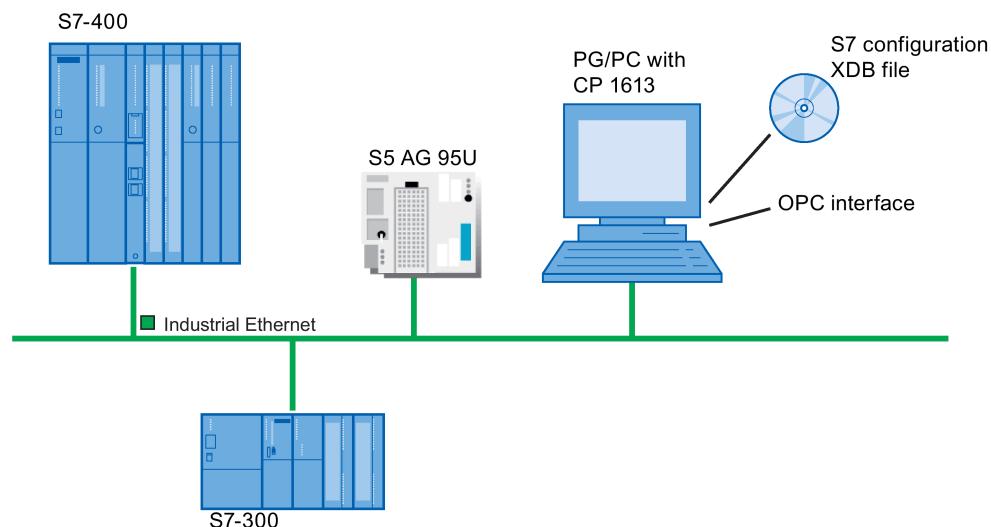
3.1.1 Overview

Explanation of the configuration example

This example illustrates how you can couple an S7400 programmable controller with a PC station over Industrial Ethernet.

In the configuration example presented here, typical communication partners are coupled to Industrial Ethernet and can be reached via the OPC server.

Example of an Industrial Ethernet configuration



There is communication between two devices or modules. Communication with an S7400 station using the S7 protocol is described in detail below.

You will see which tools are used for planning a PC station in the project engineering for coupling with an S7400. You will see how symbolic variables in the S7 program are made available in OPC. You will also see how to use the OPC Scout V10 program that ships with the product for communication with the OPC server.

Requirements

If you want to try out the example yourself, you require the following:

- A PC.
- A communications module for Industrial Ethernet (CP 1613).
- The software of the "SIMATIC NET PC Software" CD 11/2003 or later.
- An S7400 device with a CP 4431.
- Industrial Ethernet cabling between the PC module and S7 device.

For the S7400 device and the PC station, you require a STEP 7 project that was created on a central ES station (not this PC station).

In the project, you specify the hardware configuration and the programs and data blocks and define a symbol table.

3.1.2 Hardware and software installation

Follow the steps below to install the software:

1. Turn on the PC and start Windows.
2. Insert the "SIMATIC NET PC Software" DVD. If the installation program does not start the DVD automatically, start the "setup.exe" program on the DVD.
3. Follow the onscreen instructions of the installation program.

Follow the steps below to install a CP 1613:

1. Shut down the PC and turn it off.
2. Disconnect the power cable.
Read the instructions for installing cards in the manufacturer's instructions for your PC.
3. Insert the CP 1613 module in a PCI slot.
4. Reassemble the PC as described in the instructions of the PC manufacturer and reconnect the power cable.

Follow the steps below to connect to the network:

1. Connect the Ethernet cable to the CP 1613.
2. Connect the S7400 device to the network cable.

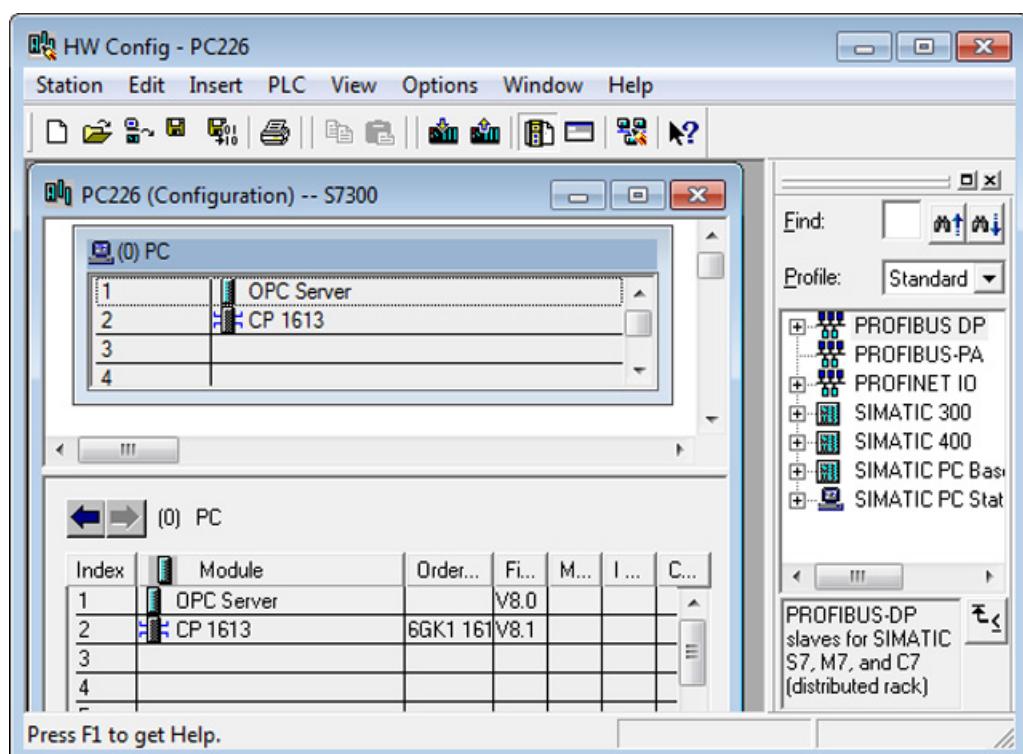
3.1.3 Creating the STEP 7 project

3.1.3.1 STEP 7 project engineering on a central engineering station

In the requirements, we have already said that you require a STEP 7 project for this example. Below, you will find a brief outline of how such a project is created.

Follow the steps below:

1. Create a project in the SIMATIC Manager.
2. Insert a SIMATIC 400 station and a SIMATIC PC station.
3. Create the hardware configuration including the network assignment and parameter settings of the CPUs.
4. Save and compile the configuration.

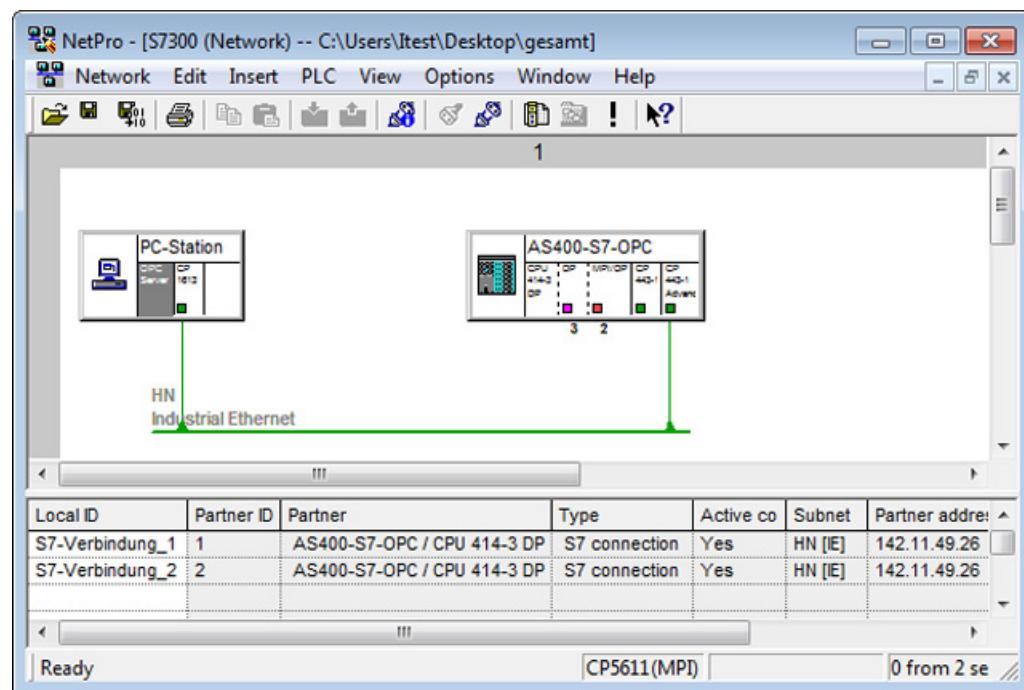


Result: The current configuration is saved in the project, system data blocks are created, the XDB file is created and any system errors are displayed.

In NetPro, you will find the network assignment of the SIMATIC 400 station and the PC station displayed graphically.

Examples

3.1 OPC application for Industrial Ethernet



3.1.3.2 Using symbol files

Introduction

Symbol tables are created during project engineering with STEP 7 on a central engineering station in the form of "ATI" files.

You can continue to use the symbol definitions specified in the STEP 7 configuration in OPC. This is necessary if user applications (OPC clients) are to access symbolic variables over the OPC server.

The symbol tables used are those of the CPUs for which S7 connections are planned for the OPC server. The symbols in the symbol table, that relate, for example, to data blocks (DB), inputs and outputs are taken into account.

Make the settings described in "Specifying the use of symbol files" for the OPC server on the central engineering station.

Specifying the use of symbol files

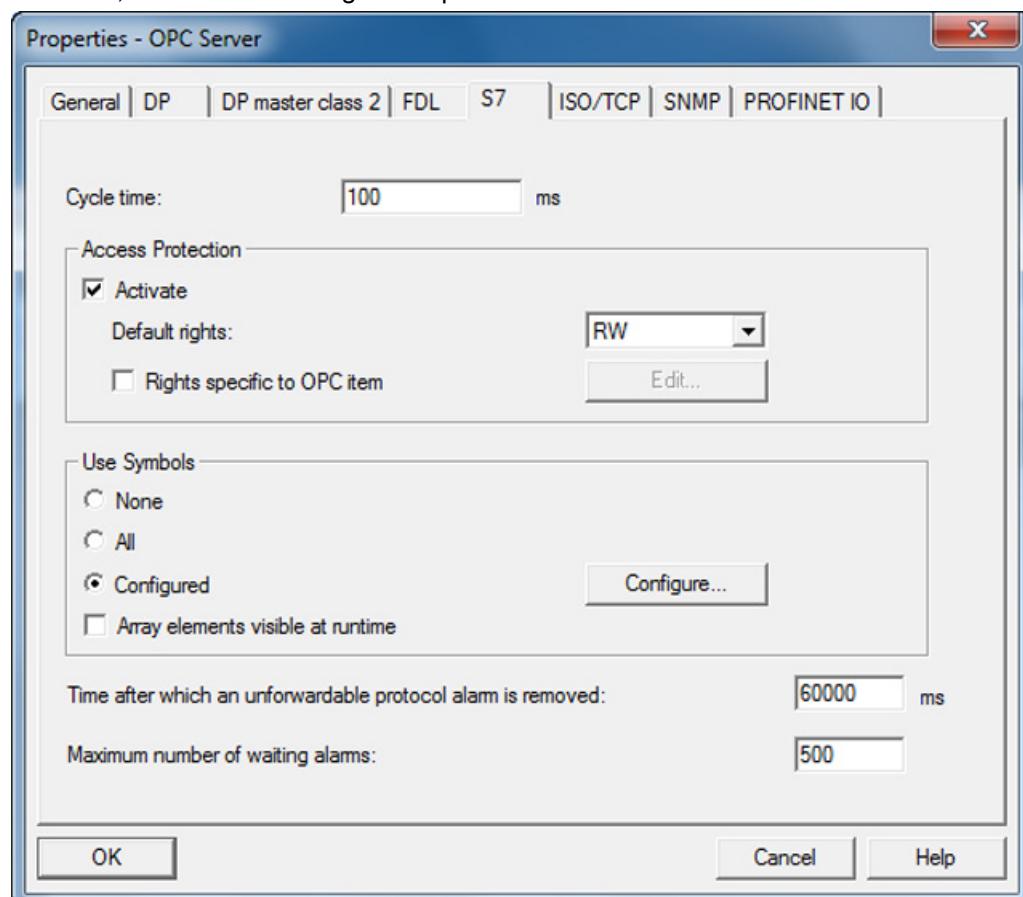
Follow the steps below:

1. Select the "OPC server" in the "PC station" in "HW Config" or "NetPro" and select "Object Properties" in the shortcut menu.

Reaction: The properties dialog of the OPC server opens.

2. Go to the "S7" tab.

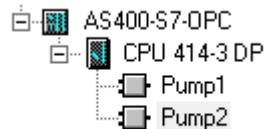
In this dialog, you specify which STEP 7 symbols you want to use on the OPC server. In this case, choose the "Configured" option.



3. Click the "Configure..." button.

Reaction: The "Use Symbols" dialog opens.

In this dialog, you specify the symbols you want to use and can configure them.



Current	WORD	DB	2	S7-Verbindu...	RW
Emergency	BOOL	DB	2	S7-Verbindu...	RW
Flow	WORD	DB	2	S7-Verbindu...	RW
Power	WORD	DB	2	S7-Verbindu...	RW

Confirm the dialog with "OK".

4. Also confirm the properties dialog of the OPC server with "OK".

Reaction:

- You return to "HW Config".
- All the symbols specified in the STEP 7 configuration are available in the OPC server.

5. Save and compile the project with the "Station" > "Save and Compile" menu command and select the option "Compile and check everything" to update the project.

6. Close "HW Config".

3.1.4 Configuring the PC station

Overview

The CP 1613 is in PG mode after:

- starting the PC station
- installing the software
- installing the CP 1613

Handling the project engineering data

Depending on the case, two situations must be distinguished (refer to the section "Steps for initial configuration (Page 33)":)

- Project engineering before initial configuration - XDB file available
- Initial configuration not dependent on project engineering

In this example, it is assumed that the project engineering data is available in the form of an XDB file that was created on an external engineering station. The XDB file is transferred to the local PC station on a data storage medium. The initial configuration is then done with "Import station" (XDB import) in the "Station Configuration Editor".

To transfer the project engineering information from the project engineering system to the PC station, the local configuration must match the configuration entered in the project engineering.

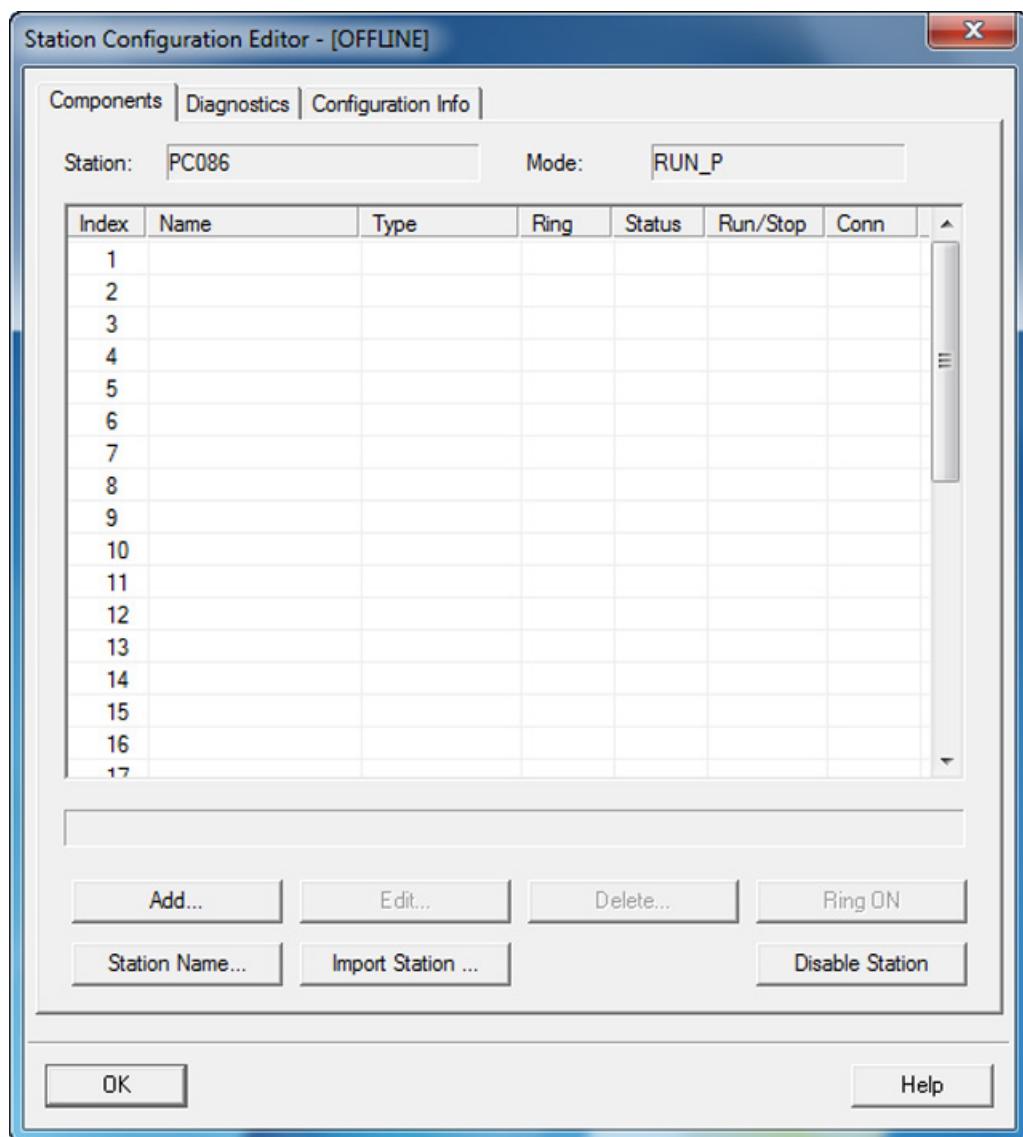
Note

If the PC station you want to configure can be reached online, you can use the remote configuration feature.

In this case, follow the steps described in the section "Case a) Initial configuration using remote configuration with STEP 7 / NCM PC (Page 34)".

Follow the steps below:

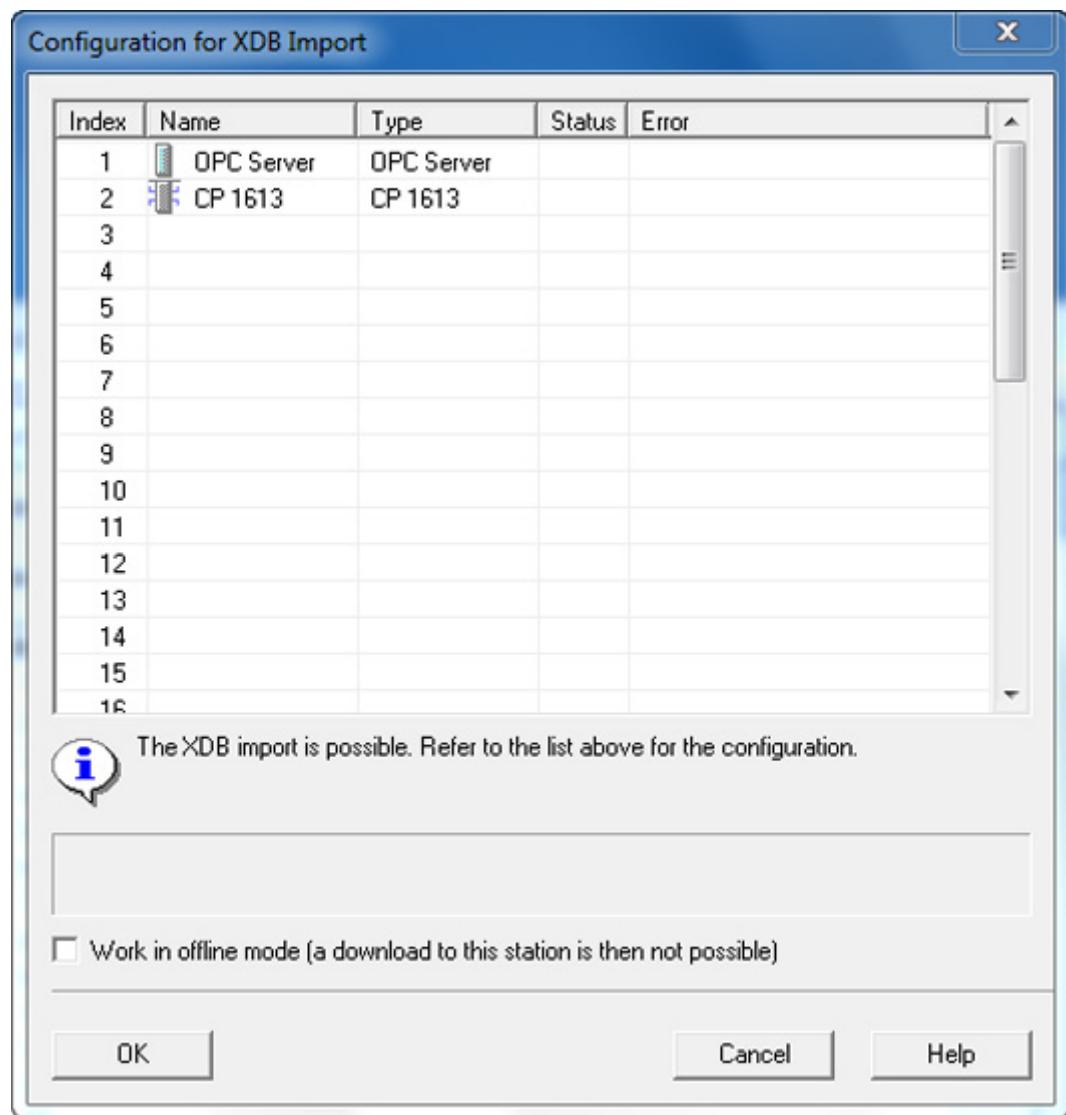
1. Start the "Station Configuration Editor" by double-clicking on its icon on the desktop.



2. Click the "Import Station..." button, select the XDB file that you want to import and confirm the dialog with "OK".

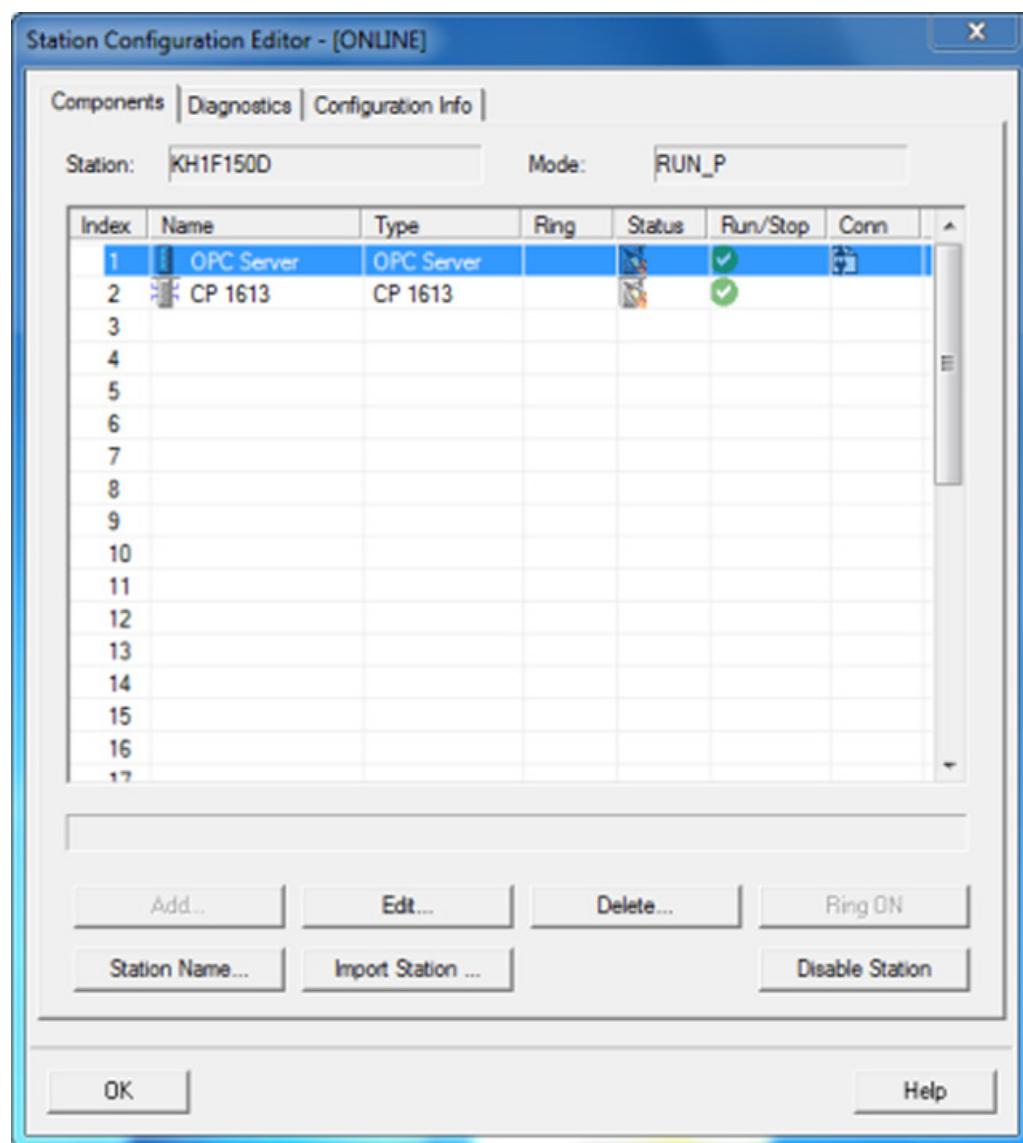
Examples

3.1 OPC application for Industrial Ethernet



Result: All the communication data configured with S7 is now on the PC station. The CP 1613 is in "configured mode".

PC configuration is complete.



3.1.5 Using the OPC Scout V10

3.1.5.1 Establishing a connection to the OPC server

The OPC Scout V10 as client for commissioning and testing

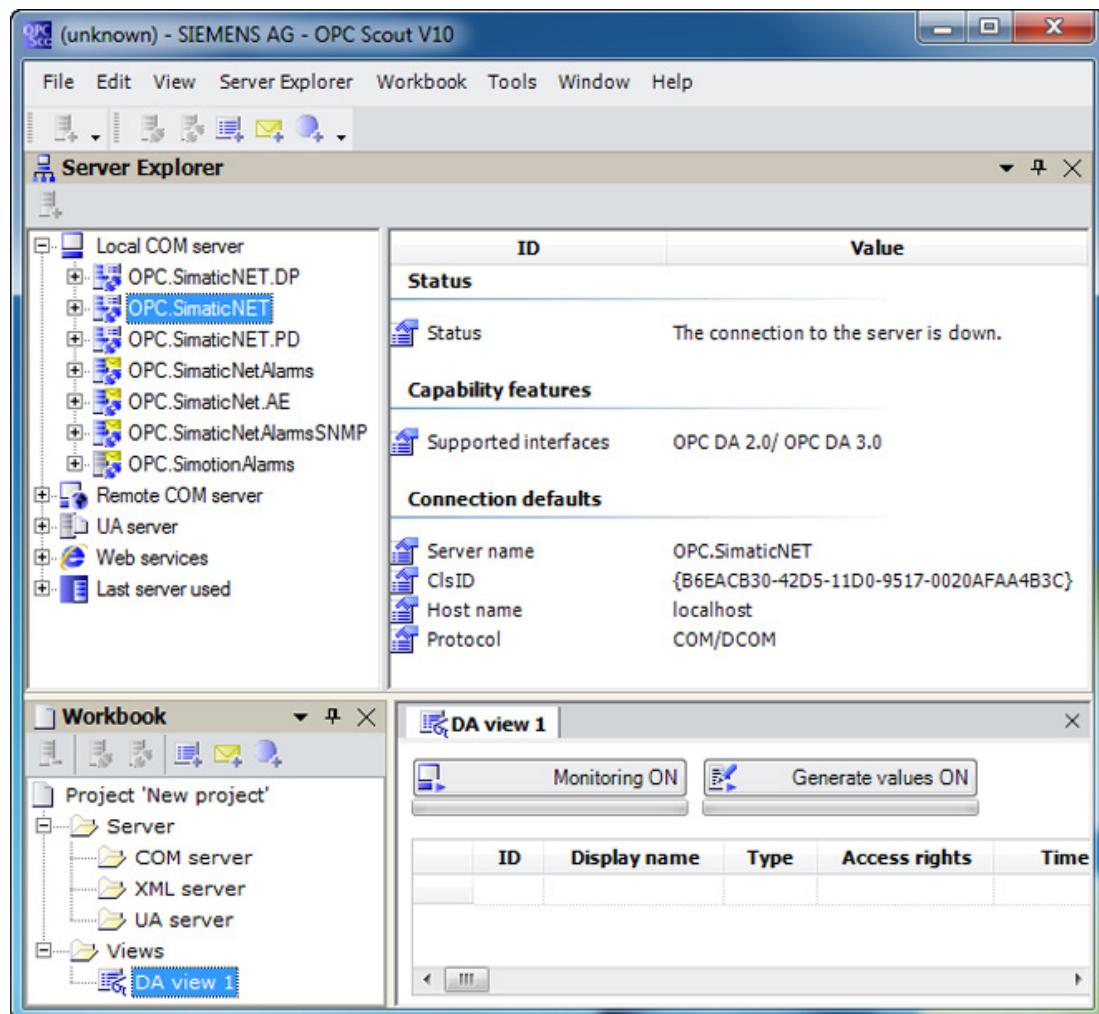
You can now access the data objects of the S7 station with any OPC client. The OPC Scout V10 ships with this product as the tool for commissioning and testing. Follow the steps below to read the inputs and set the outputs with the OPC Scout V10.

Examples

3.1 OPC application for Industrial Ethernet

Follow the steps below:

1. Start the OPC Scout V10 (Start menu "Start" > "..." > "SIMATIC NET" > "OPC Scout V10").
 2. Doubleclick the "OPC.SimaticNET" entry to link the OPC Scout V10 with the OPC server.
- The OPC Server is started.



3.1.5.2 Displaying and modifying values of variables

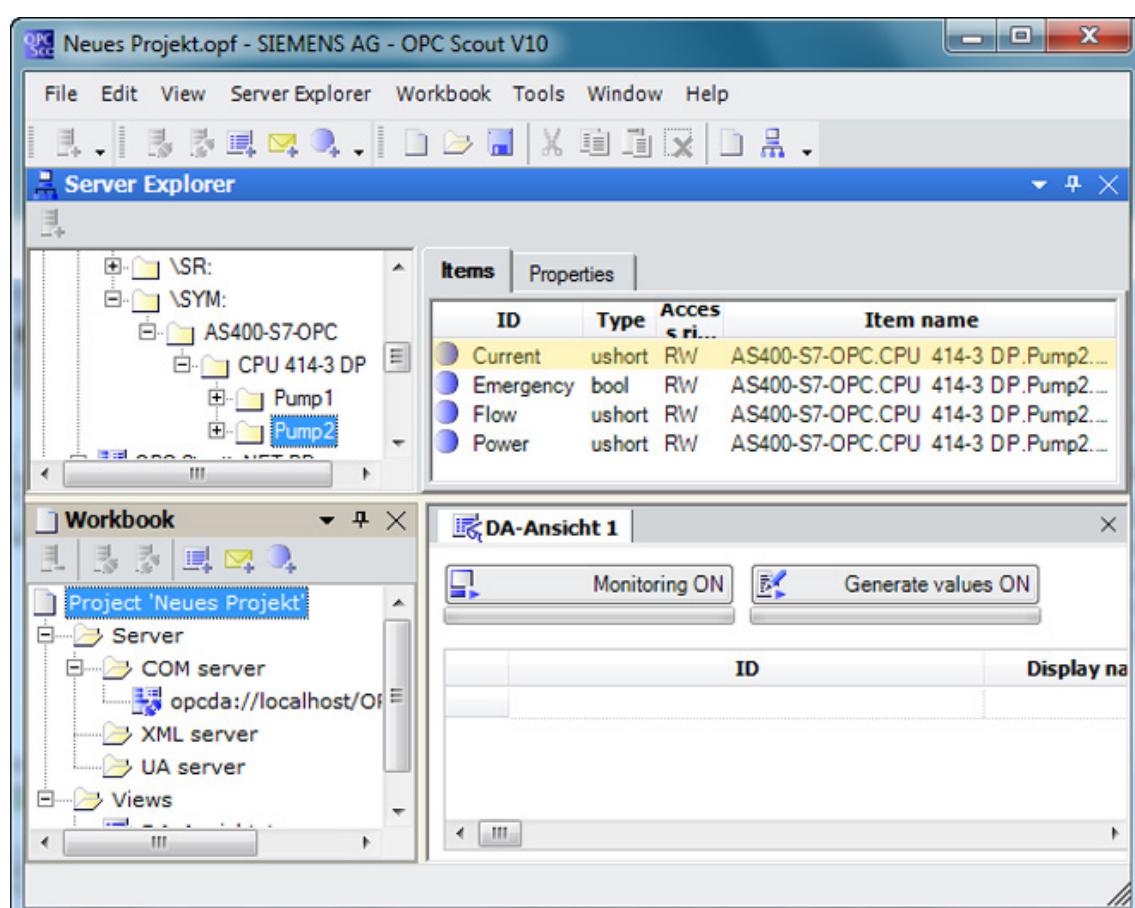
Executing synchronous write jobs

Follow the steps below:

1. Select the "OPC.SimaticNET" server in the navigation area.
2. Open the group "\SYM:" > "AS400-S7-OPC" > "CPU 414-3 DP" > "Pump2".

Note

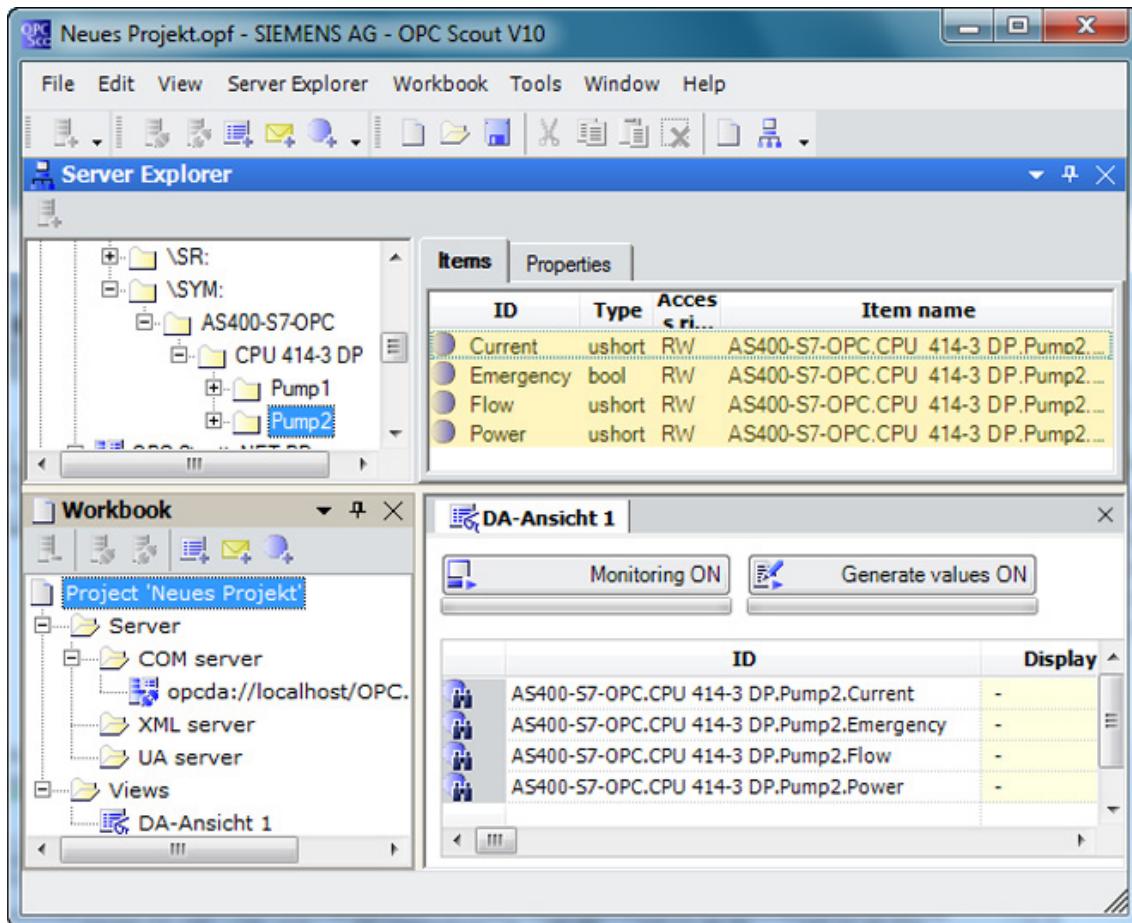
In this example, a CPU 414-3 DP is used.



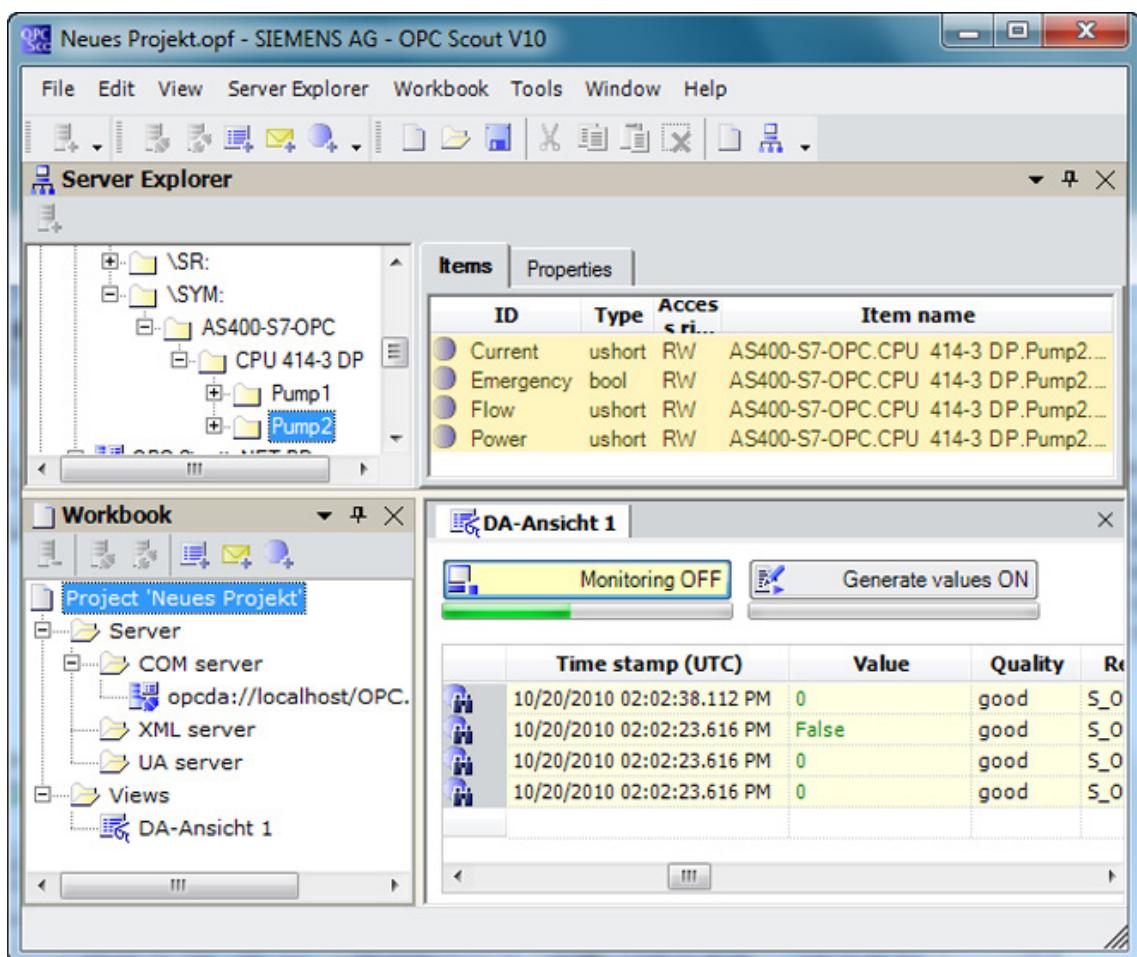
Examples

3.1 OPC application for Industrial Ethernet

3. Select the items "Current", "Emergency", "Flow" and "Power" in the information area using the shift key and mouse. Drag the items in the information area to the OPC Scout V10 view area.



4. Click the "Monitor ON" button in the view area.

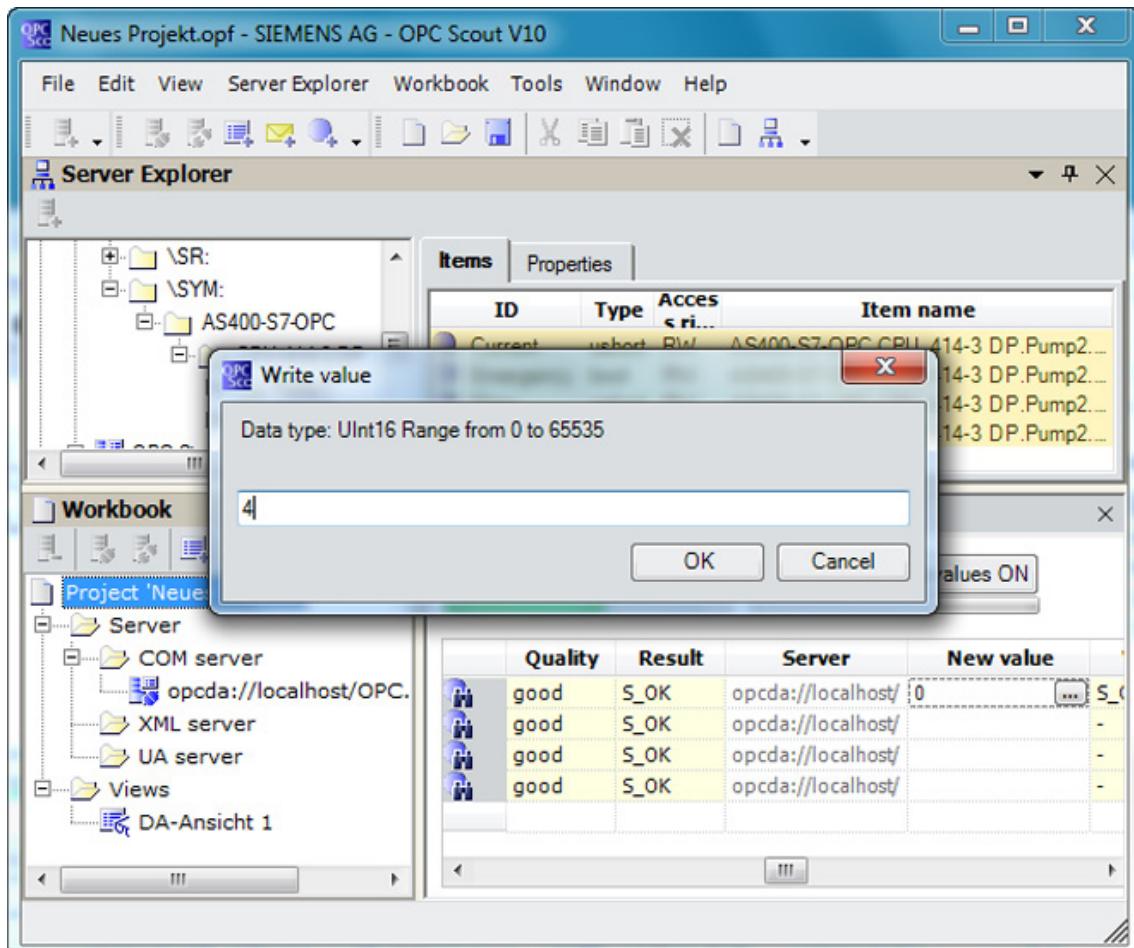


Examples

3.1 OPC application for Industrial Ethernet

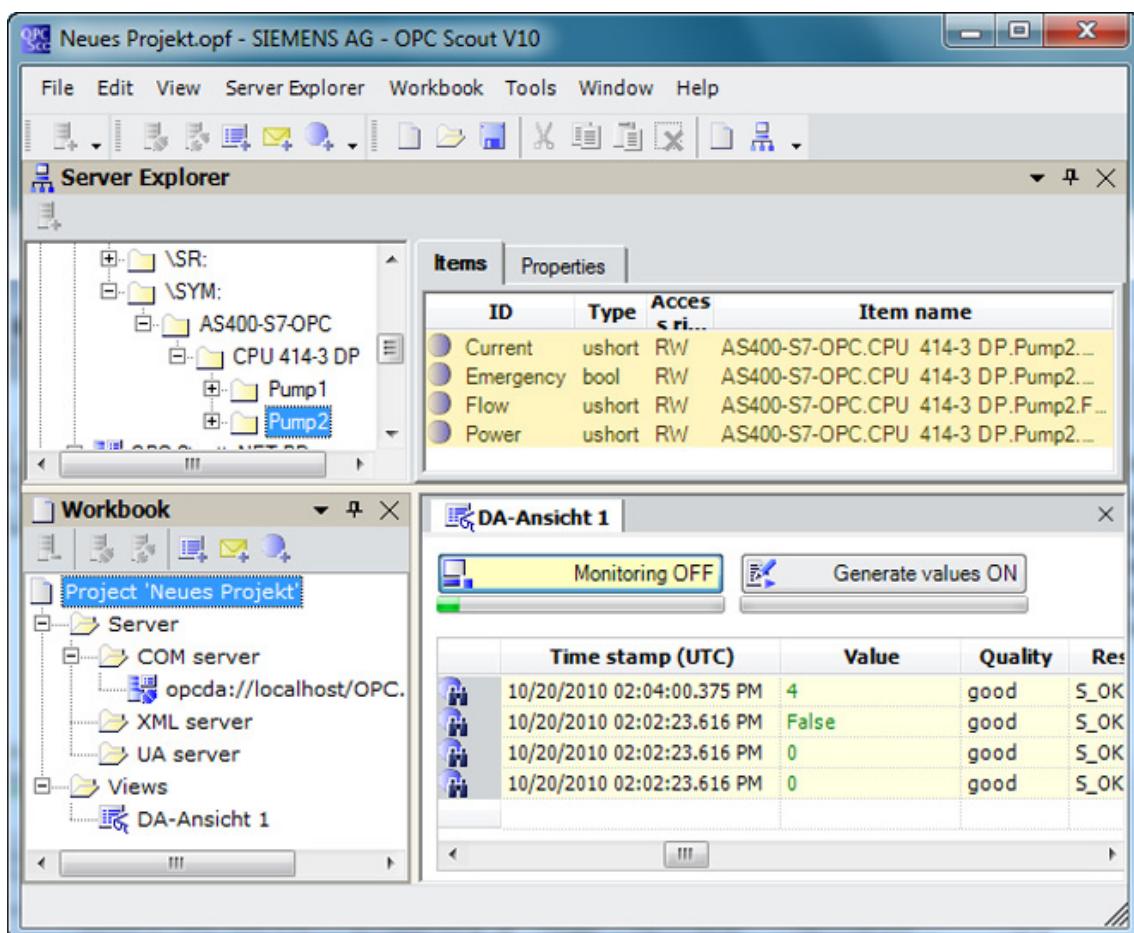
You can change the value of the "Current" item as follows:

1. Double click on the "New value" column in the view area for your "Current" item. Enter a new value and then click the "OK" button.



The new value is displayed in the view area.

2. Click the "OK" button to activate the value.



Note

Array symbols are always displayed by the OPC DA server 0-based. An array with the index range [-2 .. 4] is therefore executed as Array [0 .. 7]. When using the OPC DA server, individual elements can also be addressed. In this case, the original index for symbolic addressing, e.g. Array[-1] must be specified.

3.2 OPC application for PROFIBUS DP

3.2.1 Overview

Explanation of the configuration example

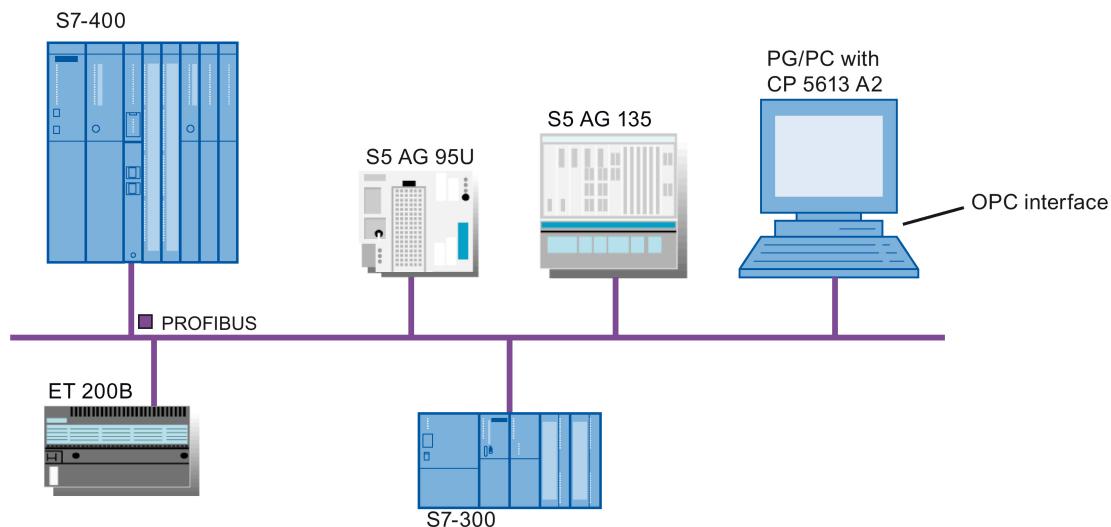
This example illustrates how to couple an ET 200B DP slave with a CP 5613 A2 in a PC station via PROFIBUS DP.

Examples

3.2 OPC application for PROFIBUS DP

In the configuration example presented here, typical communication partners are coupled over PROFIBUS and can be reached via the OPC server.

Example of a PROFIBUS configuration



There is communication between two devices or modules. Communication with an ET 200 B is described in detail below.

You will see which tools are used for configuration and project engineering of a PC station and a DP slave. You will also see how to use the OPC Scout V10 program for communication with the OPC server.

Requirements

If you want to try out the example yourself, you require the following:

- A PC.
- A communications module for PROFIBUS CP 5613 A2.
- Software of the "SIMATIC NET PC Software" CD (NCM installed).
- An ET 200B DP slave.
- PROFIBUS cabling between the PC module and ET 200B.

3.2.2 Hardware and software installation

Follow the steps below to install the software:

1. Turn on the PC and start Windows.
2. Insert the "SIMATIC NET PC Software" CD.
If the installation program does not start the CD automatically, start the "setup.exe" program on the CD.
3. Follow the onscreen instructions of the installation program. Install the SIMATIC NET software and SIMATIC NCM PC.

Follow the steps below to install a CP 5613:

1. Shut down the PC and turn it off.
2. Disconnect the power cable.
Read the instructions for installing cards in the manufacturer's instructions for your PC.
3. Insert the CP 5613 module in a PCI slot.
4. Reassemble the PC as described in the instructions of the PC manufacturer and reconnect the power cable.

Follow the steps below to connect to the network:

1. Connect the PROFIBUS cable to the CP 5613 (DP master).
2. Connect the ET 200B (DP slave) to the PROFIBUS cable.
3. Check the terminators on the connectors. The terminators at both ends of the cable must be activated ("On").

3.2.3 Configuring the PC station

Overview

After starting the PC station, after installing the software and installing the hardware, the CP 5613 or CP 5611 is in "PG mode".

By adding the CP 5613 or CP 5611 in the "Station Configuration Editor", the module is automatically switched to "configured mode".

Handling the project engineering data

Depending on the case, two situations must be distinguished (refer to the section "Steps for initial configuration (Page 33)":)

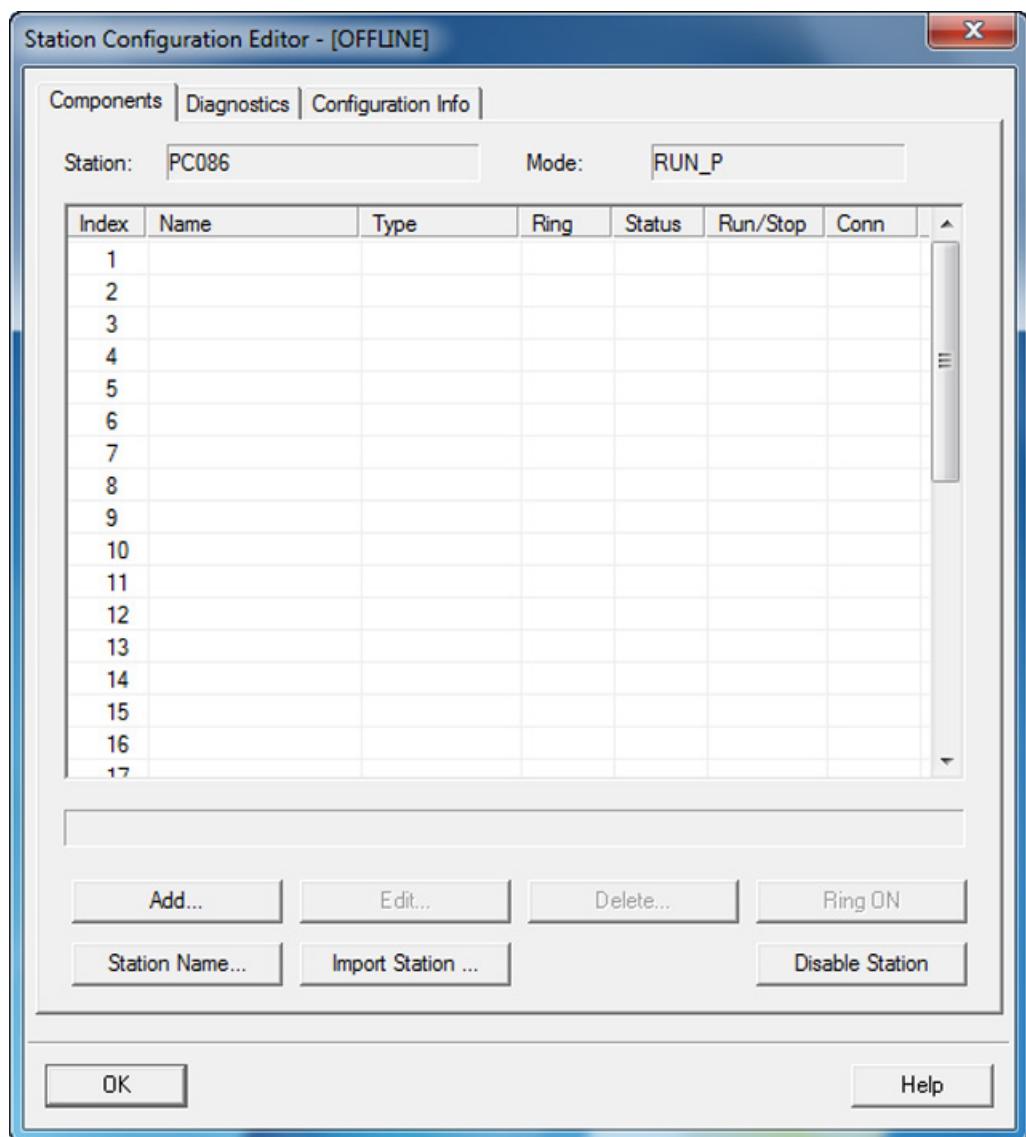
- Project engineering before initial configuration - XDB file available
- Initial configuration not dependent on project engineering

In this example, we assume that no project engineering data is available in the form of an XDB file. The initial configuration is therefore specified in the "Station Configuration Editor".

The initial configuration specified with the "Station Configuration Editor" can later be transferred to the central engineering station on which the automation solution is created.

Follow the steps below:

1. Start the "Station Configuration Editor" by double-clicking on its icon on the desktop.

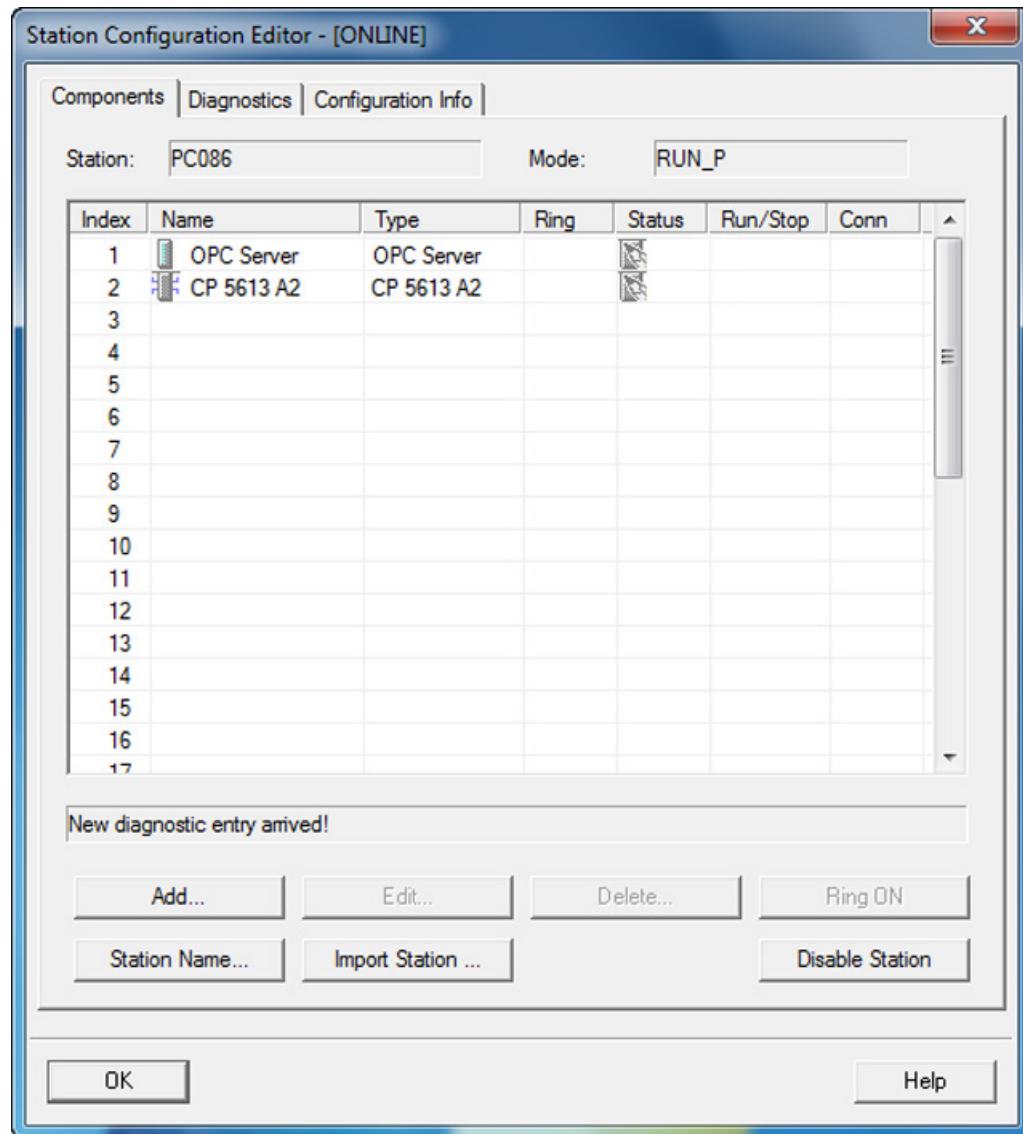


2. Using the "Add..." button, add the OPC server to be operated on the station and confirm the dialog with "OK".

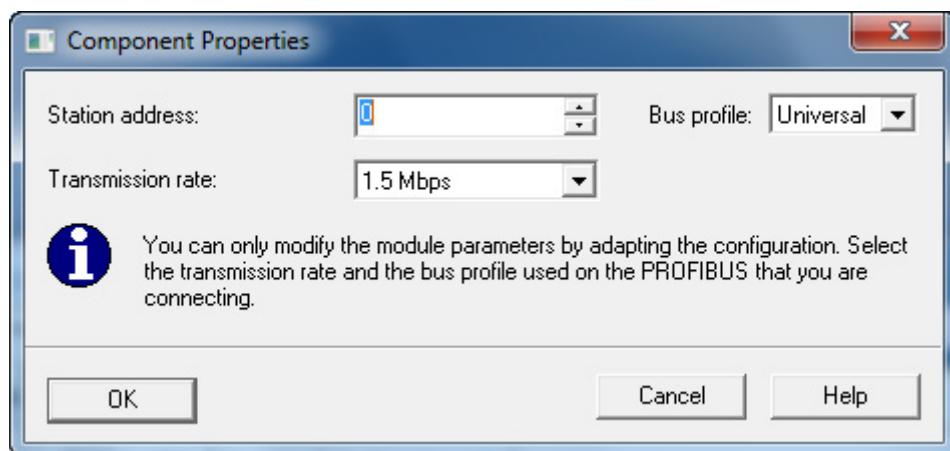
Examples

3.2 OPC application for PROFIBUS DP

3. Using the "Add..." button, select the CP 5613 or CP 5611.



4. Check whether the settings of the module match the local configuration.



5. Confirm the configuration with "OK".

Result: The CP 5613 or CP 5611 is in "configured mode".

The PC configuration is completed.

3.2.4

Changing the configuration on the PC station

Below, you will see how to expand the hardware configuration of the local PC station by a DP master system and a DP slave.

3.2.4.1 Inserting a DP master system

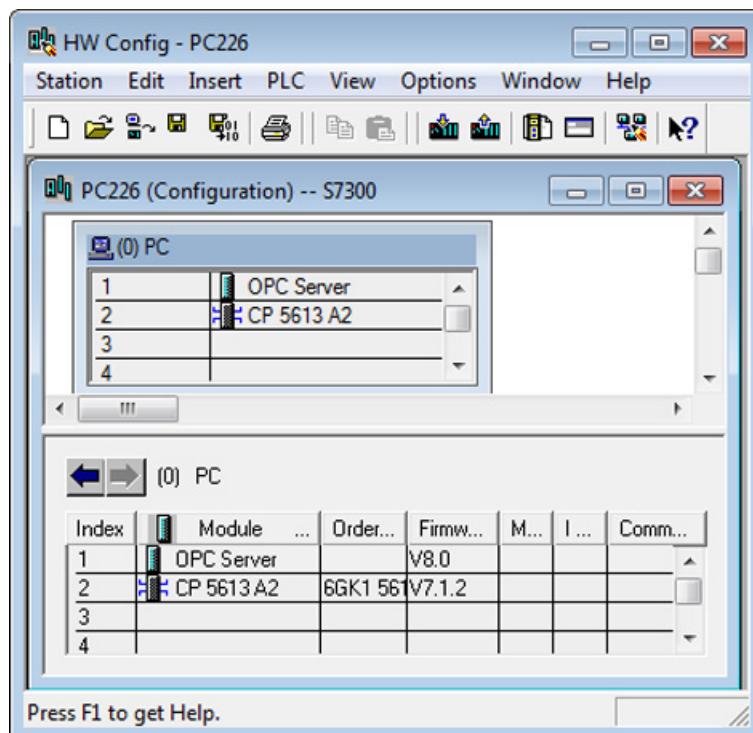
CP 5613 as DP master

In the STEP 7 project, a SIMATIC PC station was created as an image of the local PC. This PC station already includes the OPC server as the basic component for productive communication and the CP 5613.

You require a DP master system so that you can assign DP slaves. For the DP mode, a DP master system must therefore be added to the CP 5613:

Follow the steps below:

1. Select the entry for the CP 5613 and rightclick to open the shortcut menu for this component.



2. Select the "Add Master System" menu command.

Result: The DP master system is inserted.

3.2.4.2 Inserting a DP slave

ET 200B as DP slave

In this section, you insert an ET 200B as DP slave and assign it to the DP master system.

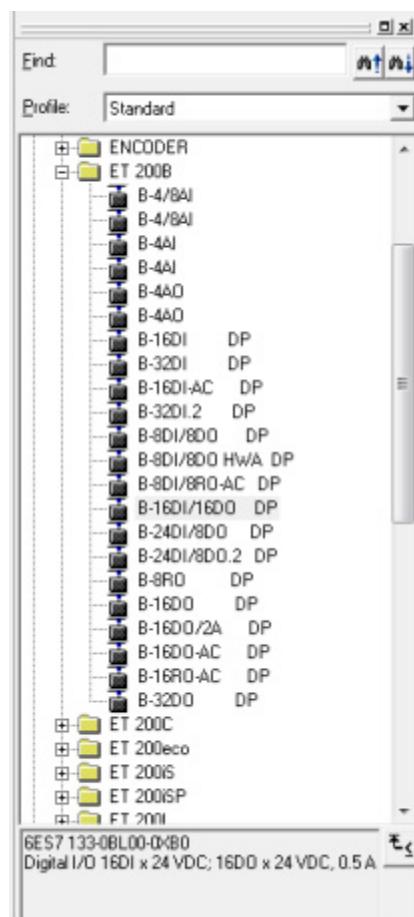
Follow the steps below:

1. Open the catalog in the right pane of the application window.

If it is not already displayed, open the catalog by clicking on the following button:



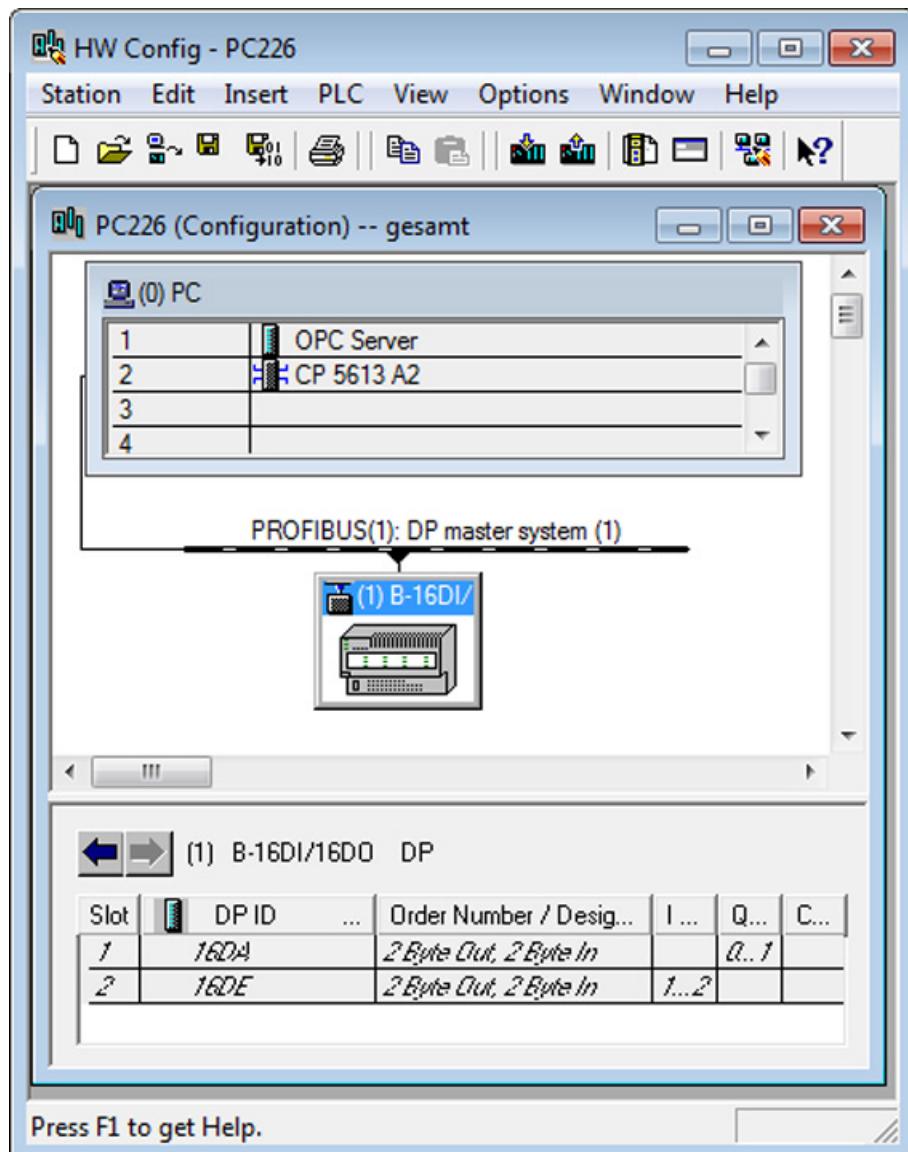
2. Select the DP slave ET 200B with 16 digital input and output bits in the catalog.



3. Holding down the left mouse button, drag the DP slave to the DP master system until the mouse pointer touches the DP master system. Release the mouse button when the "+" symbol appears attached to the mouse pointer.

Confirm the "Properties - PROFIBUS Interface" dialog with "OK".

Reaction: The DP slave is then included in the project.



4. Save and compile the project engineering data by clicking the button below:



5. Click the button below to download the project engineering:



6. Close hardware configuration.

Result: The hardware configuration of the station is downloaded to the automation system.

3.2.5 Using the OPC Scout V10

3.2.5.1 Establishing a connection to the OPC server

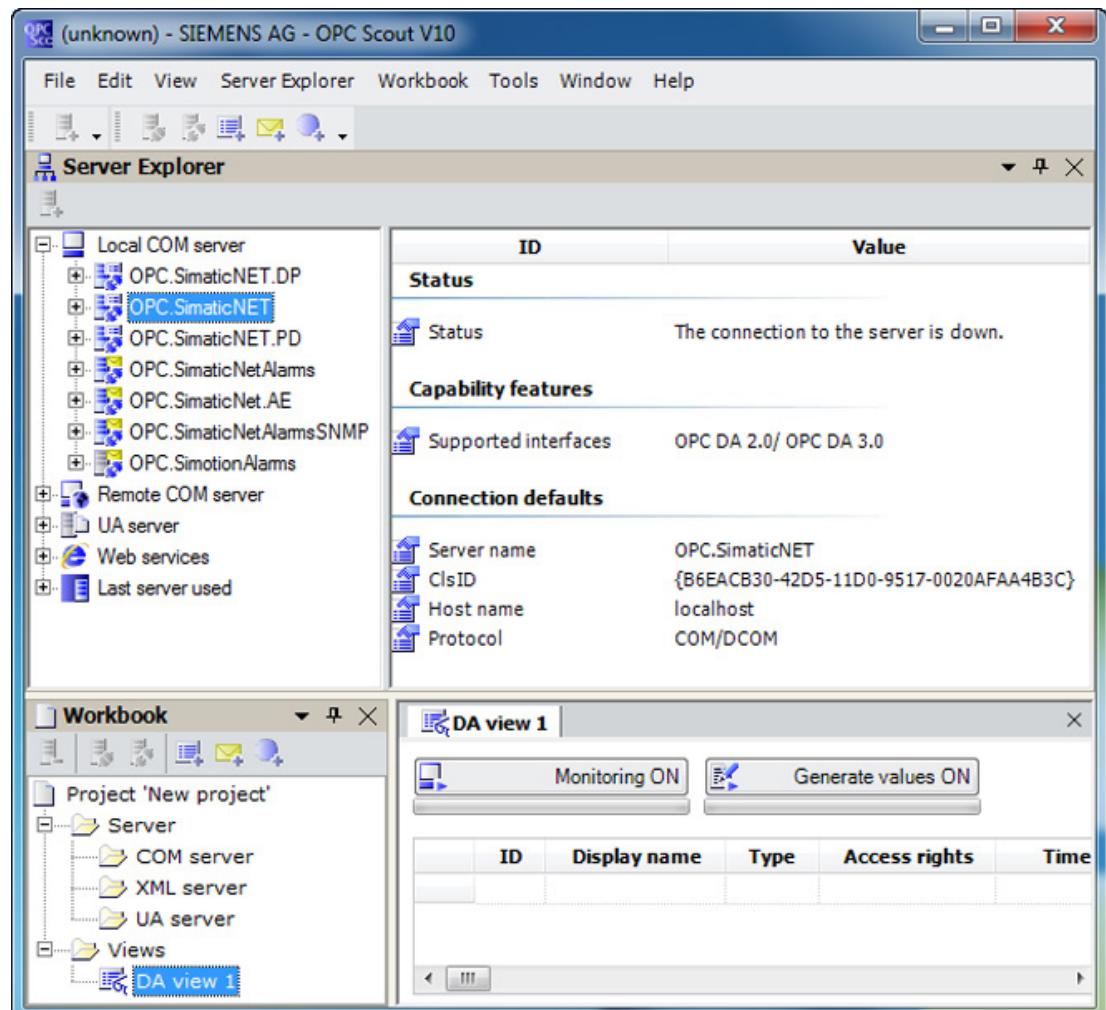
The OPC Scout V10 as client for commissioning and testing

You can now access the objects of the programmable controller with any OPC client. The OPC Scout V10 ships with this product as the tool for commissioning and testing.

Follow the steps below to set the values of the variables of the DP slave with the OPC Scout V10.

Follow the steps below:

1. Start the OPC Scout V10 (Start menu "Start" > "..." > "SIMATIC NET" > "OPC Scout V10").

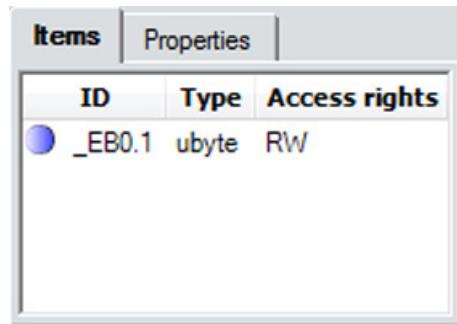


2. Doubleclick the "OPC.SimaticNET" entry to link the OPC Scout V10 with the OPC Server.

Examples

3.2 OPC application for PROFIBUS DP

3. Click "\DP:" > "CP 5613" > "Slave 018" > "_A" in the navigation panel.
4. Select the "_QB0.1" item in the information area and drag it to the view area.
5. Click "\DP:" > "CP 5613" > "Slave 018" > "_E" in the navigation panel.
6. Select the "_IB0.1" item in the information area and drag it to the view area.



The screenshot shows a software window with a title bar. Below the title bar is a tab bar with two tabs: 'Items' and 'Properties'. The 'Items' tab is selected and highlighted in blue. Below the tab bar is a table with three columns: 'ID', 'Type', and 'Access rights'. There is one row in the table containing the following data:

ID	Type	Access rights
_EB0.1	ubyte	RW

3.2.5.2 Displaying and modifying values of variables

Executing synchronous and asynchronous write jobs

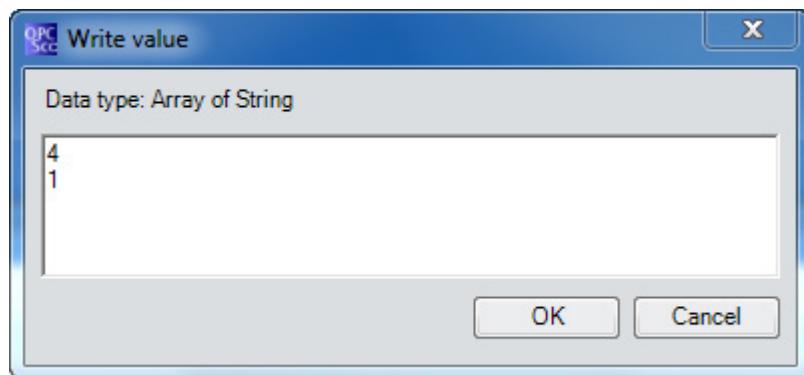
Follow the steps below:

1. The selected variables are displayed with the following additional information in the table of the view area:
 - The current value of the variable
 - Access rights
 - Information about the integrity of the data
 - Time stamp
2. To enter a new value or to change a value, double click on the cell of the "New value" column in the view area.

ID	Display name	Type	Access rights	Value	Result	Server	New value	Write re
S7:@	-	ubyte	RW			opcda		

Reaction: The "Write value" dialog opens in which you can change the value of a variable.

3. Enter a new value in each line.



4. Click the "OK" button to start the write job.
5. Click the "Write" button in the OPC Scout V10 view area.



3.3 Unspecified S7 connection from a PC application

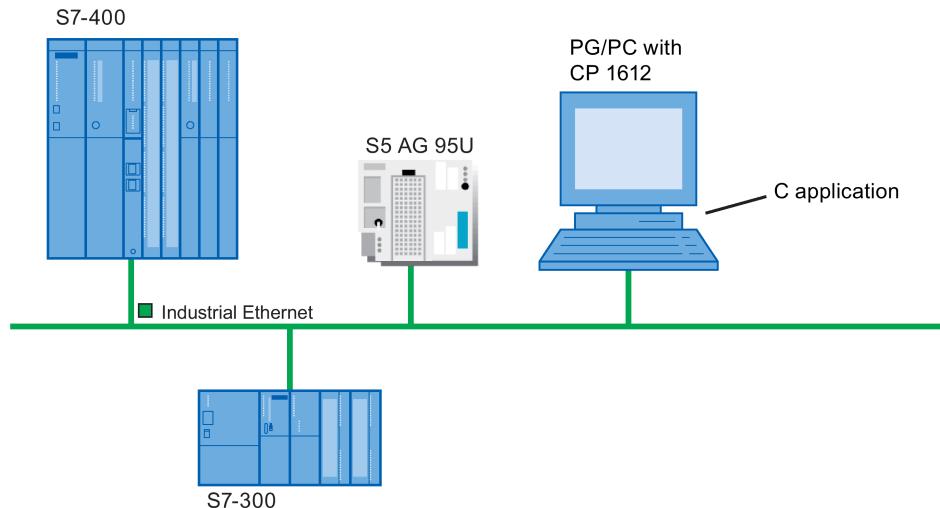
3.3.1 Overview

Explanation of the configuration example

In this chapter you will learn how to configure and commission an S7 connection from an existing PC application with the aid of the SIMATIC NET PC Software CD.

In the configuration example presented here, typical communication partners are coupled over Industrial Ethernet and are reached over the OPC server.

Example of an Industrial Ethernet configuration



There is communication between two devices or modules. Communication with an S7400 station using the S7 protocol with an unspecified S7 connection is described in detail below.

3.3.2 Installing the software

Follow the steps below to install the software:

1. Turn on the PC and start Windows.
2. Insert the "SIMATIC NET PC Software" CD.

If the installation program does not start the CD automatically, start the "setup.exe" program on the CD.

3. Follow the onscreen instructions of the installation program.

3.3.3 Configuring the PC station

Overview

After starting the PC station, installing the software and installing the hardware, the PC module of the PC station is in "PG mode".

By adding the communications module in the "Station Configuration Editor", the module is automatically switched to "configured mode".

Handling the project engineering data

Depending on the case, two situations must be distinguished (refer to the section "Steps for initial configuration (Page 33)":

- Project engineering before initial configuration - XDB file available
- Initial configuration not dependent on project engineering

In this example, we assume that no project engineering data is available in the form of an XDB file. The initial configuration is therefore specified in the "Station Configuration Editor".

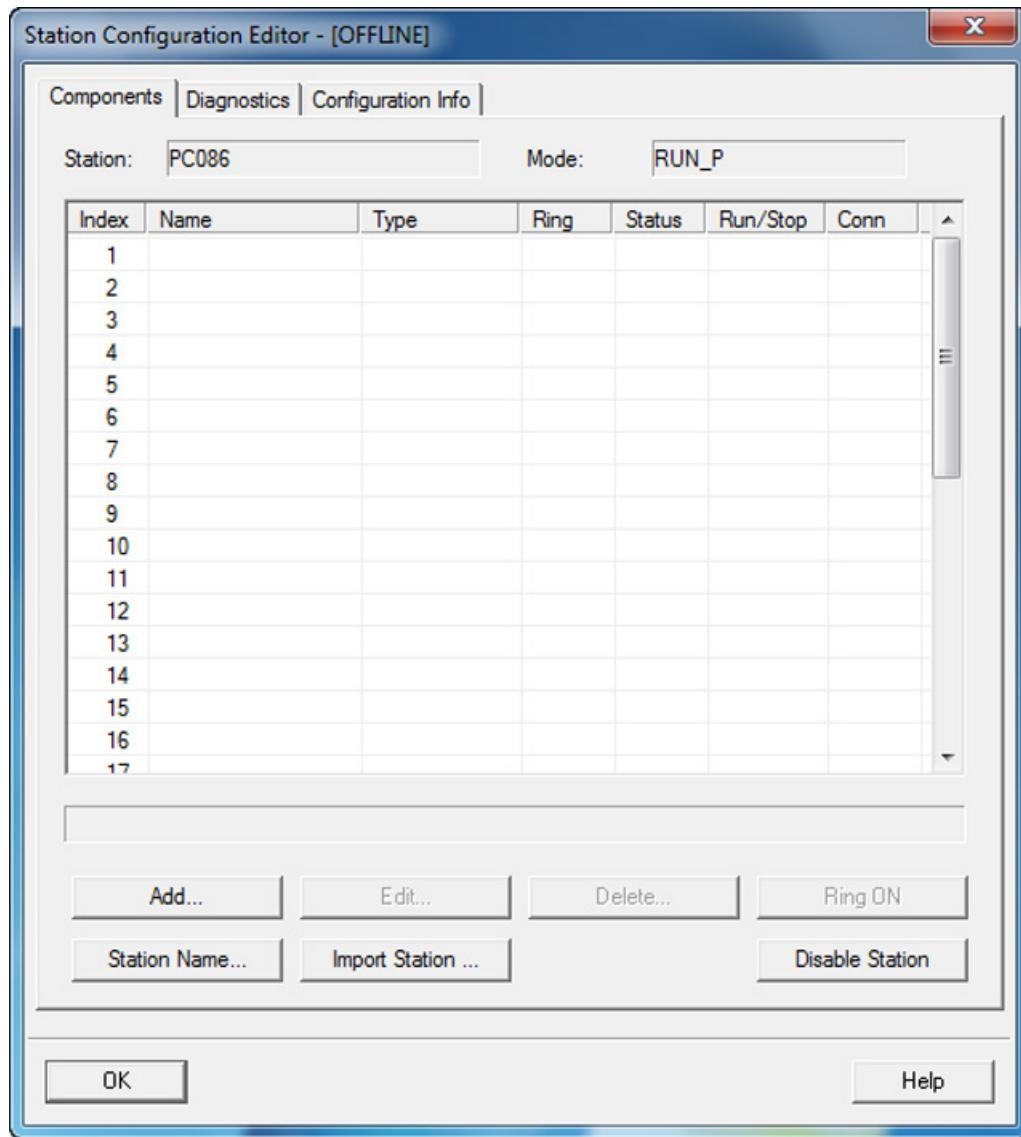
You can load the initial configuration specified with the "Station Configuration Editor" into the project engineering system at a later point in time.

Examples

3.3 Unspecified S7 connection from a PC application

Follow the steps below:

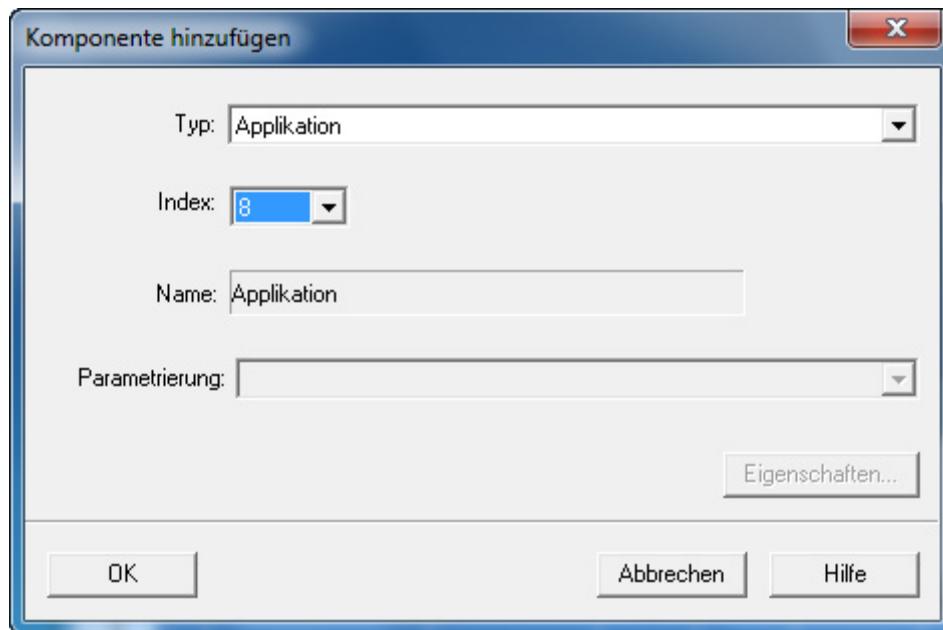
1. Start the "Station Configuration Editor" by double-clicking on its icon on the desktop.



2. Select the first row and click the "Add..." button to include the application.

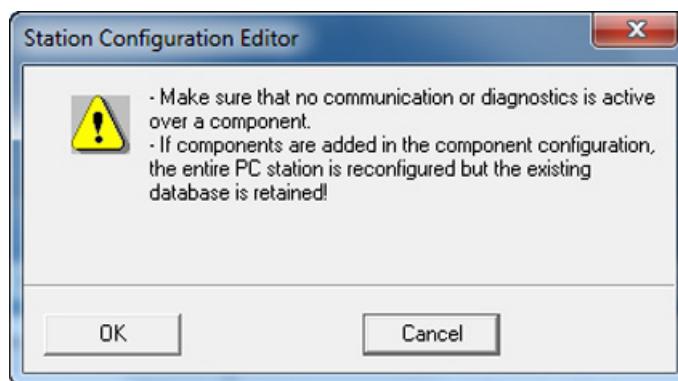
Reaction: The "Add component" dialog box opens.

- In the "Type" box, select The application and in the "Index:" box, select the slot.



The name of the application is the VFD name in your C application (assigned in STEP 7; refer to the section "Editing the network and connection project engineering (Page 138)"). If you have several VFDs, you must also include several applications and assign the corresponding VFD names.

- If the selected index causes a conflict with the slot number configured in STEP 7 HW Config, the configuration cannot be downloaded.
In this case, confirm the dialog with "OK".
- Before the application can be adopted, the PC station must be restarted.



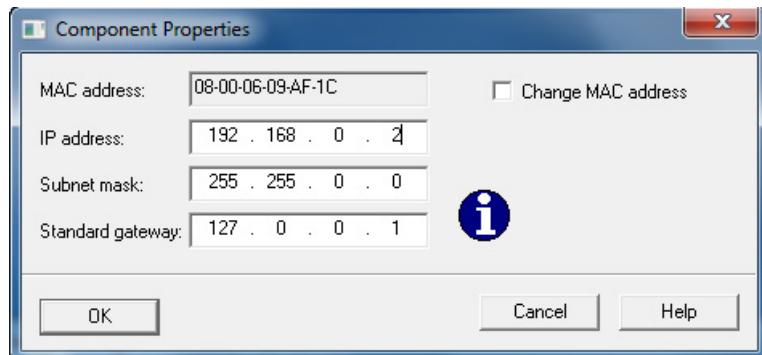
Confirm the dialog with "OK"

- Using the "Add..." button, select the CP 1612.

Examples

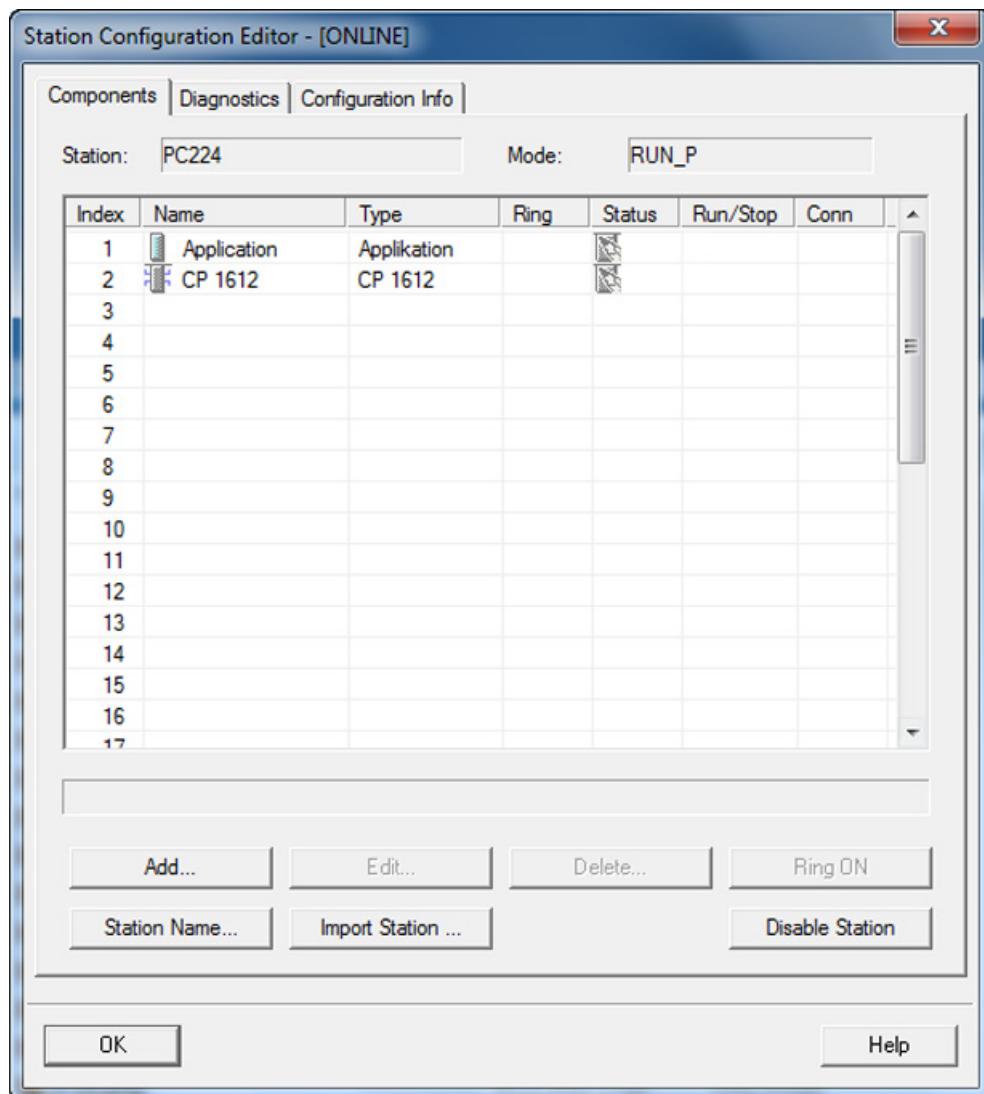
3.3 Unspecified S7 connection from a PC application

7. Check whether the settings of the module match the local configuration.



Confirm the dialog with "OK".

Reaction: The application and the CP 1612 are inserted in the "Station Configuration Editor".



8. Confirm the dialog with "OK".

CAUTION

The IP addresses are read out automatically. Please note that when using DHCP, the IP addresses can change each time the PC restarts. These changes are not automatically updated in the project engineering. Here, a synchronization is necessary otherwise the configured connections will not be established and communication will not be possible.

3.3.4 Creating, editing and downloading a STEP 7 project

Below, you will see how to create a new STEP 7 project, add an S7 connection and download the project engineering data to the target system.

3.3.4.1 Creating a new project

Follow the steps below:

1. Start the SIMATIC NCM Manager (Start menu "Start" > "..." > "SIMATIC" > "SIMATIC NCM Manager").
2. Create a PC station in an existing or new project.
Change to SIMATIC NCM PC Config / HW Config and enter the intended modules and applications (take them from the catalog).
3. Save the configuration.
4. Change to NetPro to network the station and to create the connections in the project engineering.

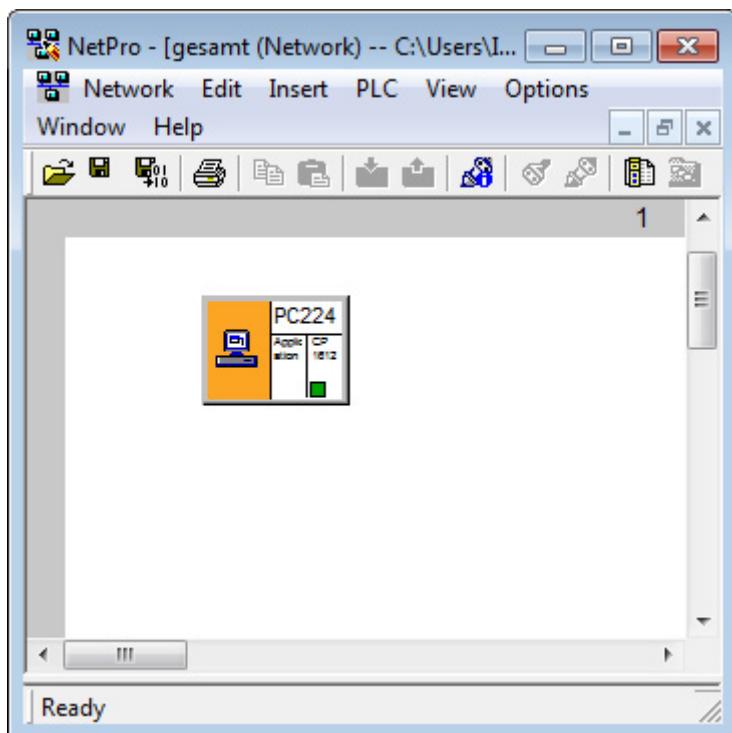
Note

For more detailed information on creating a new project, refer to the section "Steps in project engineering (Page 28)".

3.3.4.2 Editing the network and connection project engineering

Follow the steps below:

1. Change to NetPro to network the station and to create the connections in the project engineering.

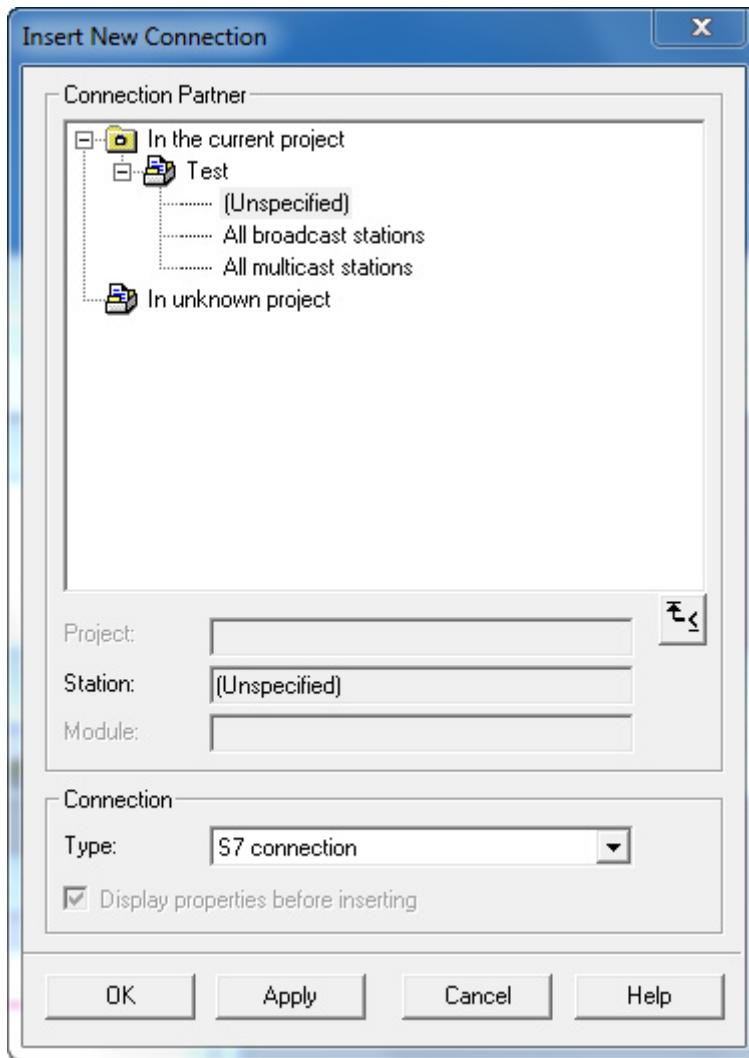


2. In NetPro, you can enter the VFD name of the application (for example VFD 20). You do this by doubleclicking on "Application" and entering the required name.

3. To insert a connection, you must select the application.

Select the "Application" object and then select "Insert" > "New Connection".

Reaction: The "Insert New Connection" dialog box opens.



4. You can select the partner, however, only if it already exists in the project. In this example, you configure an unspecified connection. In the case of an S7 connection, no project engineering whatsoever is required at the partner end.

5. In the "Connection Partner" box, select "(unspecified)" for the station.

6. In the "Connection" box, select "S7 connection" as the type.

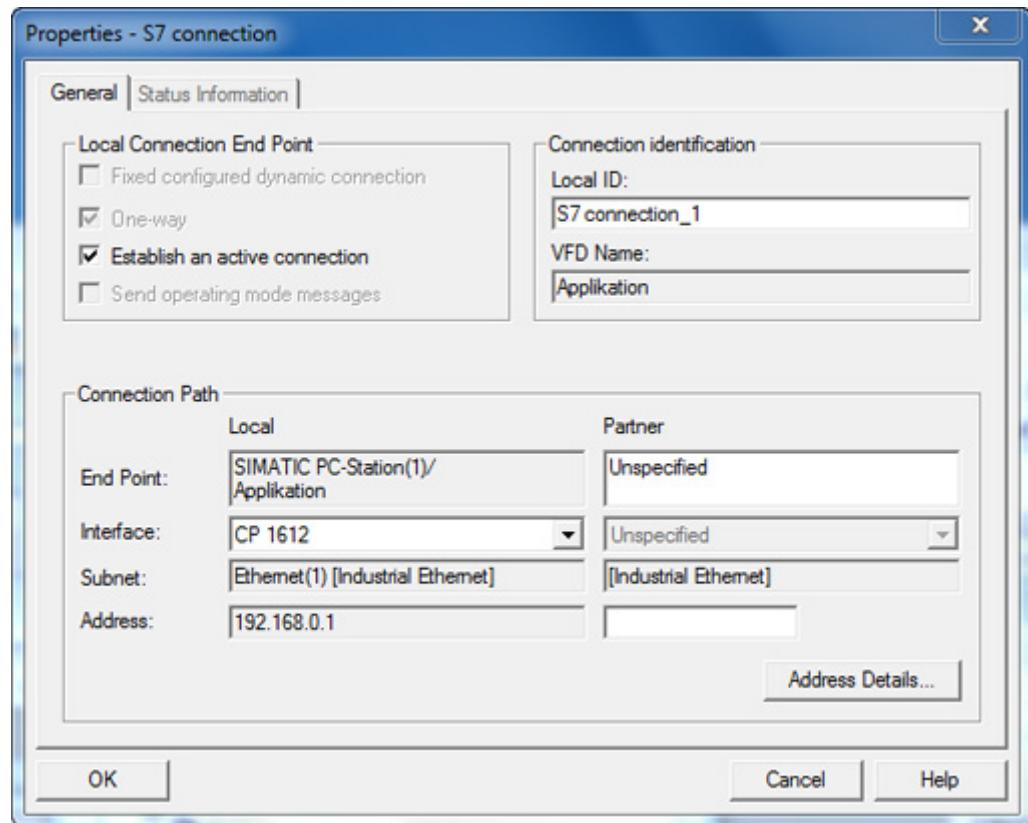
To be able to establish the connection, the partner station must be specified by the network address and access point of the partner application (slot).

Examples

3.3 Unspecified S7 connection from a PC application

7. Confirm with "OK".

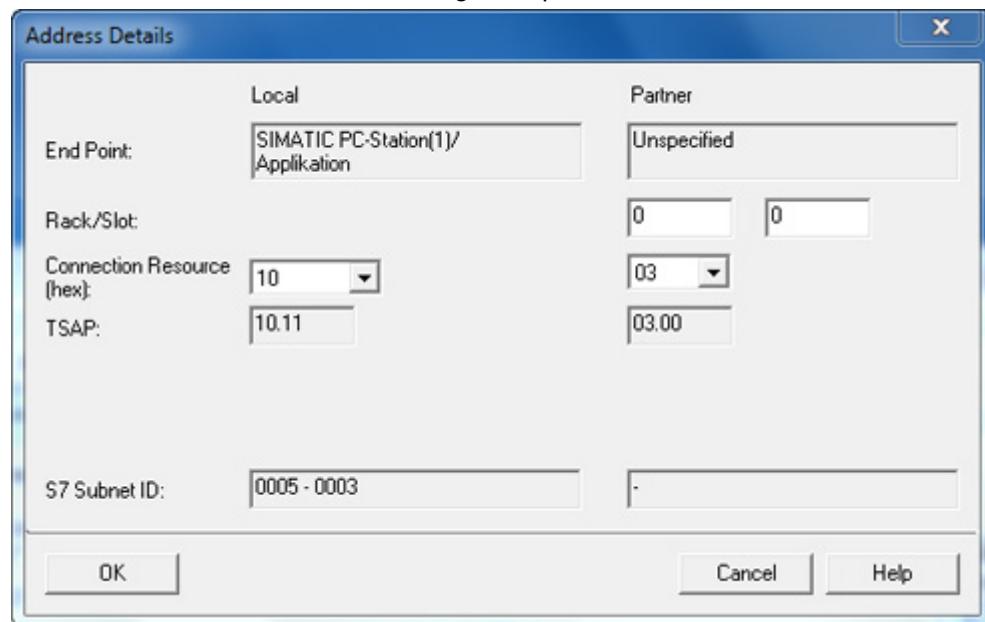
Reaction: Once you have created a new connection, the "Properties - S7 connection" dialog opens.



8. Enter the address of the partner in the field indicated.

9. Click the "Address Details" button.

Reaction: The "Address Details" dialog box opens.



10. To specify the access point of the partner application, enter the slot of the CPU in the SIMATIC S7. Once you have specified the slot, click the "OK" button.

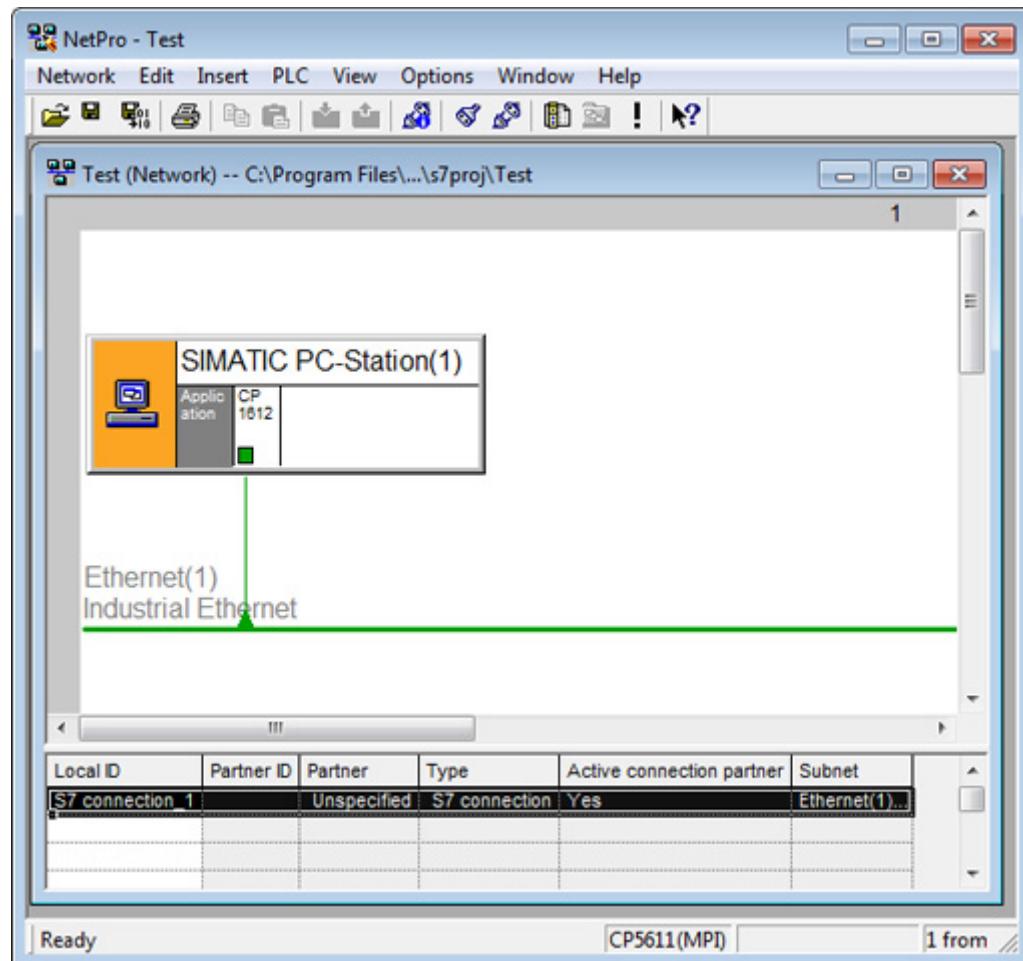
Reaction: The "Properties - S7 connection" dialog box opens.

Examples

3.3 Unspecified S7 connection from a PC application

11. Once again, confirm with "OK".

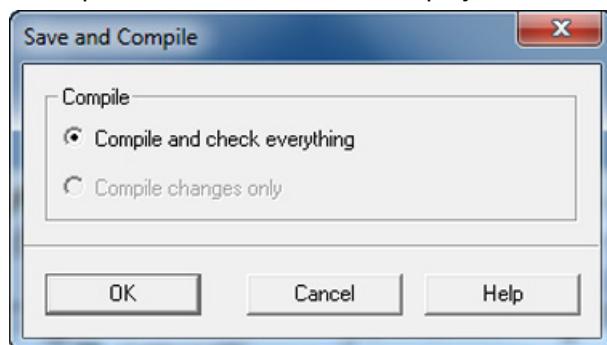
Reaction: The following menu appears:



Result: Configuration of the connection is now completed.

12. Save and compile the project with the menu command "Network" > "Save and Compile".

This updates the information in the project.



Confirm with "OK".

13. You might be informed of errors by the consistency check.

You can only download the project when it is free of errors. If you receive a warning, this is only for your information. You can close the window and download to the PC station.

Examples

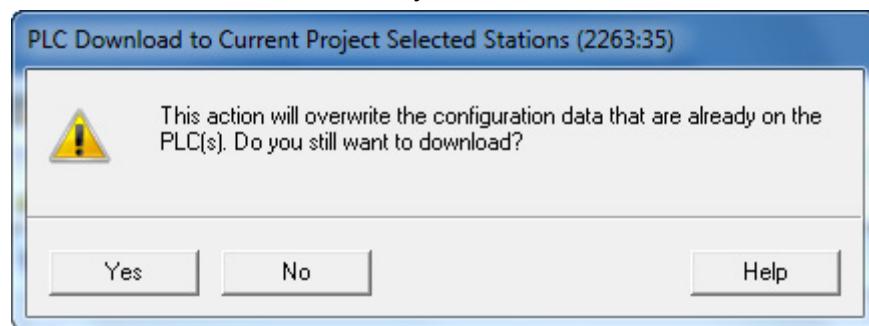
3.3 Unspecified S7 connection from a PC application

3.3.4.3 Downloading the project engineering configuration

Follow the steps below:

1. Load project engineering locally in the Station Manager on your PC.

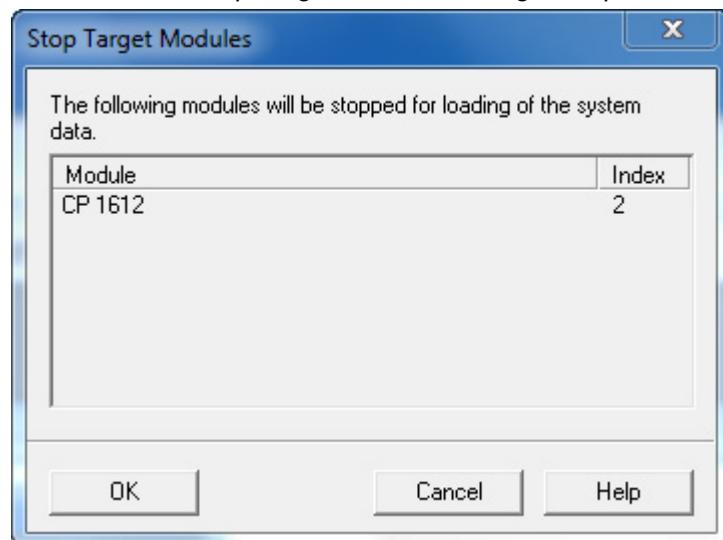
"PLC" > "Download to Current Project" > "Selected Stations".



Downloading deletes the existing data on the relevant component and overwrites it with new information.

2. Confirm with "Yes".

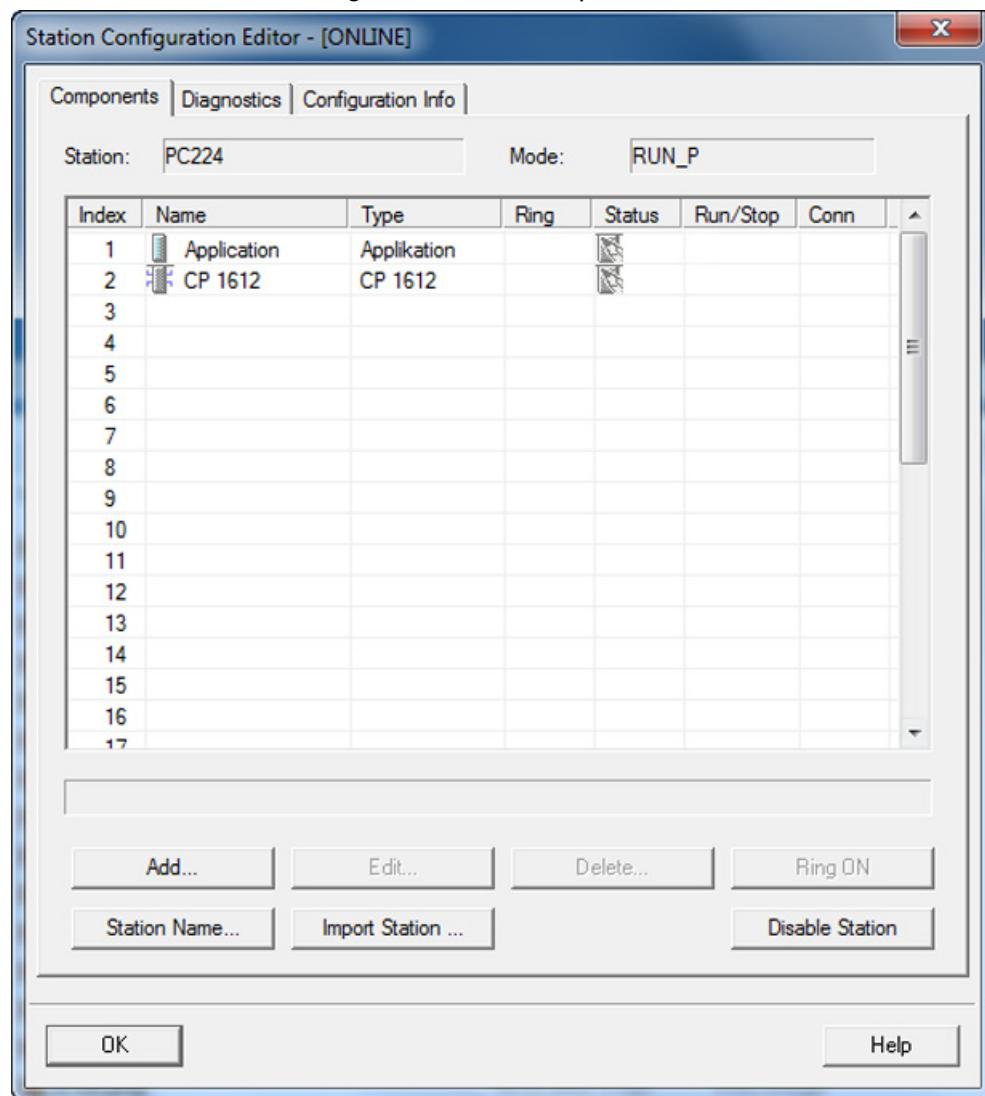
Reaction: The "Stop Target Modules" dialog box opens.



3. Confirm with "OK" to complete the loading and to start the module.

4. Open the "Station Configuration Editor".

Reaction: The "Station Configuration Editor" is opened.



Result: The application and the CP 1612 are inserted in the "Station Configuration Editor".

5. Confirm the dialog with "OK".

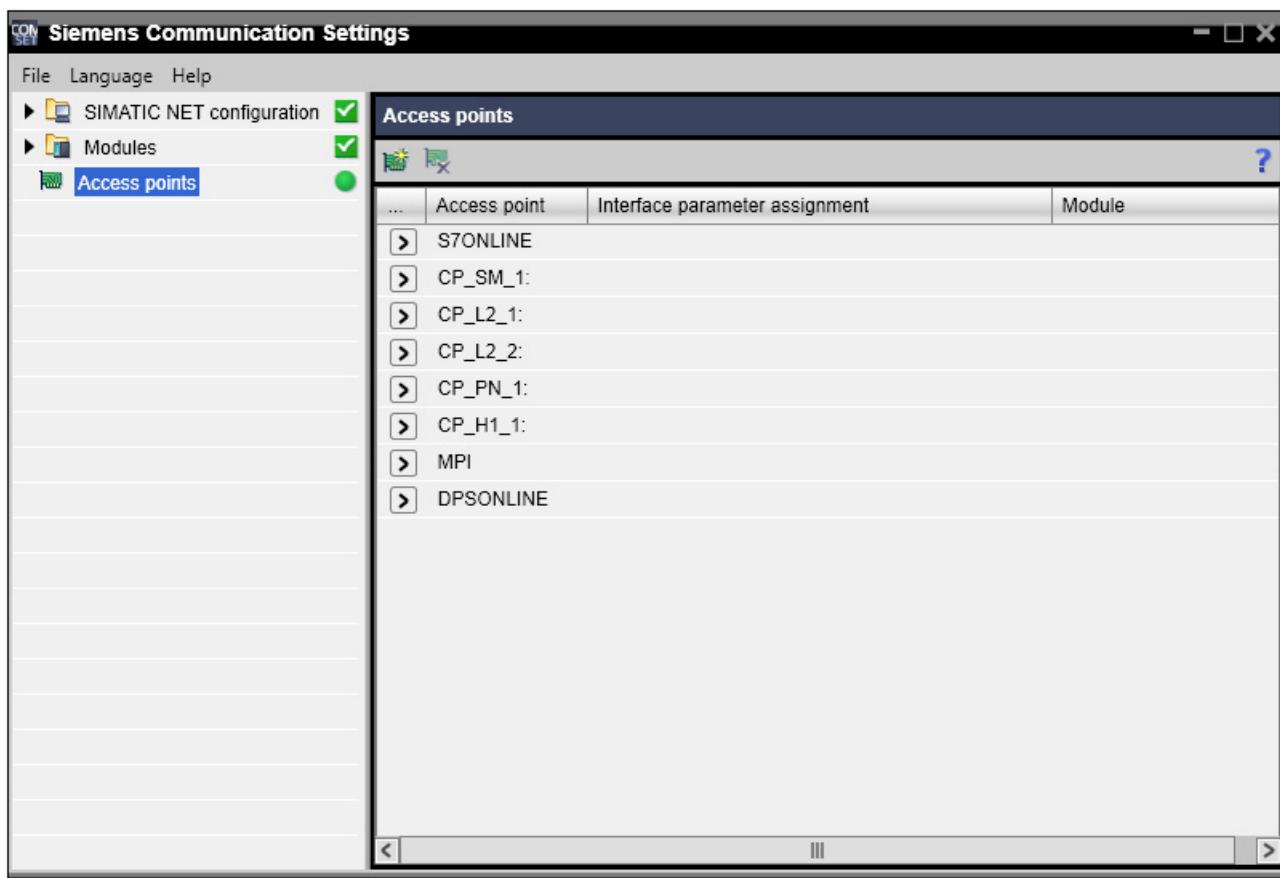
3.3.5 "Communication Settings" configuration program

The "Configuration Settings" configuration program makes all local settings and diagnostics functions possible. You also have the settings or diagnostics results of the PC modules (for example CP 1612) and of the applications (for example the OPC server) at a glance.

Communication Settings

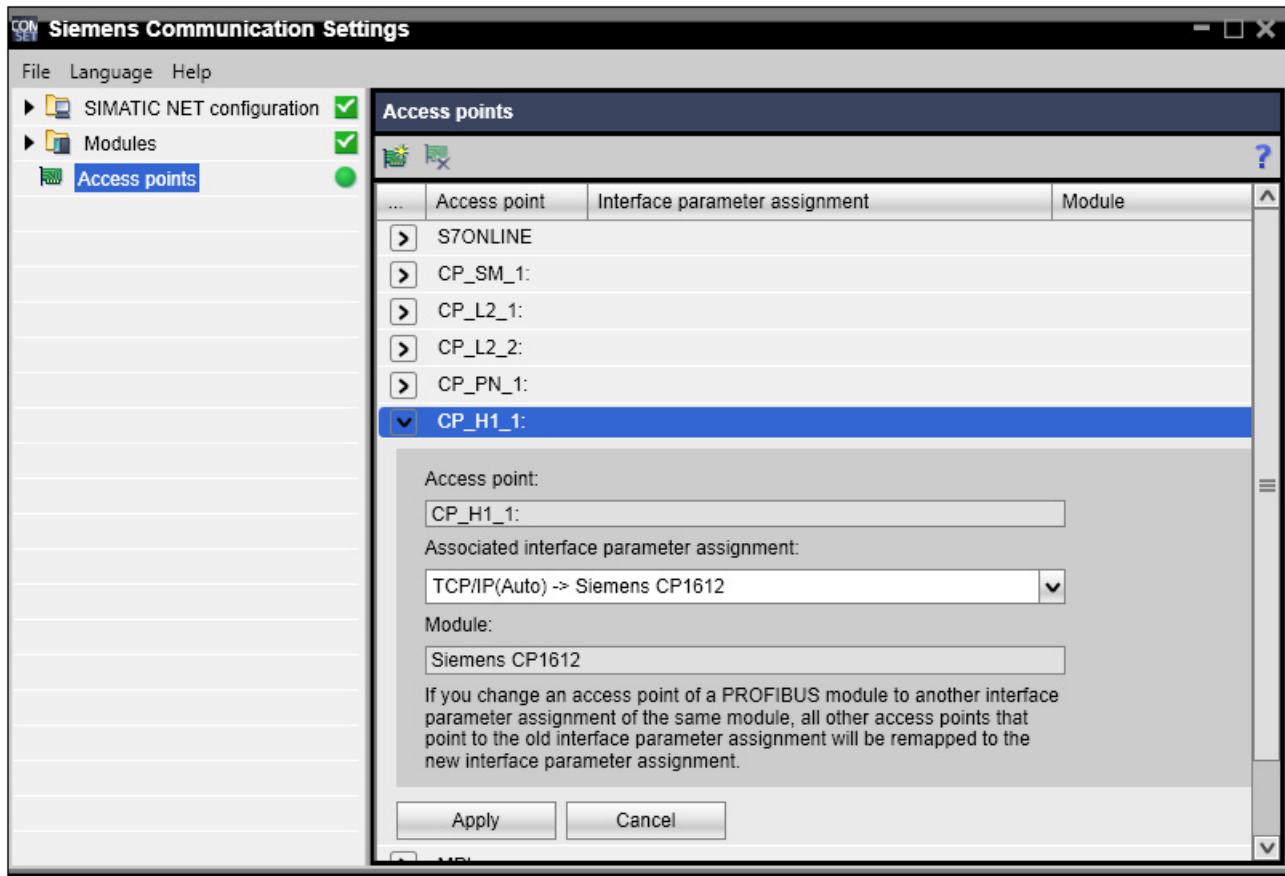
Follow the steps below:

1. Start the "Communication Settings" configuration program
Start menu "Start" > "..." > "SIMATIC NET" > "Communication Settings".
Reaction: The "Communication Settings" configuration program is started.
2. Click on "Access points" in the tree view.
If you have not used a standard access point and do not want to modify your application, you will need to add your access point yourself:
Right mouse button "New" > "New Access Point".
You can now specify your access point and select it.



3. Click on the arrow symbol next to "CP_H1_1".
Reaction: The expanded parameter list opens.

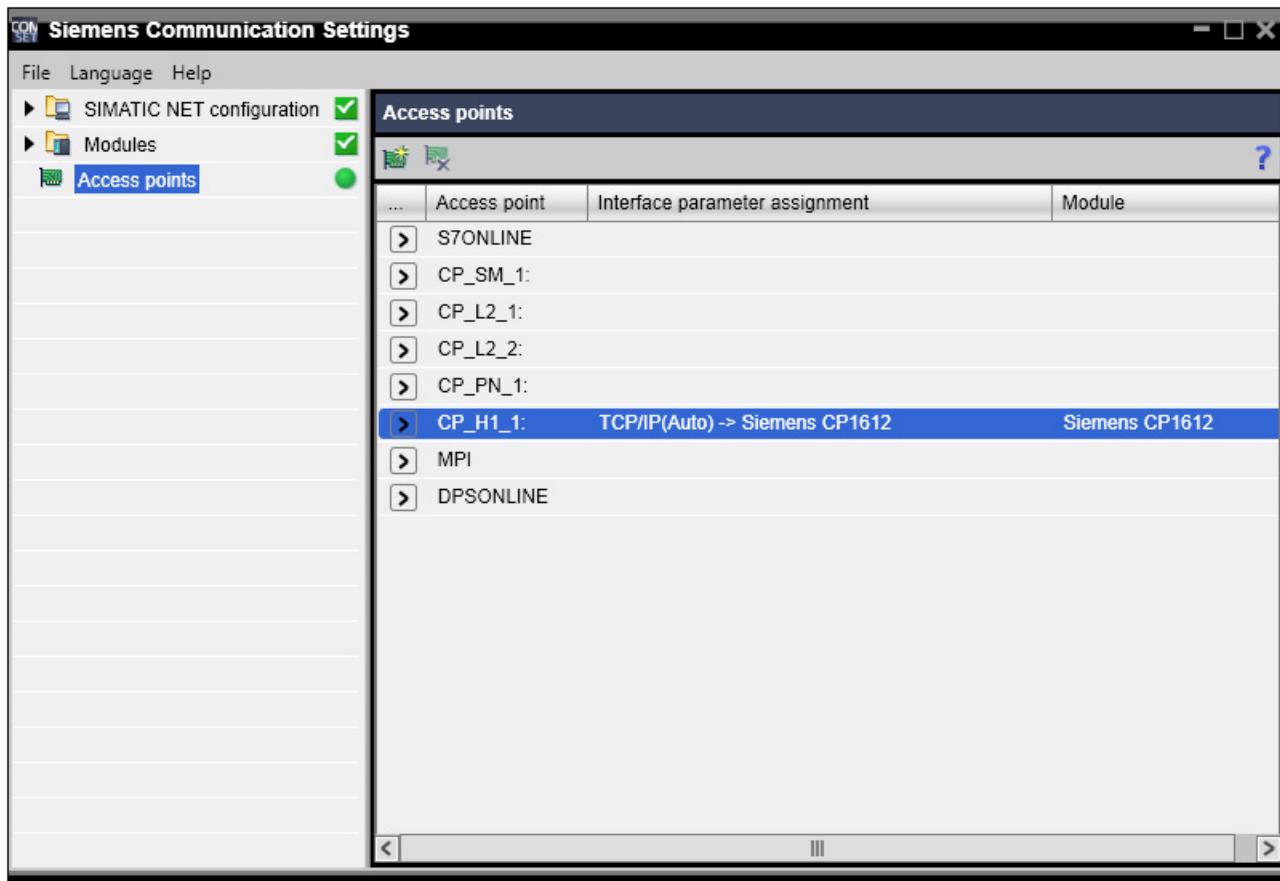
4. Select your module under "Assigned interface parameter assignment".



5. Acknowledge with "Apply" and click the arrow symbol next to "CP_H1_1".
Result: The setting is applied in the configuration program.

Examples

3.4 Unconfigured S7 connection with the OPC Scout V10



When you now start your application, it functions without changes in the source code.

3.4 Unconfigured S7 connection with the OPC Scout V10

Overview

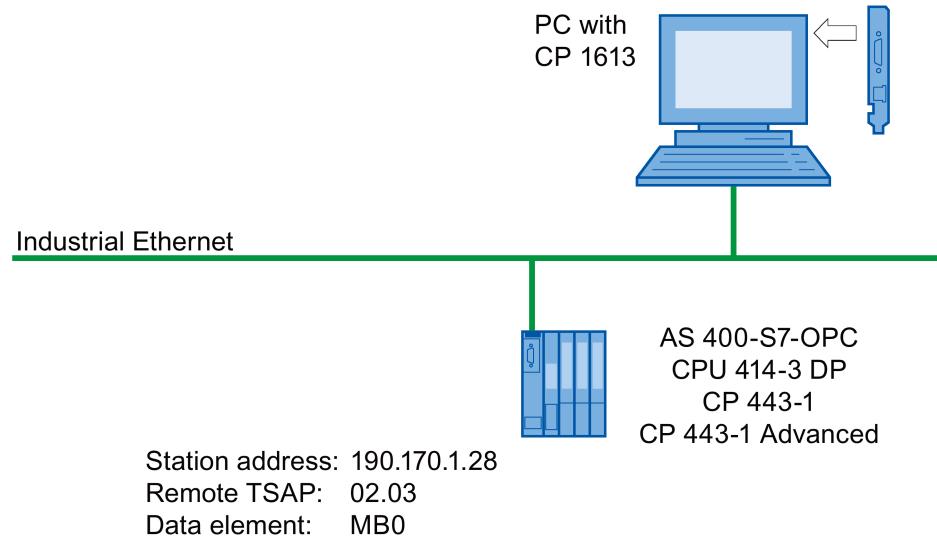
Below, you will find three examples of configurations in which an unconfigured S7 connection is established:

- Example 1 - Industrial Ethernet via TCP/IP (Page 149)
Unconfigured S7 connection with a CP 1613 to a SIMATIC S7-400 with a CPU 414-3 DP.
- Example 2 - Industrial Ethernet over ISO (Page 158)
Unconfigured S7 connection with a CP 1612 or general communications module for Industrial Ethernet to a SIMATIC S7-400 with a CPU 414-3 DP.
- Example 3 - PROFIBUS (Page 167)
Unconfigured S7 connection with a CP 5614 A2 to a SIMATIC S7-400 with CP 414-3 DP.

3.4.1 Example 1 - Industrial Ethernet via TCP/IP

Description

This example shows how to couple an AS 400-S7-OPC with a CPU 414-3 DP over an unconfigured S7 connection via Industrial Ethernet (using TCP/IP).



Requirements

If you want to try out the example yourself, you require the following:

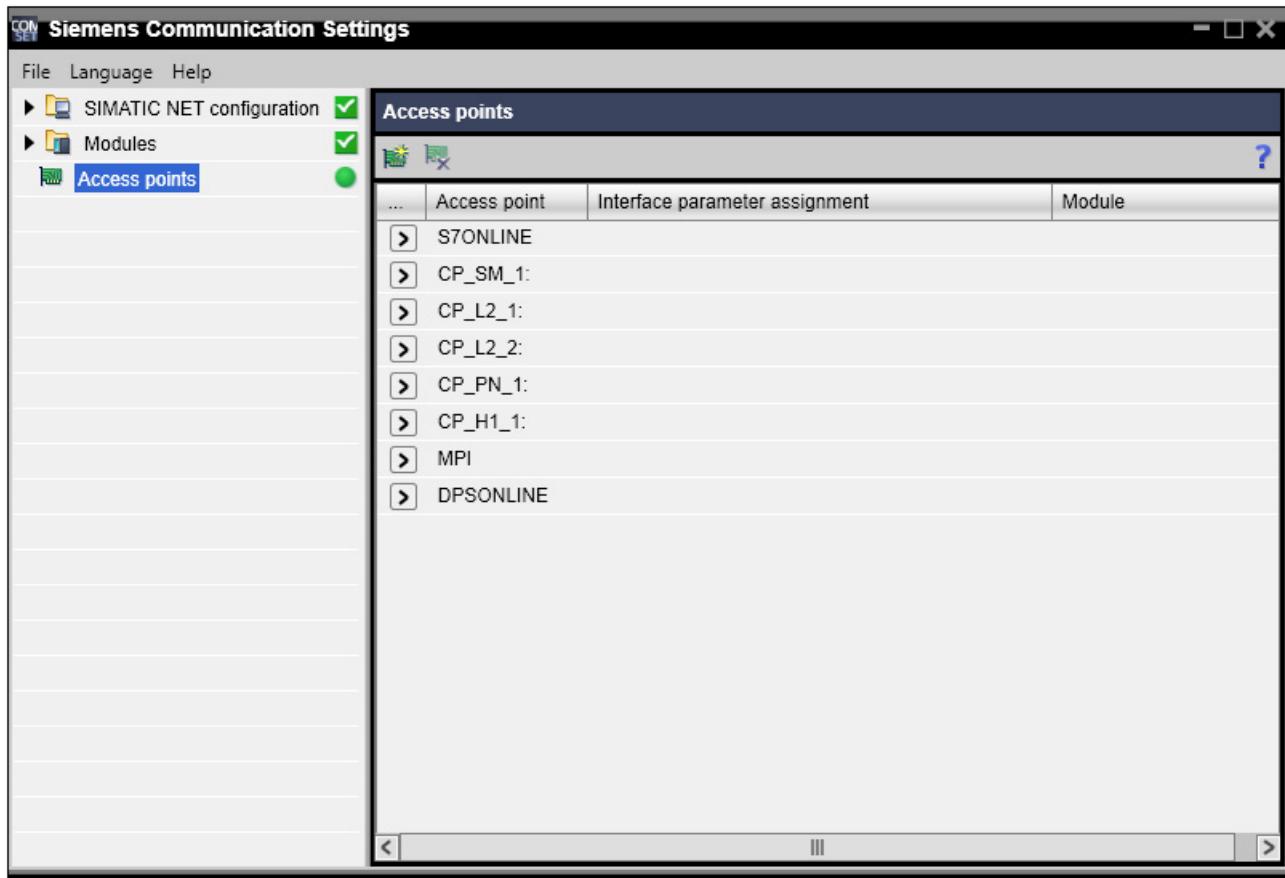
- A PC with the CP 1613 communications module for Industrial Ethernet.
You will find detailed instructions on installation in the product information/installation instructions supplied with the communications module.
- The installed software of the "SIMATIC NET PC Software" CD.
You will find details in the installation instructions "SIMATIC NET, PC Software ...", supplied with the software.
- A SIMATIC AS 400-S7-OPC with CPU 414-3 DP.
- Industrial Ethernet cabling between the PC module and S7 device.
- The SIMATIC AS 400-S7-OPC used in this example has station address "190.170.1.28", a remote TSAP of "02.03" and the data element "MB0".

3.4.1.1 Engineering of the unconfigured S7 connection - Example 1

This section describes how you set up the access point with the "Communication Settings" configuration program to allow an unconfigured S7 connection over the CP 1613 using the TCP/IP protocol.

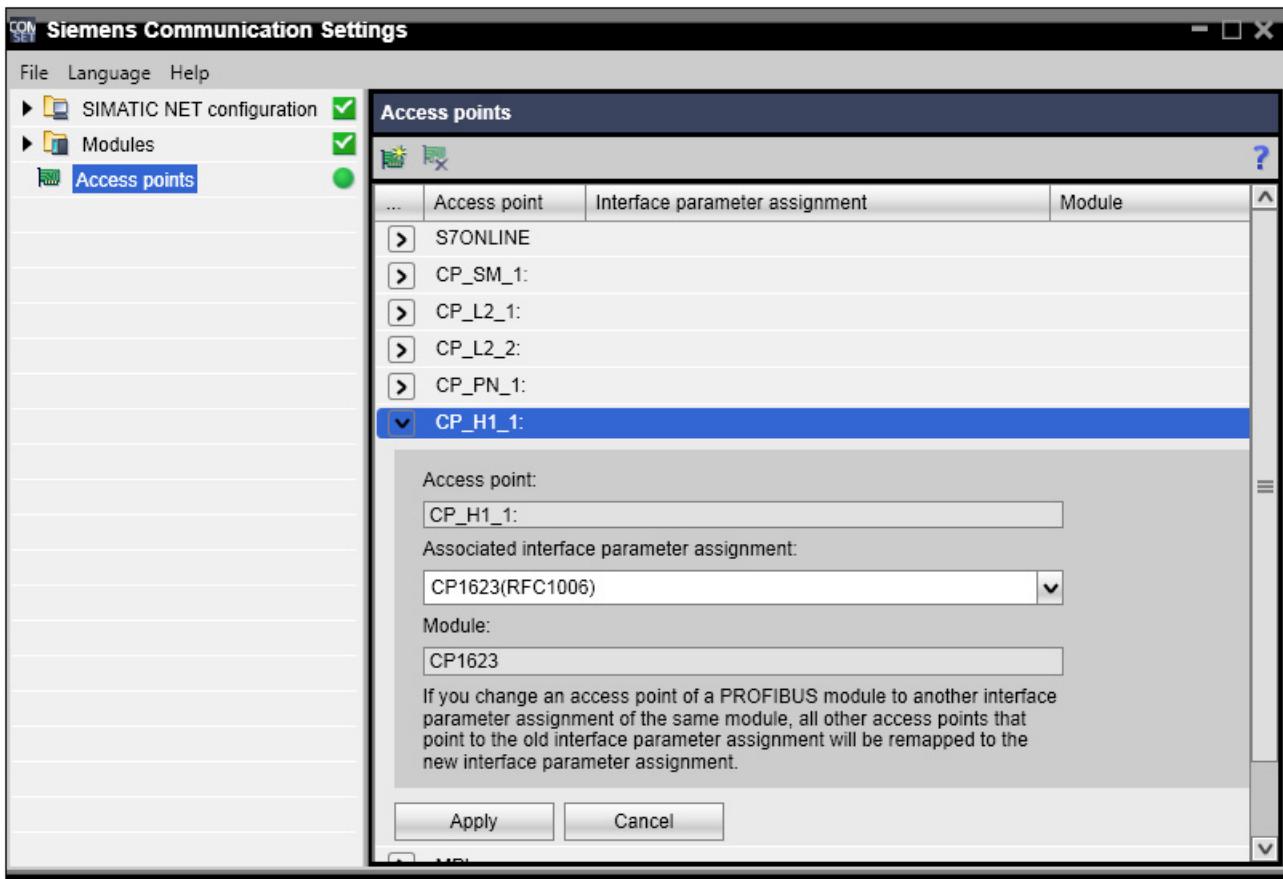
Follow the steps below:

1. Start the "Communication Settings" configuration program
Start menu "Start" > "..." > "SIMATIC NET" > "Communication Settings"
Reaction: The "Communication Settings" configuration program is started.
2. Click on "Access points" in the tree view.



3. Click on the arrow symbol next to "CP_H1_1".
Reaction: The expanded parameter list opens.

4. You find the current assignment under "Associated interface parameter assignment". For a connection using the TCP/IP protocol, select the "CP1623(RFC1006)" entry from the "Associated interface parameter assignment" drop-down list box.



Note

Note that the assignment can be changed by clicking on "Associated interface parameter assignment" drop-down list. If you have accidentally changed an assignment, make sure you correct it again.

Note

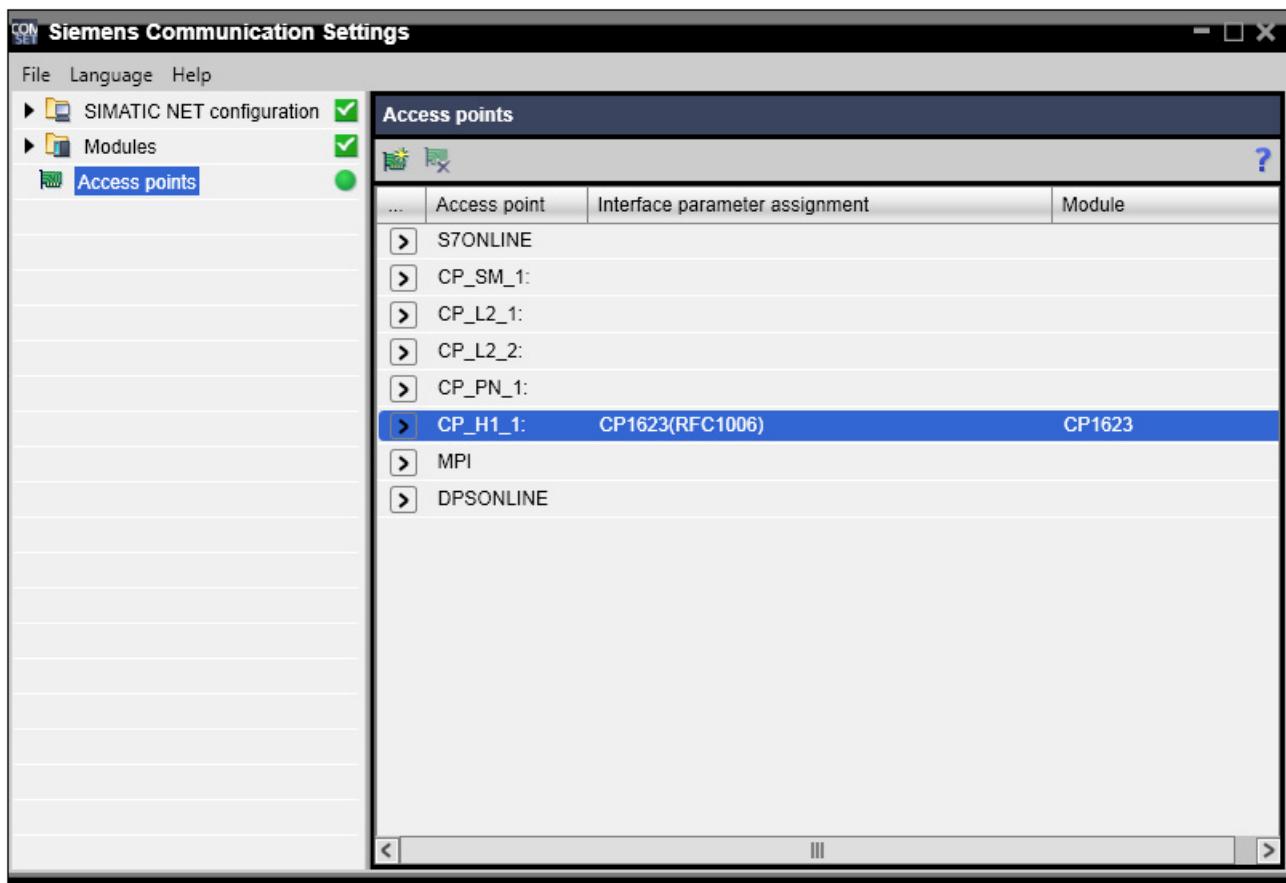
Access points must not be changed during operation.

5. Acknowledge with "Apply" and click the arrow symbol next to "CP_H1_1".

Result: The setting is applied in the configuration program.

Examples

3.4 Unconfigured S7 connection with the OPC Scout V10



3.4.1.2 Entries in the OPC Scout V10 - Example 1

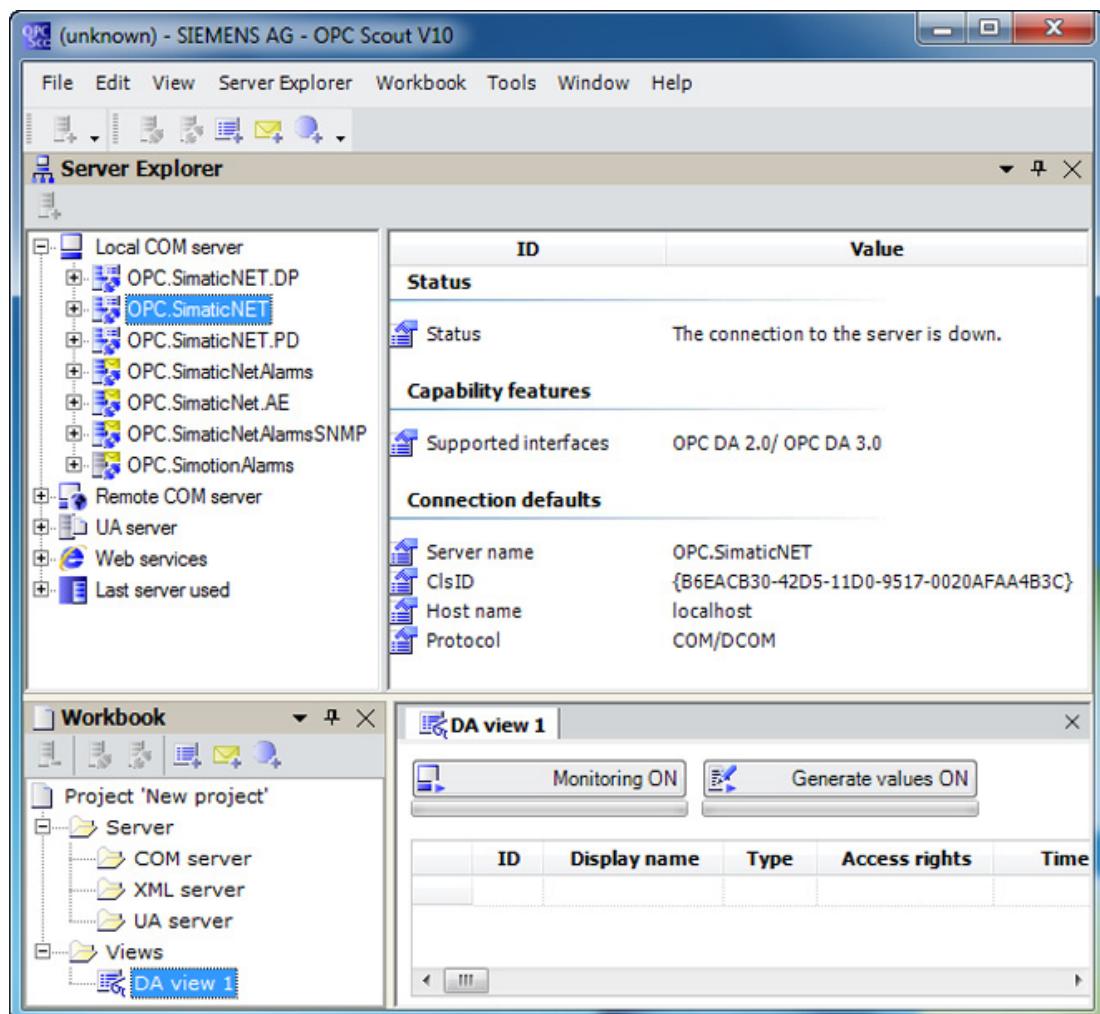
This section describes how to create an item in the "OPC Scout V10" to set up an unconfigured S7 connection.

Follow the steps below:

1. Start the OPC Scout V10 client program.

Start menu "Start" > "..." > "SIMATIC NET" > "OPC Scout V10"

Reaction: The "OPC Scout V10" program opens.



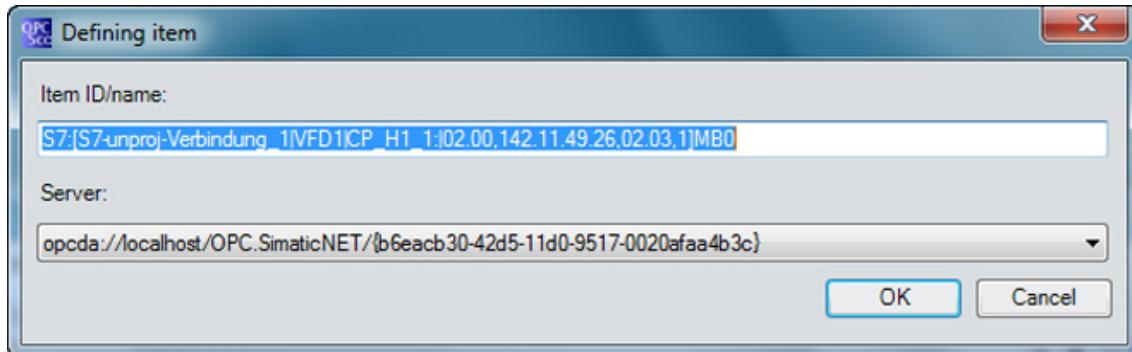
2. Double-click on "Local COM server" in the navigation area and then on the server "OPC.SimaticNET".

This creates a connection to the server.

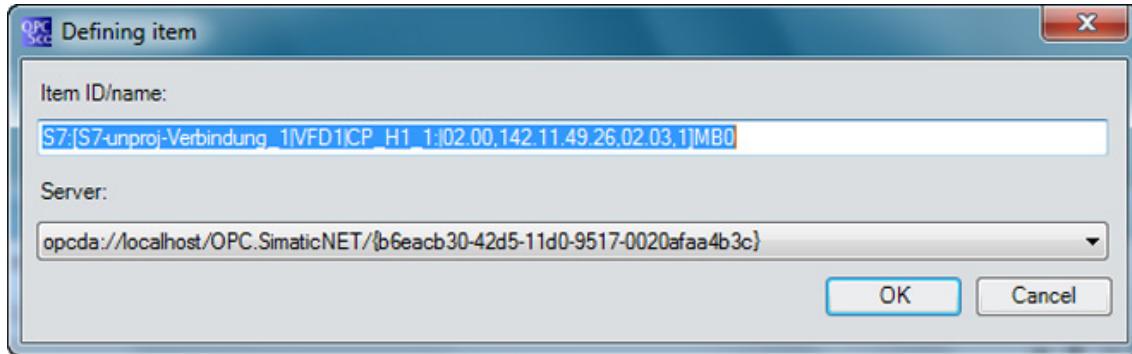
Examples

3.4 Unconfigured S7 connection with the OPC Scout V10

3. In the view area, click on an empty row and add a new item using the mouse context button.



4. Enter "S7:[S7-unproj-connection_1|VFD1|CP_H1_1:|02.00,142.11.49.26.02.03.1]MB0" in the "Item ID/name:" input box .

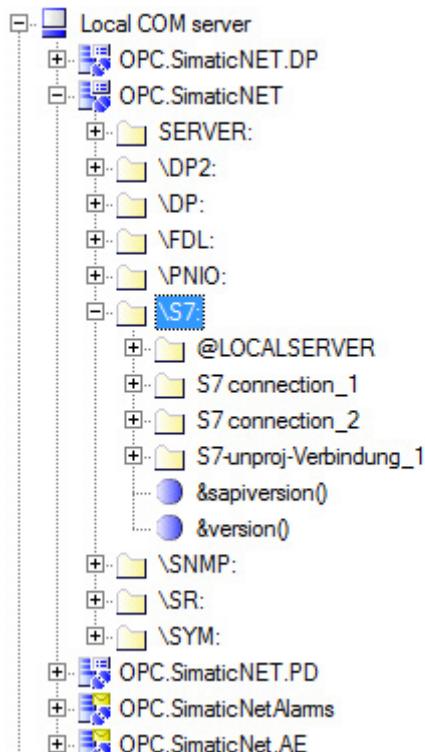


5. Click the "OK" button.

Reaction: The item is entered in the view area.

3.4 Unconfigured S7 connection with the OPC Scout V10

6. In the navigation area, go to "Local COM server" > "OPC.SimaticNET" > "\S7:" > "S7-unproj-connection_1".



Examples

3.4 Unconfigured S7 connection with the OPC Scout V10

7. Drag the Items "&statepath()" and "&vfdstate()" to the view area.

Items		Properties	
ID	Type	Access rights	Item name
&blockcompress()	string	W	S7:[S7-Verbindung_1]&blockcompress()
&blockdelete()	string[]	W	S7:[S7-Verbindung_1]&blockdelete()
&blocklinkin()	string	W	S7:[S7-Verbindung_1]&blocklinkin()
&blockread()	string[]	W	S7:[S7-Verbindung_1]&blockread()
&blockwrite()	string[]	W	S7:[S7-Verbindung_1]&blockwrite()
&identify()	string[]	R	S7:[S7-Verbindung_1]&identify()
&password()	string	W	S7:[S7-Verbindung_1]&password()
&statepath()	string	R	S7:[S7-Verbindung_1]&statepath()
&statepathval()	ubyte	R	S7:[S7-Verbindung_1]&statepathval()
&vfdstate()	object[]	R	S7:[S7-Verbindung_1]&vfdstate()

Following the drag-and-drop action, you will find the items in the view area.

DA-Ansicht 1				
		Monitoring OFF	Generate values ON	
	ID	Value	Quality	Result
1	S7:[S7-unproj-Verbindung_1 VFD1 CP_H1_1: 02.00,142.11.49.26,02.03,1]MBO	0	good	S_OK
2	S7:[S7-unproj-Verbindung_1]&statepath()	"UP"	good	S_OK
3	S7:[S7-unproj-Verbindung_1]&vfdstate()	{"\$7_ST" <input checked="" type="checkbox"/>	good	S_OK

8. Click the "Monitor ON" button to monitor the items in the view area.



Background information

You will find a detailed description of how to create an item in the manual "Industrial Communication with PG/PC volume 2" in Section 2.5.11 "Unconfigured S7 connections".

The character string to be entered in "Item-ID/Name" is made up as follows:

"S7:[<connectionname>|<VFD>|<accesspoint>|<Local TSAP>,<stationaddress>,<Remote-TSAP>,<Mode>]<dataelement>"

The information in the following table applies to this example:

Parameter descriptions	Value
<connectionname>	S7-unproj-connection_1 An entry with a maximum length of 24 characters is permitted. The name must be unique.
<VFD>	VFD1 Can be freely selected, all connections can be created on the same VFD.
<accesspoint>	CP_H1_1: Call for the access point that was set up in the section "Engineering of the unconfigured S7 connection - Example 1 (Page 150)".
<Local TSAP>	02.00 The first byte "02" stands for "Operator station operator control and monitoring", the second byte is always 0 ("00").
<stationaddress>	142.11.49.26 (example of an address) The station address is decided by the transmission mode. Since, in this case, we are accessing using TCP/IP, the IP address of the SIMATIC S7-400 must be specified here.
<Remote TSAP>	02.03 The first byte ("02") once again stands for "Operator station operator control and monitoring". The second byte ("03") contains the addressing of the S7-CPU which, in our example, is located in slot 3.
<Mode>	1 For the mode, there are two possible values: 1 - active connection establishment of the OPC server with optimization 3 - active connection establishment of the OPC server without optimization
<Dataelement>	MB0 Here, for example, a memory byte with address 0 is specified. Which data elements are possible for S7 is described in the manual "Industrial Communication with PG/PC volume 2".

Examples

3.4 Unconfigured S7 connection with the OPC Scout V10

Browsing

To be able to browse in your newly created connection (to use the connection like a configured S7 connection) note the following:

Note

Follow the steps below to make it possible to browse over this unconfigured S7 connection:

1. Move the mouse to the navigation area.
2. Right-click the on the "S7" node in the "Node" tree structure.
3. Select the menu command "Browse this level again".

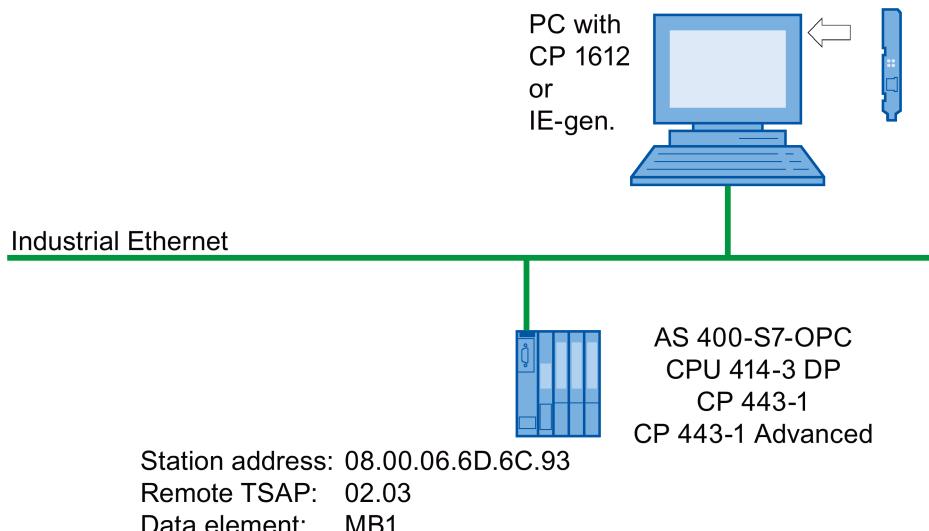
Result: It is now possible to browse over the unconfigured S7 connection.

As long as the item is active, the connection can be used like a configured S7 connection. This means that you can add further items without using the syntax of the unconfigured S7 connection. All you need to do is specify the connection name, for example "S7:[S7-unproj-connection_1]MB0".

3.4.2 Example 2 - Industrial Ethernet over ISO

Description

This example shows how to couple an AS 400-S7-OPC with a CPU 414-3 DP over an unconfigured S7 connection via Industrial Ethernet (using ISO).



Requirement

If you want to try out the example yourself, you require the following:

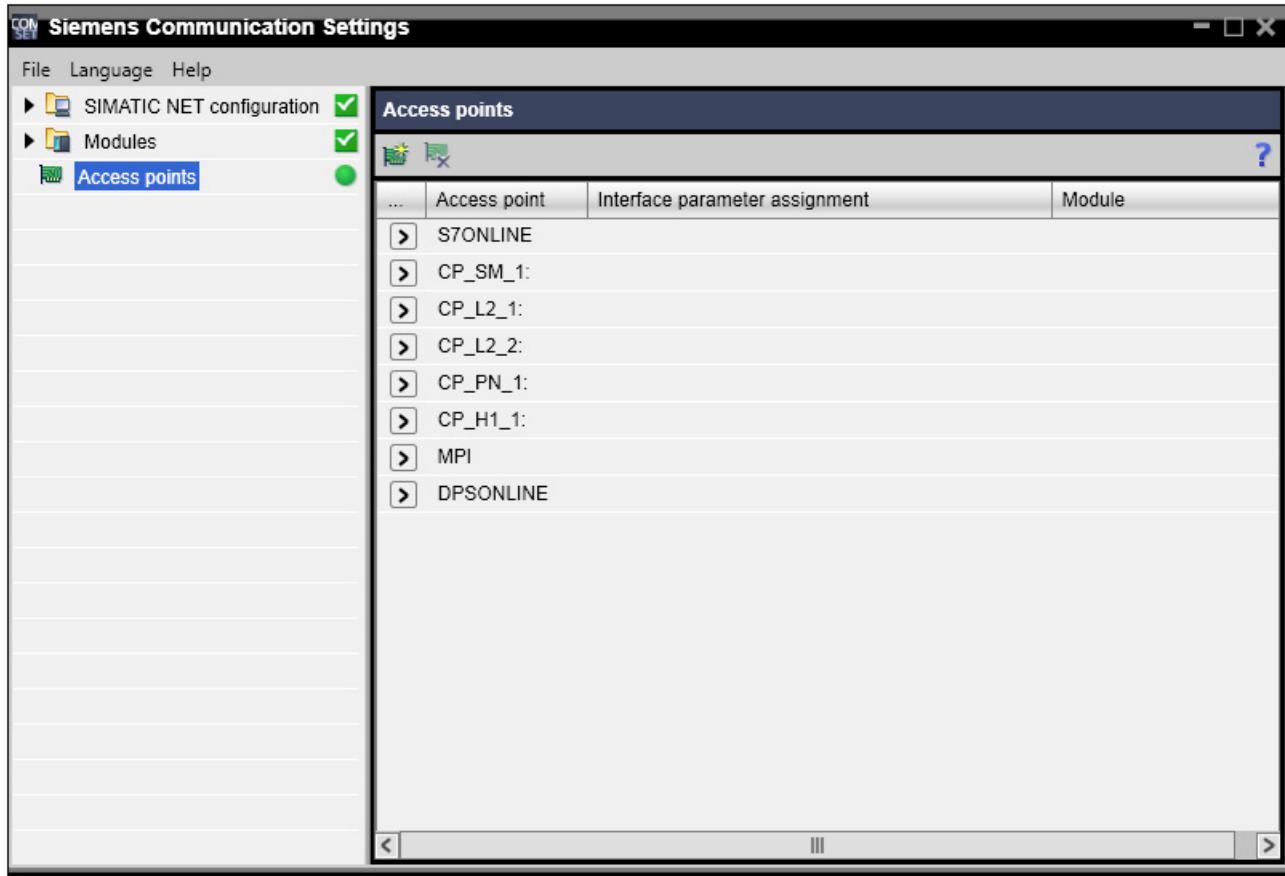
- A PC with the CP 1612 communications processor for Industrial Ethernet or a general Industrial Ethernet communications module.
You will find detailed instructions on installation in the product information/installation instructions supplied with the communications module.
- The installed software of the "SIMATIC NET PC Software" DVD.
You will find details in the installation instructions "SIMATIC NET, PC Software", supplied with the software.
- A SIMATIC AS 400-S7-OPC with CPU 414-3 DP and CP 443-1.
- Industrial Ethernet cabling between the CP 1612 communications processor or general IE communications processor and a SIMATIC AS 400-S7-OPC.
- The SIMATIC AS 400-S7-OPC used in this example has station address "08.00.06.6D.6C.93", a remote TSAP of "02.03" and the data element "MB1".

3.4.2.1 Engineering of the unconfigured S7 connection - Example 2

This section describes how you set up the access point with the "Communication Settings" configuration program to allow an unconfigured S7 connection over the CP 1612 using the ISO protocol.

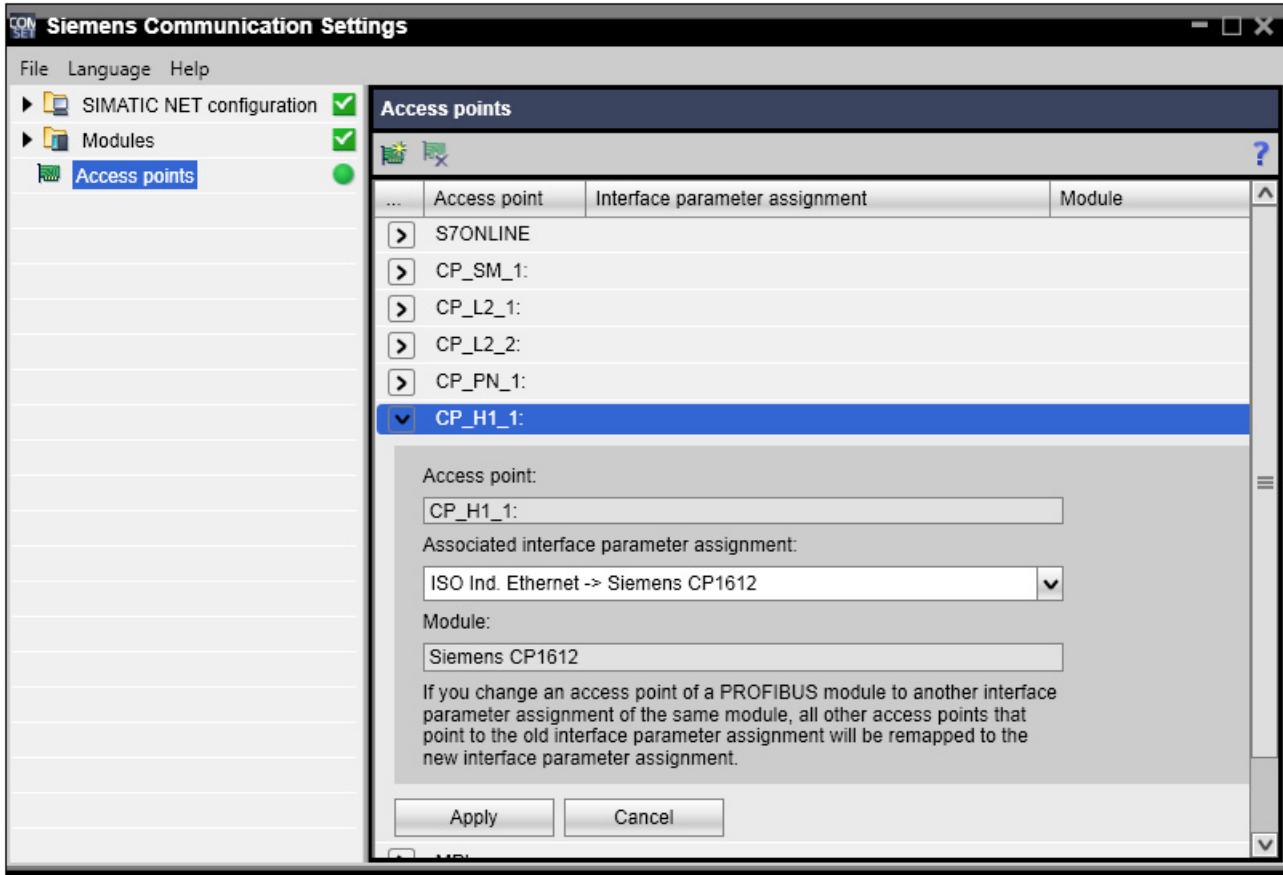
Follow the steps below:

1. Start the "Communication Settings" configuration program
Start menu "Start" > "..." > "SIMATIC NET" > "Communication Settings"
Reaction: The "Communication Settings" configuration program is started.
2. Click on "Access points" in the tree view.



3. Click on the arrow symbol next to "CP_H1_1".
Reaction: The expanded parameter list opens.

4. Under "Associated interface parameter assignment:" you find the current assignment. For a connection over ISO, select from the "Assigned interface parameter assignment:" drop-down list box the entry of a general IE module, for example, "ISO Ind. Ethernet -> Siemens CP1612" or a comparable interface.



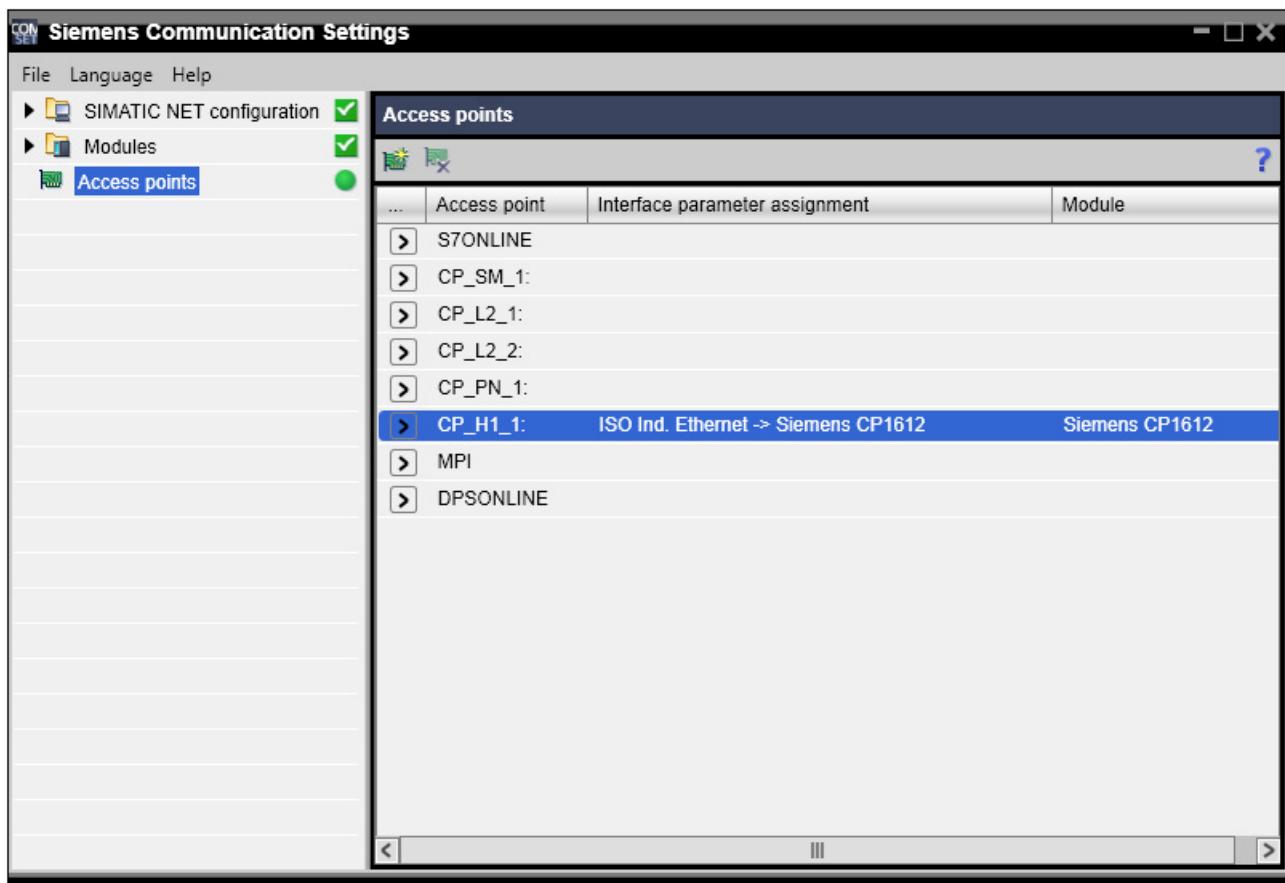
Note

Note that the assignment can be changed by clicking on "Associated interface parameter assignment" drop-down list. If you have accidentally changed an assignment, make sure you correct it again.

5. Acknowledge with "Apply" and click the arrow symbol next to "CP_H1_1".
Result: The setting is applied in the configuration program.

Examples

3.4 Unconfigured S7 connection with the OPC Scout V10



3.4.2.2 Entries in the OPC Scout V10 - Example 2

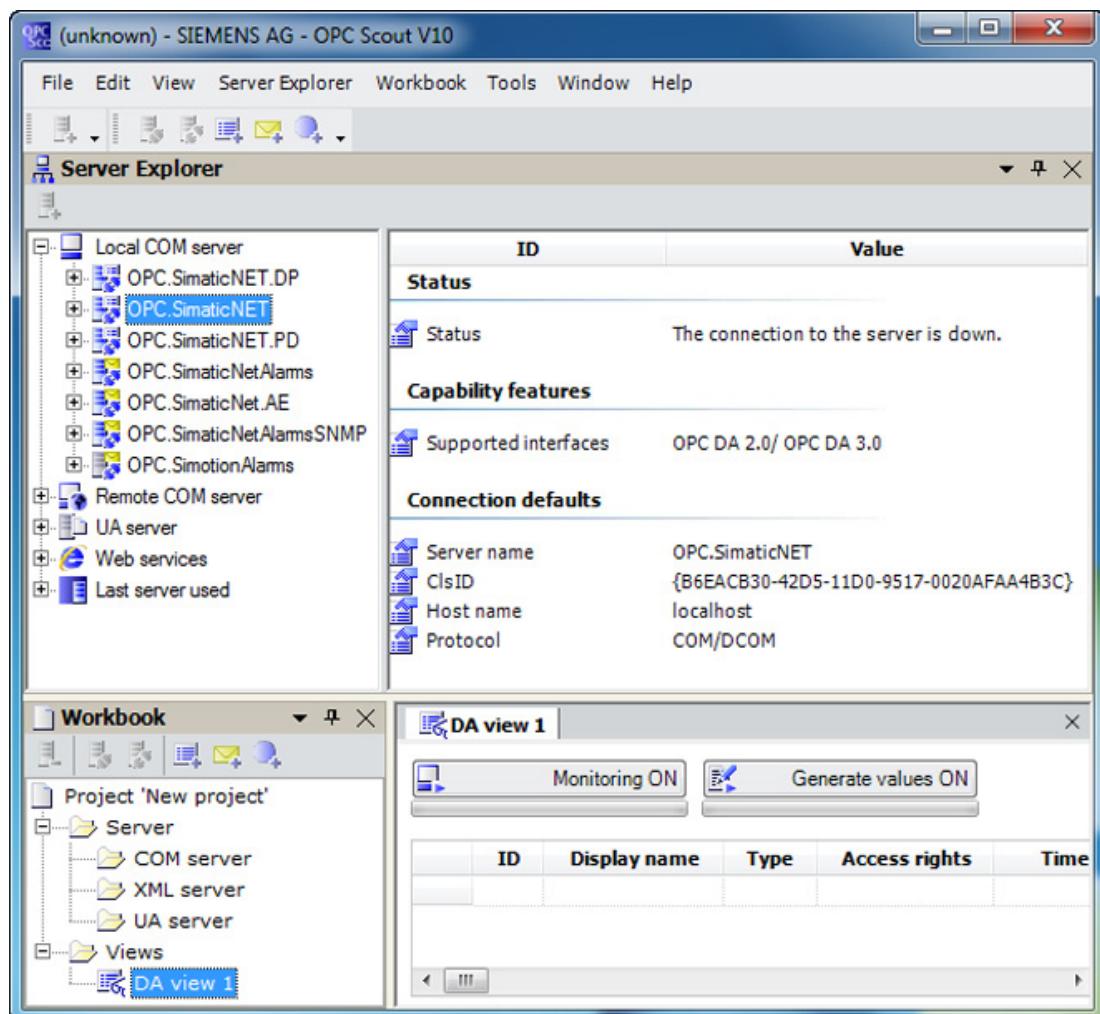
This section describes how to create an item in the OPC Scout V10 to set up an unconfigured S7 connection.

Follow the steps below:

1. Start the "OPC Scout V10" client program.

Start menu "Start" > "..." > "SIMATIC NET" > "OPC Scout"

Reaction: The "OPC Scout V10" dialog box opens.

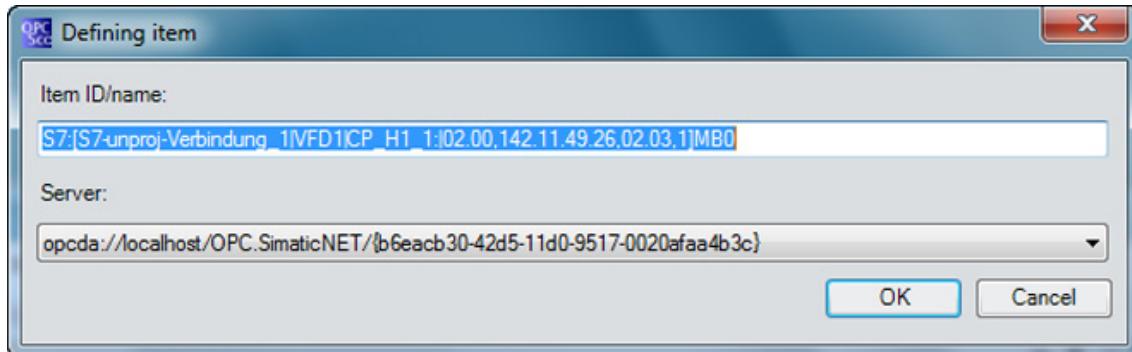


2. Double-click on "Local COM server" in the navigation area and then on the server "OPC.SimaticNET". This creates a connection to the server.

Examples

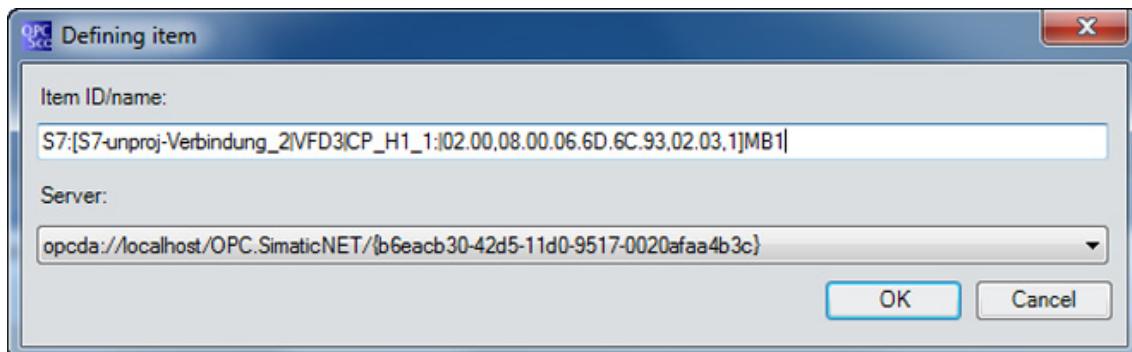
3.4 Unconfigured S7 connection with the OPC Scout V10

3. In the view area, click on an empty row and add a new item using the mouse context button.

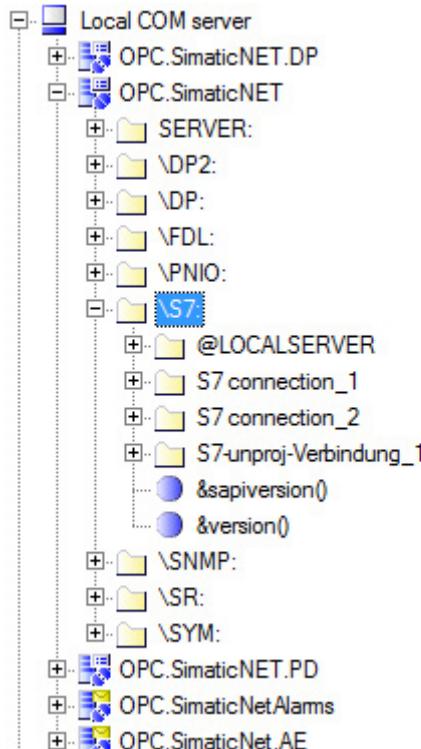


4. Enter "S7:[S7-unproj-connection_2|VFD3|CP_H1_1:I02.00,08.00.06.6D.6C.93,02.03,1]MB1" in the "Item ID/name:" input box and close the dialog with "OK".

Reaction: The item is entered in the view area.



5. In the navigation area, go to "Local COM server" > "OPC.SimaticNET" > "\S7:" > "S7-unproj-connection_2".



6. Drag the Items "&statepath()" and "&vfdsstate()" to the view area.

Items	Properties		
ID	Type	Access rights	Item name
&blockcompress()	string	W	S7:[S7-Verbindung_1]&blockcompress()
&blockdelete()	string[]	W	S7:[S7-Verbindung_1]&blockdelete()
&blocklinkin()	string	W	S7:[S7-Verbindung_1]&blocklinkin()
&blockread()	string[]	W	S7:[S7-Verbindung_1]&blockread()
&blockwrite()	string[]	W	S7:[S7-Verbindung_1]&blockwrite()
&identify()	string[]	R	S7:[S7-Verbindung_1]&identify()
&password()	string	W	S7:[S7-Verbindung_1]&password()
&statepath()	string	R	S7:[S7-Verbindung_1]&statepath()
&statepathval()	ubyte	R	S7:[S7-Verbindung_1]&statepathval()
&vfdsstate()	object[]	R	S7:[S7-Verbindung_1]&vfdsstate()

Reaction: All items can be seen in the view area.

7. Click the "Monitor ON" button to monitor the items.



Background information

You will find a detailed description of how to create an item in the manual "Industrial Communication with PG/PC volume 2" in Section 2.5.11 "Unconfigured S7 connections".

The string to be entered in "Item ID/name" is made up as follows:

"S7:[<connectionname>|<VFD>|<accesspoint>|<Local TSAP>,<stationaddress>,<Remote TSAP>,<Mode>]<dataelement>

For this example, the information in the following table applies:

Parameter descriptions	Value
<connectionname>	S7-unproj-connection_2 An entry with a maximum length of 24 characters is permitted. The name must be unique.
<VFD>	VFD3 Can be freely selected, all connections can be created on the same VFD.
<accesspoint>	CP_H1_1: Call for the access point that was set up in the section "Engineering of the unconfigured S7 connection - Example 2 (Page 160)".
<Local TSAP>	02.00 The first byte ("02") stands for "Operator station operator control and monitoring", the second byte is always 0 ("00").
<stationaddress>	08.00.06.6D.6C.93 The station address is decided by the transmission mode. Since, in this case, we are accessing using ISO, the MAC address of the SIMATIC S7-400 must be specified here.
<Remote TSAP>	02.03: The first byte ("02") once again stands for "Operator station operator control and monitoring". The second byte ("03") contains the addressing of the S7-CPU which, in our example, is located in slot 3. In this example, the Ethernet cable goes to the CP 443-1. The communications processor is located in slot 5 and is forwarded to the CPU in slot 3 with the aid of the second byte.
<Mode>	1: For the mode, there are two possible values: 1 - active connection establishment of the OPC server with optimization 3 - active connection establishment of the OPC server without optimization
<Dataelement>	MB1 Here, for example, a memory byte of the address is specified. Which data elements are possible for S7 is described in the manual "Industrial Communication with PG/PC volume 2".

Browsing

To be able to browse in your newly created connection (to use the connection like a configured S7 connection) note the following:

Note

Follow the steps below to be able to browse over this S7 unconfigured connection:

1. in the navigation area, right-click the on the "S7" node in the "Node" tree structure.
2. Select the menu command "Browse this level again".

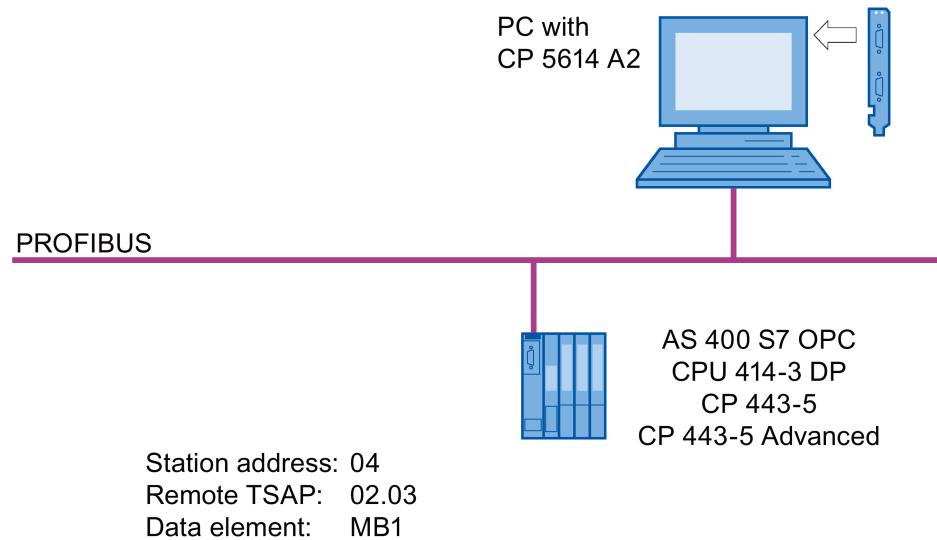
Result: It is now possible to browse over the unconfigured S7 connection.

As long as the item is active, the connection can be used like a configured S7 connection. You can also add further items without using the syntax of the unconfigured S7 connection. You simply need to specify the connection name, for example "S7:[S7-unproj-connection_2]MB1".

3.4.3 Example 3 - PROFIBUS

Description

This example shows how to couple an AS 400-S7-OPC with a CPU 414-3 DP via a CP 443-5 over an unconfigured S7 connection via PROFIBUS.



Requirement

If you want to try out the example yourself, you require the following:

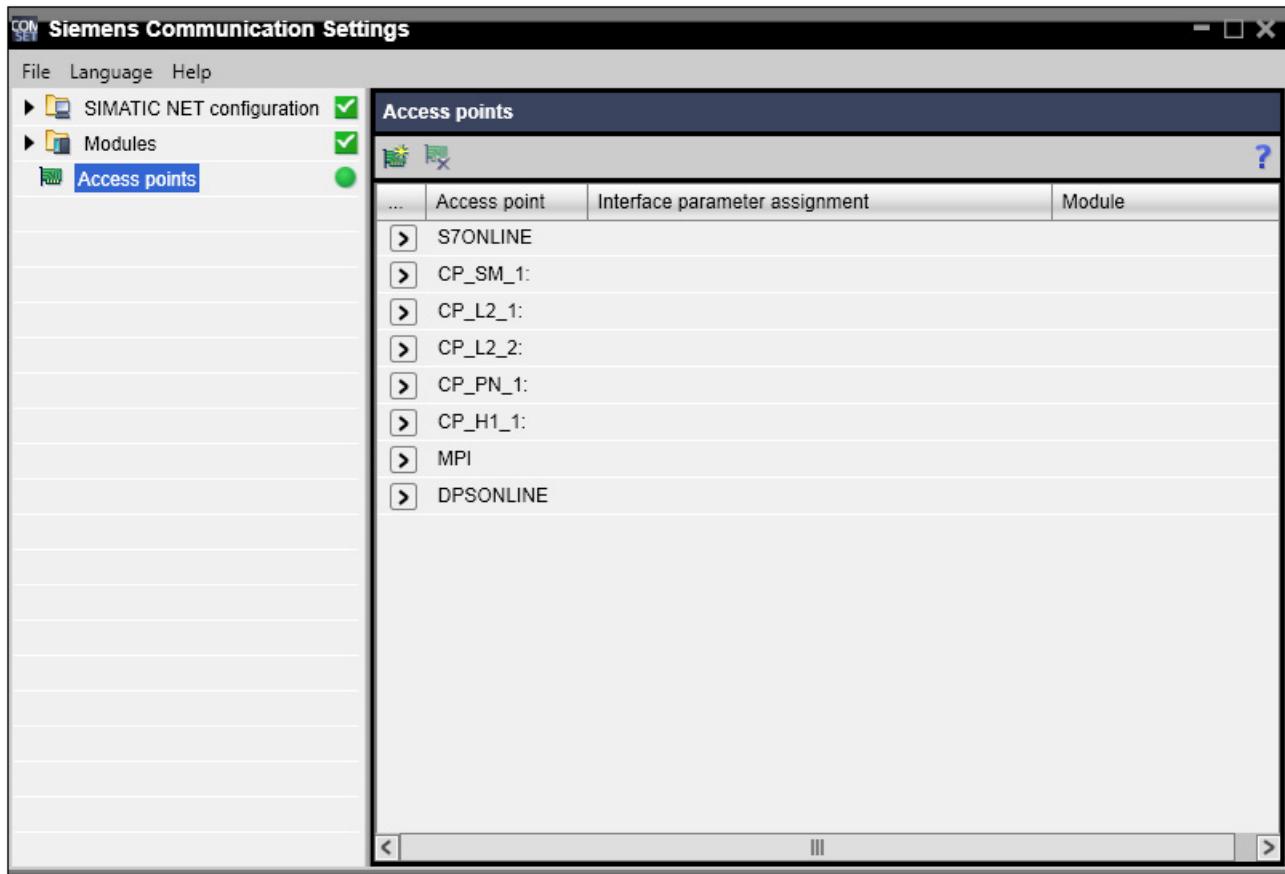
- A PC with the CP 5614 A2 communications module for PROFIBUS.
You will find detailed instructions on installation in the product information/installation instructions supplied with the communications module.
- The installed software of the "SIMATIC NET PC Software" CD.
You will find details in the installation instructions "SIMATIC NET, PC Software ...", supplied with the software.
- A SIMATIC AS 400-S7-OPC is coupled with a CPU 414-3 DP via a CP 443-5 and CP 443-5 Advanced.
- PROFIBUS cabling between the PC module and S7 device.
- The SIMATIC AS 400-S7-OPC used in this example has station address "04", a remote TSAP of "02.03" and the data element "MB1".

3.4.3.1 Engineering of the unconfigured S7 connection - Example 3

This section describes how you set up the access point with the "Communication Settings" configuration program to allow an unconfigured S7 connection over the communications processor, for example CP 5614 A2 and the PROFIBUS protocol.

Follow the steps below:

1. Start the "Communication Settings" configuration program
Start menu "Start" > "..." > "SIMATIC NET" > "Communication Settings"
Reaction: The "Communication Settings" configuration program is started.
2. Click on "Access points" in the tree view.

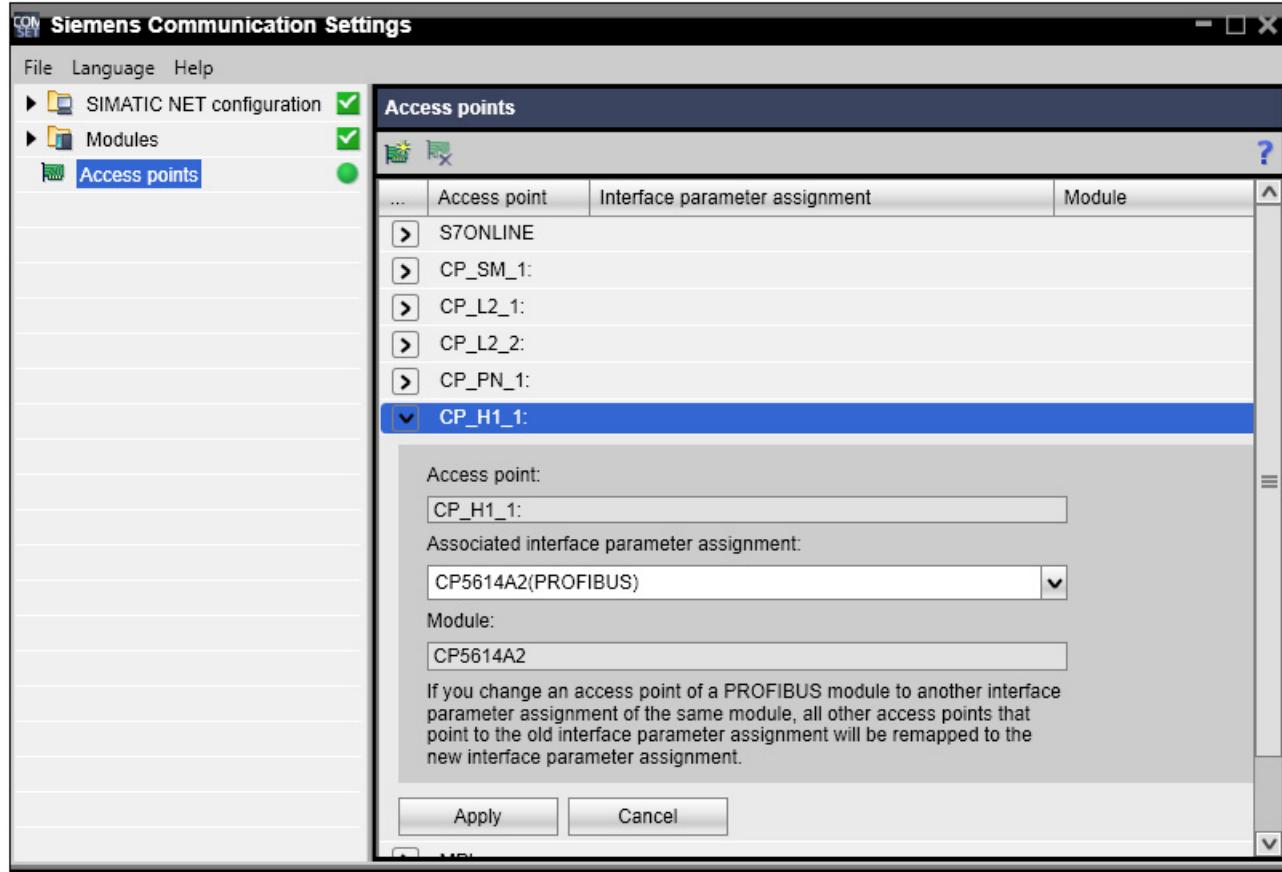


3. Click on the arrow symbol next to "CP_H1_1".
Reaction: The expanded parameter list opens.

Examples

3.4 Unconfigured S7 connection with the OPC Scout V10

4. Under "Associated interface parameter assignment:" you find the current assignment. For a connection over PROFIBUS, select the entry "CP5614A2(PROFIBUS)" from the "Associated interface parameter assignment:" drop-down list box.

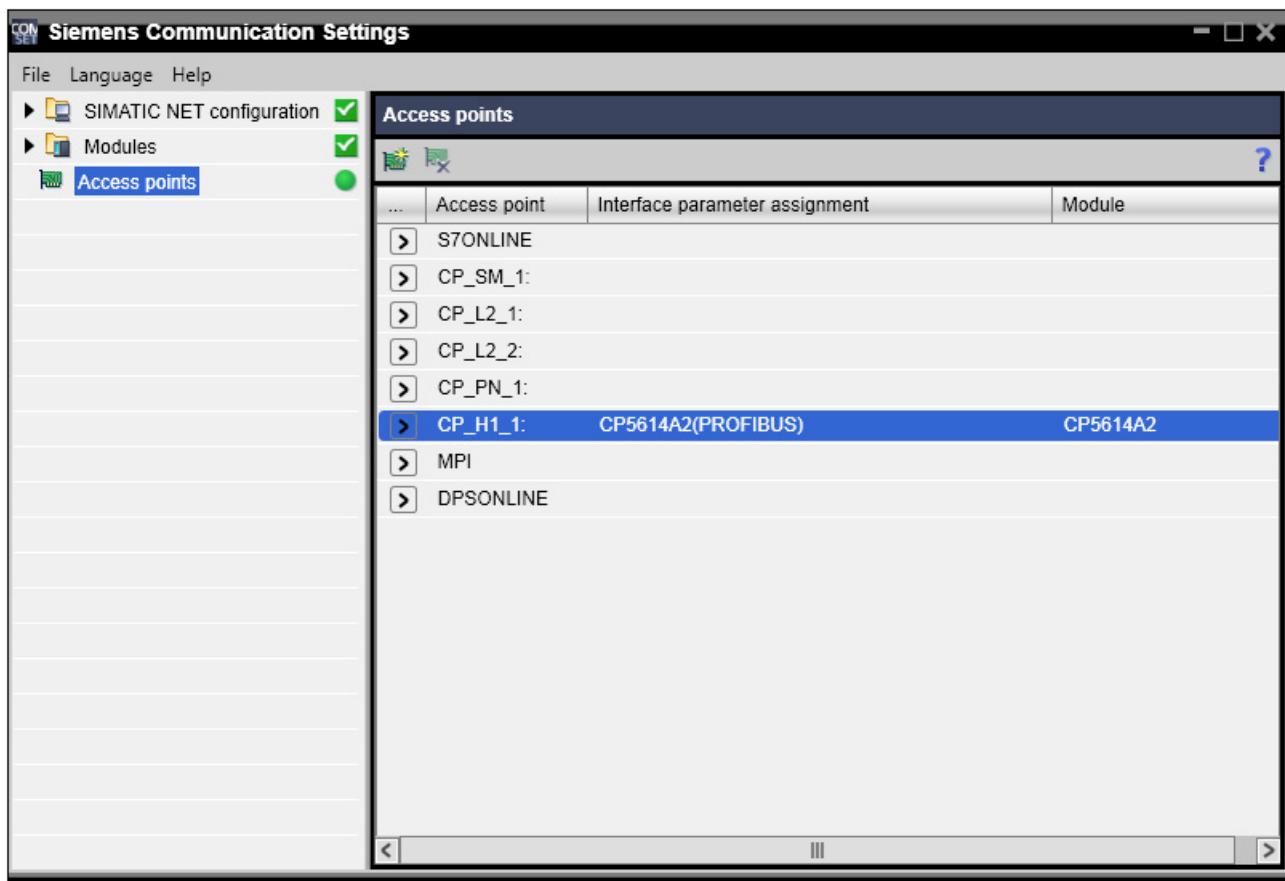


Note

Note that the assignment can be changed by clicking on "Associated interface parameter assignment" drop-down list. If you have accidentally changed an assignment, make sure you correct it again.

5. Acknowledge with "Apply" and click the arrow symbol next to "CP_H1_1".
Result: The setting is applied in the configuration program.

3.4 Unconfigured S7 connection with the OPC Scout V10



Examples

3.4 Unconfigured S7 connection with the OPC Scout V10

3.4.3.2 Entries in the OPC Scout V10 - Example 3

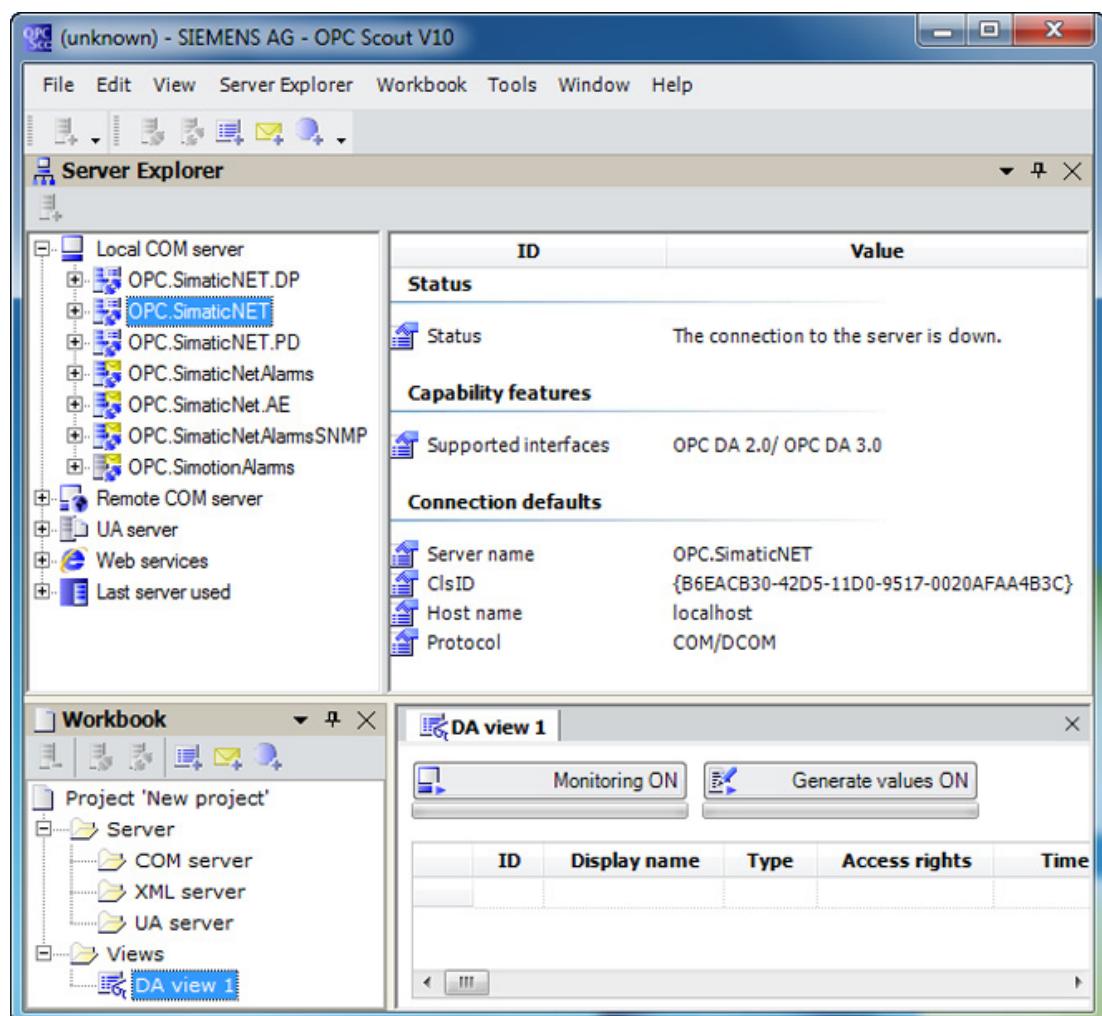
This section describes how to create an item in the "OPC Scout V10" to set up an unconfigured S7 connection.

Follow the steps below:

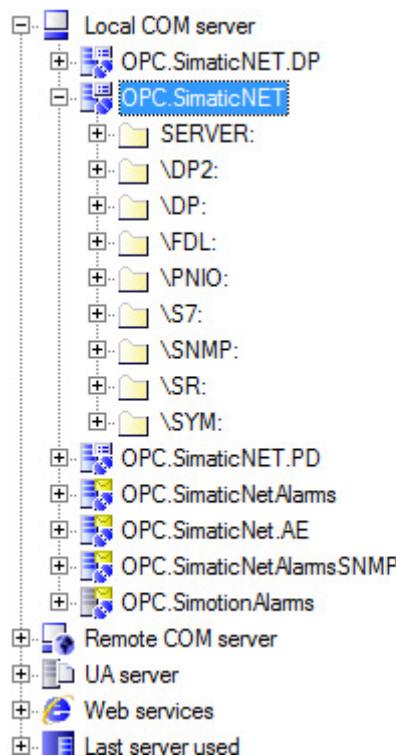
1. Start the OPC Scout V10 client program.

Start menu "Start" > "..." > "SIMATIC NET" > "OPC Scout V10"

Reaction: The "OPC Scout V10" dialog box opens.



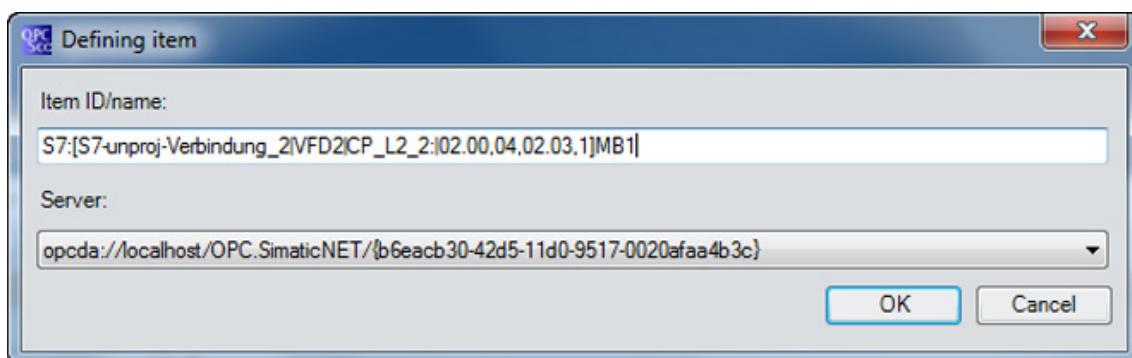
2. In the navigation area, double click on "Local COM server" > "OPC.SimaticNET" to create a connection to the server.



3. In the view area, click on an empty row and add a new item using the mouse context button.

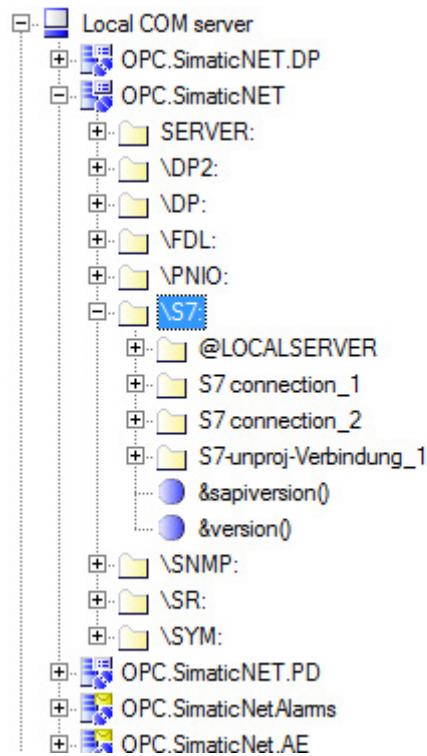
Enter "S7:[S7-unproj-connection_2|VFD2|CP_L2_2:[02.00,04,02.03,1]MB1" in the "Item ID/name:" input box and close the dialog with "OK".

Reaction: The item is entered in the view area.



3.4 Unconfigured S7 connection with the OPC Scout V10

4. In the navigation area, go to "Local COM server" > "OPC.SimaticNET" > "\S7:" > "S7-unproj-connection_2".



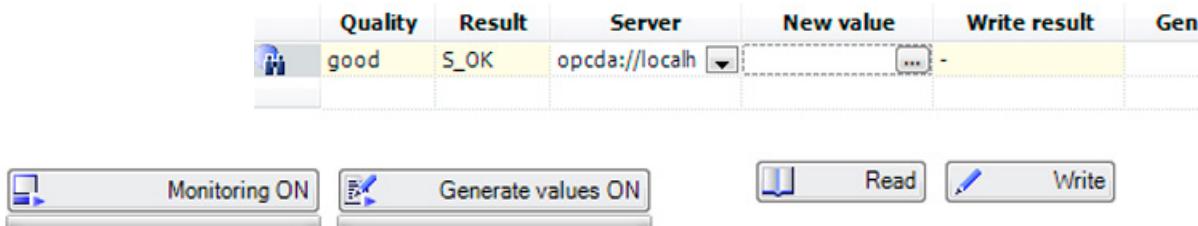
5. Drag the Items "&statepath()" and "&vfdstate()" to the view area.

Items	Properties		
ID	Type	Access rights	Item name
&blockcompress()	string	W	S7:[S7-Verbindung_1]&blockcompress()
&blockdelete()	string[]	W	S7:[S7-Verbindung_1]&blockdelete()
&blocklinkin()	string	W	S7:[S7-Verbindung_1]&blocklinkin()
&blockread()	string[]	W	S7:[S7-Verbindung_1]&blockread()
&blockwrite()	string[]	W	S7:[S7-Verbindung_1]&blockwrite()
&identify()	string[]	R	S7:[S7-Verbindung_1]&identify()
&password()	string	W	S7:[S7-Verbindung_1]&password()
&statepath()	string	R	S7:[S7-Verbindung_1]&statepath()
&statepathval()	ubyte	R	S7:[S7-Verbindung_1]&statepathval()
&vfdstate()	object[]	R	S7:[S7-Verbindung_1]&vfdstate()

6. Click in the row of the view area where the item created above is located and go to the column with the name "New value".

Enter a new value and click on the "Write" button and then the "Monitoring ON" button.

Reaction: The new value is adopted in the "Value" column.



Background information

You will find a detailed description of how to create an item in the manual "Industrial Communication with PG/PC volume 2" in section 2.5.11 "Unconfigured S7 connections".

The character string to be entered in "Item-ID/Name" is made up as follows:

"S7:<connectionname>|<VFD>|<accesspoint>|<Local TSAP>,<stationaddress>,<Remote TSAP>,<Mode>|<dataelement>"

The information in the following table applies to this example:

Parameter descriptions	Value
<connectionname>	S7-unproj-connection_2 An entry with a maximum length of 24 characters is permitted. The name must be unique.
<VFD>	VFD2 Can be freely selected, all connections can be created on the same VFD.
<accesspoint>	CP_L2_2: Call for the access point that was set up in the section "Engineering of the unconfigured S7 connection - Example 3 (Page 169)".

Examples

3.4 Unconfigured S7 connection with the OPC Scout V10

Parameter descriptions	Value
<Local TSAP>	02.00 The first byte ("02") stands for "Operator station operator control and monitoring", the second byte is always 0 ("00").
<stationaddress>	04 The station address depends on the transmission mode. Since, in this case, we are accessing over PROFIBUS, the PROFIBUS address of the SIMATIC S7-400 must be specified here.
<Remote TSAP>	02.03: The first byte ("02") once again stands for "Operator station operator control and monitoring". The second byte ("03") contains the addressing of the S7-CPU which, in our example, is located in slot 3. In this example, the PROFIBUS cable is connected to the CP 443-5 in slot 4.
<Mode>	1: For the mode, there are two possible values: 1 - active connection establishment of the OPC server with optimization 3 - active connection establishment of the OPC server without optimization
<Dataelement>	MB1 Here, for example, a memory byte with address 2 is specified. Which data elements are possible for S7 is described in the manual "Industrial Communication with PG/PC volume 2".

Browsing

To be able to browse in your newly created connection (to use the connection like a configured S7 connection) note the following:

Note

Follow the steps below to be able to browse over this S7 unconfigured connection:

1. Right-click the on the "S7" node in the navigation area.
2. Select the menu command "Browse this level again".

Result: It is now possible to browse over the unconfigured S7 connection.

As long as the item is active, the connection can be used like a configured S7 connection. This means that you can add further items without using the syntax of the unconfigured S7 connection. All you need to do is specify the connection name, for example "S7:[S7-unproj-connection_2]MB1".

3.5 SNMP communication with OPC

Introduction

This section describes how you couple network components and nodes with an SNMP agent with a PC station over an SNMP OPC server. You will learn which tools to use to configure a PC station to implement the interfacing of a device with SNMP capability and how make the SNMP variables and SNMP traps available on the OPC interface.

You will find information about the SNMP OPC server on the Internet at:

Link to the SNMP OPC server: (<http://www.automation.siemens.com/mcms/industrial-communication/en/ie/software/network-management/snmp-opc-server/Pages/snmp-opc-server.aspx>)

Requirements

If you want to try out the example yourself, you require

- a PC
- a network adapter
- the software of the "SIMATIC NET PC Software" CD
- an SNMP-compliant device (for example SIMATIC NET OSM/ESM)
- a network connection between the OPC SNMP server and the SNMP-compliant device

For the PC station, you require a STEP 7 project that was created on a central ES station (not this PC station). This should contain the hardware configuration.

3.5.1 Hardware and software installation

Follow the steps below to install the software:

1. Turn on the PC and start Windows.
2. Insert the "SIMATIC NET PC Software" CD.
If the installation program does not start the CD automatically, start the "setup.exe" program on the CD.
3. Follow the onscreen instructions of the installation program. Install the SIMATIC NET PC software and SIMATIC NCM PC.

Follow the steps below to install the network adapter:

1. Shut down the PC and turn it off.
2. Disconnect the power cable.
Read the instructions for installing cards in the manufacturer's instructions for your PC.
3. Follow the installation instructions for your network adapter and install it.
4. Close the PC casing as described in the instructions from your PC manufacturer and then insert the network cable.

Follow the steps below to connect to the network:

1. Connect the network cable to your network adapter.
2. Connect the SNMPcompliant device to the network cable.
3. Assign an IP address to the SNMPcompliant device. Use a devicespecific or vendor-specific project engineering tool.

3.5.2 Configuration of the SNMP OPC server

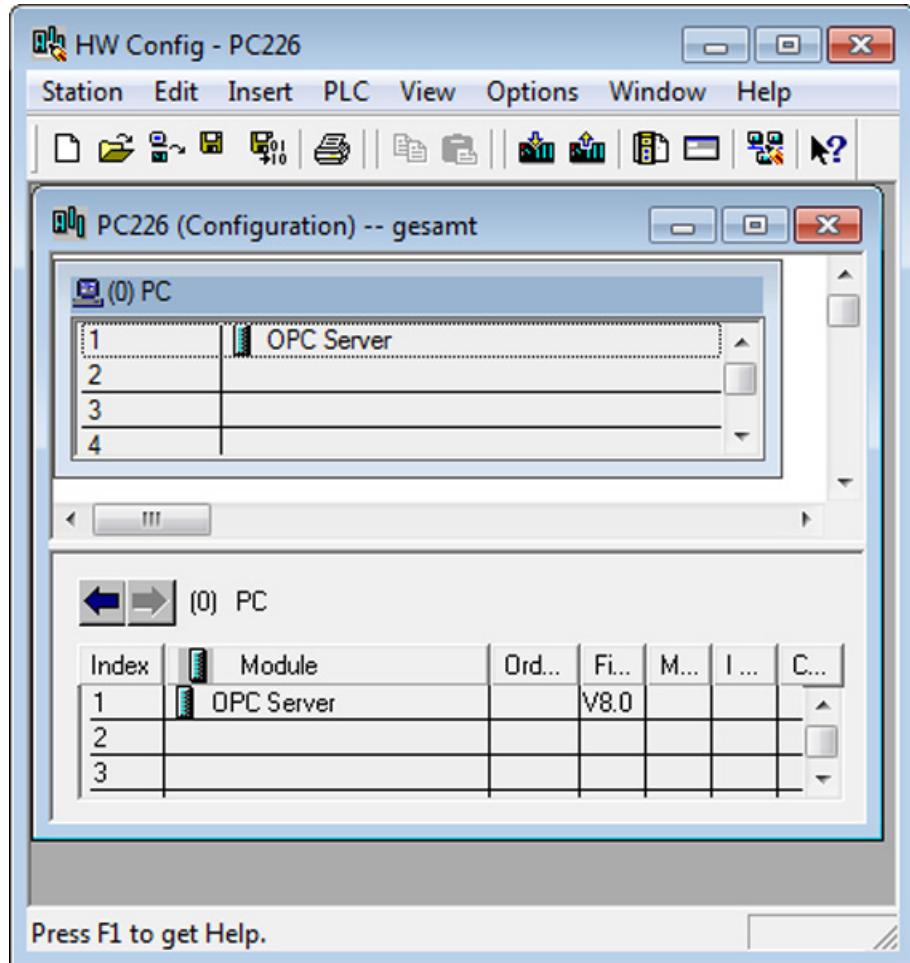
Follow the steps below:

1. Start the "SIMATIC NCM PC Config" program.

Start menu "Start" > "..." > "SIMATIC" > "SIMATIC NCM PC Manager"

2. Double-click on the configuration icon.

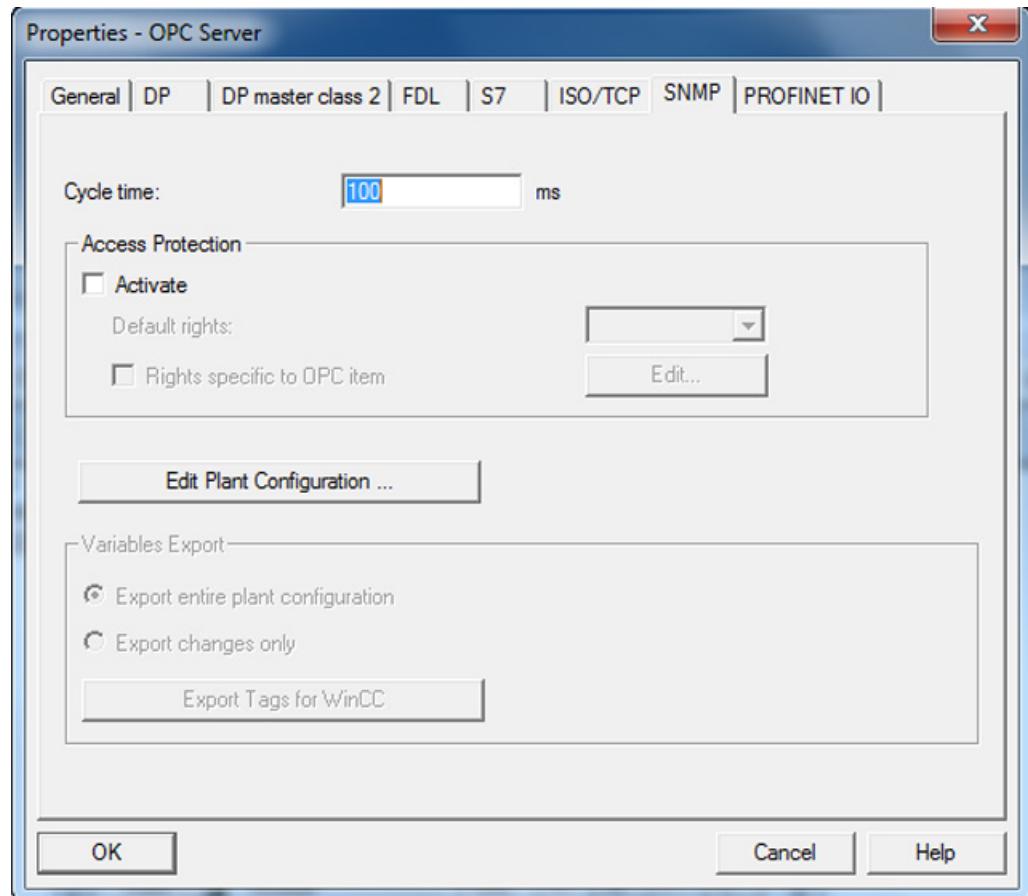
Doubleclick on the "OPC Server" box in the section "(0) PC" to configure the OPC server.



Reaction: The "Properties - OPC Server" dialog box opens.

3. Select the "SNMP" tab. Change the cycle time if necessary.

The cycle time is the minimum time in which the variables of the SNMP OPC server are polled. For more detailed information on the cycle time, refer to the online help available with the "Help" button.



4. Click on "Edit plant configuration...".

Reaction: A dialog box appears in which all the devices registered with the OPC Server are listed.

3.5.2.1 Editing the plant configuration

Follow the steps below:

1. In this case, no devices have been registered yet.

Click the "Add ..." button to make a new node known in the plant configuration of the OPC server.

Reaction: The "Add node" dialog box opens.

2. Enter the necessary information for your device in the "Add Nodes" dialog box:

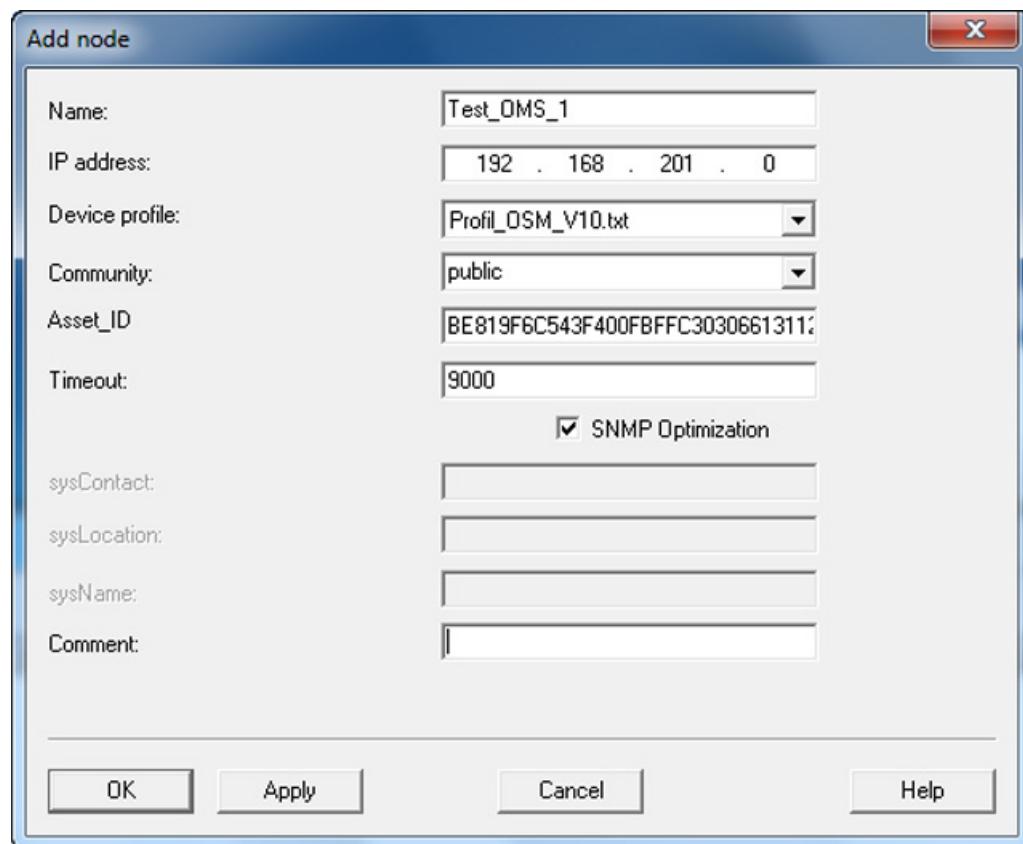
- In the "Name" box, enter a node name.
- Enter the IP address of the device.
- Select a device profile. The device profile describes the mapping of SNMP variables and traps to the OPC interface. You can also create your own profiles from MIB files (see below, "Generating a profile"). You open the relevant dialog box when you click the "Create Profile ..." button.

Devices without SNMP capability can also be entered to allow uniformity. For these devices, a "PING" is mapped on a signoflife variable.

- Enter an "SNMP Community" for the device. This decides whether or not read-only access or write access is permitted with the device.
- As a comment, you can enter a maximum 255 characters long text.

Note:

The "sysLocation", "sysContact" and "sysName" boxes are deactivated for devices that are not SNMPcompliant because these parameters are specified during device configuration and can be queried on the devices.



3. Confirm your entries by clicking "OK".
4. The settings are visible in the window of the plant configuration.

With "Import Nodes", all devices that have an IP address and exist in the current project are included automatically in the list of the plant configuration. If the device supports Web based management, this can be started with the "Web based Management..." button (make sure your browser settings are suitable).

5. Click "OK" to close the plant configuration window.
6. Click "OK" again in the dialog box for the properties of the OPC server to complete configuration of the SNMP OPC server.
7. Select the "NCM PC" menu and then the menu item "Station" > "Save and Compile".
8. Select the "NCM PC" menu and then the menu item "PLC" > "Download to Module". The configuration data is downloaded to the OPC server.
9. The OPC server starts with the new configuration data.

Confirm the next window with "OK".

3.5.3 Configuring the PC station

Overview

After starting the PC station, installing the software and installing the hardware, the PC module of the PC station is in "PG mode".

Handling the project engineering data

Depending on the case, two situations must be distinguished (refer to the section "Steps for initial configuration (Page 33)":)

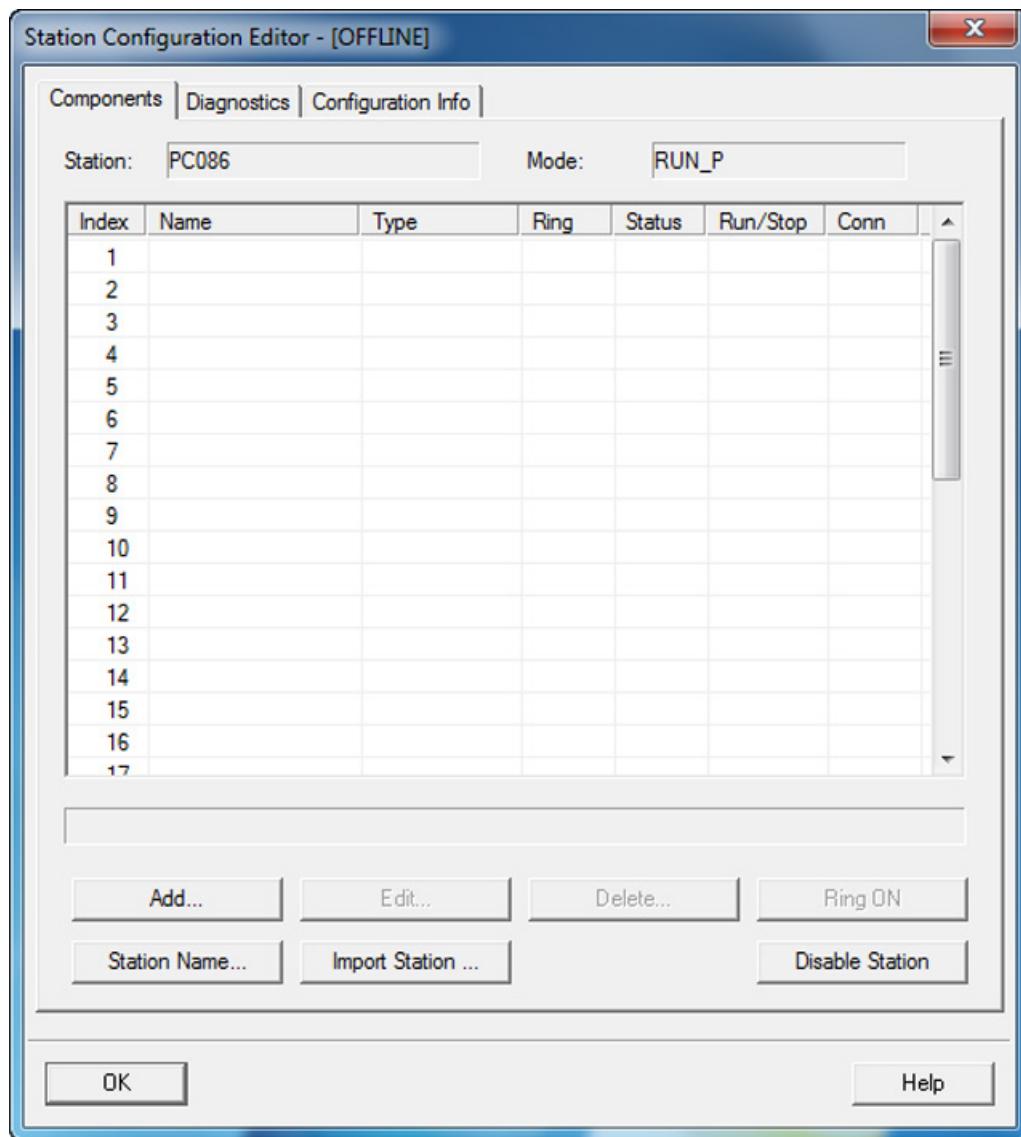
- Project engineering before initial configuration - XDB file available
- Initial configuration not dependent on project engineering

In this example, we assume that the project engineering data is available in the form of an XDB file that was created on an external engineering station. The XDB file is transferred to the local PC station on a data storage medium. The initial configuration is then done with "Import station" (XDB import) in the "Station Configuration Editor".

To allow the information from the project engineering to be transferred from the engineering system to the PC station, the local configuration must match the configuration data entered in the project engineering.

Follow the steps below:

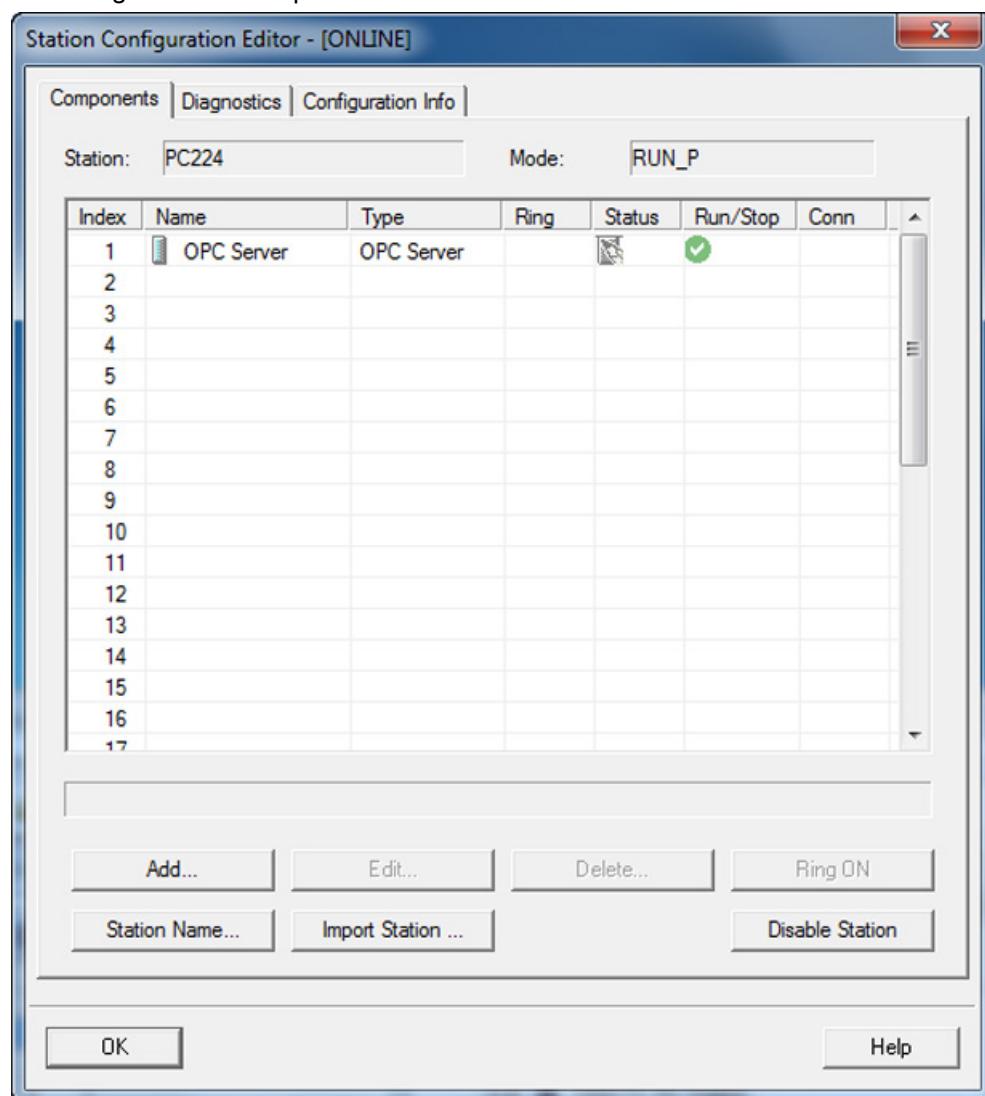
1. Start the "Station Configuration Editor" by double-clicking on its icon on the desktop.



2. Click the "Import Station..." button.
3. Select the XDB file that you want to import and confirm the dialog with "OK".

4. Check whether the settings of the module match the local configuration.
5. Confirm the configuration with "OK".

Result: All the communication data configured with S7 is now on the PC station. The communications module is in "configured mode".
PC configuration is complete.



3.5.4 Using the OPC Scout V10

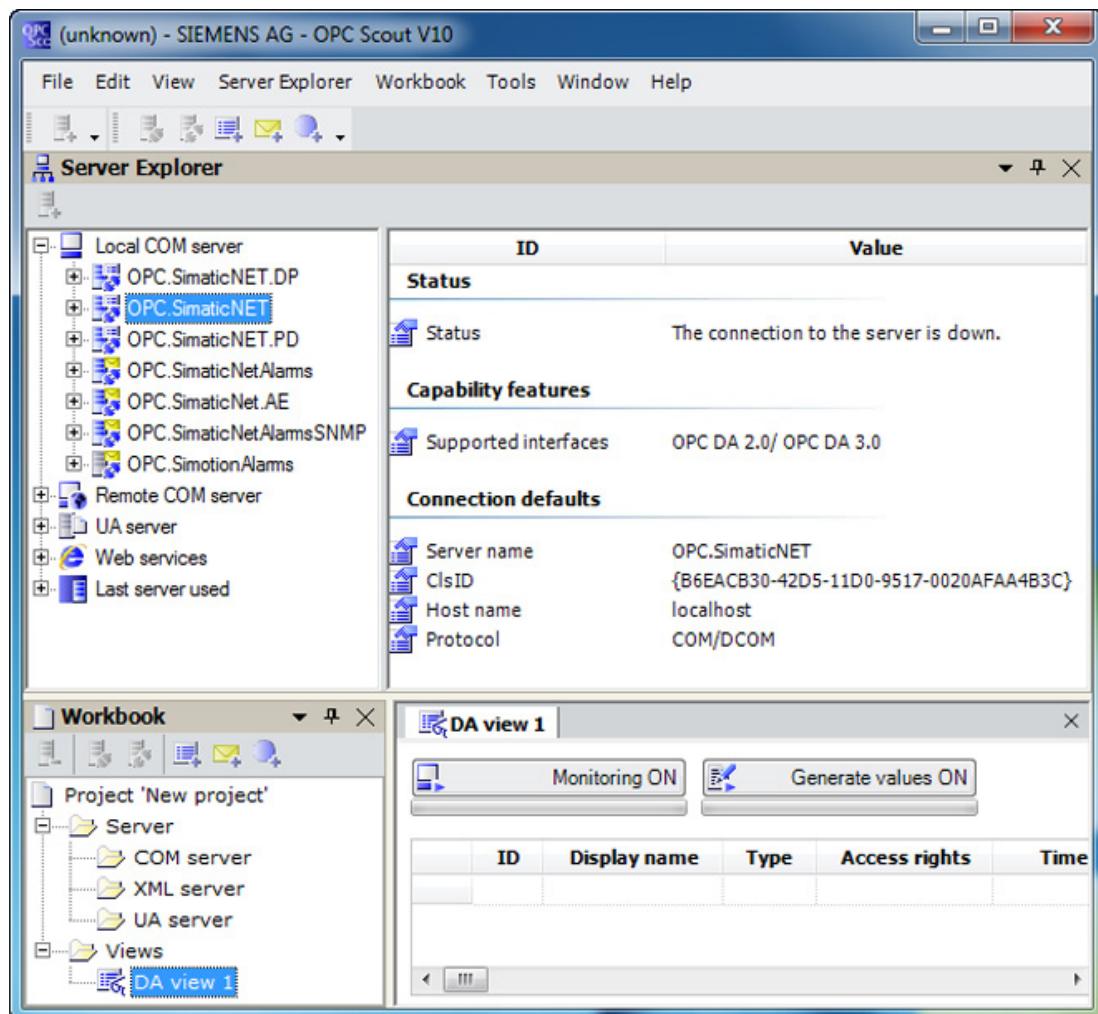
The OPC Scout V10 as client for commissioning and testing

You can now access the objects of the programmable controller with any OPC client. The OPC Scout V10 is supplied with the SIMATIC NET PC software as a tool for commissioning and testing. The next section describes how to read and write variables with this program.

3.5.4.1 Establishing a connection to the OPC server

Follow the steps below:

1. Start the OPC OPC Scout V10.
2. Doubleclick the "OPC.SimaticNET" entry to link the OPC Scout V10 with the OPC server.



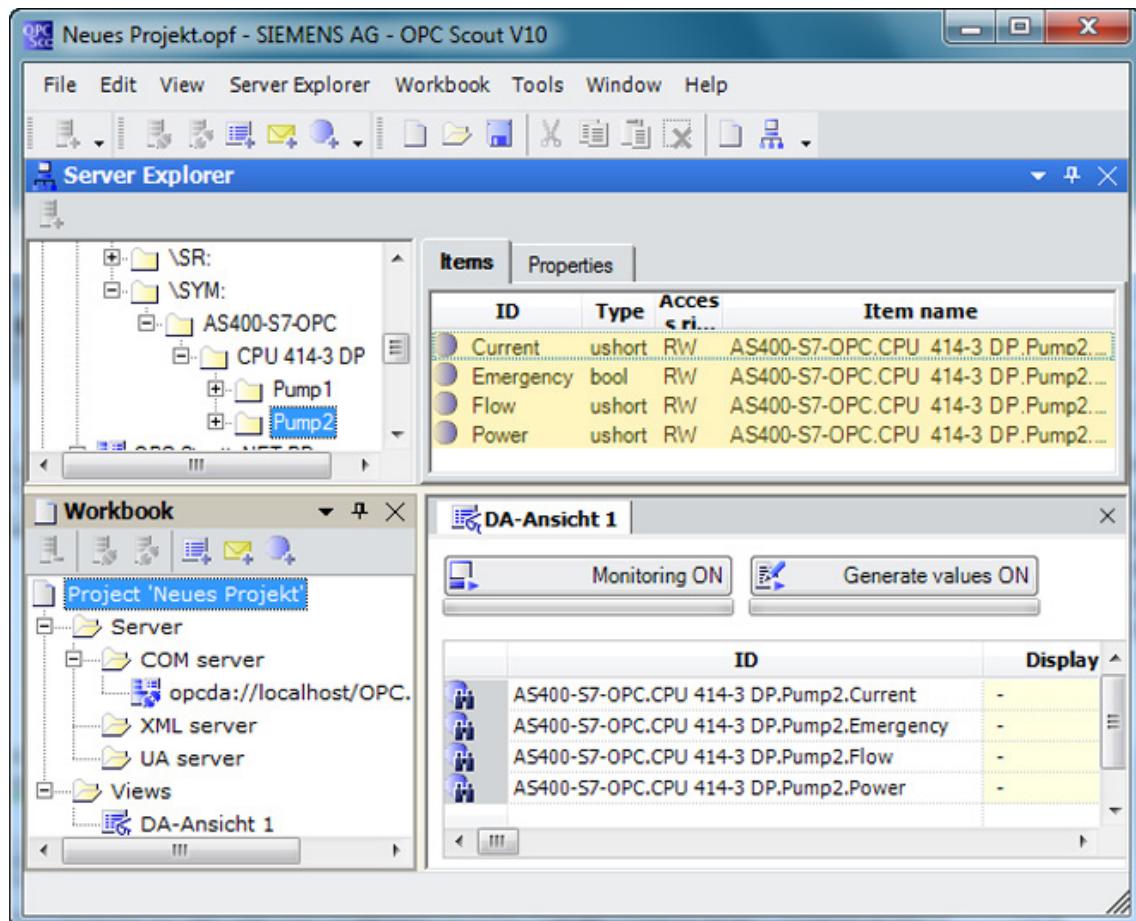
3.5.4.2 Add and monitor process variables

Follow the steps below:

Note

You will find the full example in "OPC application for Industrial Ethernet (Page 103)".

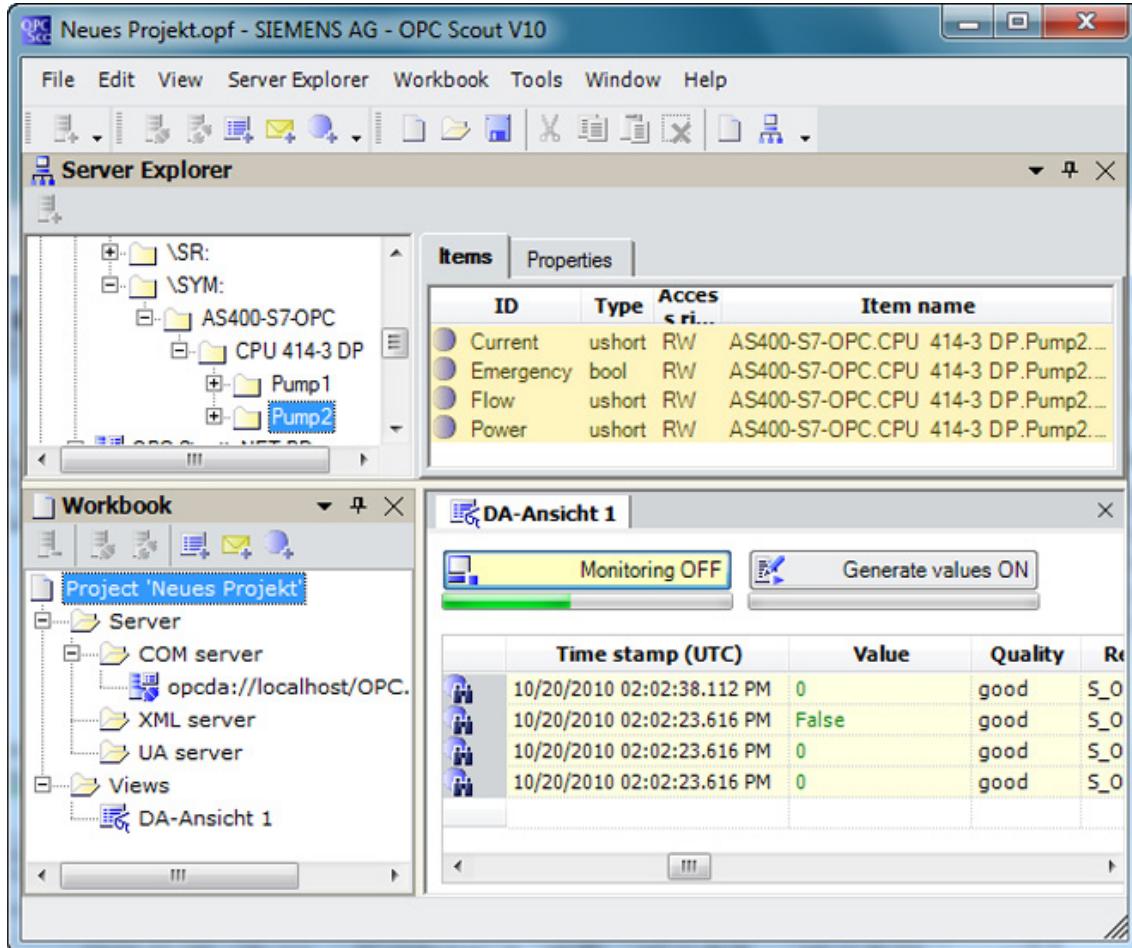
1. Click on "\SYM:" > "AS400-S7-OPC" > "CPU 414-3 DP" > "Pump2" in the navigation area.
2. In the information area, select all the process variables (items) and drag these to the view area.



Examples

3.5 SNMP communication with OPC

3. Click the "Monitor ON" button in the view area.



4. Click the "Monitor OFF" button to stop monitoring the items in the view area.

3.5.4.3 Setting the trap recipient based on the example of an OSM/ESM

Writing values

You set the trap recipient of an OSM/ESM by assigning suitable values to two OPC items. The procedure described here is also an example of how to write values for OPC items using the OPC Scout V10.

Maximum of ten trap recipients

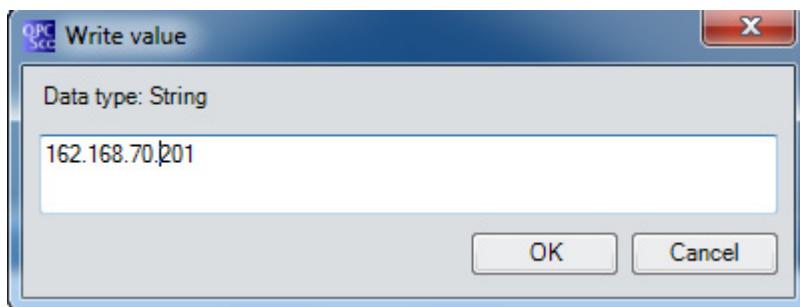
To specify the trap recipients, you use the variables *snTrapAddress* and *snTrapState*. These variables each have ten instances (*snTrapAddress1* to *snTrapAddress10* and *snTrapState1* to *snTrapState10*). On the OSM/ESM, you can therefore enter up to ten trap recipients. The device sends the trap frames to all registered recipients.

Writing values for *snTrapAddress* and *snTrapState*

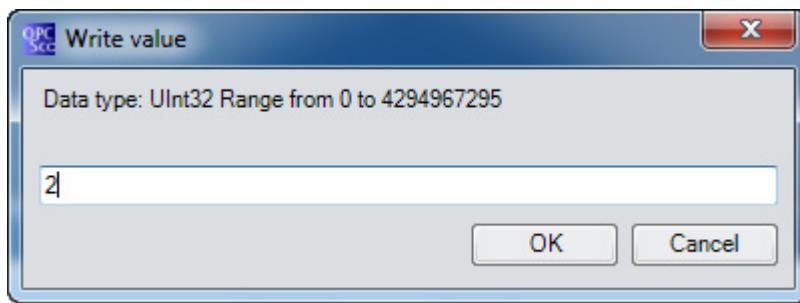
In the navigation area of the OPC Scout V10, the folder icon "SNMP" also contains a subfolder with the configured connection name. This folder contains a group with trap variables. If you use the profile supplied with the OSM, the name of this group is "Private-Common". If you use a newly created profile, the trap variables are in the group specified for it.

Follow the steps below:

1. Click on the icon of the group with the trap variables to display a list of these variables in the information area. Select the variables *snTrapAddress1* und *snTrapState1* and drag these to the view area. The variable *snTrapAddress* contains the IP address of the trap recipient, *snTrapState* specifies whether or not the entry is activated (2) or deactivated (3):
2. Click on the "New value" column to change the value for the *snTrapAddress* item.
3. Enter the IP address of the trap recipient and click the OK" button.



4. Click the "Write" button in the view area.
5. Click on the "New value" column to change the value for the *snTrapAddress* item.
6. Enter "2" to activate the trap recipient and click the "OK" button.



7. Click the "Write" button in the view area.

Note

You can drag items from the information area to the view area.

3.5.5 Creating a device profile with the MIB compiler

Device profile

A device profile contains the SNMP objects (OPC items) required for the SNMP interface of the OPC server. It maps SNMP variables and SNMP traps on the OPC interface. Device profiles are stored in profile files.

MIB files and MIB compiler

MIB files (**Management Information Base**) are descriptions of SNMP variables and SNMP traps in a form specified by Internet standards. There are standard MIBs specified for devices with the same functionality and device/vendorspecific MIB files.

You create a device profile with the MIB compiler from an existing MIB file.

Calling and handling the MIB compiler.

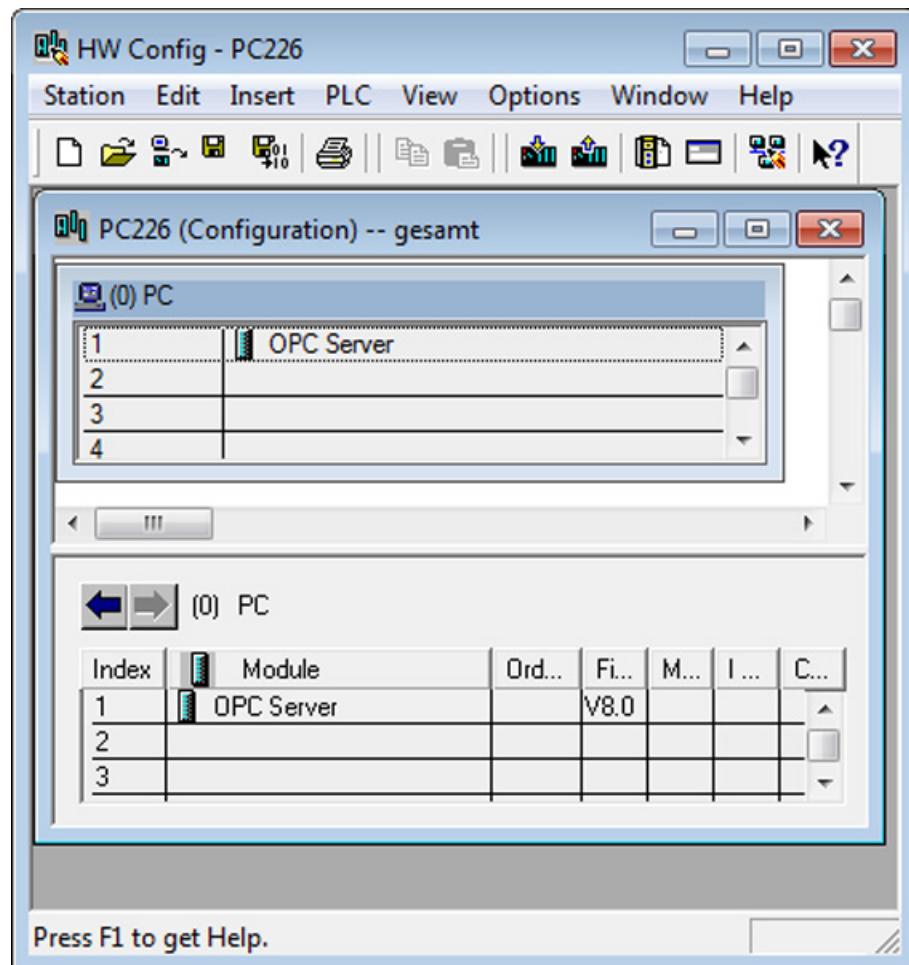
Follow the steps below:

1. Start the "SIMATIC NCM PC Config" program.

Start menu "Start" > "..." > "SIMATIC" > "SIMATIC NCM PC Manager"

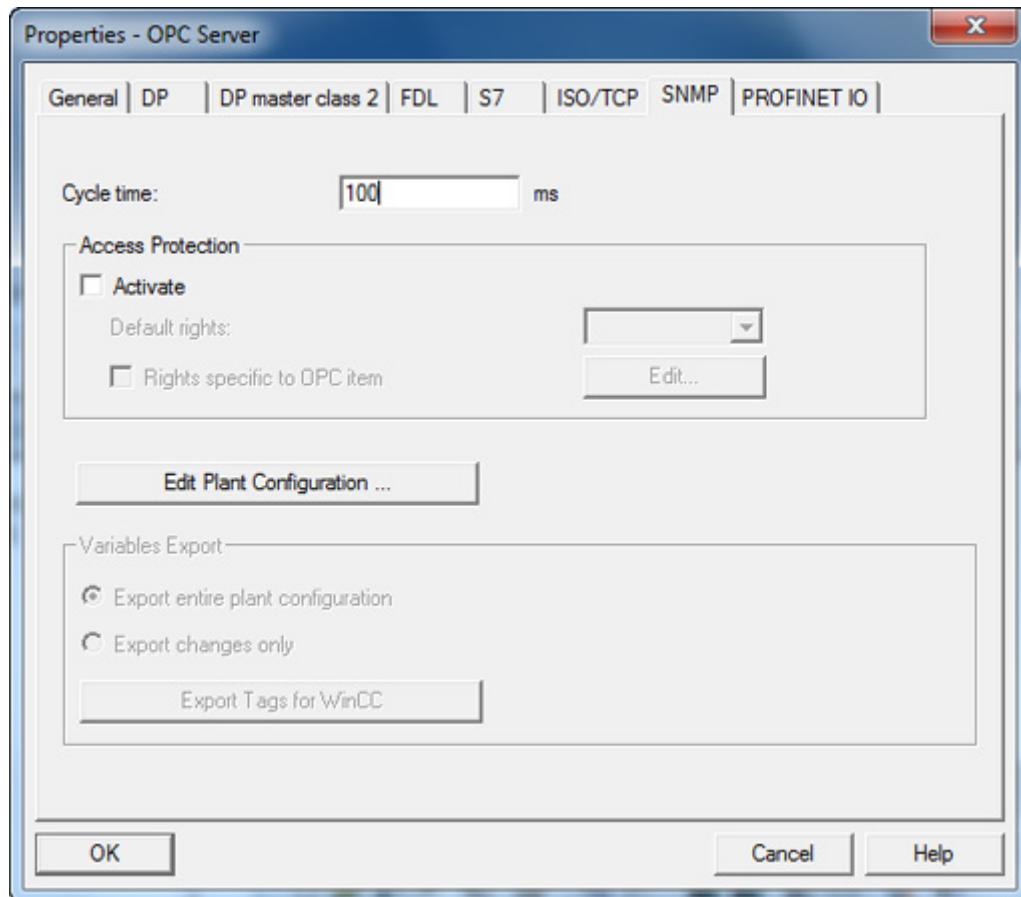
2. Double-click on the configuration icon.

3. Doubleclick on the "OPC Server" box in the section "(0) PC" to configure the OPC server.



Result: The "Properties - OPC Server" dialog box opens.

4. Select the "SNMP" tab and click on the "Edit Plant Configuration ..." button.



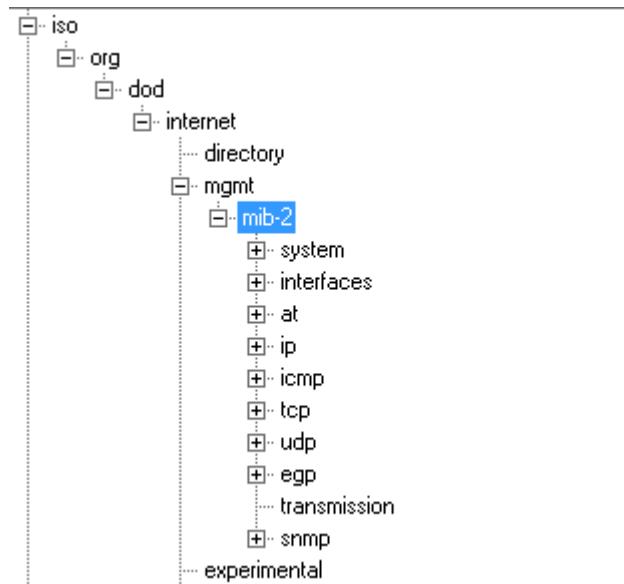
Reaction: A dialog box appears in which all the SNMPcompliant devices registered with the OPC server are listed.

5. Select the device for which you want to create a profile and click the "Edit ..." button to display the dialog box with the node data of the device.
Under the "Edit" button, you can modify node data.
6. Click the "Create Profile ..." button to open the dialog box of the MIB compiler.

7. The dialog box of the MIB compiler has three areas:

- Left area:
MIB area for displaying the MIB objects from the loaded MIB files.
- Right area:
Profile area for adopting and displaying the OPC items / OPC events.
- Lower area:
Output window for compiler messages.

Click the "Load MIB..." button. In the dialog for opening a file, select the required MIB file (for example "RFC1213-MIB.mib"). The content of this file is shown in the lefthand area:



8. Select the MIB objects for the profile in the structure tree on the left and drag them to the profile area of the dialog box. You can also select a node and drag it to the righthand area. In this case, all the SNMP variables belonging to the node are adopted as OPC variables.
9. Structuring of the variables in the profile area is possible in keeping with the OPC specification by creating groups. To do this, click the "Create Group" button.
10. Check whether or not the adopted SNMP variables still include unspecified instances of variables. Such elements are indicated by a "!".

Double-click on such elements to open the "Enter Instances" dialog box.
(For example, for an 8port switch, the object "ifOperStatus" must be assigned the instances 1-8 so that the OPC items "ifOperStatus.1" to "ifOperStatus.8" can be formed).
11. Save the profile by clicking on the "Save" button. You can select the newly created profile in the "Device Profile" list box of the "Add Nodes" dialog box.

4.1 "Station Configuration Editor"

With the "Station Configuration Editor", you can access the component management of the Station Manager in the PC station. You require the "Station Configuration Editor" for the initial configuration (as an alternative to remote configuration) and for project engineering and maintenance of a PC station.

4.1.1 Characteristics, functions and activation

The "Station Configuration Editor" is the user interface of the Station Manager.

The components are the modules and the applications involved in communications in the PC station. These components require configuration and project engineering data that is managed by the Station Manager in component management (database).

Apart from component configuration, the "Station Configuration Editor" can also be used for diagnostics purposes.

Component management of a PC station

4.1 "Station Configuration Editor"

Station Configuration Editor - [ONLINE]

Components | Diagnostics | Configuration Info

Station: PC224 Mode: RUN_P

Index	Name	Type	Ring	Status	Run/Stop	Conn
1	OPC Server	OPC Server			✓	
2	Applikation	Applikation			✓	
3	CP 1613	CP 1613			✓	
4	CP 5614 A2	CP 5614 A2			✓	
5						
6						

Station-Manager with component management (database)
- Configuration of components
- Project engineering data (connections and symbols)

OPC-Server

User Application

Virtual Rack in the PC Station

Index 1 Index 2 Index 3 Index 4

Industrial Ethernet

PROFIBUS

Area of application / use cases

- Initial configuration (commissioning)

When a module is put into operation for the first time, an initial configuration is necessary. This initial configuration is done for all newly installed modules. The initial configuration sets the index (the "virtual slot number") of the module.

After initial configuration of the modules, the PC station is prepared to receive the project engineering data. This step can be compared with inserting the component in the rack of an S7 station.

- Project engineering and maintenance

Changes in the project engineering and in the configuration data can be downloaded from the project engineering tool to the PC station (local and remote). As an alternative, it is possible to transfer data using an XDB file (if the station is not networked).

Using the "Station Configuration Editor", you can check the effects in the "Components" tab. The "Diagnostics" tab provides you with information on the operating state at any time.

By adding the communications module in the "Station Configuration Editor", the module is automatically switched to the "configured mode"; as default, modules are set to "PG mode".

How to start the "Station Configuration Editor":

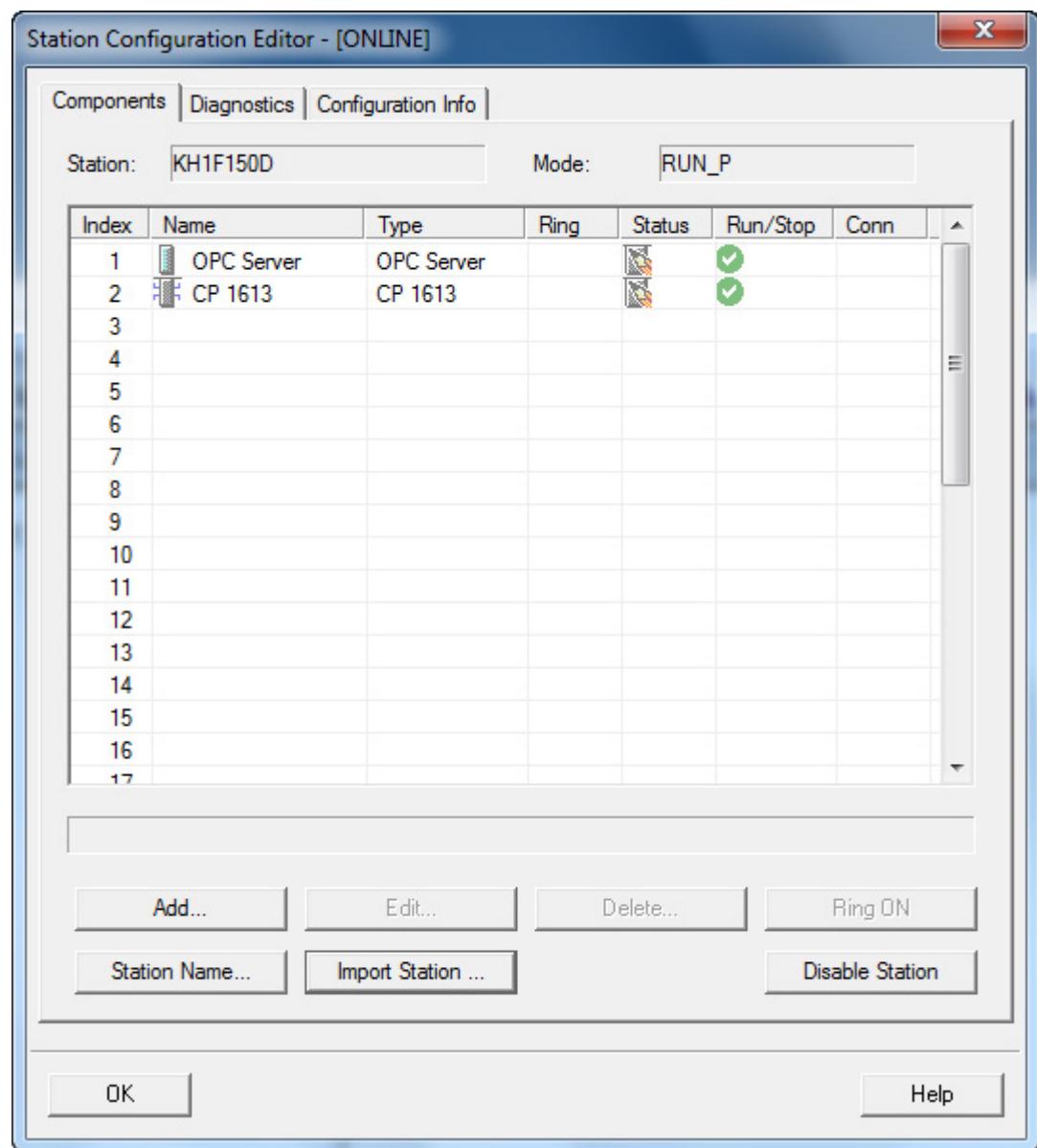


The "Station Configuration Editor" is always available and started on the PC station on which you have installed the SIMATIC NET CD. You can bring it to the foreground by clicking the icon shown here in the taskbar of the Windows desktop (SYSTRAY).

4.1.2 Managing components: "Components" tab

In the "Components" tab, you will find the essential functions for PC configuration and project engineering:

- Assigning the station name
- Creating new components
- Adopting a component configuration and project engineering data (online or offline mode)
- Setting the mode - online or offline
- Checks and diagnostics



Note

You will find more information on the meaning of the display boxes and the buttons in the integrated help system.

Assigning the station name

You can assign a name for the PC station by clicking the "Station Name..." button.

To be able to identify a project engineering configuration that is already loaded locally, the name assigned here must match the name you assigned to the PC station in the project engineering communication settings with NCM PC / STEP 7.

Creating new components

You can select the components installed on your PC station (applications, OPC Server, modules such as controllers) by clicking the "Add..." button. The modules are detected automatically.

Note

The components in the configuration list you can edit here must be entered in exactly the same order as in the component image you created in SIMATIC NCM PC with HW Config. If the configuration differs from the list, the configuration data that you download from SIMATIC NCM PC to the PC station will not be adopted correctly.

The status display constantly informs you whether the component you have created matches the current hardware configuration and whether it matches any project engineering data that has already been downloaded.

Note

Remember that you have the option of a partial download if you have set the properties of the "Station Configuration Editor" accordingly.

For more detailed information, refer to the next section "Setting the "Station Configuration Editor": "Properties" dialog (Page 203)".

Adopting the component configuration and project engineering data

For productive operation, you require not only the component configuration but also the project engineering data for the communication connections and possibly also for the symbols of variables.

4.1 "Station Configuration Editor"

You have the following options:

- Downloading using the project engineering tool

In online mode, you can download the project engineering data directly to the PC station using NCM PC / STEP 7. You can download both locally or over the network.

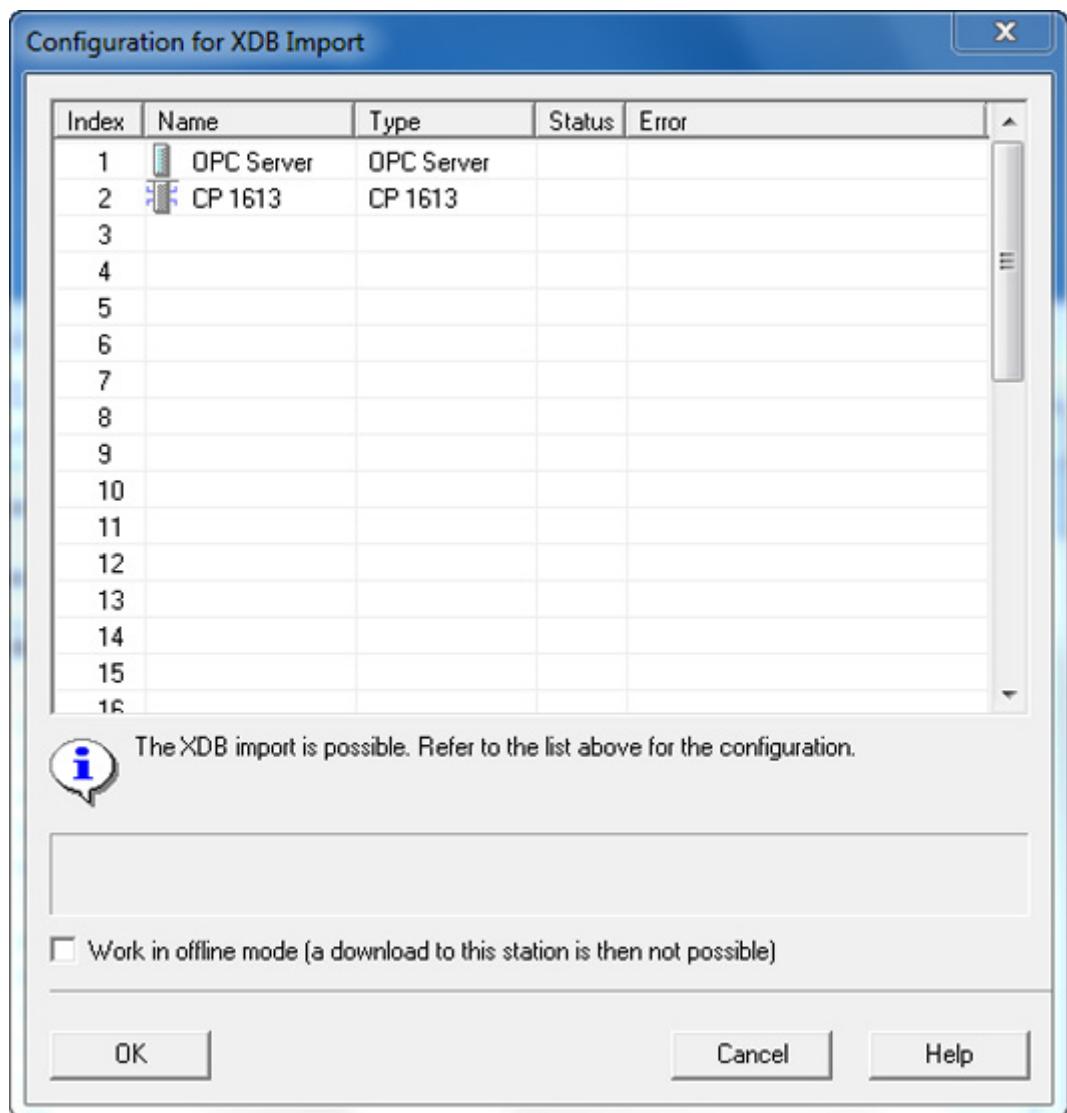
- Station import

If the station is not networked, you can load the component configuration and project engineering data by importing the XDB file on the PC station (for details on creating an XDB file, refer to the section "Downloading project engineering data to the PC station (after initial configuration) (Page 229)".

The XDB file can be imported using the "Import Station" button in the "Station Configuration Editor".

Importing the XDB file is possible only when compatible modules are installed in the computer and the actual current module configuration exactly matches the information in the XDB file.

You can import an XDB file at any time regardless of the current mode (online or offline). You can also specify (option) whether you want the "offline mode" to be set following the import.



Setting the online or offline mode

The current mode is displayed in the title bar of the "Station Configuration Editor".

- Offline mode

In offline mode, you can make changes to the configuration only by entering them directly or by importing the station (XDB file).

In offline mode, you can click the active "Change mode" button to change to online mode.

- Online mode

In online mode, you can download the project engineering data directly to the PC station using NCM PC / STEP 7. You can download both locally or over the network.

In online mode, you can also import an XDB file at any time. You can also specify (option) whether you want the "offline mode" to be set following the import.

Checks and diagnostics

- Note on diagnostics entries

The entry in the "Status" field in the configuration list constantly informs you whether or not the created component matches the actual hardware configuration and whether there is a match to an existing loaded project engineering database.

If this is the case, you will be prompted to select new diagnostics entries in the "Diagnostics" tab.

- Checking the accessibility of the module - "ring" function

Once you have completed the configuration, you can check whether or not modules are accessible using the "Ring" button. If the module supports this function, you will see an indicator respond on the module.

With the help of the Ring function, you can distinguish between several modules of the same type installed on the computer.

4.1.3 Evaluating messages: "Diagnostics" tab

How it works

The "Station Configuration Editor" manages a diagnostic buffer in which the PC station components (hardware and software) enter event information.

You can use this list to analyze configuration or communication problems.

Note

You will find more information on the meaning of the display boxes and the buttons in the integrated help system.

Note

The diagnostic buffer entries you can read out in the "Station Configuration Editor" in the "Diagnostics" tab can also be read out remotely with the "NCM S7 Diagnostics" tool.

4.1.4

Setting the "Station Configuration Editor": "Properties" dialog

You open this dialog by right-clicking on the icon of the "Station Configuration Editor" in the Windows taskbar (SYSTRAY). Select the properties in the shortcut menu and you can then make the following settings in the "Station Configuration Editor":

Configuring activation of warnings

When warnings are enabled, a new event in the diagnostics buffer causes a display in the station manager ICON in the system tray. Whether a warning is indicated depends on the set warning level.

Here, you can configure the warning activation (yellow "!" character) over the Station Manager icon in the system tray of the taskbar. The following settings for "warning activation" are possible depending on the weighting of the errors:

- Only when important errors occur
- If an error occurs
- Power on
- Off

Default setting: Only when important errors occur.

Accept partial loading

If the "accept partial loading" property is activated, the Station Manager also accepts project engineering that contains only part of the configuration visible in the "Station Configuration Editor".

The components (modules and applications) that do not receive an engineered configuration are fully deleted if you download only part of the configuration (engineered configuration is lost). However, they are retained in the configuration of the Station Manager (with corresponding status display: The component exists in the current actual configuration of the PC station but it was not created in the project engineering).

Default setting: Accept partial loading.

4.2

SIMATIC NCM PC project engineering tool

SIMATIC NCM PC is the central tool with which you configure the communication services for your PC station. The configuration data generated with this tool must be downloaded to the PC station or exported. This makes the PC station ready for communication.

4.2.1

Characteristics, functions and activation

SIMATIC NCM PC is a version of STEP 7 especially for project engineering of PC stations. It provides the full range of features of STEP 7 for PC stations.

SIMATIC NCM PC comprises the following main components:

4.2 SIMATIC NCM PC project engineering tool

SIMATIC NCM PC Manager

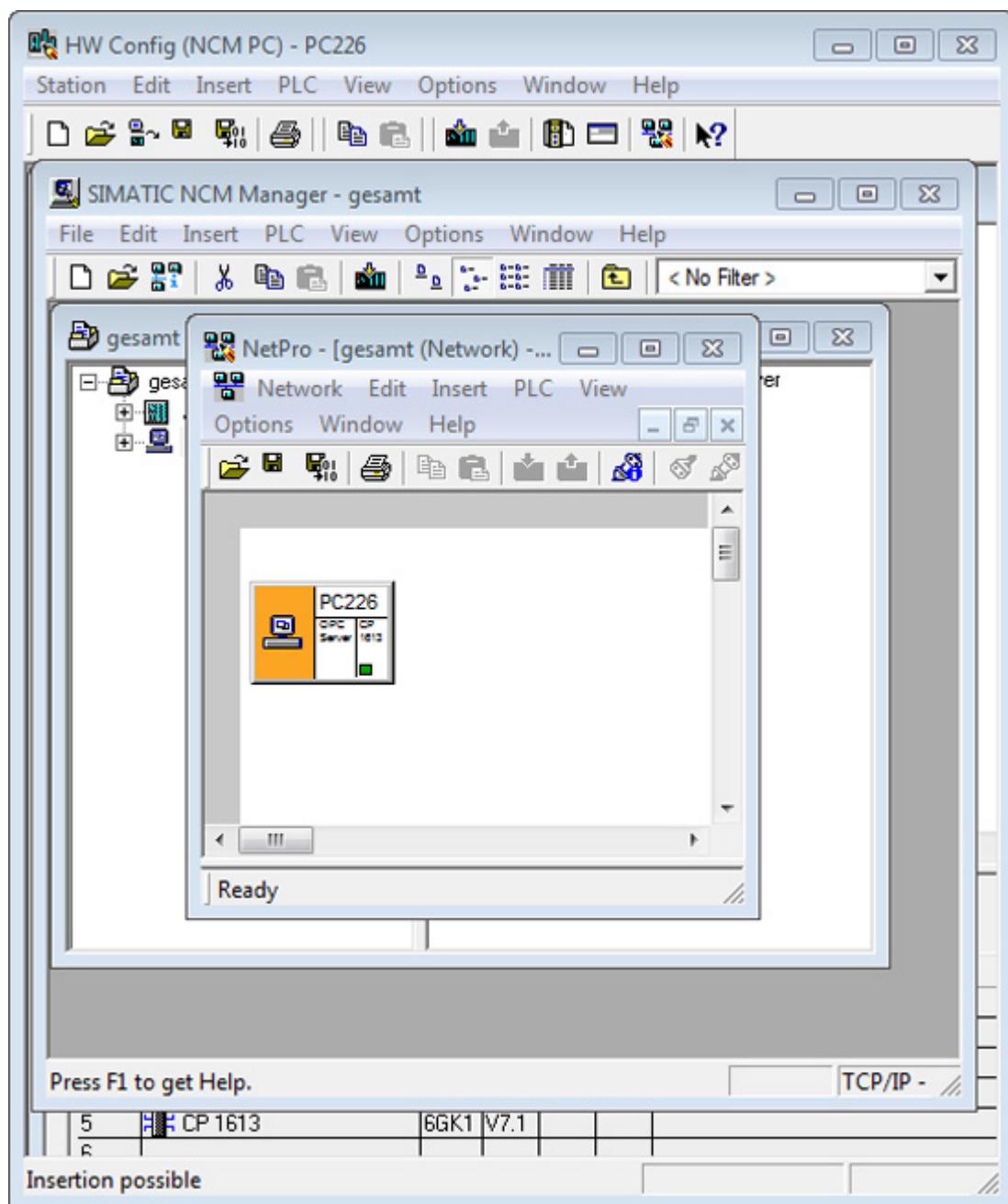
Provides functions for project and component management. From here, you can start the other tool components.

SIMATIC NCM PC Config

This is required to configure PC stations and their components.

NetPro

This is primarily used for the project engineering of connections and communication properties of the SIMATIC NET OPC server and applications.



Functions

To create the configuration and project engineering data of a PC station, use the following functions:

- Create and configure components of the PC station.
- Configure the communication properties of the SIMATIC NET OPC server.
- Configure connections.
- Adopt the symbols from the SIMATIC S7 configuration.
- Configure DP operation.
- Set network parameters for PROFIBUS and Ethernet operation.
- Configure the PC station remotely.
- Download configuration data to the PC stations.
- Store configuration and project engineering data in an XDB file.
- Monitor the communication with connected S7 stations using NCM diagnostics.

Initial configuration

You can make the initial configuration of your PC station starting with the project engineering data created in NCM PC in three different ways:

- Remote configuration with STEP 7 / NCM PC
- Transfer of the configuration and project engineering data using an XDB file

Refer also to the section "Commissioning for configured mode - Overview (Page 23)".

Note

You can create the project engineering both in SIMATIC NCM PC and in STEP 7. STEP 7 also provides all the SIMATIC NCM PC functions described here for configuring your PC! STEP 7 is necessary if you also want to configure S7 stations in the project.

From now on, the description will only refer to SIMATIC NCM PC but nevertheless applies to both.

Note

Optional packages are not supported by SIMATIC NCM PC. If you are editing a project that was created or edited in STEP 7, it may contain components from STEP 7 optional packages. If this is the case, you can only edit stations using SIMATIC NET PC that do not contain components from STEP 7 optional packages.

How to start SIMATIC NCM PC



Select the following from the Start menu of the Windows operating system:

Start menu "Start" > "..." > "SIMATIC NCM PC Manager".

Further information in Help

The following integrated help system functions will also provide you with detailed information:

- "Help" > "Introduction"

Contains a brief description of SIMATIC NCM PC.

- "Help" > "Getting Started"

Here you will find brief instructions on how to create a PC station, its applications and modules. For more detailed information, you can go from here to the PC topics in the main help system.

These instructions are available only in SIMATIC NCM PC. In STEP 7, select the Help menu directly:

- "Help" > "Help Topics"

Here you will find help topics relating to the PC station under:

- Configuring Hardware / SIMATIC PC Station
- Configuring Connections for a SIMATIC PC Station

4.2.2 Relationship between SIMATIC NCM PC and STEP 7

SIMATIC NCM PC and STEP 7 are compatible with each other.

- You can open and edit projects you have created with SIMATIC NCM PC at any time in STEP 7/SIMATIC Manager. This allows you to use additional functions for programming and configuring S7 stations.
- You can open and edit projects that you created with STEP 7/SIMATIC Manager at any time in SIMATIC NCM PC. You can edit existing PC stations and create new PC stations. You can configure the communication links for these PC stations to the existing S7 stations.

NCM PC can use STEP 7 project data

The restrictions in SIMATIC NCM PC relate to the types of station that can be configured. The project engineering for S7 stations and programming them can only be done in STEP 7.

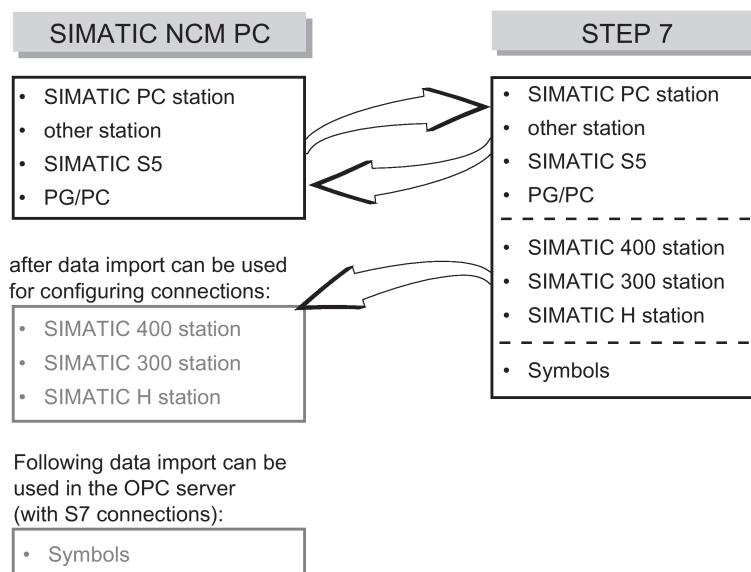
The station types that can only be configured in STEP 7 are, however, available for connection configuration as target stations after importing the project into SIMATIC NCM PC.

The OPC server can also use the symbol files created for the S7 stations. The relevant settings are made when you configure the OPC server.

After editing such a project in SIMATIC NCM PC, you can return it to STEP 7 and edit it again at any time.

STEP 7 provides extra functions for testing and diagnostics.

The following graphic illustrates the differences once more:



4.2.3 Creating a PC station

The PC station in the STEP 7 project

The "SIMATIC PC Station" is an object in a SIMATIC STEP 7 project. A typical PC station consists of the following elements:

- One or more communications modules (CPs)
- An OPC server application and/or other applications
- In some situations, other controlling elements such as soft PLC or slot PLC

One CP is connected to a PROFIBUS or Ethernet network over which other communication partners can be reached.

Within the OPC server application, connections can be created and used for various protocols that describe the communications relations with the partner devices.

Aims

You want to create configuration and project engineering data for communication services for individual PC stations. This database will then be downloaded to the PC station. After this, the PC applications can use the communications services.

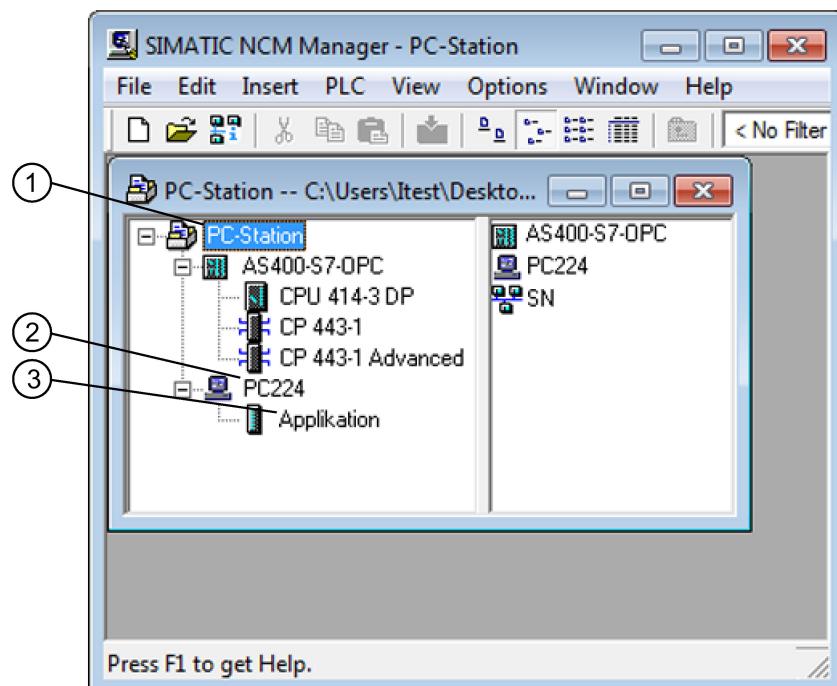
You can use this in the following ways:

- On a local station, in other words, when your engineering station is the PC station at the same time, the parameters specified in the initial configuration with the "Station Configuration Editor" tool can be transferred later to the local project engineering system.
- For transferring the data to an engineering station

To allow the information from the project engineering to be transferred from an engineering system to the PC station, the local configuration must match the configuration data entered in the project engineering. To make sure of this, you can create project engineering data locally on the PC station and then download it to the target PC station or import it using an XDB file.

Creating and managing objects

After starting SIMATIC NCM PC, you either open an existing project or create a new one. You use projects to manage your configurations consisting of all or part of the stations of your plant.



- 1 Within a project, objects are arranged in a structure.
- 2 For each PC station, a separate object of the type "PC station" is created.
- 3 The configuration and parameter assignment data of the hardware and software is located within these objects. These objects are then used to assign the communications services.

Note

The name of the PC station you select here identifies the PC configuration.

- If you configure on the local station with NCM PC, select the name identical to the name in the local configuration.
- If you configure a remote PC station, the name you select must not be identical to the local PC configuration! When you download, you would otherwise overwrite the local configuration.

Tip: You can also adapt names, when necessary, in the Station Manager using the "Station Configuration Editor".

Note

"PC Stations" > "Simatic PC Station" > "OPC Server"

The objects are created with the "PC Config" component as described in the section "Configuring a PC station with SIMATIC NCM PC Config (Page 211)".

Follow the steps below:

1. Start the SIMATIC NCM PC Manager.
2. You can create the stations with the insert objects function.
3. Opening a station object starts the "HW Config" tool with which you can create the configuration of a PC station consisting of modules and applications (see the following page).

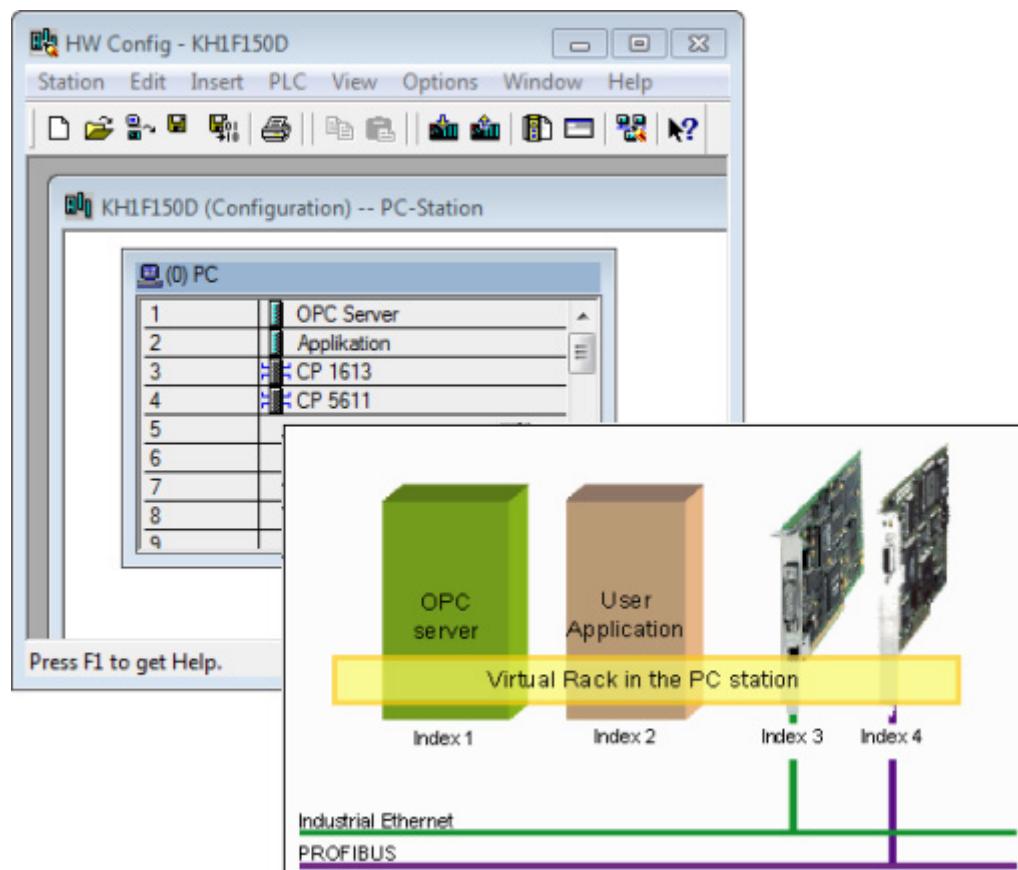
4.2.4 Configuring a PC station with SIMATIC NCM PC Config

Creating an image of the PC configuration

To allow the configuration data sent by the configuration system to be assigned to a module or an application, it must have a unique identification number. The identification number for modules, applications, and other components in a PC station is the index.

You place your applications and modules in slots in a "virtual rack" in HW Config. This slot number then corresponds to the index mentioned above.

Component management of a PC station



Note:

This procedure corresponds to the one already described for the "Station Configuration Editor" tool.

Note

Be careful not to confuse this "index" with a hardware slot, for example on the PCI bus of the PC station. The slot on the PCI bus is not relevant for commissioning and is not used at any point.

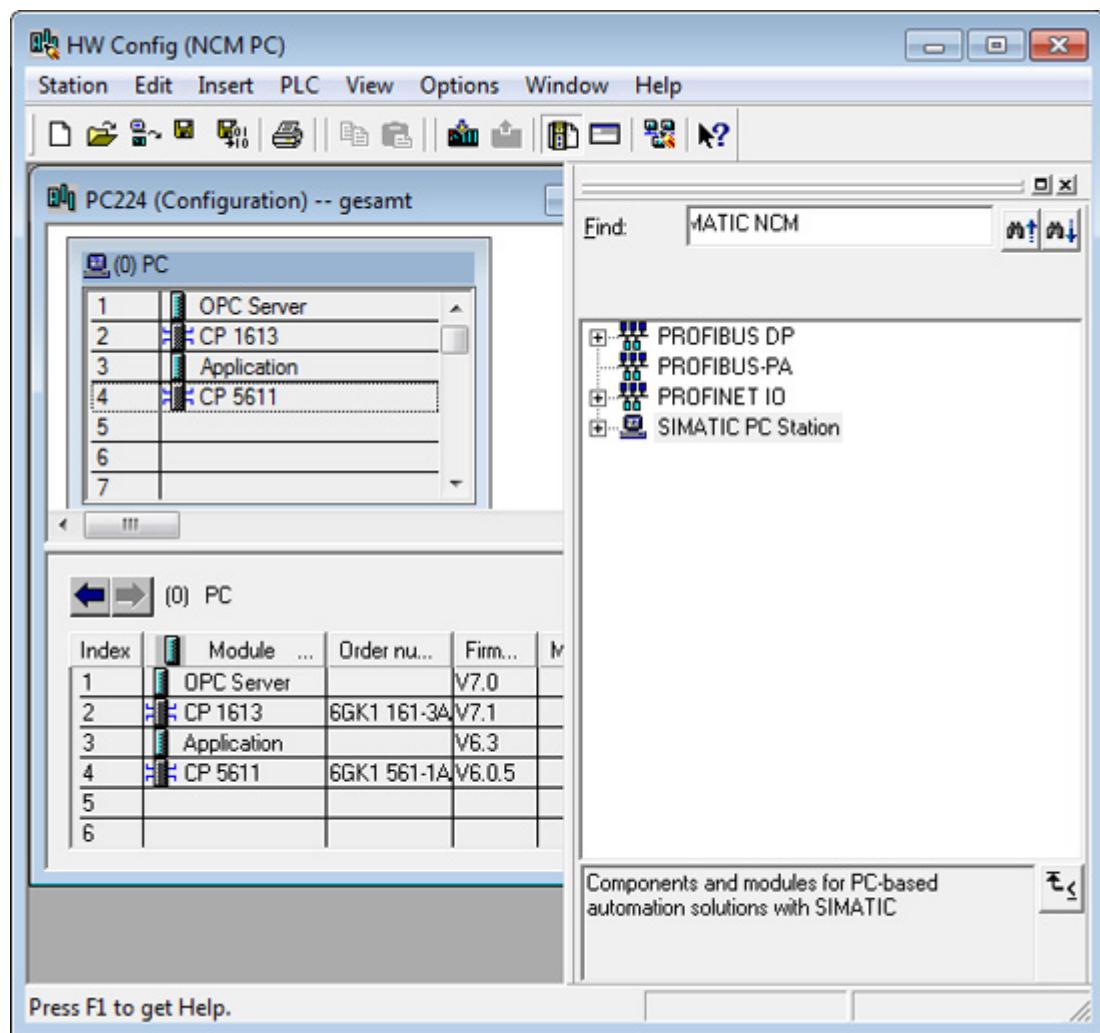
Follow the steps below:

Drag the components from the catalog to the list (the "virtual rack") displayed in PC Config.

Note

Please note the following if you are transferring data by downloading:

Make sure you arrange the components exactly the same as in the configuration list of the "Station Configuration Editor" (refer to the section "Managing components: "Components" tab (Page 198)"). If the configuration differs from the list, the configuration data that you download from SIMATIC NCM PC to the PC station will not be adopted correctly.



Note:

This display shows the situation after configuring in with STEP 7 / HW Config; in SIMATIC NCM PC, only the components for the PC stations are available in the catalog.

PC components in the catalog

For the SIMATIC PC station, you can select the following components:

- **Application**

- Application (standard application)

You use standard interfaces to communicate with other applications and devices via your PC module.

The user programs included in the application use suitable interfaces for communication, such as the SAPI programming interface or the SEND/RECEIVE programming interface.

You can configure the following communications services depending on the module inserted:

- Connectionoriented services
- DP services (for example, DPV0 and DPV1)
- PROFINET IO

Note how these differ from the user programs that use the communication service as OPC clients via an OPC Server as described below.

- OPC server

You use the convenient interface to an OPC server to communicate with a programmable controller such as a SIMATIC S7400.

The OPC server can be configured as an interface to all available communication protocols. You can create this object only once in a PC station.

You can then use this OPC server for communication with any number of user programs (OPC clients).

The following communications services can be used depending on the modules inserted:

- All types of connection
- DP services
- PROFINET IO

- **CP Industrial Ethernet**

This contains all the CP modules for attachment to Industrial Ethernet.

- **CP PROFIBUS**

This contains all the CP modules for attachment to PROFIBUS.

4.2.5 Creating the DP master system

Read the information below if you want to use a PROFIBUS CP and configure a DP master system.

Significance of the configuration data in a DP master system

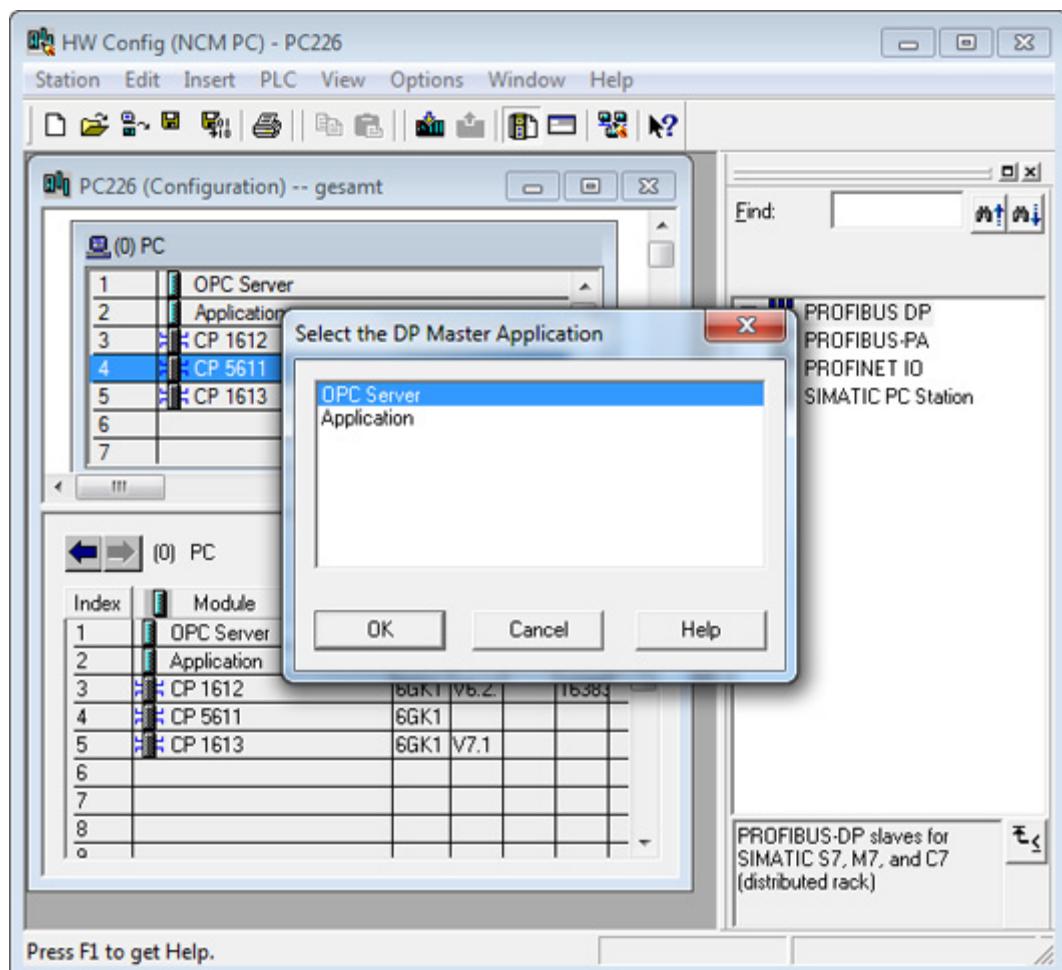
The configuration data inform the DP master in the PC station of the data and address areas of the attached slaves.

Depending on the type of slave, this information is either implicitly linked to the entry in the catalog or must be configured here additionally as, for example, when using an intelligent DP slave such as the CP 3425.

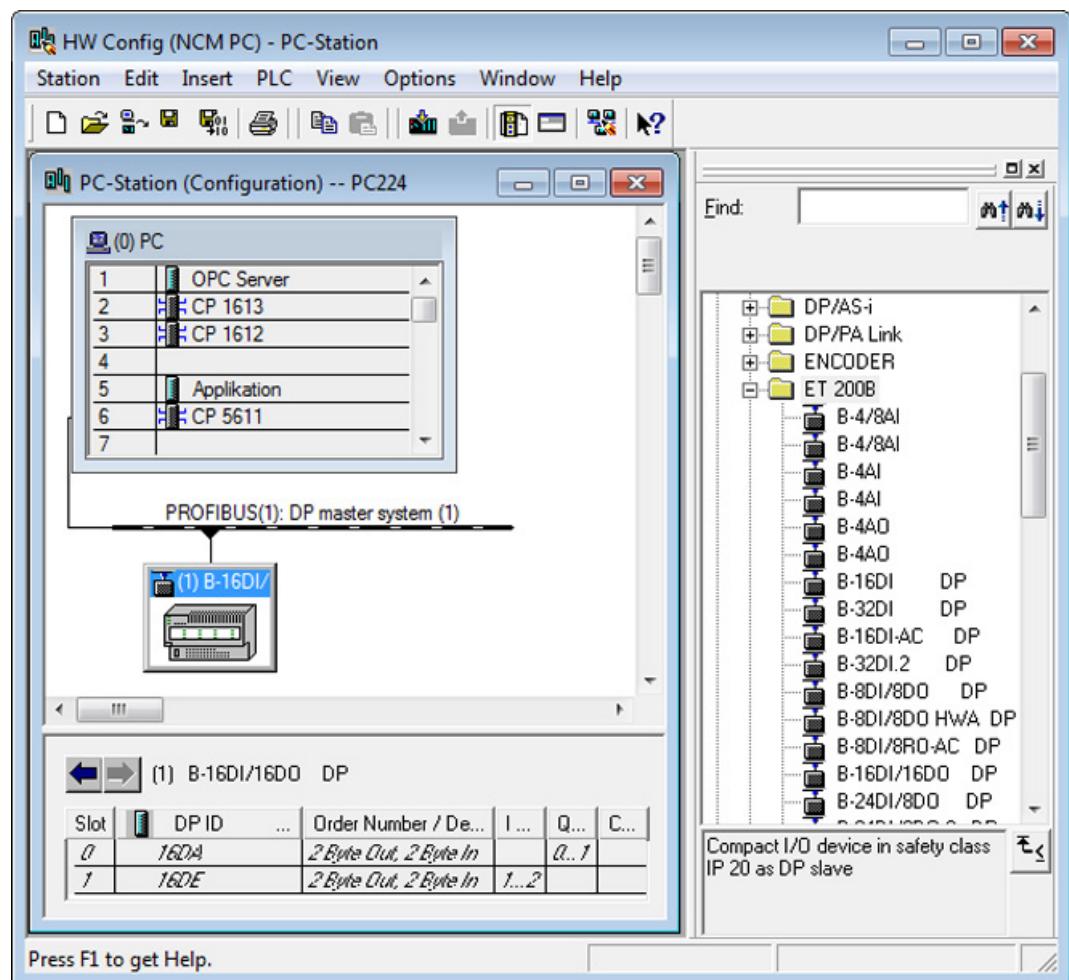
Follow the steps below:

1. You have already placed the applications and modules as described in the section "Configuring a PC station with SIMATIC NCM PC Config (Page 211)".
2. After you have taken the module from the catalog, you can select it and create a DP master system using the "Insert" menu command.

3. Select the application that will address the master system (the DP slaves).



4. Now go to the catalog and insert the DP slaves that will be addressed over the application.



4.2.6 Creating a PROFINET IO system

The following information applies if you want to use an Ethernet CP as a PROFINET IO controller in the PC station and want to configure a PROFINET IO system.

Significance of the configuration data in a PROFINET IO system

The configuration data inform the PROFINET IO controller in the PC station of the data and address areas of the connected PROFINET IO devices.

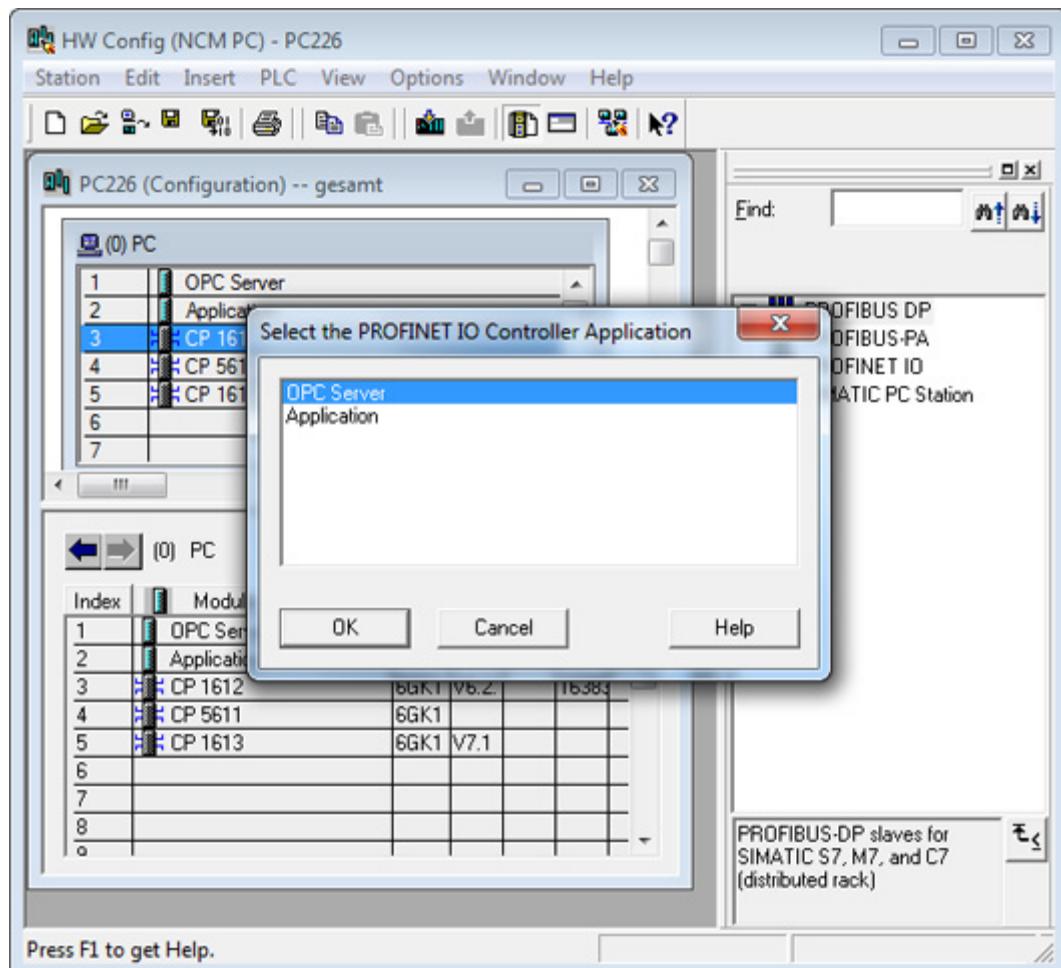
This data also includes the device names which the PROFINET IO controller assigns to the PROFINET IO devices during startup.

Follow the steps below:

1. You have already placed the applications and modules as described in the section "Guide to installation and commissioning (Page 19)".
2. After you have taken the module from the catalog, you can select it and create a PROFINET IO system using the "Insert" menu command.

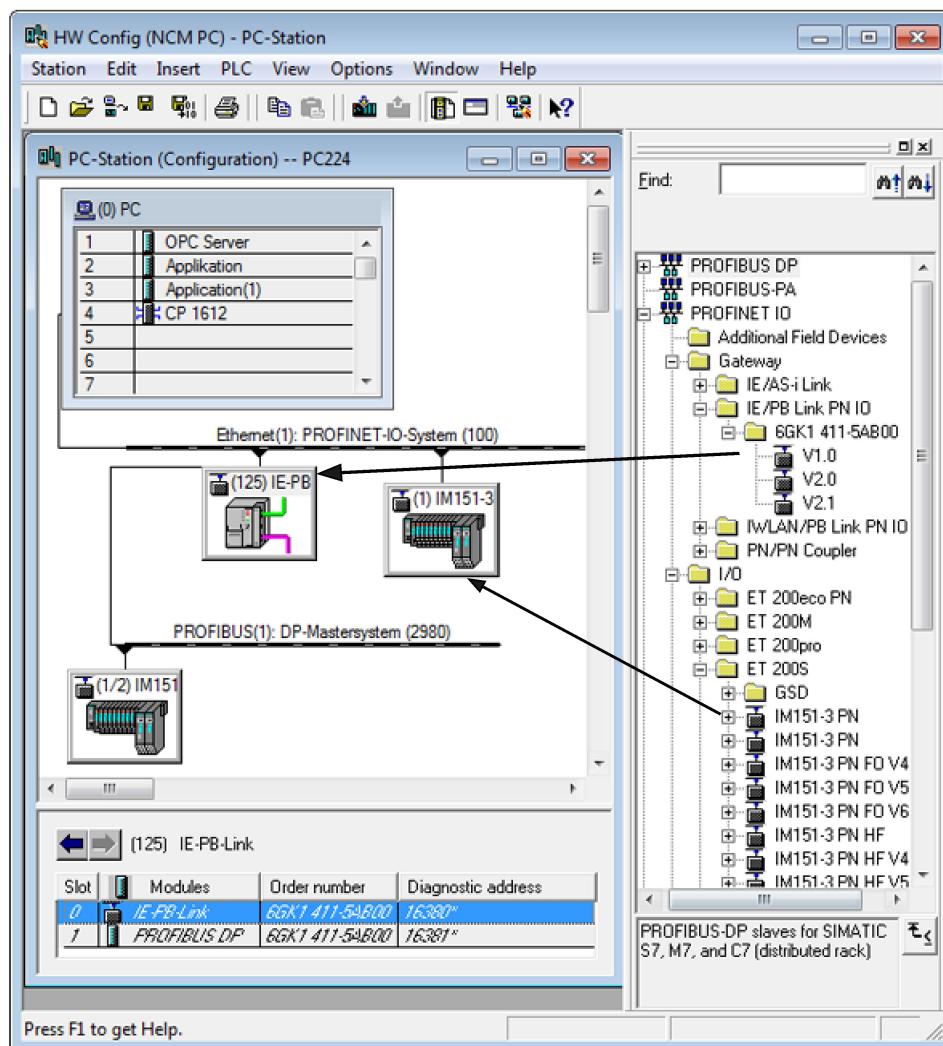
If required, you can also connect an existing PROFINET IO system with the PROFINET IO controller you have just created by selecting the CP, rightclicking, and then selecting the "Connect PROFINET IO System" menu command.

3. Select the application (OPC server or application) that will address the PROFINET IO system (the PROFINET IO devices).



4. Now go to the catalog and insert the IO devices that will be addressed over the application.

To do this, drag the IO device from the catalog to the symbol of the PROFINET IO system (see figure).



PROFINET IO devices

PROFINET IO devices can be connected either directly to Ind. Ethernet or can be connected as PROFIBUS DP slaves to a DP master system. By using an IE/PB Link PN IO, you can address the DP slaves of a DP master system just like PROFINET IO devices.

You will find further information here

- Project engineering

In the basic help of STEP 7 / SIMATIC NCM PC in the topic "Steps in Configuring a PROFINET IO System", you will find a detailed description of how to configure a PROFINET IO system.

- PROFINET IO - system descriptions: Refer to /18/ and /19/

4.2.7 Configuring connections

Meaning

During operation, configured connections are established either implicitly or on request, depending on the parameter assignment. They are then available to the OPC server or the PC application for communication.

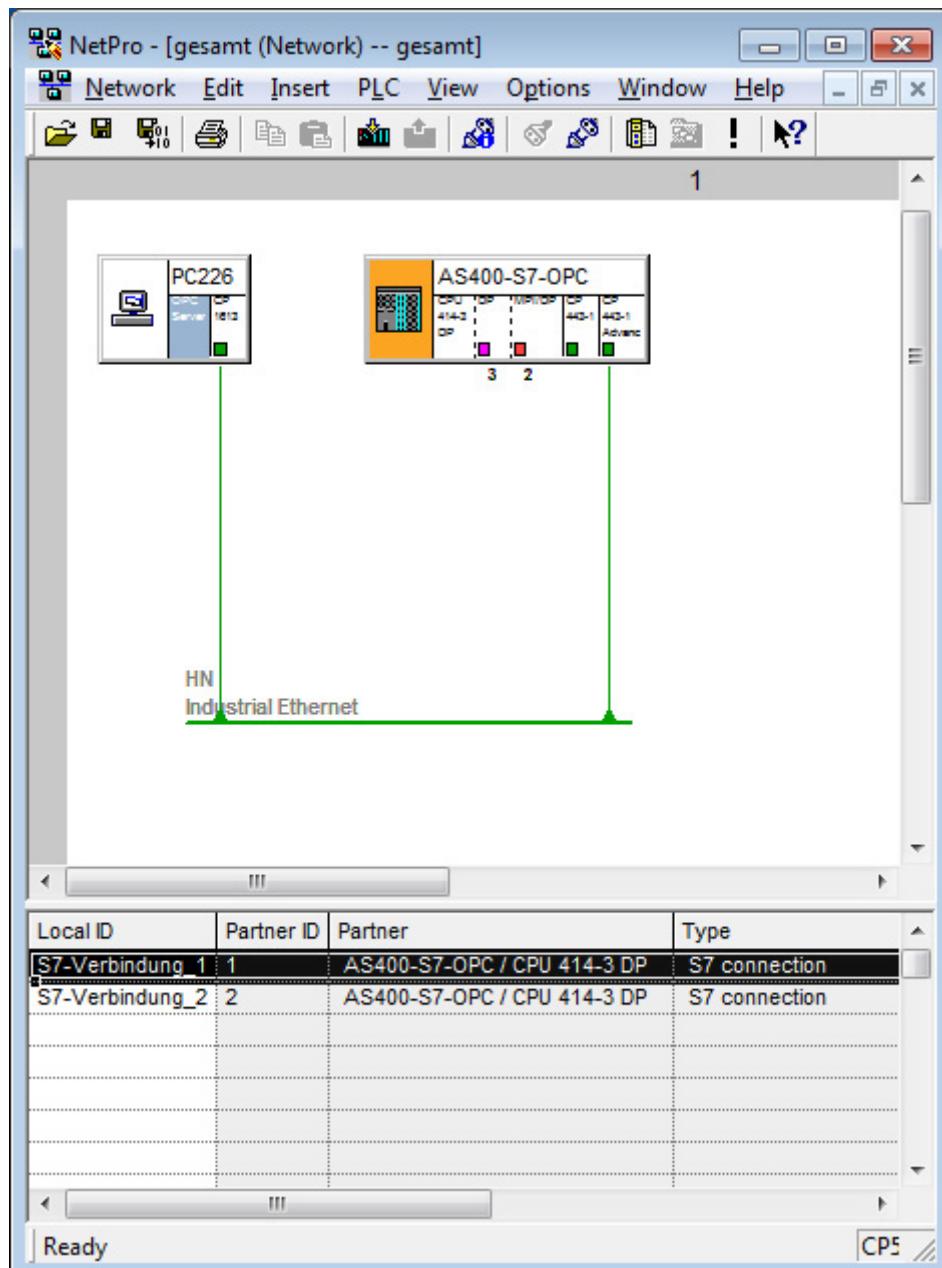
Procedure

Regardless of the application type, the general rules for connection configuration apply:

- Communication connections are always assigned to an application.
- In the PC station, the CP that supports the type of connection is used for the data transfer.
- If there is more than one CP with this capability, you can use Routing to select the transmission path.

Follow the steps below:

1. Select the application to which you want to assign a connection.



2. Enter the desired connection type. You will be requested to specify the connection partner.

Connections to SIMATIC S7 stations

When you configure systems that include PC stations and SIMATIC S7 stations, the use of STEP 7 is generally advisable. You can then edit and process every station type completely and with full functionality.

After creating a new project in SIMATIC NCM PC, you will find that the required destination station (for example an S7 station) may not exist depending on the particular application intended. You then have the following options:

- Create an unspecified connection:

Select "unspecified" as the connection partner. In the Properties dialog box, you can then set the address parameters for the connection partner.

- Create a substitute object:

Create an "Other Station" type station. You then network this station by assigning the necessary interface types in the Properties dialog.

This method is advisable if you intend to assign several connections to this partner station on the same interface in your project.

- Create a copy of an S7 station:

Insert the copy of an S7 station that you have created in another project using STEP 7. You can then select this S7 station as your destination station.

4.2.8 Configuring a PC station as a DP slave

This section explains how to create the project engineering for a PC station with the CP 5611 as DP slave.

Two situations can be distinguished:

- The PROFIBUS DP master engineering was created in NCM/STEP 7 (in the example as other PC station);
- The PROFIBUS DP master cannot be configured in NCM / STEP 7.

In both cases, a CP 5611 is used as the DP slave. We are assuming a project in which a PROFIBUS DP master system has already been created. For a description, refer to the section "Creating the DP master system (Page 214)".

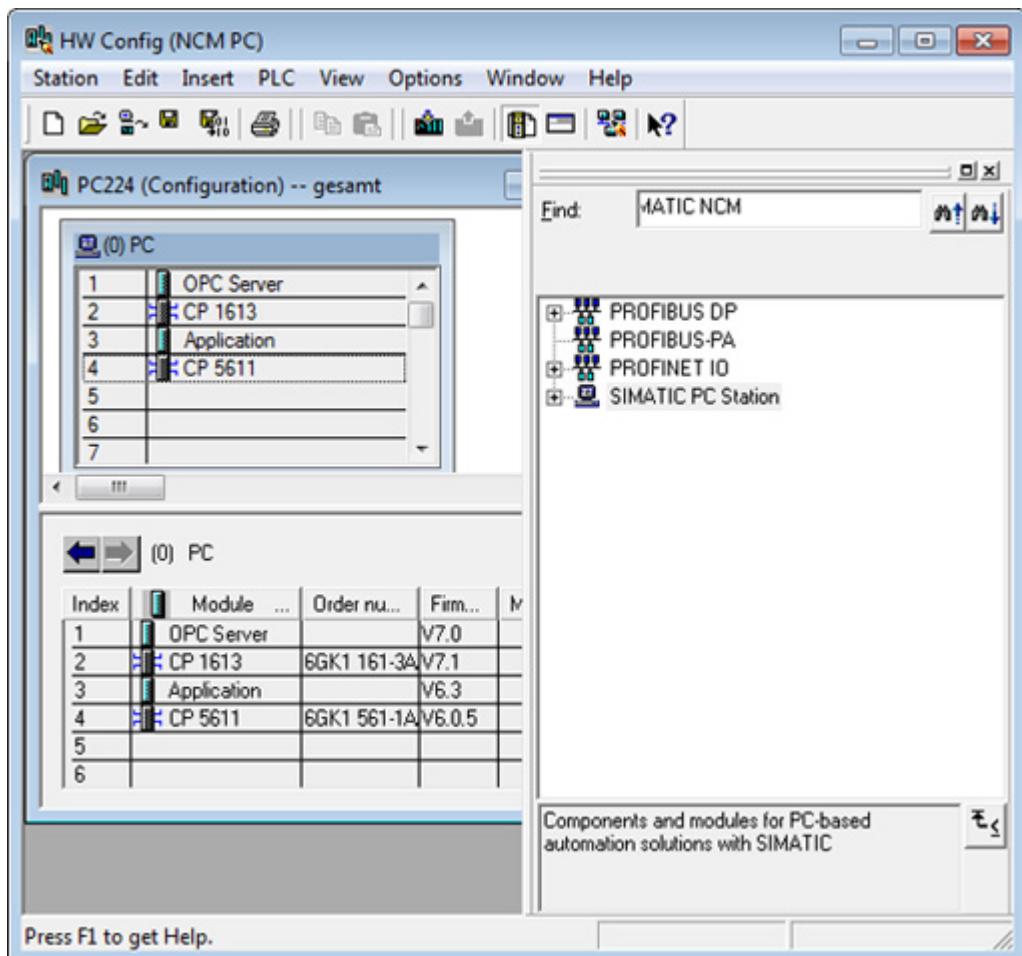
4.2.8.1 DP master is known in NCM / STEP 7

As an example, we first create a PC station that can take on the role of a DP slave.

Follow the steps below:

1. Open the project with the DP master system.
2. Insert a new SIMATIC PC station. The PC station adopts the role of the DP slave.
3. Open the PC station in HW Config.
4. Add a user application of the type OPC server or application in the PC station.

5. Insert a module of the type CP 5611.

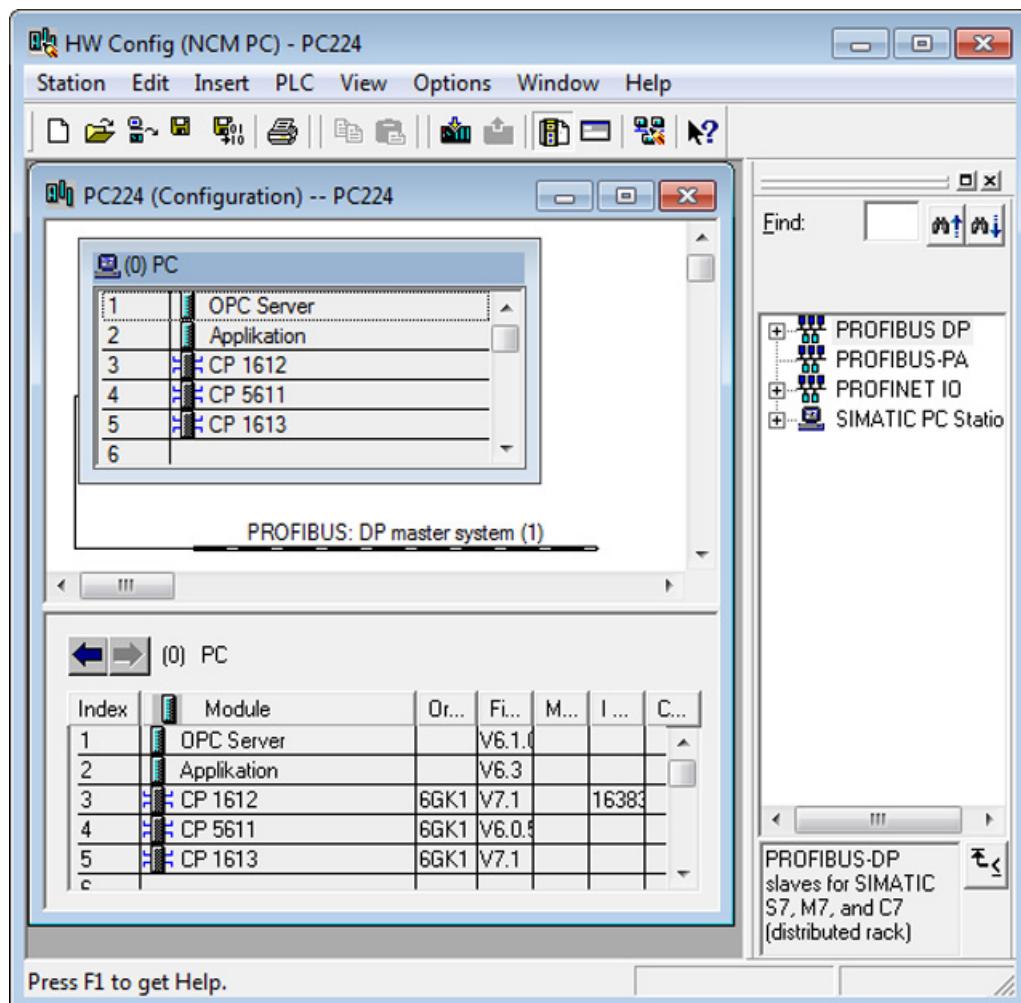


6. Save and compile the configuration.

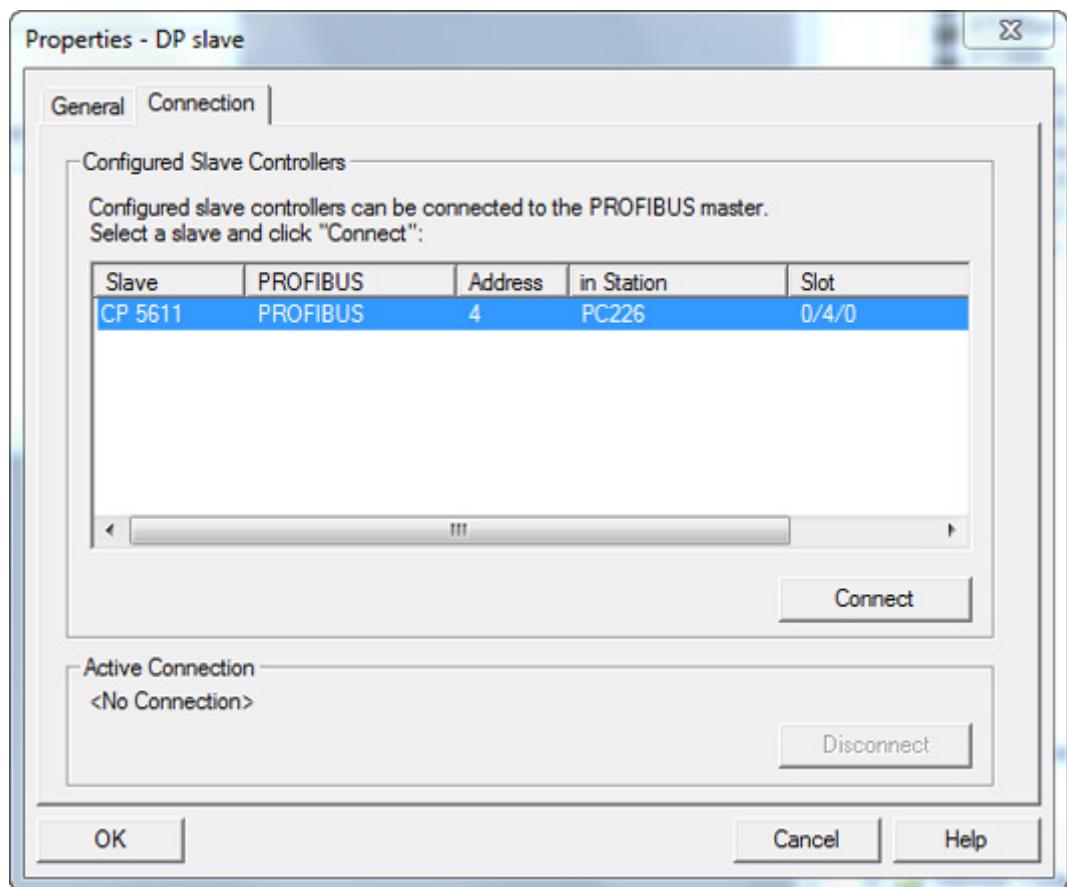
In the next section, the PC station will be assigned to a DP master system (in the example also a PC station).

Follow the steps below:

1. In HW Config, open the configuration of the PC station set up with a DP master system.
2. Select the entry "PC station as DP slave" in the catalog under "PROFIBUSDP" and drag the entry to the DP master system.



Reaction: The "Properties - DP slave" dialog box opens.



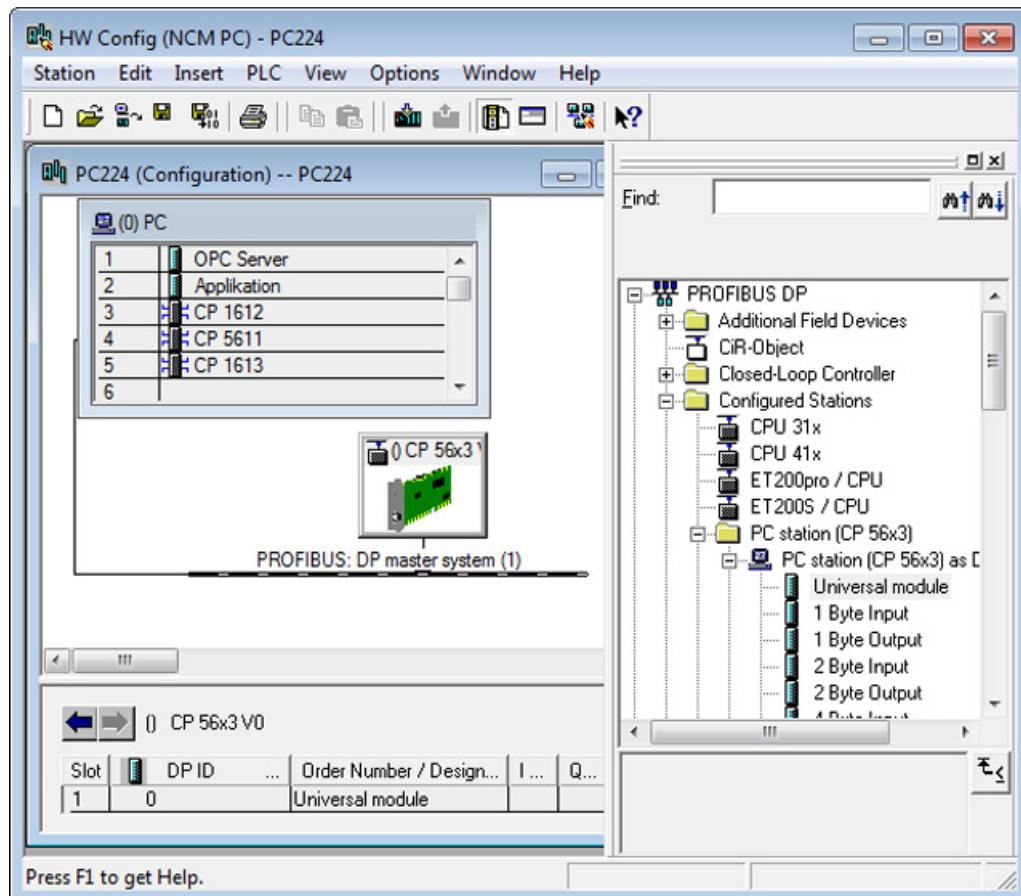
3. Click the "Connect" button and confirm with OK.

This creates a link between the DP slave now connected to the master system and the PC station previously created in the engineering.

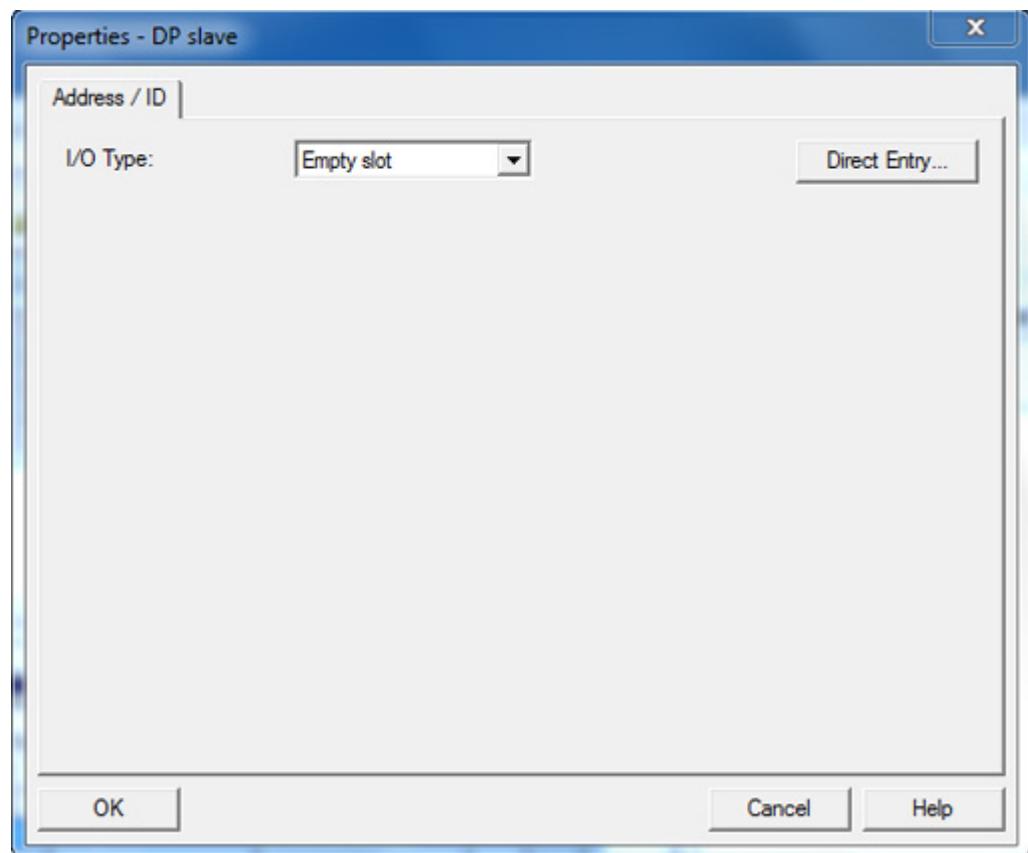
In the next section, the submodules of the DP slave will be configured with the inputs and outputs.

Follow the steps below:

1. To create inputs and outputs in the project engineering, select universal modules under "PC station as DP slave" in the catalog and insert them in the list.



2. By doubleclicking on the inserted universal module, you can configure the module with the required I/O types.



3. Repeat these steps for all submodules.
4. Save and compile the configuration.

4.2.8.2 Configuration with a "thirdparty" DP master

DP master system for configuring the DP slave

If the DP master engineering cannot be done in NCM / STEP 7, however you want to engineer the DP slave used in the PC station in NCM / STEP 7, you will have to create a substitute DP master with a DP master system in the STEP 7 project. This can be a PC station as already described in this chapter or a SIMATIC S7 station.

Create this substitute master in the project engineering just like a real DP master. You then simply require the project engineering data for the DP slave.

Supplying the DP master with data from the GSD file

The real DP master is supplied with the configuration data of the DP slave from a GSD file.

Examples/model

Note

Remember that a SOFTNET DP slave operated with OPC must have the PNO identification number 0x9001.

There are sample GSD files in the "SIMATIC.NET\dp\demo_gsd" folder.

- Two GSD files are intended for the CP 5613 A2/CP 5623 in the DP slave mode.
 - slv80b4.gsd
Use this sample file when operating the CP 5613 A2/CP 5623 as a modular DP-V0 slave or
 - slv180b4.gsd
Use this sample file when operating the CP 5613 A2/CP 5623 as a non-modular DP-V1 slave.

You will find more detailed information in the section "Using CP 5613 A2/CP 5623/CP 5603 as a DP slave (Page 96)"

- Two GSD files are intended for the CP 5614.
 - siem80b4.gsd
Use this sample file when operating the CP 5614 as a modular DP-V0 slave or
 - siv180b4.gsd
Use this sample file when operating the CP 5614 as a non-modular DP-V1 slave.
- Two are intended for the SIMATIC NET SOFTNET PROFIBUS modules.
 - siem8076.gsd
Use this sample file when operating the DP slave with its own application.
 - siem9001.gsd
Use this sample file when operating the DP slave with OPC. This modular DP slave can be configured with NCM/STEP 7.

4.2.9 Downloading project engineering data to the PC station (after initial configuration)

To allow applications to exchange information over configured communication connections, the project engineering data created with NCM PC / STEP 7 must be loaded on the PC station.

If the initial configuration was performed with XDB import of the project engineering data, "loading" is already completed with the initial configuration.

Refer to the explanations relating to initial configuration in the section "Steps for initial configuration (Page 33)".

The section below describes how project engineering data can be downloaded to the PC station after the initial configuration. This is necessary when the project engineering data is not yet available at the time of the initial configuration, or to make changes to the project engineering data.

Network, local load, and XDB file

There are three possible ways of transferring a configuration from the project engineering to the PC station:

- Online mode
 - Networked (engineering station networked with runtime PC)
 - Locally (project engineering station and PC station one and the same)
- Offline mode (engineering station and runtime PC separate) - XDB import

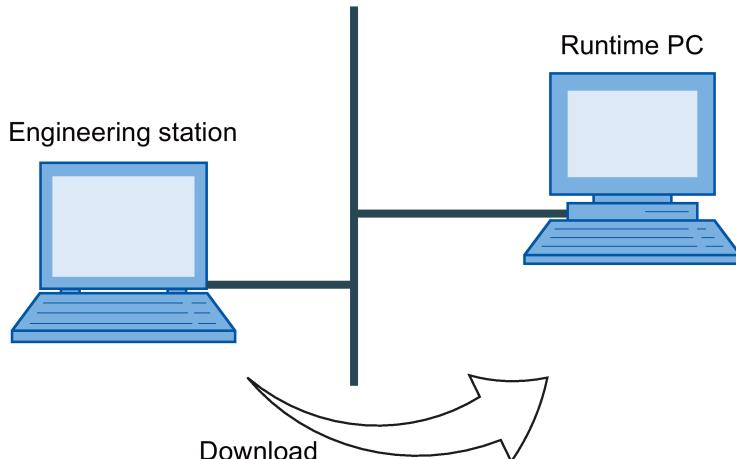
4.2.9.1 Online mode

Note

Downloading as described below only results in successful installation of the communications services on your PC station if the arrangement of the components in the configuration data is identical to that of the configuration data on the PC station.

The online mode allows you to download the configuration data directly to a PC station attached to the network (MPI, PROFIBUS or Ethernet), or to load the data on the local PC station if you are using this as the configuration station.

Online mode - networked (engineering station networked with runtime PC)



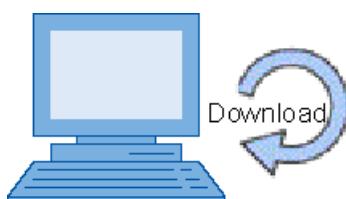
Use this option when the following requirements are met:

- The PC station (runtime PC) is also the configuration station.
- The PC station (runtime PC) is coupled with the configuration station via a network. The PC station is accessible as a communications node, for example after setting the parameters in the initial configuration.
- An existing connection is checked, for example, using the "Accessible Nodes" function.

Follow the steps below:

Procedure for "downloading project engineering data to the PC station" - online - networked		Tool
1.	Check the following on the runtime PC: <ul style="list-style-type: none">• The mode is set to online;• The runtime PC is not disabled.	"Station Configuration Editor"
2.	Select the station you want to load to in the STEP 7/NCM project.	NCM PC / STEP 7
3.	Download the configuration data with PLC → Download If you use PG mode: Make sure that you set the correct interface with Set PG/PC Interface (access point "S7ONLINE").	NCM PC / STEP 7

Online mode - local (configuration station and PC station identical)



This situation occurs when the configuration system is installed on the PC station (engineering station).

In this case, the configuration data is transferred directly over an internal PC connection. Within the configuration system, you still use the known mechanisms for accessing the target system.

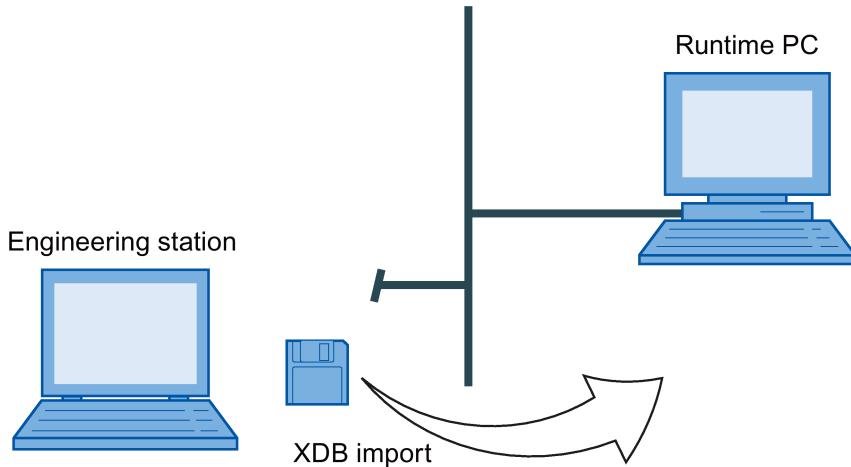
Follow the steps below:

Procedure for the step "downloading project engineering data to the PC station" - online - local		Tool
1.	Make sure that the following requirement is met: The access point of the application must be set as follows: S7ONLINE (STEP 7) → PC internal (local)	Set PG/PC Interface
2.	Select the station you want to load to in the STEP 7/NCM project.	NCM PC / STEP 7
3.	Download the configuration data with PLC → Download	NCM PC / STEP 7

4.2.9.2 Offline mode (engineering station and runtime PC separate) - XDB import

If you are working offline, you will require an XDB file to transfer the data. The configuration system always generates an XDB file for each configured PC station.

The storage location of the configuration file can be found in the properties of the "PC Station" object in the configuration system. On the PC station, this file can be imported with the "Station Configuration Editor".



Note

To make it possible to identify the PC station, the station name in the configuration must match the locally configured station name. If this is not the case, it is not possible to adopt the configuration on the PC station!

Set the station name, if necessary, in the "Station Configuration Editor".

Follow the steps below to create and import an XDB file:

Procedure for "downloading project engineering data to the PC station" - offline		Tool
1.	Select the station you want to load to in the STEP 7 project.	NCM PC / STEP 7
2.	Open the object properties of the station with the "Object Properties" menu command and select the "Configuration" tab.	NCM PC / STEP 7
3.	Here, you can check and, if necessary, change the setting under "Storage Location of the Configuration File".	NCM PC / STEP 7
4.	Save and compile your project. You will then find the required XDB file in the folder you have selected.	NCM PC / STEP 7
5.	Copy the XDB file onto a data medium that the destination station can access.	Windows Explorer
6.	Import the XDB file into your destination PC station using the "Station Configuration Editor".	"Station Configuration Editor"

4.2.10 Adapting mismatched configurations

The "Station Configuration Editor" displays assigned indexes

If you cannot download configuration information to the PC station, this may be due to a mismatched configuration. The "Station Configuration Editor" will provide you with an overview of the indexes allocated to the PC station. This is the tool for setting up the components installed in the PC station.

Adapting the configuration

There are two ways of matching up the actual local configuration of the PC station and the engineering as in your project.

- Adapting the assignment in the project engineering

Change the assignment of the modules configured on the PC in the project engineering using NCM PC / PC Config so that it matches the configuration recognized by the "Station Configuration Editor".

- Changing the configuration on the PC station

Using the "Station Configuration Editor" program, you can assign a different index to a component and change modules that are not set for configured mode to the configured mode.

See also the description in the section ""Station Configuration Editor" (Page 195)".

4.3 Configuration tool STEP 7 Professional (TIA Portal)

In the TIA Portal, there is a new alternative project engineering tool that will replace the previous STEP 7 Professional V5.5 project engineering tool. The new configuration tool is called STEP 7 Professional (TIA Portal). It brings together the functions found in STEP 7 Professional V5.5 and WinCC. This means that a STEP 7 configuration no longer needs to be transferred to WinCC via the Mapper.

STEP 7 Professional (TIA Portal) is the central tool with which you configure the communications services for your PC station. You download or export the configuration data created with this tool to the PC station. The PC station is then prepared for communication.

Note

You have the choice of creating an STEP 7 configuration with STEP 7 V5.5 or NCM PC V5.5 or STEP 7 Professional (TIA Portal) as of V11.

Note

If you want to use symbols with optimized data blocks (S7-1200 and S7-1500), you need to use the OPC server V12 with STEP 7 (TIA Portal) as of V12.01.

4.3.1 Characteristics, functions and activation

Functions

To create the configuration and project engineering data of a PC station, use the following functions:

- Create and configure components of the PC station.
- Configure the communication properties of the SIMATIC NET OPC server.
- Configure connections.
- Adopt the symbols from the SIMATIC S7 configuration.
- Configure DP operation.
- Set network parameters for PROFIBUS and Ethernet operation.
- Configure the PC station remotely.
- Download configuration data to the PC stations.
- Store configuration and project engineering data in an XDB file.
- Monitor the communication with connected S7 stations using NCM diagnostics.

Initial configuration

You can generate the initial configuration of your PC station in STEP 7 Professional (TIA Portal):

- Remote configuration and project engineering with STEP 7 Professional (TIA Portal)
- Transfer of the configuration and project engineering data using an XDB file

Further information in Help

You will find help on all topics as well as detailed information in the integrated information system available with the menu command:

- "Help" > "Show help"

Here you will find help topics relating to the PC station under:

Editing devices and networks > Configuring devices and networks > Creating configurations > Configurations for PC stations

See also

[Commissioning for configured mode - Overview \(Page 23\)](#)

4.3.2 Creating a PC station

The PC station in the STEP 7 Professional project

The "SIMATIC PC Station" is an object in a SIMATIC STEP 7 Professional project. A typical PC station consists of the following elements:

- One or more communications modules (CPs)
- An OPC server application and/or other applications
- In some situations, other controlling elements such as soft PLC or slot PLC

One CP is connected to a PROFIBUS or Ethernet network over which other communication partners can be reached.

Within the OPC server application, connections can be created and used for various protocols that describe the communications relations with the partner devices.

Aims

You want to create configuration and project engineering data for communication services for individual PC stations. This database will then be downloaded to the PC station. After this, the PC applications can use the communications services.

You can use this in the following ways:

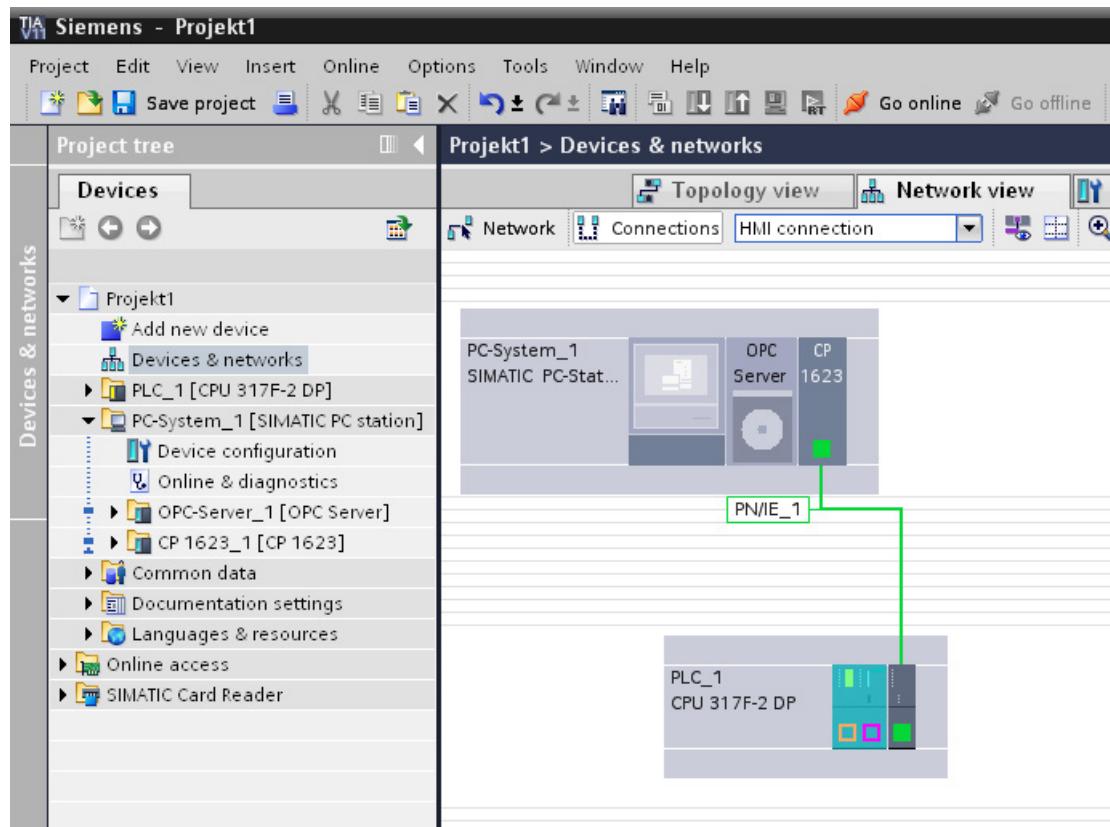
- On a local station, in other words, when your engineering station is the PC station at the same time, the parameters specified in the initial configuration with the "Station Configuration Editor" tool can be transferred later to the local project engineering system.
- For transferring the data to an engineering station

To allow the information from the project engineering to be transferred from an engineering system to the PC station, the local configuration must match the configuration data entered in the project engineering. To make sure of this, you can create project engineering data locally on the PC station and then download it to the target PC station or import it using an XDB file.

4.3 Configuration tool STEP 7 Professional (TIA Portal)

Creating and managing objects

After starting SIMATIC STEP 7 Professional (TIA Portal), you either open an existing project or create a new one. You use projects to manage your configurations consisting of all or part of the stations of your plant.



Within a project, objects are arranged in the "Network view". For each PC station, a separate object of the type "PC station" is created. The configuration and parameter assignment data of the hardware and software is located within these objects. These objects are then used to assign the communications services.

Note

The name of the PC station you select here identifies the PC configuration.

- If you configure on the local station with STEP 7 Professional (TIA Portal), select the name identical to the name in the local configuration.
- If you configure a remote PC station, the name you select must not be identical to the local PC configuration! When you download, you would otherwise overwrite the local configuration.

Tip: You can also adapt names, when necessary, in the Station Manager using the "Station Configuration Editor".

Follow the steps below:

1. Start STEP 7 Professional (TIA Portal).
2. Change to the project view.
3. Select the "Devices and networks" view
4. You can create the PC station with the "Add new device" function or using the .hardware catalog.

4.3.3 Configuring the PC station in STEP 7 Professional (TIA Portal)

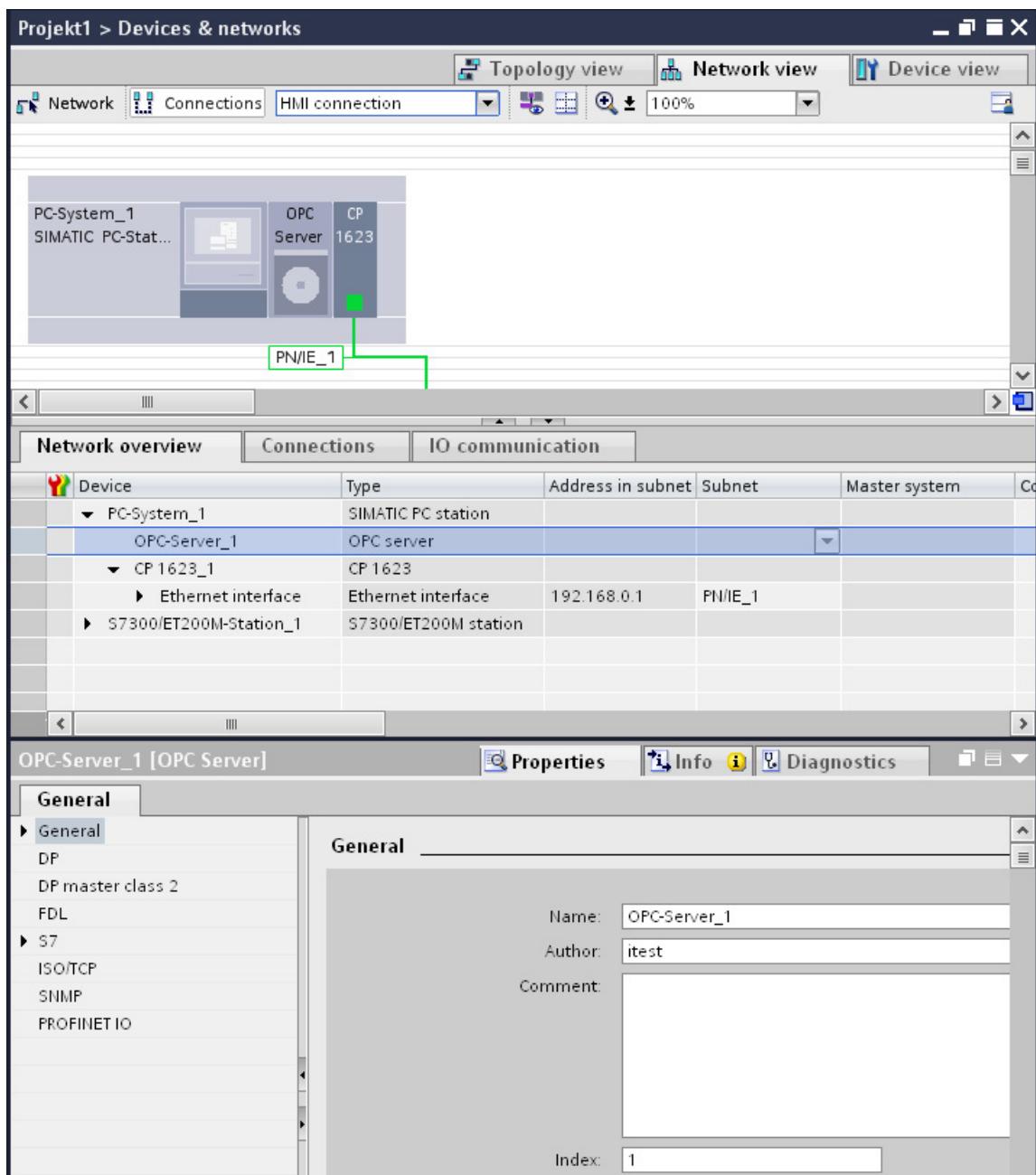
Creating an image of the PC configuration

To allow the configuration data sent by the configuration system to be assigned to a module or an application, it must have a unique identification number. The identification number for modules, applications, and other components in a PC station is the index.

You place your applications and modules in slots in a "virtual rack". This slot number then corresponds to the index mentioned above.

Component management of a PC station

4.3 Configuration tool STEP 7 Professional (TIA Portal)

**Note:**

This procedure corresponds to the one already described for the "Station Configuration Editor" tool.

Note

Be careful not to confuse this "index" with a hardware slot, for example on the PCI bus of the PC station. The slot on the PCI bus is not relevant for commissioning and is not used at any point.

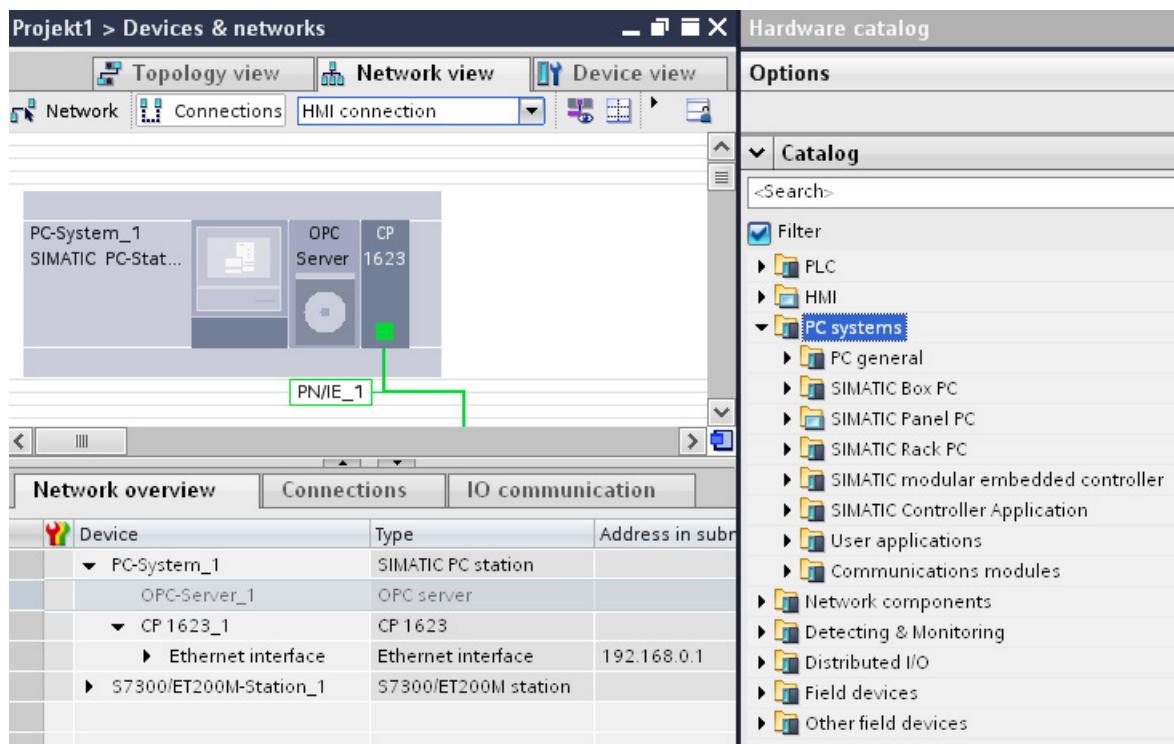
Follow the steps below:

Drag the components from the catalog to the PC station in the network view ("virtual rack") in STEP 7 Professional (TIA Portal).

Note

Please note the following if you are transferring data by downloading:

Make sure you arrange the components exactly the same as in the configuration list of the "Station Configuration Editor" (refer to the section "Managing components: "Components" tab (Page 198)"). If the configuration differs, the configuration data that you download from STEP 7 Professional (TIA Portal) to the PC station will not be adopted correctly.



PC components in the catalog

For the SIMATIC PC station, you can select the following components:

- **User applications**

- Application (standard application)

You use standard interfaces to communicate with other applications and devices via your PC module.

The user programs included in the application use suitable interfaces for communication, such as the SAPI programming interface or the SEND/RECEIVE programming interface.

You can configure the following communications services depending on the module inserted:

- Connection-oriented services
- DP services (for example, DPV0 and DPV1)
- PROFINET IO

Note how these differ from the user programs that use the communication service as OPC clients via an OPC Server as described below.

- OPC server

You use the convenient interface to an OPC server to communicate with a programmable controller such as a SIMATIC S7400.

The OPC server can be configured as an interface to all available communication protocols. You can create this object only once in a PC station.

You can then use this OPC server for communication with any number of user programs (OPC clients).

The following communications services can be used depending on the modules inserted:

- All types of connection
- DP services
- PROFINET IO

- **Communications modules > PROFINET / Ethernet**

This contains all the CP modules for attachment to Industrial Ethernet.

- **Communications modules > PROFIBUS**

This contains all the CP modules for attachment to PROFIBUS.

4.3.4 Creating a DP master system

Read the information below if you want to use a PROFIBUS CP and configure a DP master system.

Significance of the configuration data in a DP master system

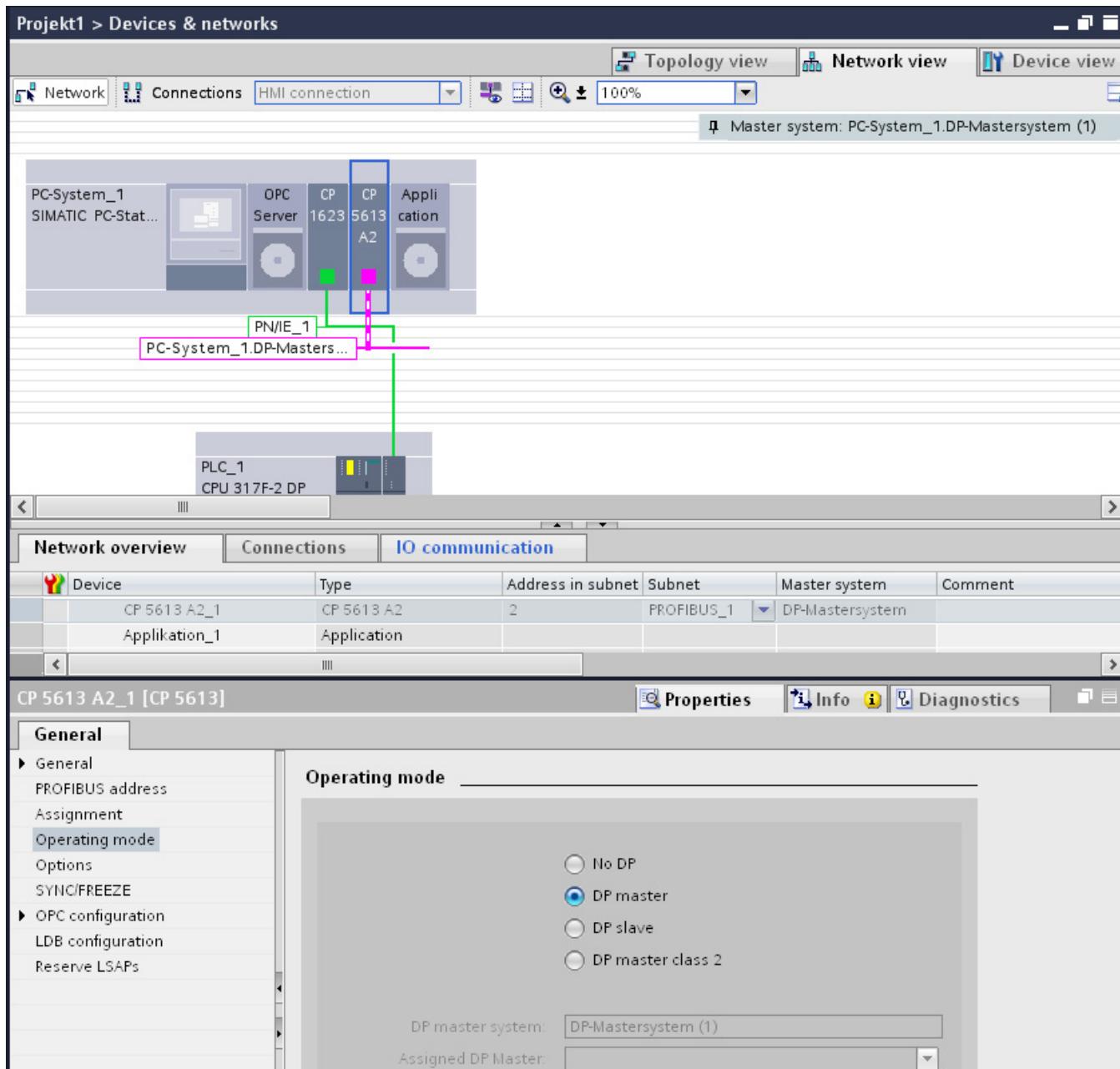
The configuration data inform the DP master in the PC station of the data and address areas of the attached slaves.

Depending on the type of slave, this information is either implicitly linked to the entry in the catalog or must be configured here additionally as, for example, when using an intelligent DP slave such as the CP 3425.

4.3 Configuration tool STEP 7 Professional (TIA Portal)

Follow the steps below:

1. You have already placed the applications and modules as described in the section "Configuring the PC station in STEP 7 Professional (TIA Portal) (Page 237)".
2. After you have taken the module from the catalog, you can select the PROFIBUS interface of the CP and then select "Assign master system" from the shortcut menu. The CP then automatically becomes the DP master.



3. If suitable, save the configuration.

Note

You will find information on configuring the DP slave in the section "Configuring a PC station as a DP slave (Page 246)".

4.3.5 Creating a PROFINET IO system

The following information applies if you want to use an Ethernet CP as a PROFINET IO controller in the PC station and want to configure a PROFINET IO system.

Significance of the configuration data in a PROFINET IO system

The configuration data inform the PROFINET IO controller in the PC station of the data and address areas of the connected PROFINET IO devices.

This data also includes the device names which the PROFINET IO controller assigns to the PROFINET IO devices during startup.

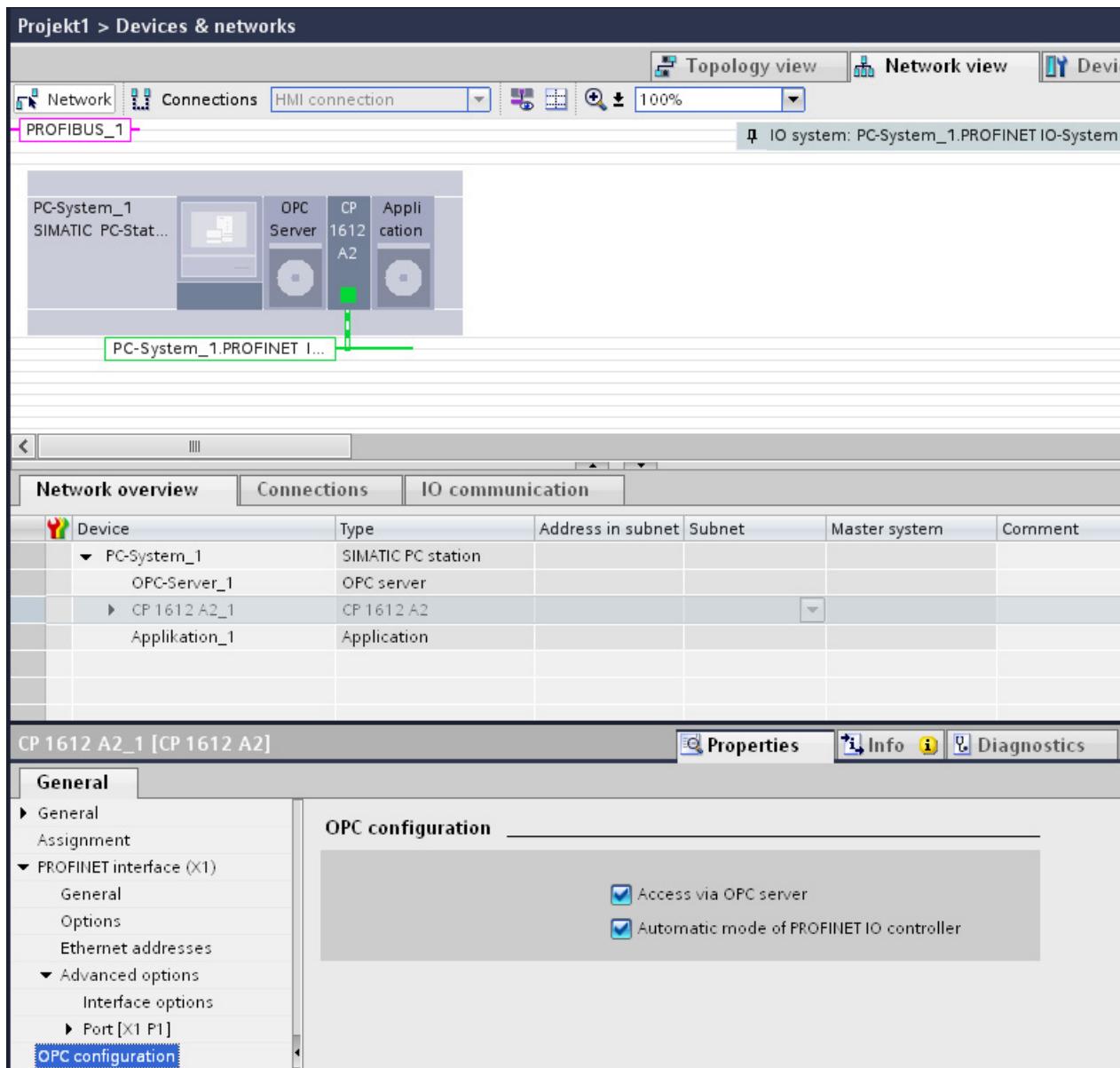
Follow the steps below:

1. You have already placed the applications and modules as described in the section "Guide to installation and commissioning (Page 19)".
2. After you have taken the module from the catalog, you can select it and create a PROFINET IO system with "Assign IO system" in the shortcut menu.

If required, you can also connect an existing PROFINET IO system with the PROFINET IO controller you have just created by selecting the CP, rightclicking, and then selecting the "Connect PROFINET IO System" menu command.

4.3 Configuration tool STEP 7 Professional (TIA Portal)

3. Select the application (OPC server) under "OPC configuration" in the Inspector window that will address the PROFINET IO system (the PROFINET IO devices).



4. Now go to the catalog and insert the IO devices that will be addressed over the application.

PROFINET IO devices

PROFINET IO devices can be connected either directly to Ind. Ethernet or can be connected as PROFIBUS DP slaves to a DP master system. By using, for example, an IE/PB Link PN IO, you can address the DP slaves of a DP master system just like PROFINET IO devices.

You will find further information here

- Project engineering

In the information system of STEP 7 Professional (TIA Portal), you will find detailed instructions on configuring a PROFINET IO system in the following topic:

Editing devices and networks > Creating configurations > Configurations for PROFINET IO

- PROFINET IO - system descriptions: Refer to /18/ and /19/ in the section "References and literature (Page 465)".

4.3.6 Configuring connections

Meaning

During operation, configured connections are established either implicitly or on request, depending on the parameter assignment. They are then available to the OPC server or the PC application for communication.

Procedure

Regardless of the application type, the general rules for connection configuration apply:

- Communication connections are always assigned to an application.
- In the PC station, the CP that supports the type of connection is used for the data transfer.
- If there is more than one CP with this capability, you can use Routing to select the transmission path.

Follow the steps below

How to configure connections is described in detail in the information system of STEP 7 Professional (TIA Portal) in:

Configuring devices and networks > Configuring networks > Communication via connections

Connections to SIMATIC S7 stations

When you configure systems that include PC stations and SIMATIC S7 stations, the use of STEP 7 or STEP 7 Professional (TIA Portal) is generally advisable. You can then edit and process every station type completely and with full functionality.

4.3 Configuration tool STEP 7 Professional (TIA Portal)

After creating a new project in STEP 7 Professional (TIA Portal), you may find that the required destination station (for example an S7 station) may not exist depending on the particular application. You then have the following options:

- Create an unspecified connection:

Select "unspecified" as the connection partner. In the Properties dialog box, you can then set the address parameters for the connection partner.

- Create a copy of an S7 station:

Insert the copy of an S7 station that you have created in another project using STEP 7 Professional (TIA Portal). You can then select this S7 station as your destination station.

4.3.7 Configuring a PC station as a DP slave

This section explains how to create the project engineering for a PC station with the CP 5611 A2 as DP slave.

Two situations can be distinguished:

- The PROFIBUS DP master engineering was created in STEP 7 Professional (TIA Portal) (in the example as other PC station);
- The PROFIBUS DP master cannot be configured in STEP 7 Professional (TIA Portal).

In both cases, a CP 5611 A2 is used as the DP slave. We are assuming a project in which a PROFIBUS DP master system has already been created. For a description, refer to the section "Creating a DP master system (Page 241)"

4.3.7.1 DP master is known to STEP 7 Professional (TIA Portal)

As an example, we first create a PC station that can take on the role of a DP slave (I-slave).

Follow the steps below:

1. Open the project with the DP master system.
2. Insert a new SIMATIC PC station. The PC station adopts the role of the DP slave.
3. Add a user application of the type OPC server or application in the PC station.
4. Insert a module of the type CP 5611 A2.
5. Network the PROFIBUS interface with the DP master system you created earlier.
6. In the Inspector window, set the mode of the CP 5611 A2 to "DP slave" and under "Assigned DP master" select the station configured as DP master.
7. Save the configuration.

In the next section, the submodules of the DP slave will be configured with the inputs and outputs.

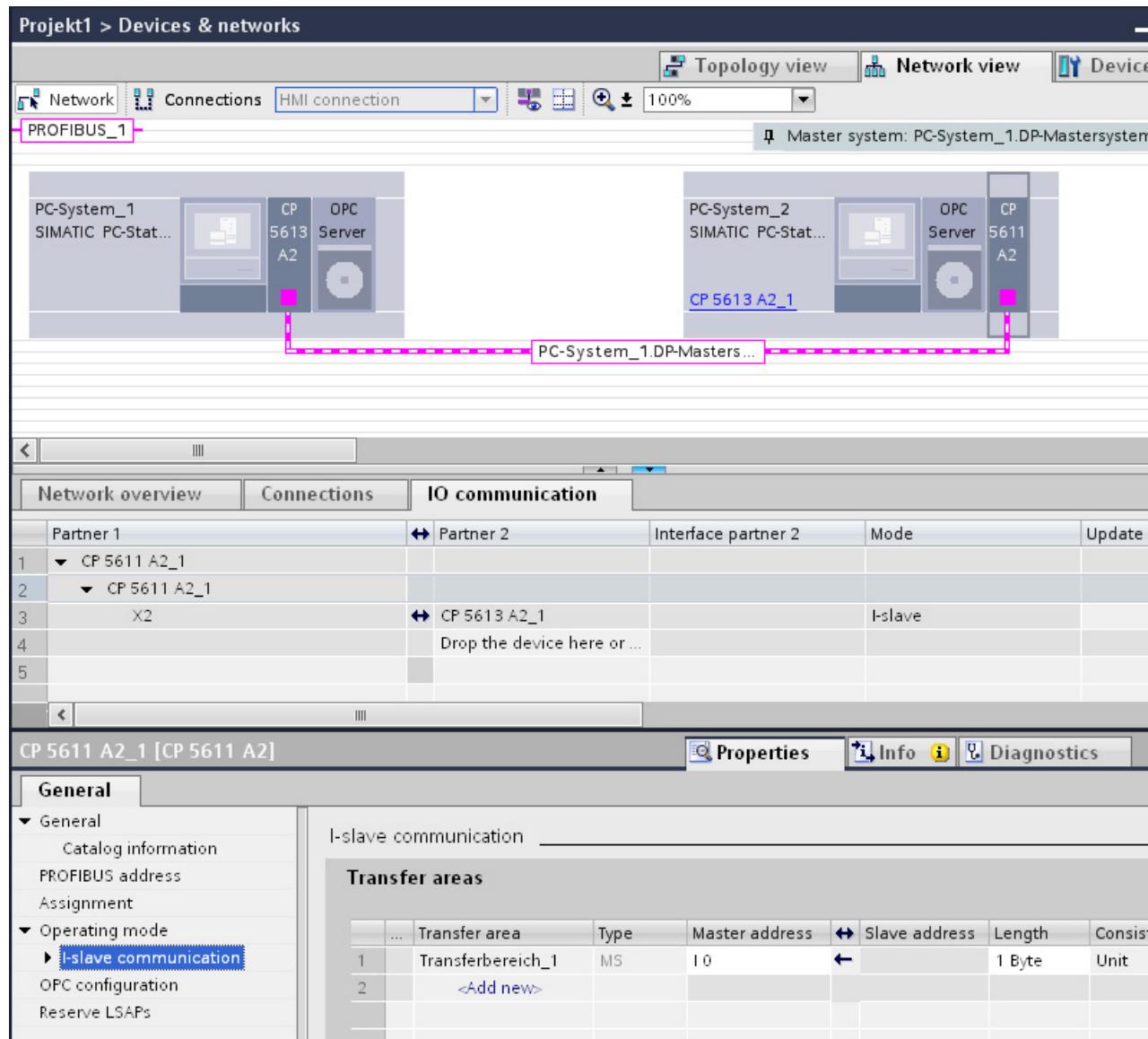
Follow the steps below:

To configure the inputs and outputs, you need to set up the transfer areas for the I-slave communication.

1. Select the CP 5611 A2 configured as the DP slave in the network view.
2. In the Inspector window, under "Mode > I-slave communication" select the table in which you can configure the inputs and outputs of the transfer areas.
3. In the table view, click "Add new" to create a new transfer area.
4. In the "General" tab, select the newly created transfer area.

4.3 Configuration tool STEP 7 Professional (TIA Portal)

5. Configure the inputs and outputs in the "Properties" dialog.
If you want to create an I/O transfer area, enable the "Bi-directional address mapping" check box.
6. Save and compile the configuration.



4.3.7.2 Configuration with a "third-party" DP master

DP master system for configuring the DP slave

If the DP master engineering cannot be done in STEP 7 Professional (TIA Portal), however you want to engineer the DP slave used in the PC station in STEP 7 Professional (TIA Portal), you will have to create a substitute DP master with a DP master system in the STEP 7 Professional project. This can be a PC station as already described in this chapter or a SIMATIC S7 station.

Create this substitute master in the project engineering just like a real DP master. You then simply require the project engineering data for the DP slave.

Supplying the DP master with data from the GSD file

The real DP master is supplied with the configuration data of the DP slave from a GSD file.

Examples/model

Note

Remember that a SOFTNET DP slave operated with OPC must have the PNO identification number 0x9001.

There are sample GSD files in the "SIMATIC.NET\dp\demo_gsd" folder.

- Two GSD files are intended for the CP 5613 A2/CP 5623 in the DP slave mode.
 - slv80b4.gsd
Use this sample file when operating the CP 5613 A2/CP 5623 as a modular DP-V0 slave or
 - slv180b4.gsd
Use this sample file when operating the CP 5613 A2/CP 5623 as a non-modular DP-V1 slave.
- Two GSD files are intended for the CP 5614.
 - siem80b4.gsd
Use this sample file when operating the CP 5614 as a modular DP-V0 slave or
 - siv180b4.gsd
Use this sample file when operating the CP 5614 as a non-modular DP-V1 slave.
- Two are intended for the SIMATIC NET SOFTNET PROFIBUS modules.
 - siem8076.gsd
Use this sample file when operating the DP slave with an application of your own.
 - siem9001.gsd
Use this sample file when operating the DP slave with OPC. This modular DP slave can be configured with STEP 7 Professional (TIA Portal).

4.3.8 Downloading the project engineering data to the PC station (after the initial configuration)

To allow applications to exchange information over configured communication connections, the project engineering data created with STEP 7 Professional (TIA Portal) must be loaded on the PC station.

If the initial configuration was performed with XDB import of the project engineering data, "loading" is already completed with the initial configuration.

Refer to the explanations relating to initial configuration in the section "Steps for initial configuration (Page 33)".

The section below describes how project engineering data can be downloaded to the PC station after the initial configuration. This is necessary when the project engineering data is not yet available at the time of the initial configuration, or to make changes to the project engineering data.

Network, local load, and XDB file

There are three possible ways of transferring a configuration from the project engineering to the PC station:

- Online mode
 - Networked (engineering station networked with runtime PC)
 - Locally (project engineering station and PC station one and the same)
- Offline mode (engineering station and runtime PC separate) - XDB import

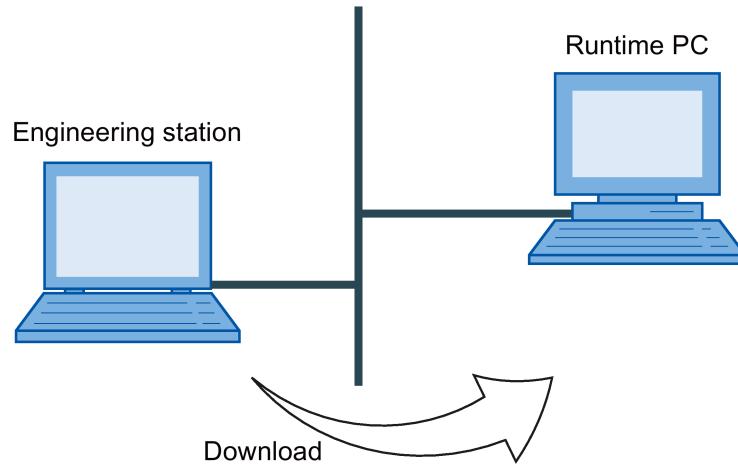
4.3.8.1 Online mode

Note

Downloading as described below only results in successful installation of the communications services on your PC station if the arrangement of the components in the configuration data is identical to that of the configuration data on the PC station.

The online mode allows you to download the configuration data directly to a PC station attached to the network (MPI, PROFIBUS or Ethernet), or to load the data on the local PC station if you are using this as the configuration station.

Online mode - networked (engineering station networked with runtime PC)



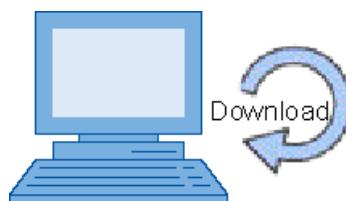
Use this option when the following requirements are met:

- The PC station (runtime PC) is also the configuration station.
- The PC station (runtime PC) is coupled with the configuration station via a network. The PC station is accessible as a communications node, for example after setting the parameters in the initial configuration.
- An existing connection is checked, for example, using the "Accessible Nodes" function.

Follow the steps below:

Procedure for "downloading project engineering data to the PC station" - online - networked		Tool
1.	Check the following on the runtime PC: <ul style="list-style-type: none">• The mode is set to online;• The runtime PC is not disabled.	"Station Configuration Editor"
2.	Select the station you want to download to in the STEP 7 Professional project.	STEP 7 Professional (TIA Portal)
3.	Download the engineering data with Online → Download to device If you use PG mode: Make sure that you set the correct interface with Set PG/PC Interface (access point "S7ONLINE").	STEP 7 Professional (TIA Portal)

Online mode - local (configuration station and PC station identical)



4.3 Configuration tool STEP 7 Professional (TIA Portal)

This situation occurs when the configuration system is installed on the PC station (engineering station).

In this case, the configuration data is transferred directly over an internal PC connection. Within the configuration system, you still use the known mechanisms for accessing the target system.

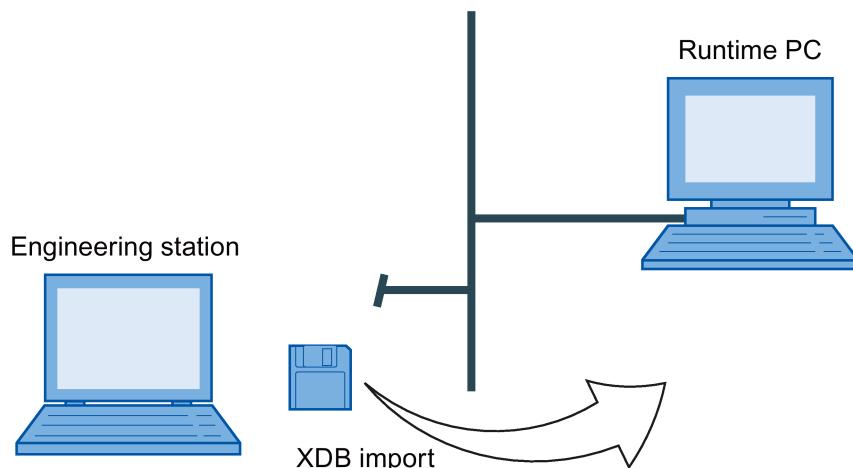
Follow the steps below:

Procedure for the step "downloading project engineering data to the PC station" - online - local		Tool
1.	Make sure that the following requirement is met: The access point of the application must be set as follows: S7ONLINE (STEP 7) → PC internal (local)	STEP 7 Professional (TIA Portal)
2.	Select the station you want to download to in the STEP 7 Professional project.	STEP 7 Professional (TIA Portal)
3.	Download the engineering data with Online → Download to device	STEP 7 Professional (TIA Portal)

4.3.8.2 Offline mode (engineering station and runtime PC separate) - XDB import

If you are working offline, you will require an XDB file to transfer the data. The project engineering system generates an XDB file for each configured PC station.

The storage location of the configuration file can be found in the properties of the "PC Station" object in the configuration system. On the PC station, this file can be imported with the "Station Configuration Editor".



Follow the steps below to create and import an XDB file:

Procedure for "downloading project engineering data to the PC station" - offline		Tool
1.	Select the station you want to download to in the STEP 7 Professional project.	STEP 7 Professional (TIA Portal)

2.	Select the entry "XDB configuration" in the Inspector window.	STEP 7 Professional (TIA Portal)
3.	Enable the check box beside "Generate XDB file" and check the setting for "Path of the XDB configuration file". If necessary, change this setting.	STEP 7 Professional (TIA Portal)
4.	Save and compile your project. You will then find the required XDB file in the folder you have selected.	STEP 7 Professional (TIA Portal)
5.	Copy the XDB file onto a data medium that the destination station can access.	Windows Explorer
6.	Import the XDB file into your destination PC station using the "Station Configuration Editor".	"Station Configuration Editor"

4.3.9 Adapting a configuration that does not match

The "Station Configuration Editor" displays assigned indexes

If you cannot download configuration information to the PC station, this may be due to a mismatched configuration. The "Station Configuration Editor" will provide you with an overview of the indexes allocated to the PC station. This is the tool for setting up the components installed in the PC station.

Adapting the configuration

There are two ways of matching up the actual local configuration of the PC station and the engineering as in your project.

- Adapting the assignment in the project engineering

Change the index assignment of the modules configured on the PC in the project engineering using STEP 7 Professional (TIA Portal) so that it matches the configuration in the "Station Configuration Editor".

You will find the index assignment for each PC component under "General" in the Inspector window.

- Changing the configuration on the PC station

Using the "Station Configuration Editor" program, you can assign a different index to a component and change modules that are not set for configured mode to the configured mode.

See also the description in the section ""Station Configuration Editor" (Page 195)".

4.3.10 Initial configuration using remote configuration with STEP 7 Professional (TIA Portal)

If you are putting PC modules into operation the first time, you will need to perform an initial configuration. After initial configuration of the PC modules, the PC station is set up to receive the project engineering data.

You can perform the initial configuration for a PC station available online and then download the project engineering data to the configured PC station.

Note

If the PC station is not available online, you can also perform the initial configuration offline using an XDB file.

Requirements

- You are in the network view.
- On the target PC station, both "allow" check boxes must be selected in the "Security" menu of the "Communication Settings" configuration program.

Procedure

Follow the steps outlined below to configure a PC station:

1. From "PC systems" in the hardware catalog, drag a device for a PC station to the network view.
2. Select the PC station.
3. Under "Properties > General" in the Inspector window, change the name of the PC station to suit your application.
4. Drag any other components required from the hardware catalog to the PC station. An inserted component is placed on a new index.
5. Select the PC station.
6. Select "Configure PC station online" in the shortcut menu to be able to perform the initial configuration of the PC station.
7. In the "Configure" dialog, you can make various settings for your local area network, the reachable computers and the target PC station.
8. Click "Configure...". You obtain an overview of the configuration to be adopted.
9. Click "OK" to download the configuration to the target PC station.

4.4**Symbol Editor**

With the Symbol Editor, you can create symbol files of the type "ATI" that allow you the option of access to symbolic variables over the SIMATIC NET OPC server.

A symbol file is hierarchical and has a structure similar to a file system.

4.4.1 Characteristics, functions and structure

Area of application / use cases

The Symbol Editor is additional support tool. If you can access symbol files for the S7 protocol that have already been created in STEP 7, you do not need the Symbol Editor.

You can access existing symbol files and expand or modify them.

Range of functions of the Symbol Editor

The Symbol Editor provides the following options:

- Creating your own hierarchical name space
- Setting the properties of a symbol:
 - Visibility in OPC browsing
 - Access rights (readable/writable) for OPC clients
 - Value range of variables to support the "Percent Deadband" OPC functionality
 - Entry of the runtime name
 - Assigning the runtime name
 - Importing/exporting "CSV" files
 - Importing/exporting symbol files of the type "ATI"

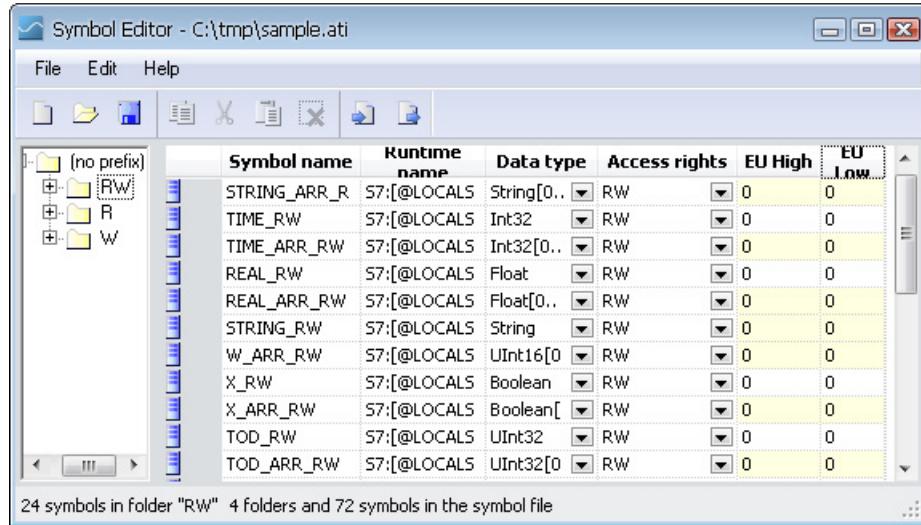
How to start the Symbol Editor



Select the following from the Start menu of the Windows operating system:

Start menu "Start" > "..." > "SIMATIC NET" > "Symbol Editor"

Structure



Analogous to the folder and files in the file system, the symbol file contains folders and symbols. In the structure view in the left window, you can navigate through the hierarchy of the symbol file. When you click on a folder there, the right-hand side displays its content. In the upper part of the content area you can see the folders and in the lower part the symbols.

The folders are used to structure your data. The symbols contain the actual information of the process variables such as access rights, data types, and the name of the item and the runtime name.

The symbol list shows the following detailed information:

Parameter	Meaning
Symbol name	The name of the symbol.
Item ID	The names of the hierarchy levels and the symbolic name, separated by a period.
Runtime name	An OPC Item ID with protocol and address information. This runtime name is accepted directly by the OPC Server (in other words without the assignment information of a symbol file).
Data type	Indicates the data type of the symbol.
Access rights	Indicates whether the data of the symbol can be read or written.
EU Low	Indicates the low limit of the range of values of the variable (Engineering Units Low). The information about a range of values is used for the "Percent Deadband" OPC functionality.
EU High	Indicates the high limit of the range of values of the variable (Engineering Units High). The information about a range of values is used for the "Percent Deadband" OPC functionality.

Converting old symbol files

Note

If you have performance problems with old symbol files of the type "STI", we recommend that you convert to the new type "ATI". This achieves a significant improvement in performance when accessing symbols with OPC.

4.4.2 The meaning of symbols

Definitions

The terms listed below are important in conjunction with the Symbol Editor:

Term	Meaning
OPC item ID	The OPC Item ID is the identifier of a process variable used by the OPC server. An ItemID is transferred by the OPC client to the OPC Server to identify a process variable and is unique for the OPC Server. It is either a symbolic name or a runtime name.
Symbolic name	A symbolic name is an OPC item ID that was generated by the Symbol Editor. In a hierarchically structured name space, a symbolic name is made up of the names of the hierarchical levels and the actual symbol. Example: Plant_Packing.Conveyor1.Limit_Switch
Runtime name	A runtime name is an OPC Item ID that contains protocol and address information to allow the assignment and that is accepted directly by the OPC Server without the use of a symbol file. Using the Symbol Editor, a symbolic name is assigned to a runtime name. Examples: <ul style="list-style-type: none"> • DP:[CP5613]Slave1M003_IB0 • S7:[S7-connection_1]MW5
Name space prefix	The prefix precedes the OPC name space of a symbol file and is used to identify symbols uniquely if there are several symbol files. If a prefix exists, it is displayed in the folder view.

Accessing process variables using symbols

An OPC client normally accesses process variables using Item IDs that contain address information. It is, however, also possible to access the variables using symbolic names that can be structured hierarchically.

These names that are independent of the protocol and device are known as symbols. In contrast, the variable names that include information about the communication path and type in their syntax are known as runtime names.

Example of a symbol: "Conveyor_1.drive_1.lim_switch"

Example of a runtime name: "S7:[S7-connection_1]EX3.1"

When should you use symbols?

The use of symbolic names is not mandatory. You can either do without selfdefined symbols or add symbols at a later point in time.

One exception to this is communication with a SIMOTION partner. You cannot edit symbolic names here.

The symbols in data blocks with optimized access (for S7-1200 and S7-1500 systems) are another exception. You cannot edit these symbols. You can recognize these symbols because they have a different background color. Because there is no address information available for these symbols, the runtime name is shown only with the protocol ID and the connection name and the fixed character string "***optimized access***".

Creating and using symbol files

A symbolic name space is created either directly with STEP 7 or using the "Symbol Editor" tool.

The Symbol Editor then creates a file containing the symbolic hierarchical name space and the assigned runtime names.

The file created by the Symbol Editor is entered in the "Communication Settings" program.

A symbol file must match the configuration loaded on the PC station. To resolve a symbolic name, the symbol file uses the runtime name. For this reason, if you modify a connection name in the configuration, you must also adapt the symbol file to the change. Otherwise the OPC client will not be able to use the symbol.

4.4.3 Menus of the Symbol Editor in detail

"File" menu

This menu contains standardized commands for working with files (for example "Open File", "Save File" etc.). All symbol files have the extension "ATI" (Advanced Tag Info). The following menu commands are available.

Menu command	Meaning
New	Select this menu command to create a new symbol file. As an alternative, you can click the following button: 
Open	Select this menu command to open an existing symbol file. As an alternative, you can click the following button: 
Save	Select this menu command to save an open symbol file in the current folder. As an alternative, you can click the following button: 
Save As ...	Select this menu command to save a symbol file under a new name or in a different folder.
Close	Select this menu command to close a currently open symbol file. Other open files remain open and are not affected by this command.

Menu command	Meaning
Last used files	Fast access to symbol files.
Exit	Select this menu command to close the Symbol Editor and all open files.

"Edit" menu

Menu command	Meaning
Cut	Select this menu command to cut selected symbols. As an alternative, you can click the following button: 
Copy	Select this menu command to copy selected symbols. As an alternative, you can click the following button: 
Paste	Pastes a symbol that was previously copied or cut. As an alternative, you can click the following button: 
Delete	Select this menu command to delete selected symbols. As an alternative, you can click the following button: 
Select All	Selects all the symbols in the list.

Note

The connection of folder path and symbol path must be unique.

"Help" Menu

With the help menu, you can open the contents, index, or find views of the online help system. You can also display the version number of the program with the "About" menu command. In addition to this, you can change the language setting as well.

4.4.4 Managing symbols

4.4.4.1 How to insert a new symbol

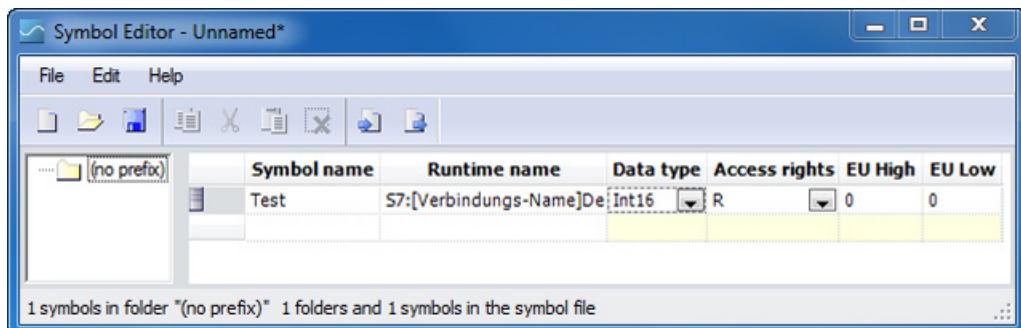
A symbol has the following properties:

- Symbol name
- Runtime name
- Data type
- Access right
- EU High
- EU Low

Follow the steps below:

1. Move the mouse pointer to the cell of the "Symbol name" column.
2. Left-click.
The input box can now be edited.
3. Enter a symbol name.
The permitted characters are: A-Z, a-z, 0-9, _, -, ^, !, #, \$, %, &, ', /, (,), <, >, =, ?, ~, +, *, ., :, |, @, [,], {, }, "
4. Follow the same procedure as in step 1 and enter a runtime name in the cell of the "Runtime name" column.
5. Follow the same procedure as in step 1. Enter the data type in the cell of the "Data type" column with the following syntax:
 - Data type: Data type for example Int16
 - ARRAY: Data type[x...n], for example Int16[0...3]

You can also change the parameters "Access rights", "EU High" and "EU Low".



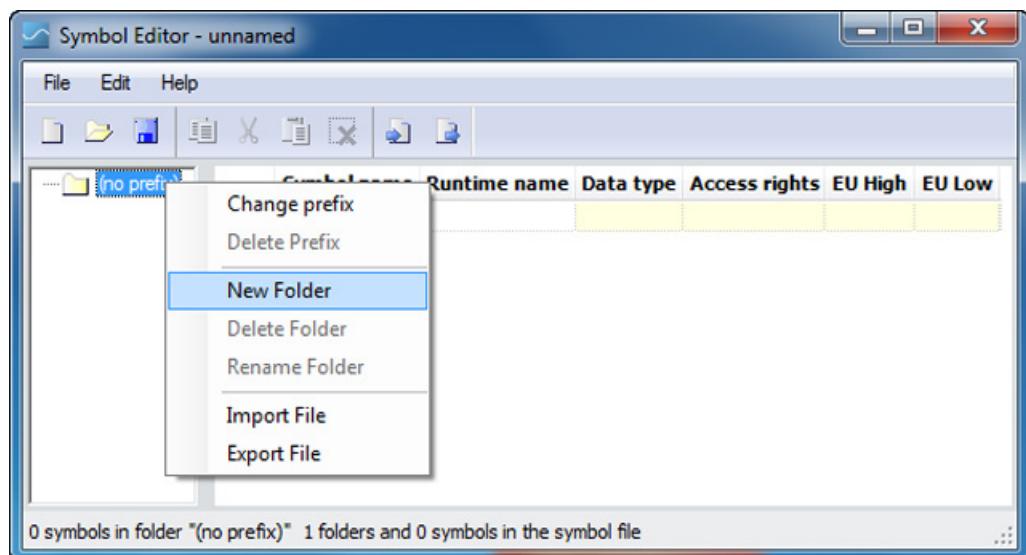
Note

You cannot insert symbols for tags within data blocks with optimized access (S7-1200 and S7-1500).

4.4.4.2 How to insert a new folder

Follow the steps below:

1. Move the mouse pointer to left-hand area.
2. Right-click and select the menu command "New Folder".
3. Enter a new name for the folder.
The permitted characters are: A-Z, a-z, 0-9, _, -, ^, !, #, \$, %, &, ', /, (,), <, >, =, ?, ~, +, *, ,, :, |, @, [,], { , }, "



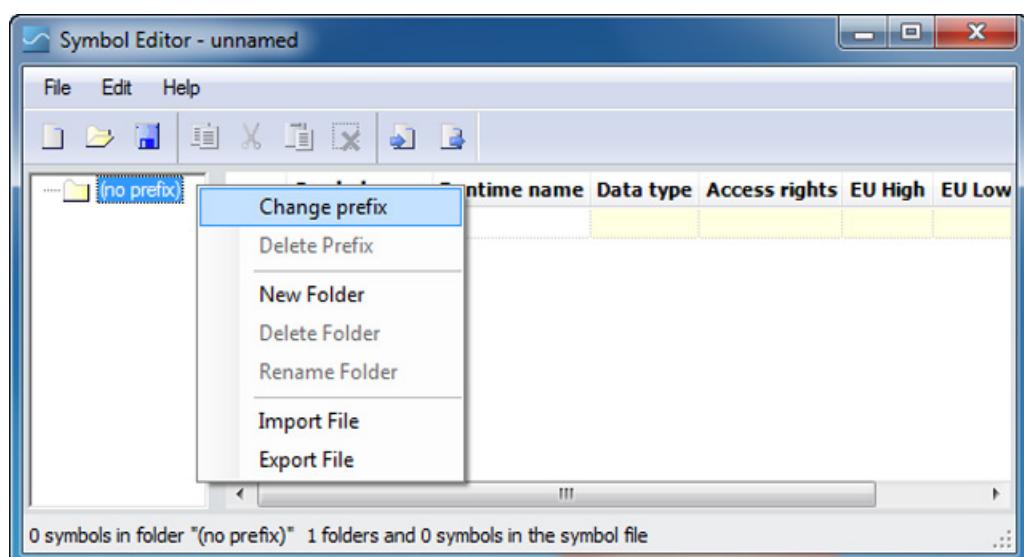
4.4.4.3 How to change the name space prefix

Follow the steps below:

1. Move the mouse pointer to left-hand area.
2. Right-click and select the menu command "Change Prefix".
3. Enter a new name.

The permitted characters are: (A-Z), (a-z), (0-9), (_)

If you want to delete the prefix, click the menu command "Delete Prefix" in the shortcut menu.



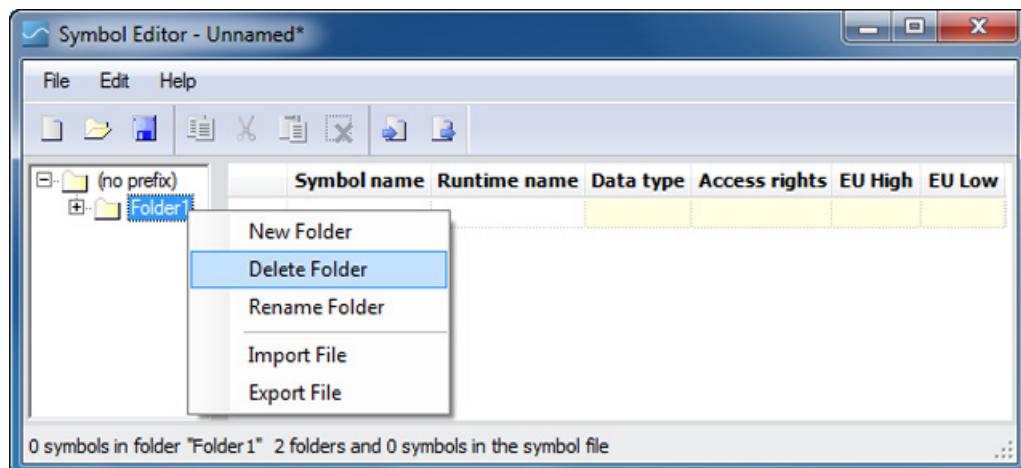
4.4.4.4 How to delete folders or symbols

Follow the steps below:

1. Select the folder or symbol you want to delete in the tree structure of the folder.
2. Right-click and select the menu command "Delete Folder".

Note

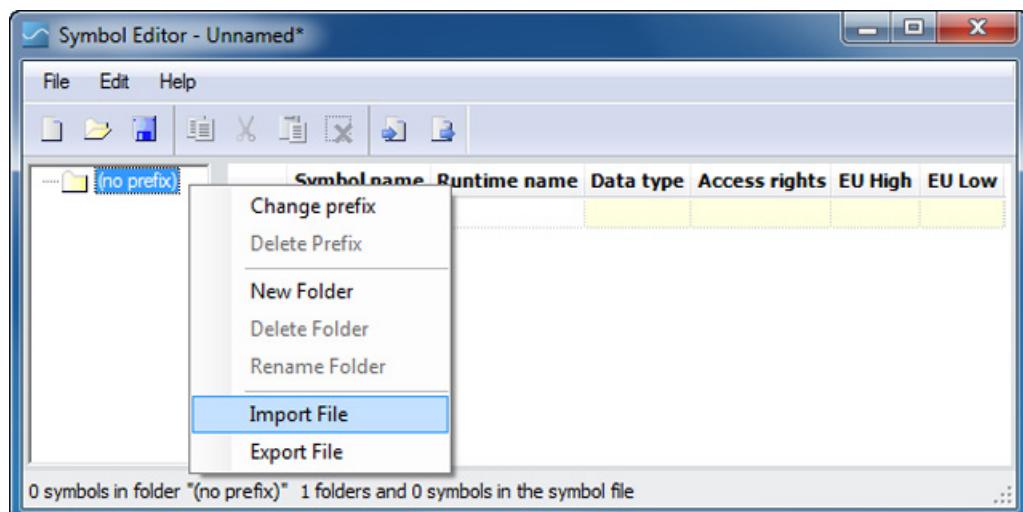
Remember that when you delete a folder, you also delete all the elements contained in the folder (subfolders and symbols).



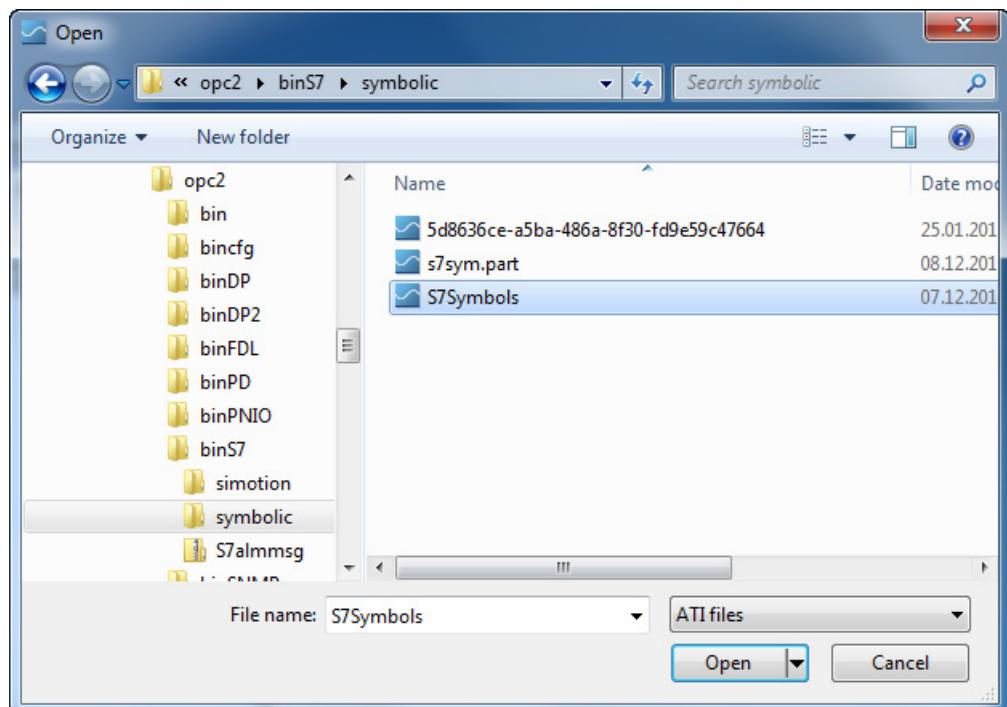
4.4.4.5 How to import a symbol file

Follow the steps below:

1. Select the folder in the tree structure into which you want to import the file.
2. Right-click and select the menu command "Import File".
You can import "CSV", "STI" or "ATI" files.

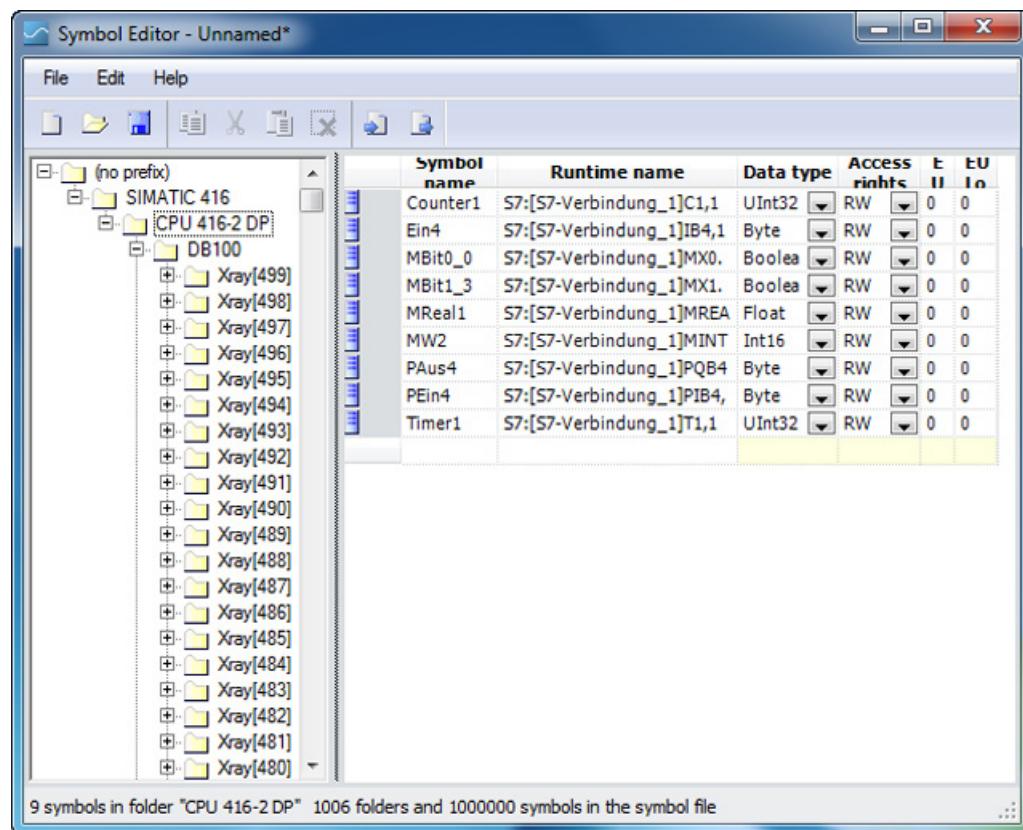


3. In the dialog box, select the file you want to import and click the "Open" button.



The "ATI" data is then imported into the Symbol Editor.

4.4 Symbol Editor



Follow the same steps to import a "CSV" file:

In the following figure, you can see a "CSV" file displayed in the editor.

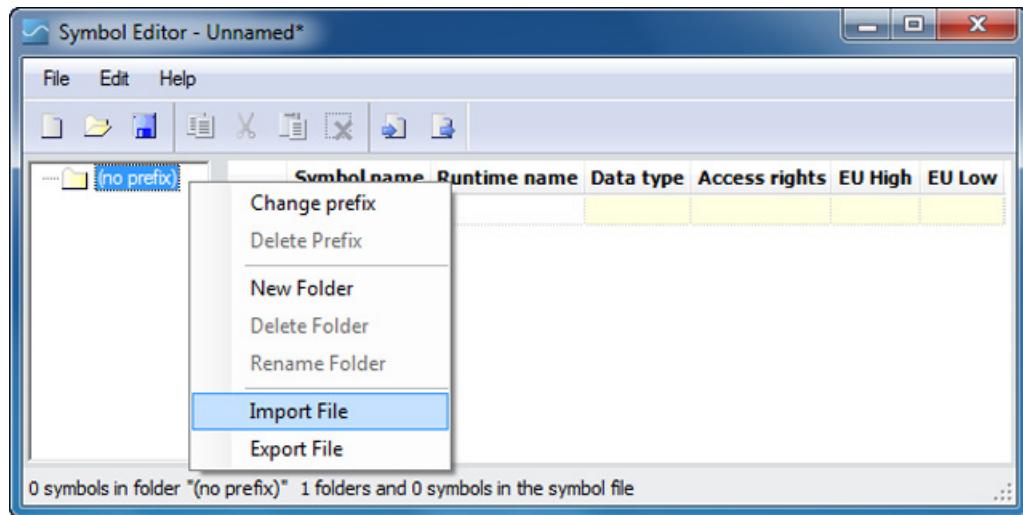
```

sample.csv - Notepad
File Edit Format View Help

TagType;Level;ShortName;RTName;DataType;AccessRights;102;103
B;1;W;;
L;2;X_W;S7:[@LOCALSERVER]DB1,X4800.0,1;B;W;0;0
L;2;B_W;S7:[@LOCALSERVER]DB1,B4900,1;11;W;0;0
L;2;W_W;S7:[@LOCALSERVER]DB1,W5000,1;12;W;0;0
L;2;D_W;S7:[@LOCALSERVER]DB1,D5100,1;13;W;0;0
L;2;CHAR_W;S7:[@LOCALSERVER]DB1,CHAR5200,1;10;W;0;0
L;2;INT_W;S7:[@LOCALSERVER]DB1,INT5300,1;2;W;0;0
L;2;DINT_W;S7:[@LOCALSERVER]DB1,DINT5400,1;3;W;0;0
L;2;REAL_W;S7:[@LOCALSERVER]DB1,REAL5500,1;4;W;0;0
L;2;STRING_W;S7:[@LOCALSERVER]DB1,STRING5600.11,1;8;W;0;0
L;2;TIME_W;S7:[@LOCALSERVER]DB1,TIME5700,1;3;W;0;0
L;2;TOD_W;S7:[@LOCALSERVER]DB1,TOD5800,1;13;W;0;0
L;2;DT_W;S7:[@LOCALSERVER]DB1,DT5900,1;7;W;0;0
L;2;X_ARR_W[0];S7:[@LOCALSERVER]DB1,X6000.0;B;W;0;0
L;2;X_ARR_W[1];S7:[@LOCALSERVER]DB1,X6000.1;B;W;0;0
L;2;X_ARR_W[2];S7:[@LOCALSERVER]DB1,X6000.2;B;W;0;0
L;2;X_ARR_W[3];S7:[@LOCALSERVER]DB1,X6000.3;B;W;0;0
L;2;X_ARR_W[4];S7:[@LOCALSERVER]DB1,X6000.4;B;W;0;0
L;2;X_ARR_W[5];S7:[@LOCALSERVER]DB1,X6000.5;B;W;0;0
L;2;X_ARR_W[6];S7:[@LOCALSERVER]DB1,X6000.6;B;W;0;0
L;2;X_ARR_W[7];S7:[@LOCALSERVER]DB1,X6000.7;B;W;0;0

```

1. Move the mouse pointer to the left-hand area and right-click.
2. Select the menu command "Import File".



3. In the dialog box, select the file you want to import and click the "Open" button.
The imported symbol file is shown in the next figure.

The screenshot shows the 'Symbol Editor - Unnamed*' window after importing symbols. The table lists 73 symbols under the '(no prefix)' folder. The columns are: Symbol name, Runtime name, Data type, Access rights, EU High, and EU Low. The table contains numerous entries such as B_ARR_R, B_ARR_RW, B_ARR_W, B_R, B_RW, B_W, CHAR_ARR_R, etc., each with its corresponding runtime address and data type (e.g., Byte[0..3], SByte[0..3], UInt32[0..]).

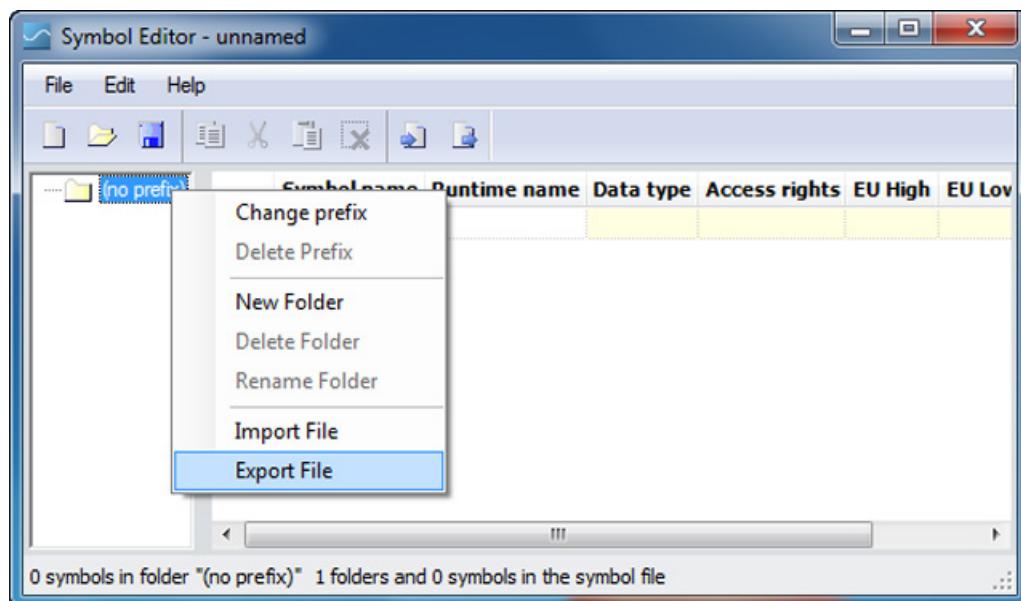
Note

You cannot import symbols into structures within data blocks with optimized access (S7-1200 and S7-1500).

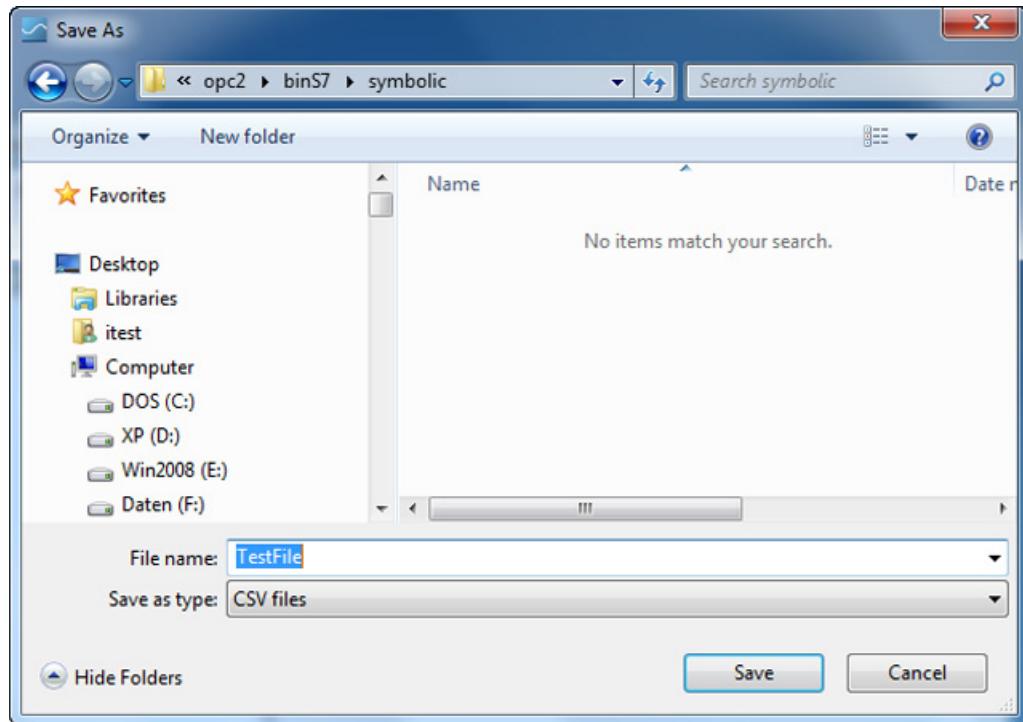
4.4.4.6 How to export a symbol file

Follow the steps below:

1. Select the folder you want to export in the tree structure.
2. Right-click and select the menu command "Export File".
You can export "CSV", "STI" or "ATI" files.



3. In the "File name" input box of the open dialog, enter the file name that the file you are exporting will have.
4. Click the "Save" button.



Note

You cannot export symbols from data blocks with optimized access (S7-1200 and S7-1500). If you export several symbols, these symbols are ignored during export.

4.5

"Communication Settings" configuration program

The "Communication Settings" configuration program provides a variety of options for configuration and diagnostics of PC hardware components and PC user programs.

The "Communication Settings" configuration program supports the following tasks in the communications system of a SIMATIC PC station:

- Commissioning and operation
- Editing the configuration
- Diagnostics
- Settings of the SIMATIC NET OPC servers

4.5.1 Characteristics, function and activation

How to start the "Communication Settings" configuration program



Select the following from the Start menu of the Windows operating system:

Start menu "Start" > "..." > "SIMATIC NET" > "Communication Settings"

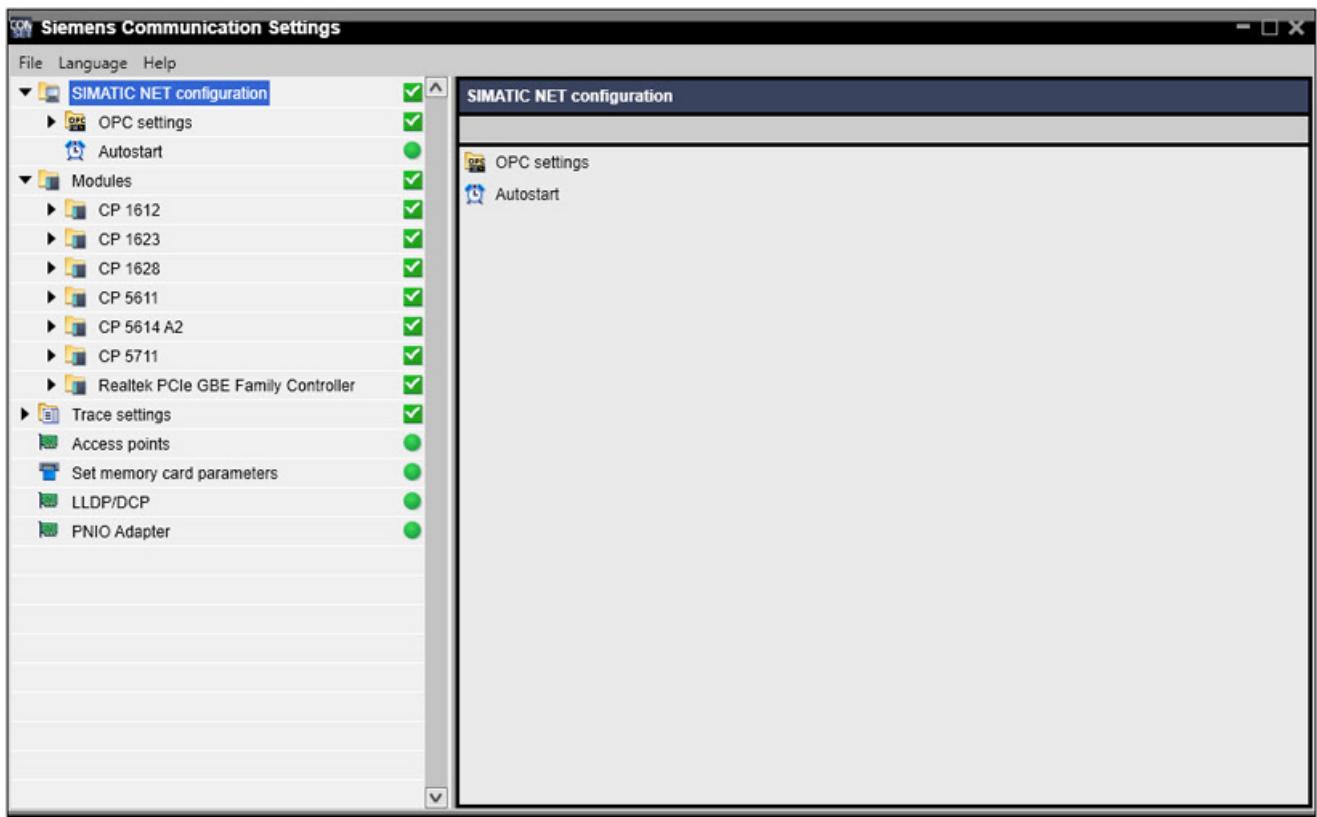
Structure

In the "Communication Settings" configuration program, you navigate in basically the same way as in the Windows Explorer.

You navigate on the lefthand side. On the righthand side, the input/output area, you will see the properties of the selected element (properties object).

The elements in the navigation area are grouped as follows:

- SIMATIC NET configuration
- Modules
- Trace settings
- Access points
- Setting parameters for the memory card
- LLDP/DCP
- PNIO adapter



Note

You will find configuration examples in the section "Configuration examples (Page 306)".

4.5.2 Support during commissioning and operation

Overview

The essential functions provided by the "Communication Settings" tool for commissioning and operation are as follows:

- Trigger a restart on the module
- Force the OPC server to shut down (for example, when an OPC application is no longer reacting)
- Deactivate the configured protocols to commission the system step-by-step
- Set the symbol files for OPC
- Configure and set the traces for OPC and protocols
- Setting for the user interface language
- Automatic startup of applications and services

4.5 "Communication Settings" configuration program

- Setting parameters for the security settings
- Manage the OPC UA certificates

These options are described in the following sections of this chapter.

4.5.2.1 Triggering a restart on the module

The module is reset and the drivers, firmware, and databases are reloaded.

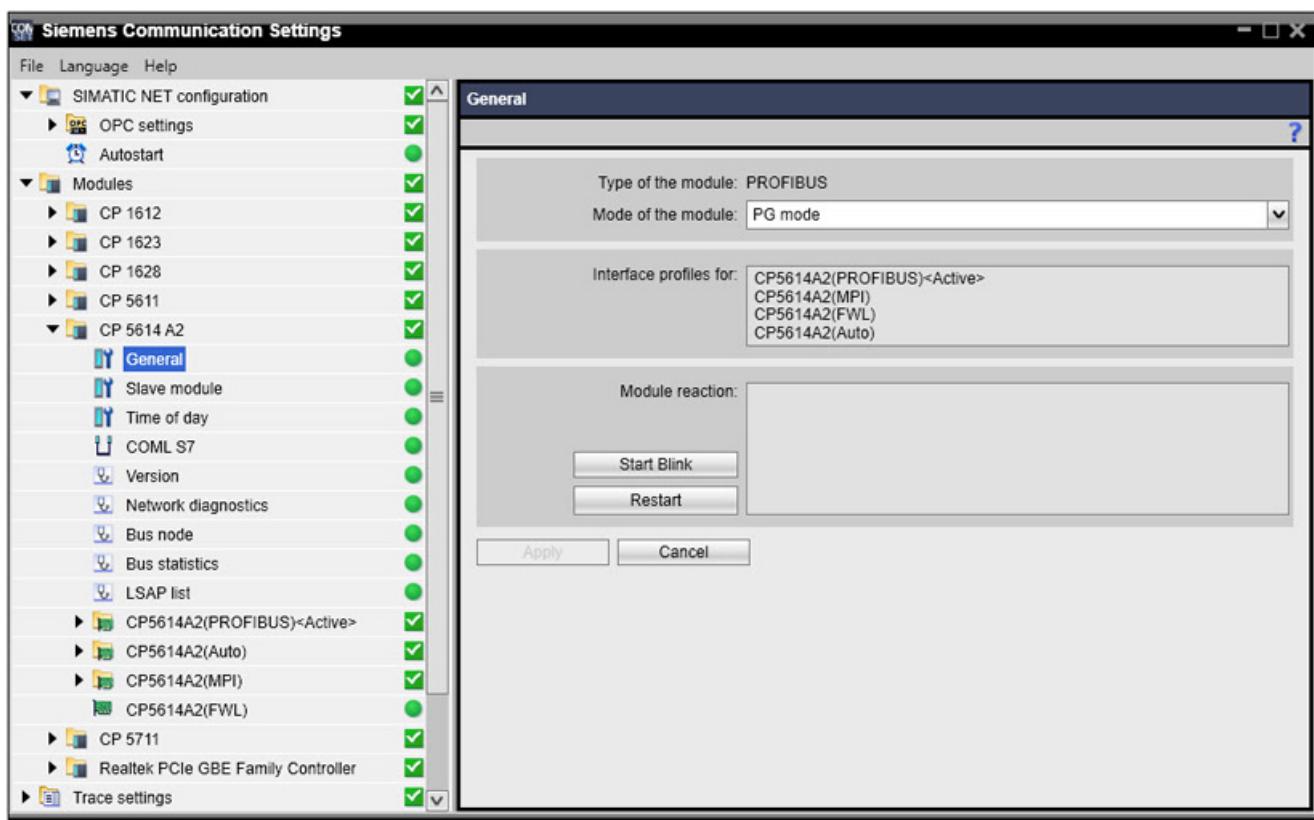
Note

A restart is only possible if the module is not communicating and when it is not in configured mode.

Follow the steps below to restart the module:

1. Open the "Modules" folder in the navigation area.
2. Select the relevant module and click on the "General" property object.
3. Click the "Restart" button.

If currently possible, the module is reset. The result of the restart is displayed in the text box.



4.5.2.2 Forcing the OPC server to close down

The OPC server for SIMATIC NET is started automatically by the operating system when a client wants to use it. The OPC server maintains reference counters to be able to recognize when the last registered client is closed. The OPC Server then closes itself down. This is only possible when the clients set and reset the user counters of the OPC Server correctly.

If a client closes down irregularly and the user counter is not reset, the OPC server will not close down although no more clients are active. The server continues to keep the communication connections open.

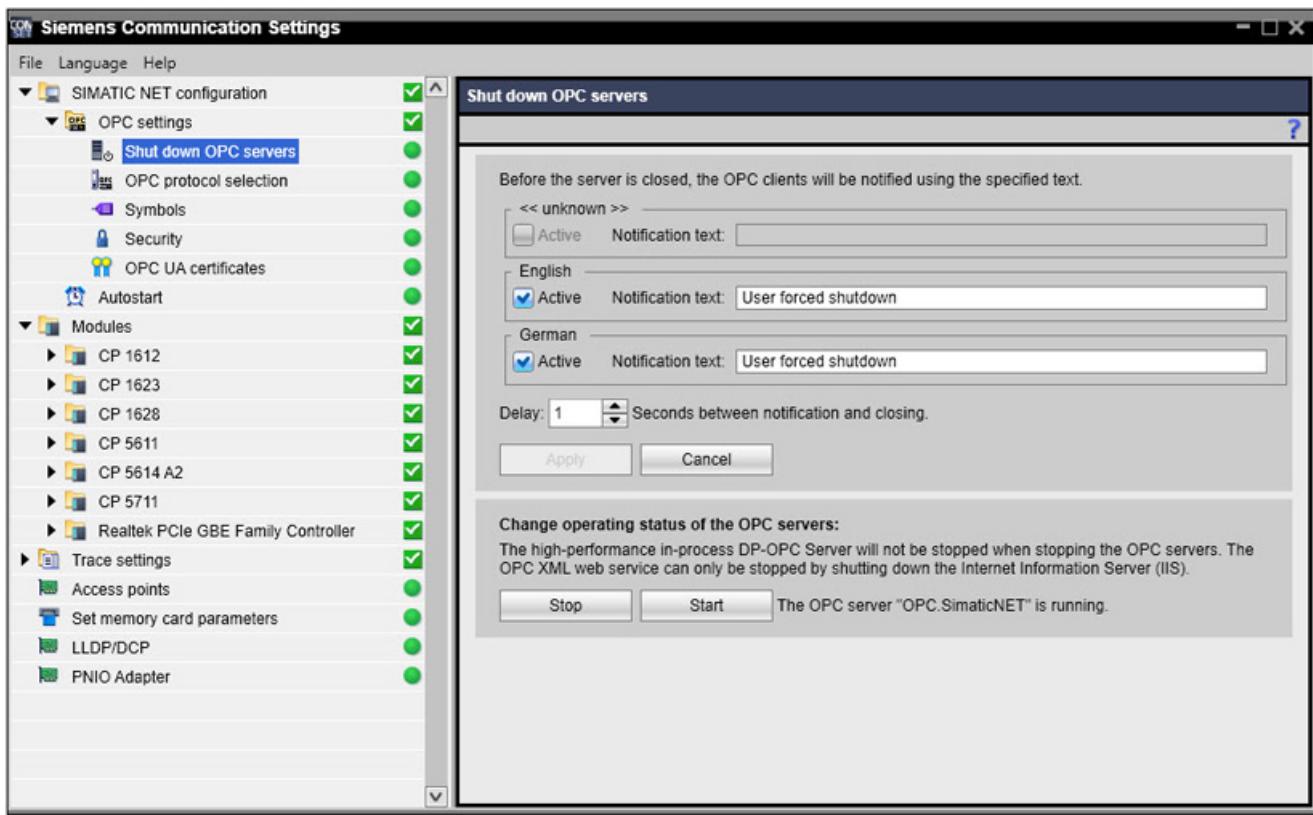
In this case, it is a good idea to stop the OPC server manually.

Follow the steps below if you want to close down or restart OPC server:

1. Open the "SIMATIC NET Configuration" folder in the navigation area.
2. Select "OPC settings" and click on the "Quit OPC server" property object.
3. If you want to send a notification text to the OPC clients about the close down over the OPC Server, you can enter this in the "Notification text" box. You can also specify a wait time between the notification of the clients and shutting down the server to allow a client to react. Enter this time in the "Delay" box.
4. With the notification text, you can choose between a non-language specific text and texts for English and German. If you select a language-specific text, the OPC client receives the text in the language for which it registered.

4.5 "Communication Settings" configuration program

5. Click the "Apply" button to activate the changes you made. Depending on the current operating mode, you can either close or start the OPC server. Both an active OPC Data Access server as well as to an Alarms & Events / Alarms & Conditions server is closed. You should first close all OPC clients, otherwise you must expect error messages from the clients.



6. Before an OPC UA client can register, it must be started. Click the "Start" button to start all configured OPC UA servers.

4.5.2.3 Activating configured protocols step by step

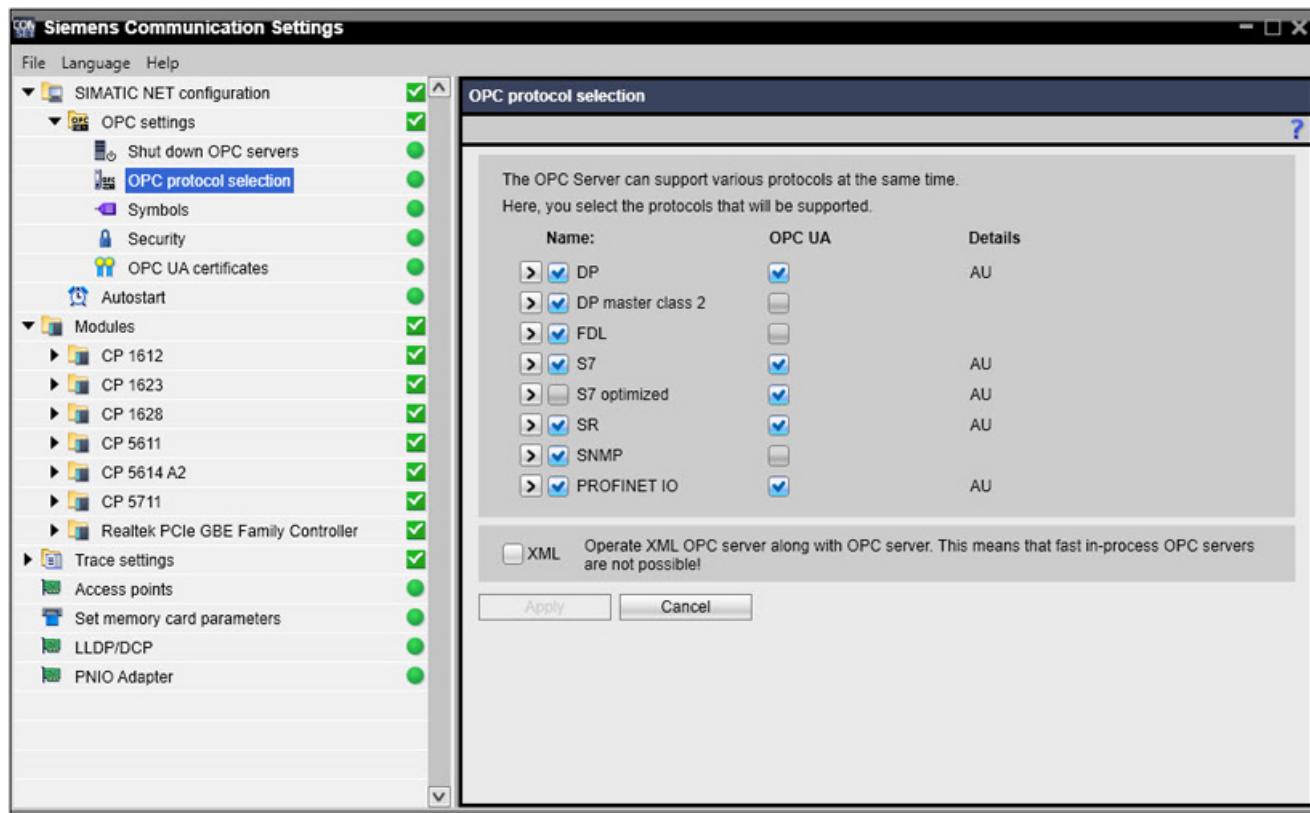
By configuring a DP master system and connections, you specify which protocols will be used by the OPC server.

During the commissioning of a system, it is sometimes useful to commission the protocols individually one after the other. With the procedure described below, you can first deactivate the configured protocols and then activate them again step by step.

If you change the configuration, the manual protocol selection will be replaced by the automatic selection again.

Follow the steps below to activate the configured protocols step by step:

1. Go to "SIMATIC NET Configuration" > "OPC settings" > "Select OPC protocol" in the tree structure.
2. As default, all protocols are activated. Deactivate the protocols you do not want the OPC server to use. Activate the protocols that were specified in the configuration and that you want to use as of now.
3. Click the "Apply" button to activate the data you have set.



Note

When you download a configuration, all protocols configured in the project engineering are activated automatically, even if you had deactivated them previously. If necessary, you must also deactivate such protocols again.

Note

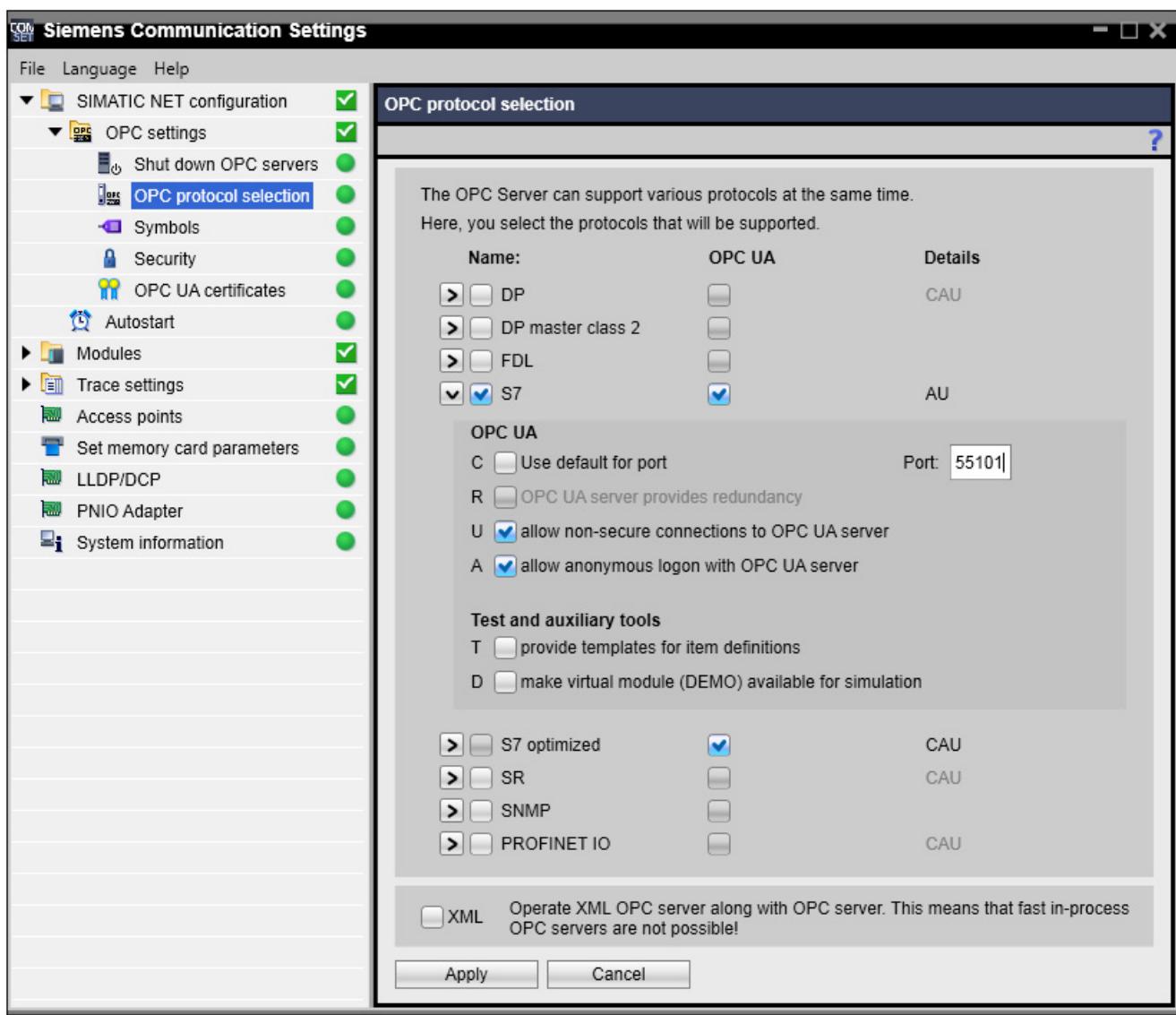
By deactivating protocols you restrict the range of functions and possibly also the operability of the PC station, the SIMATIC NET Information Service therefore notifies you of this setting (icon flashes in the notification area)!

4.5.2.4 Configuring OPC UA port

The OPC UA servers have a default port for their TCP end point that is preset by installing the "SIMATIC NET PC Software". By knowing the relevant TCP/IP system configuration, you can configure this OPC UA port.

Follow the steps below to configure an OPC UA port:

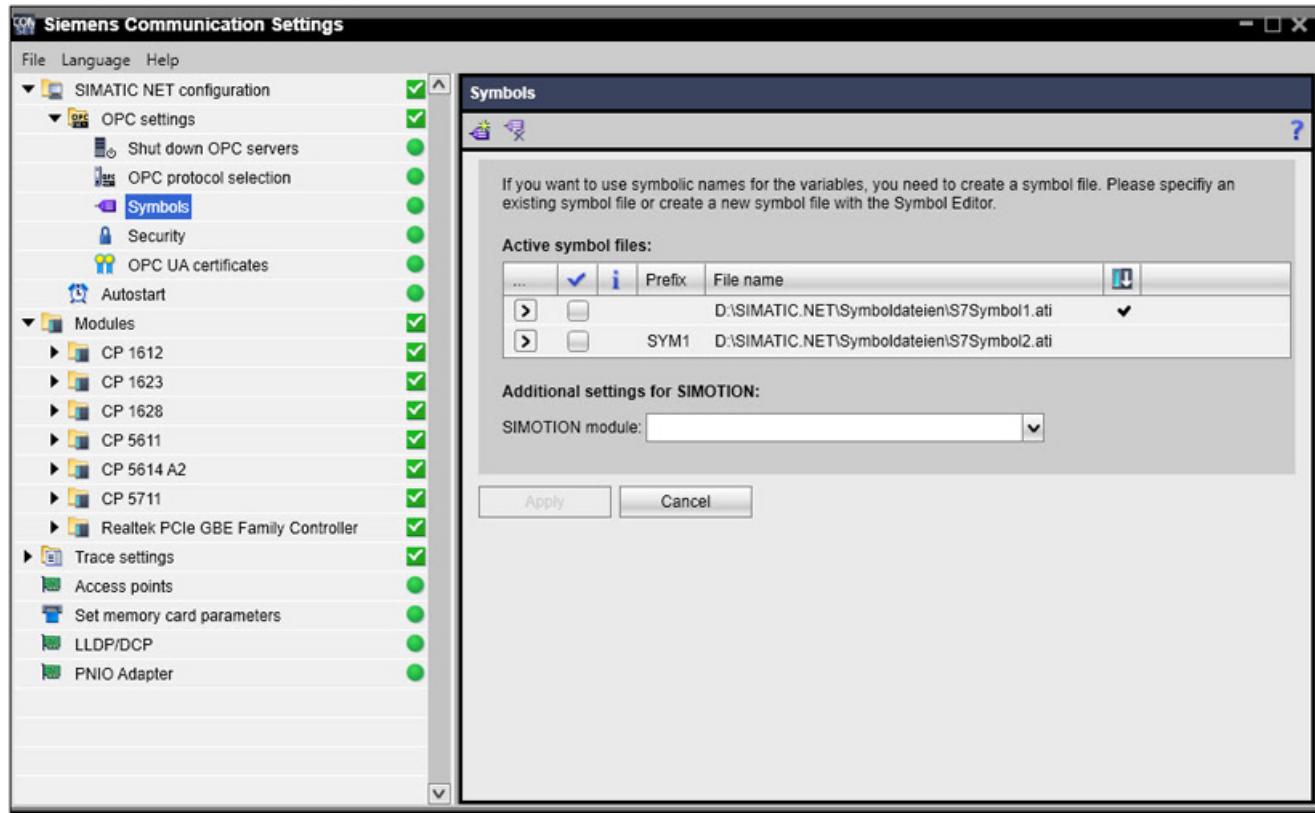
1. Go to "SIMATIC NET Configuration" > "OPC settings" > "Select OPC protocol" in the tree structure.
2. Select the OPC UA server for which you want to configure the OPC UA port.
3. Disable the "Use default for Port" check box and confirm the dialog box that opens with "OK".
4. In the "Port" input box, configure the OPC UA port to suit your requirements.
5. Click the "Apply" button to activate your configuration.



4.5.2.5 Setting a symbol file for OPC

Follow the steps below if you want to use a symbol file for the OPC Server:

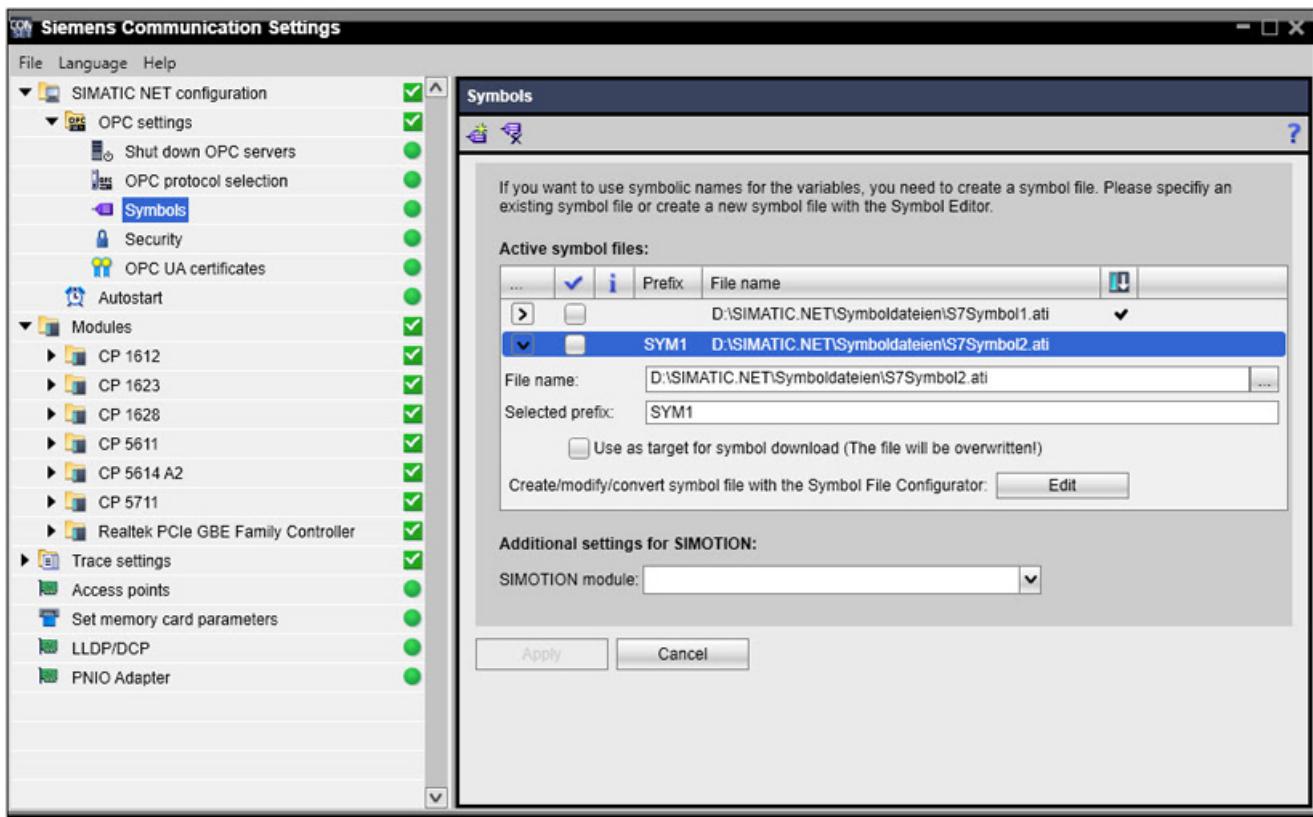
1. Open the "SIMATIC NET Configuration" > "OPC settings" > "Symbols" folder in the navigation area.



2. In the input/output area, click on the arrow symbol of a row to make further settings.

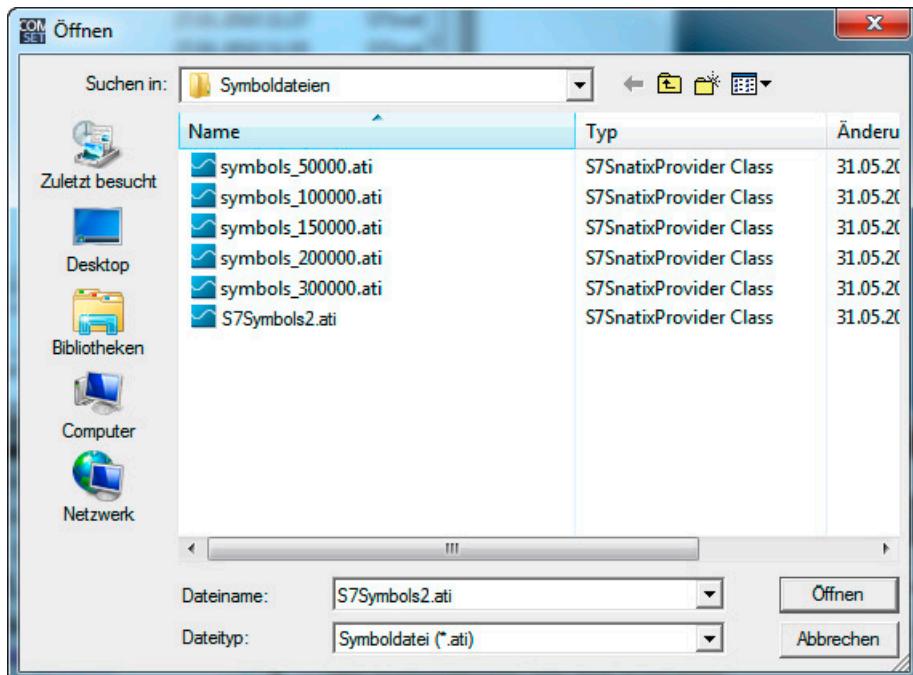
Reaction: The expanded parameter list opens.

4.5 "Communication Settings" configuration program



3. Click the "..." button.

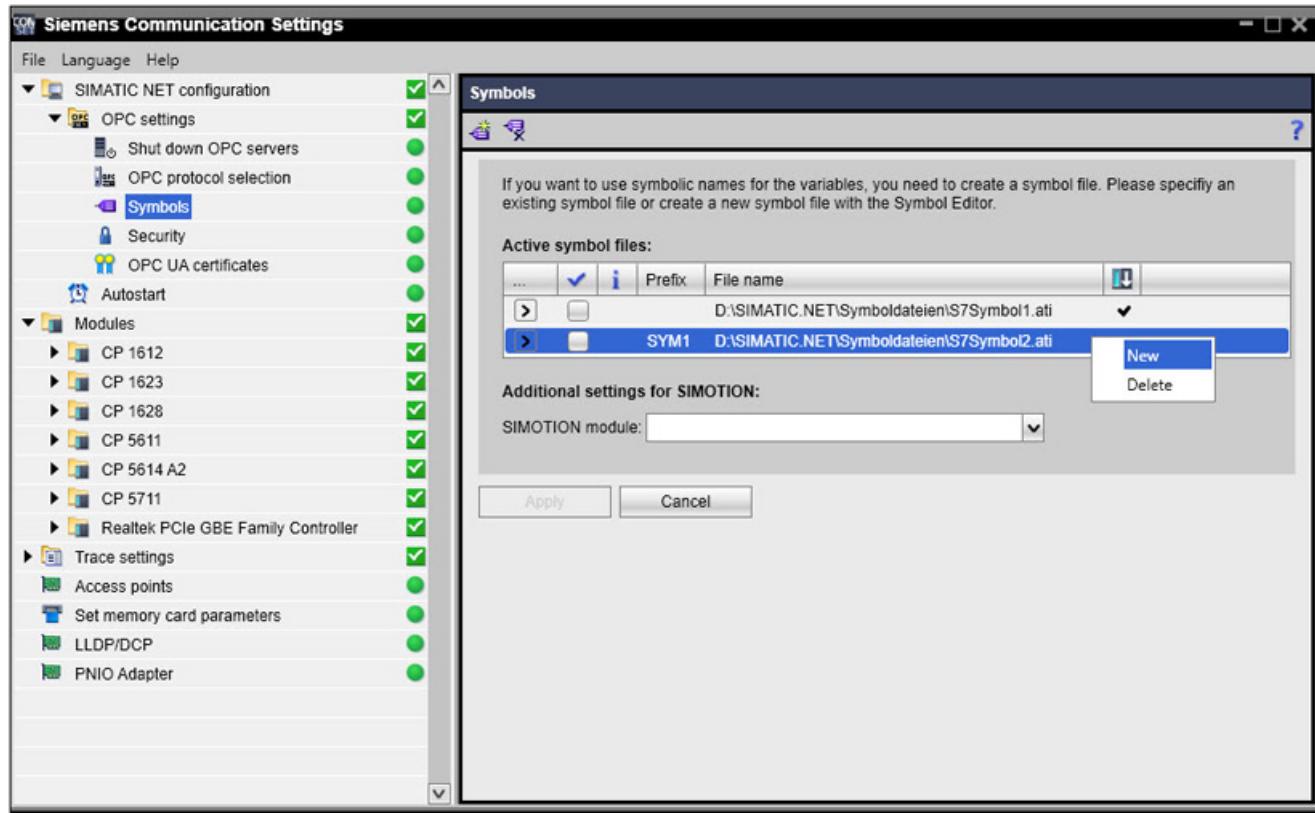
Reaction: A file selection dialog opens.



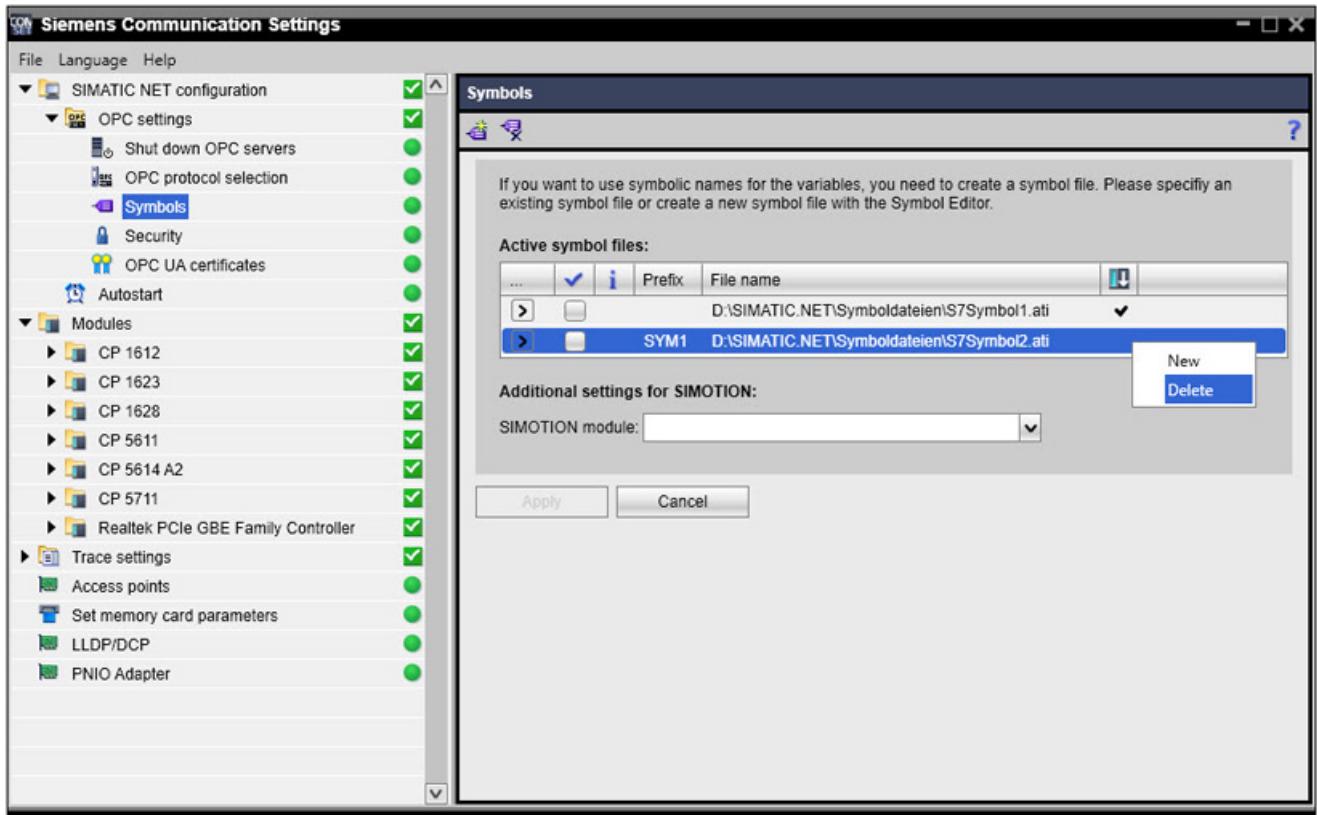
4. Select the required symbol file and click "Open".

4.5 "Communication Settings" configuration program

5. Close the expanded parameter list by clicking on the arrow symbol again.
6. If necessary, add further symbol file entries by right-clicking in the list. In the shortcut menu that then opens, select "New".



7. Remove any symbol file entry you do not require by selecting it and then clicking with the right mouse button. In the shortcut menu that then opens, select "Delete".



Note

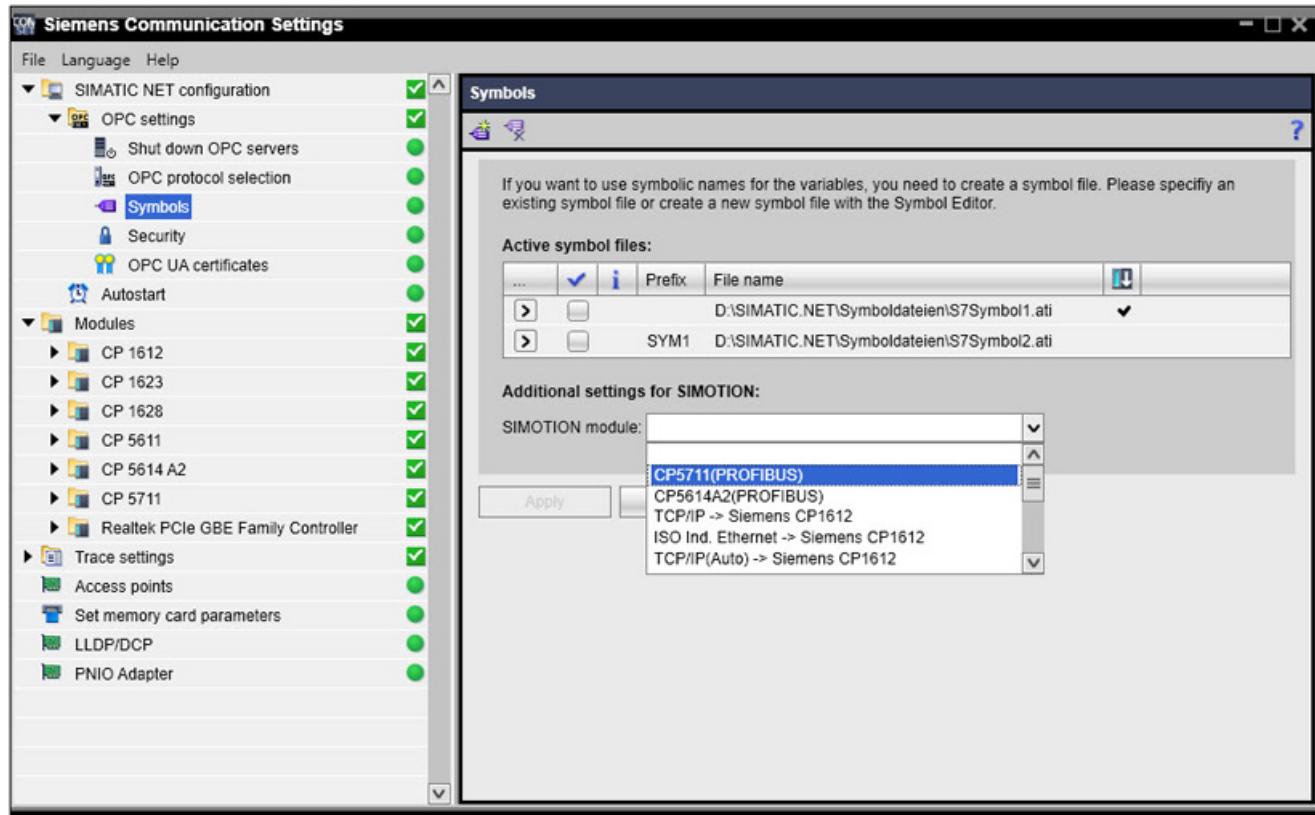
If you use several symbol files at the same time, the prefixes of the activated symbol files must not contain more than 24 characters.

8. Additional settings for SIMOTION:

If you use a symbol file created by the engineering tools for SIMOTION, you will also need to select a module for the communication paths.

4.5 "Communication Settings" configuration program

9. Select the module you require for communication with SIMOTION.

**Note**

For communication with SIMOTION, you only need to set a symbol file and select a module. No further configuration with SIMATIC NCM PC or SIMATIC STEP 7 is necessary.

10. Click the "Apply" button to activate the data you have set.

4.5.2.6 Setting traces

A trace logs the internal sequences of the component. It allows you to check the functions, for example of a user program. Depending on the configuration, the actions of a software module are logged in a file.

The following traces are available:

- Traces of the OPC servers for Data Access and Alarms & Events / Alarms & Conditions
- Trace of the protocol adapters of the OPC servers
- Trace of the protocol libraries (using the "TraceConcept" program)

Note

In normal operation, the trace should be deactivated since the creation of trace files significantly reduces the speed at which programs are executed. You should also bear in mind that the reduction in speed caused by the trace may result in other problems such as timeouts.

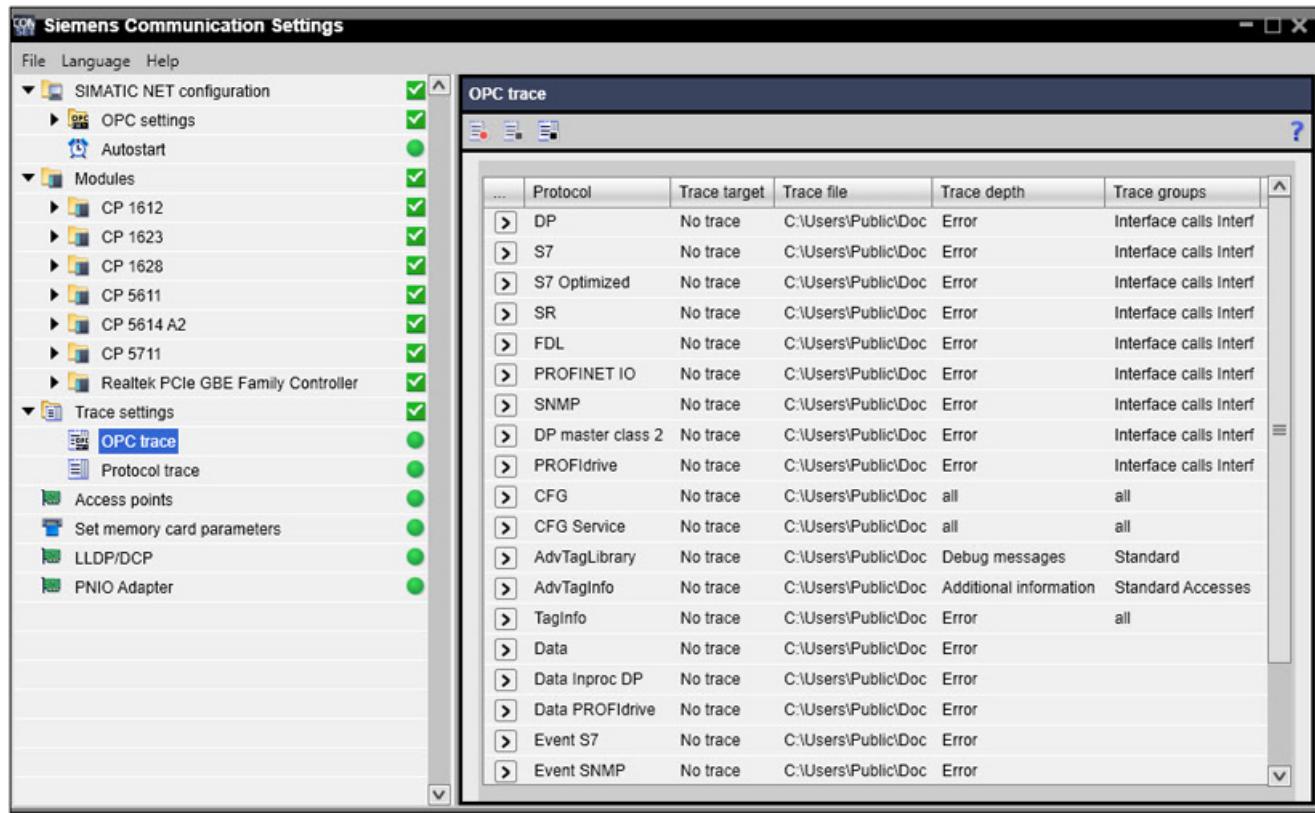
The SIMATIC NET Information Service signals the activation of a trace so that the user is immediately aware of the reduced performance.

4.5 "Communication Settings" configuration program

Follow the steps below if you want to set the traces for the OPC Server or the protocol adapters:

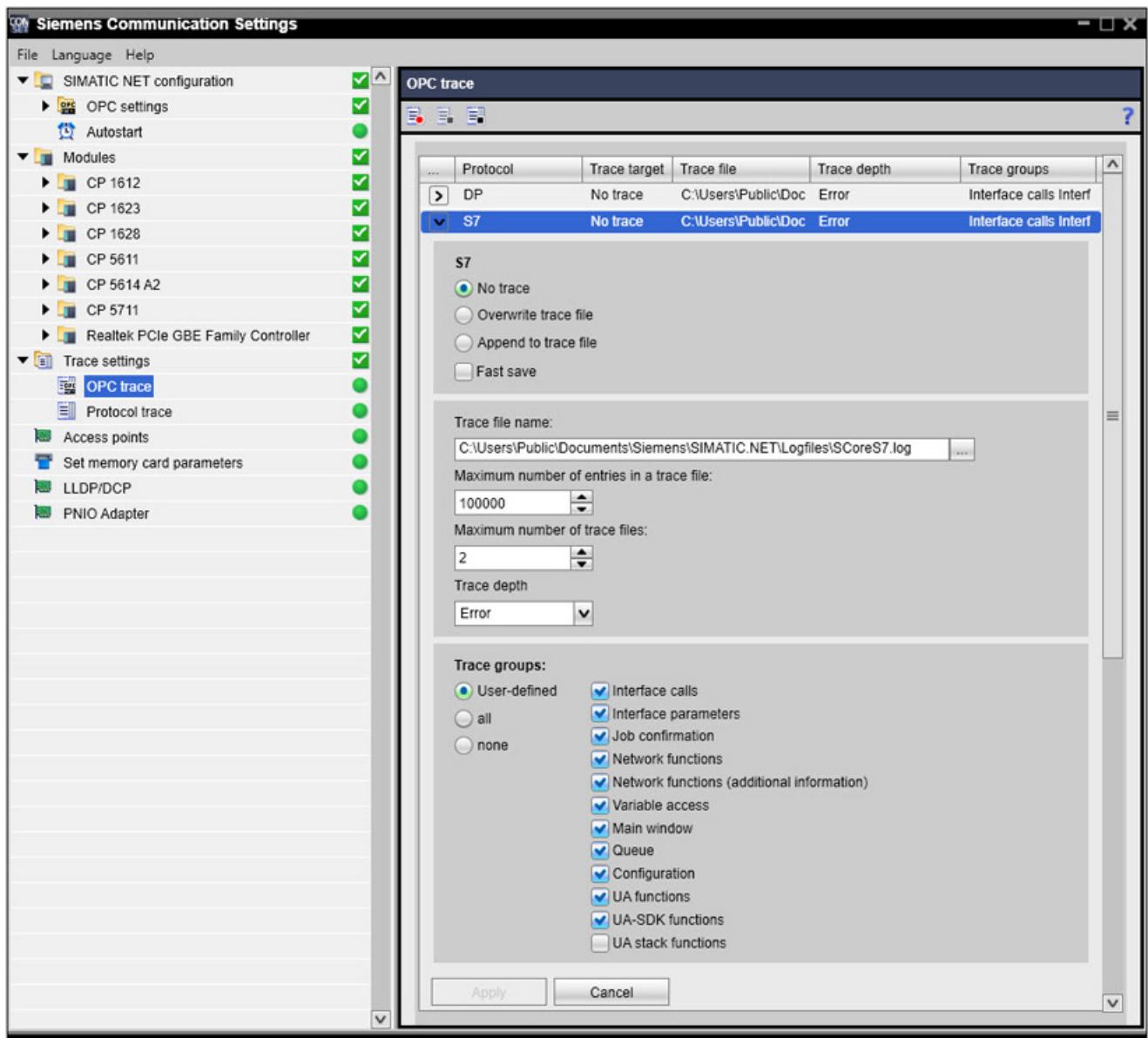
1. Go to "Trace settings" > "OPC trace" in the tree structure.

Reaction: The table lists the possible traces for the protocols and the OPC servers in the display area.



2. Click on the arrow symbol of an entry, for example on "S7" for the OPC server for the S7 protocol.

4.5 "Communication Settings" configuration program

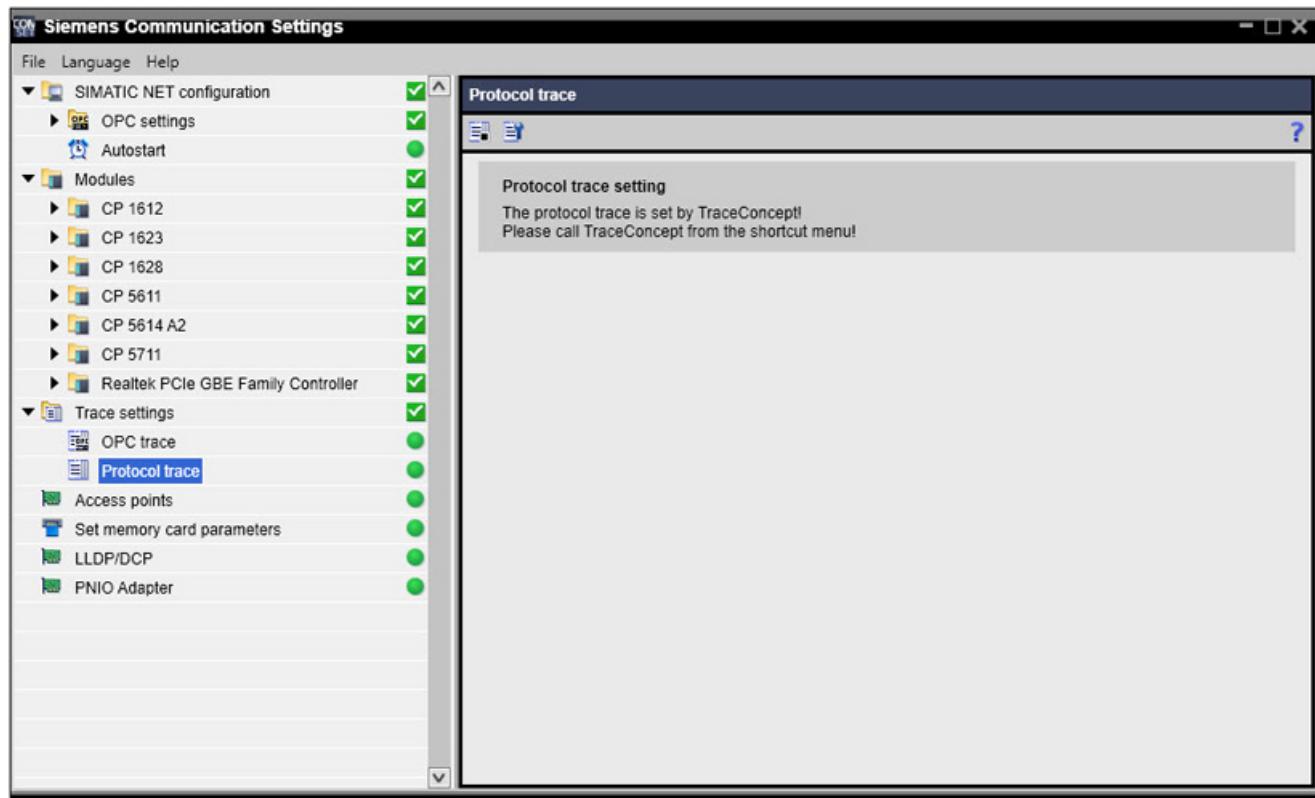


3. Activate the trace and select the trace depth. Select "Errors", for example to log information about errors and exceptions.
4. Click the "Apply" button to activate the data you have set.

4.5 "Communication Settings" configuration program

Follow the steps below if you want to create traces of the protocol libraries:

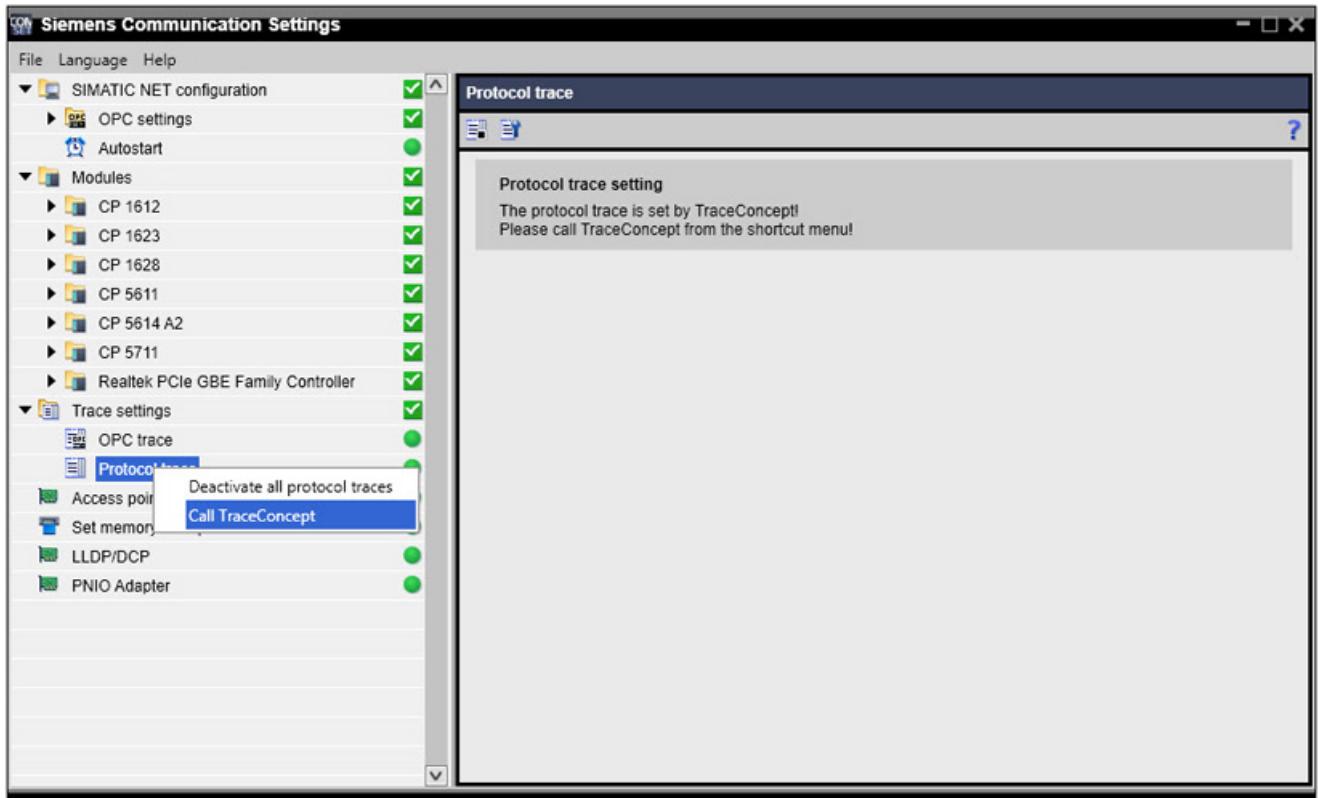
1. Go to "SIMATIC NET Configuration" > "Trace settings" > "Protocol trace" in the tree structure.



2. Right-click on "Protocol trace".

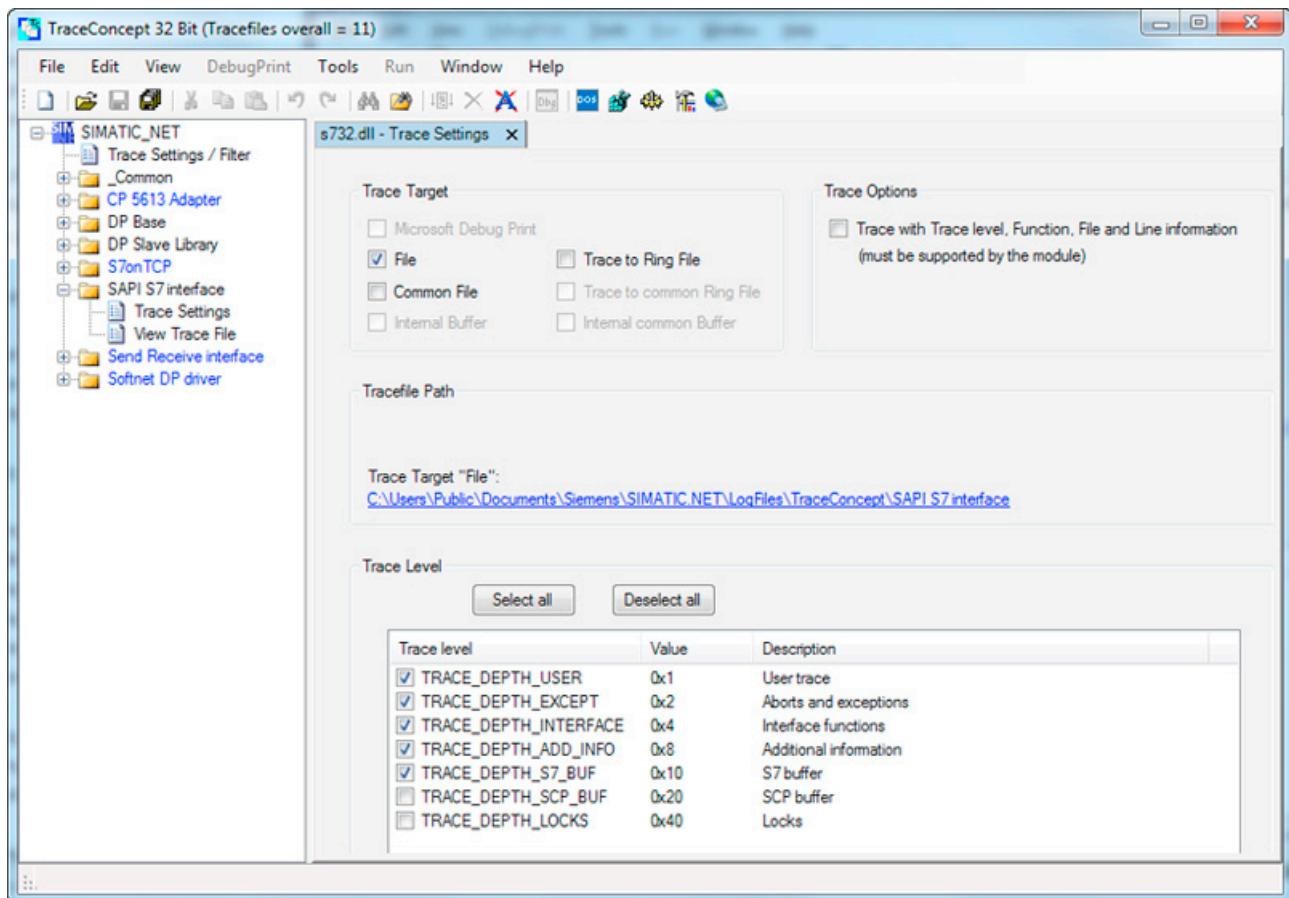
4.5 "Communication Settings" configuration program

3. Select "Call TraceConcept" in the list.



4. In the tree structure, select the component whose trace you want to activate and make your settings in "Trace Settings". Click on "View Trace File" to view the results.

4.5 "Communication Settings" configuration program

**Note**

The settings made in "Trace Settings" are active immediately and do not need to be confirmed with a button.

Updating the "View Trace File" window (if several are displayed, further tabs are shown at the top) takes up computing time and the window should only be displayed if you want to track an error online.

Activated traces are identified by a red exclamation point.

4.5.2.7 Language setting

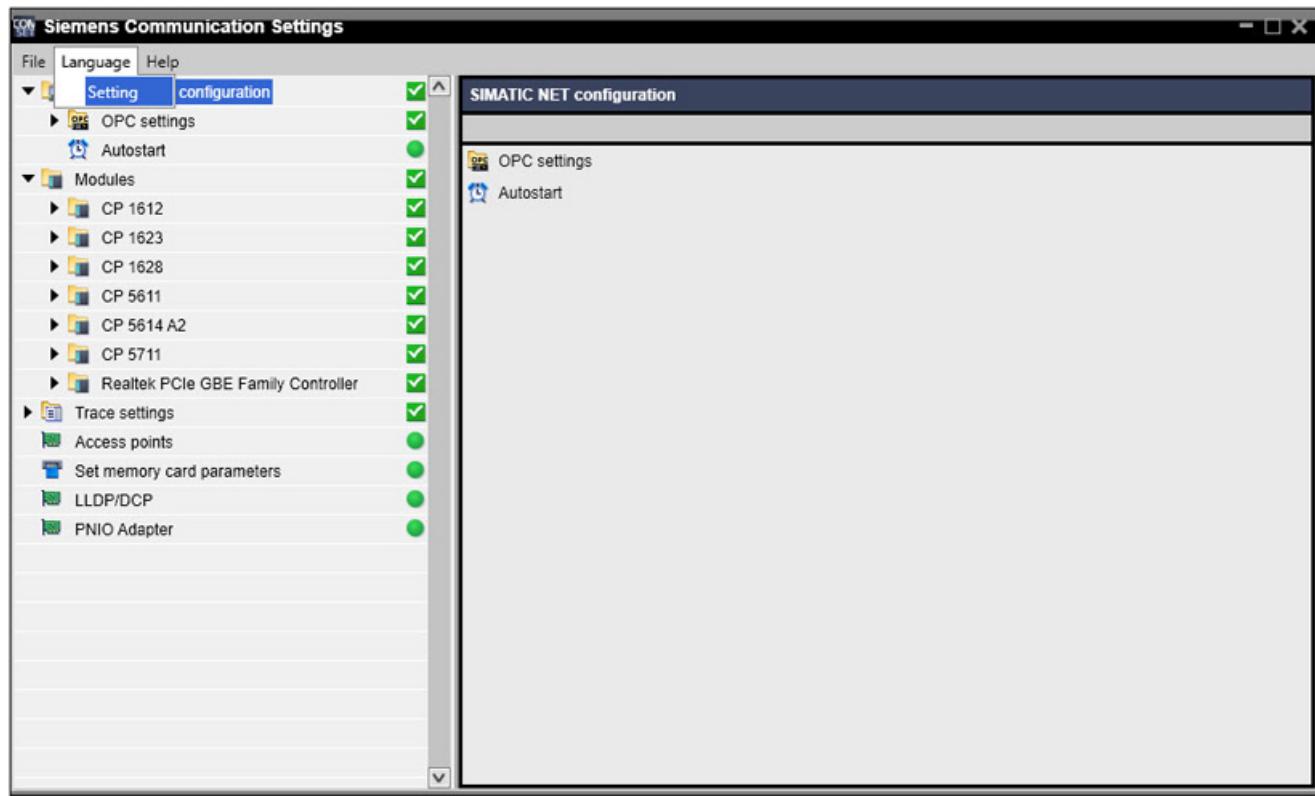
The language for the program user interface can also be changed after installation.

The selected language is also used for the SIMATIC NET notification service and the SIMATIC NET entries in the Start menu.

4.5 "Communication Settings" configuration program

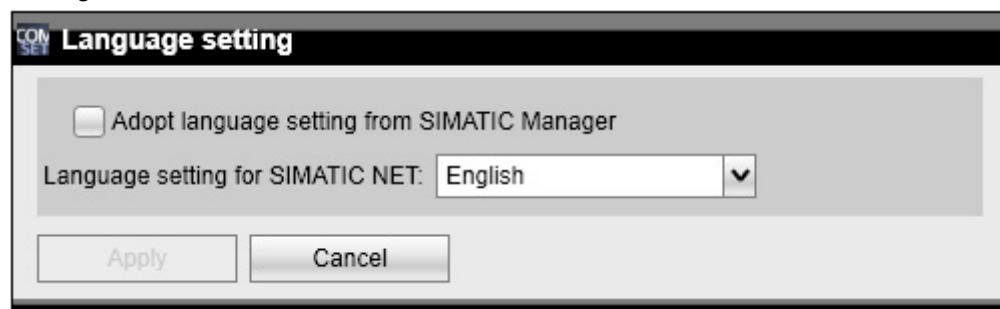
Follow the steps below to change the language setting:

1. Click on "Language" > "Setting" in the menu bar.



2. Select the required language.

The list includes all available languages. The currently set language is indicated by the check mark in the check box. If the "Adopt language setting from SIMATIC Manager" check box is selected, the language of the SIMATIC NET tools will be set to the language selected for the SIMATIC Manager. This is only possible if the language is included in the list. Otherwise, the language selected in the "Language" list will continue to be used. Clear the check box if you do not want to adopt the language setting from the SIMATIC Manager.



3. Click the "Apply" button to activate the data you have set.

4.5.2.8 Automatic startup of applications and services

Applications and services you set up on a PC station can be synchronized with the startup of the PC station.

As soon as the PC station is operational, user applications and user services are started.

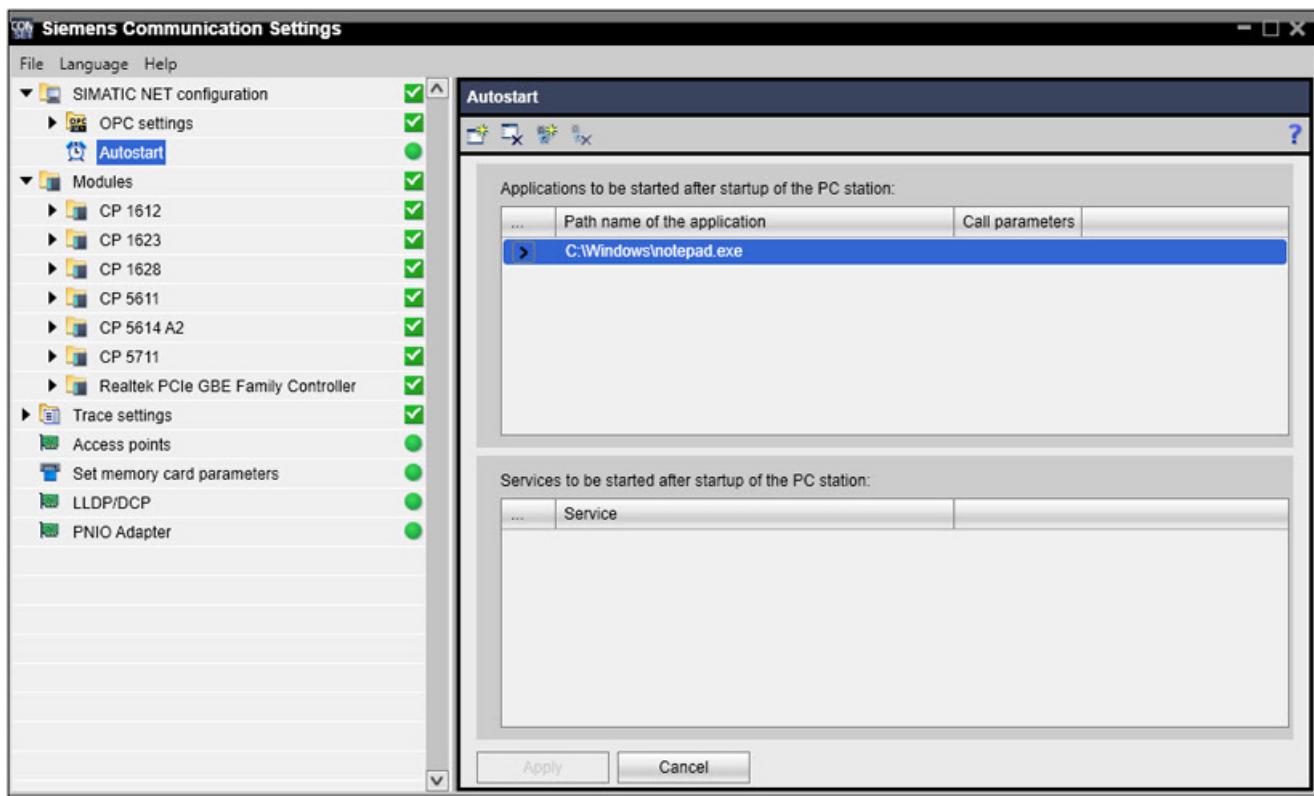
Note

Do not use the Windows "Autostart" function for applications and services that are that require PC functionality. In Windows, the function is not synchronized with the PC station startup.

Follow the steps below to start applications or services automatically after the PC station has started up:

1. Open the "SIMATIC NET Configuration" folder in the navigation area.
2. Select the "Autostart" folder.

The applications to be started are shown in the upper list, the services to be started in the lower list. As default, both lists are empty.



3. To enter an application in the list, click in the upper list with the right mouse button.

In the menu that is displayed, select "New".

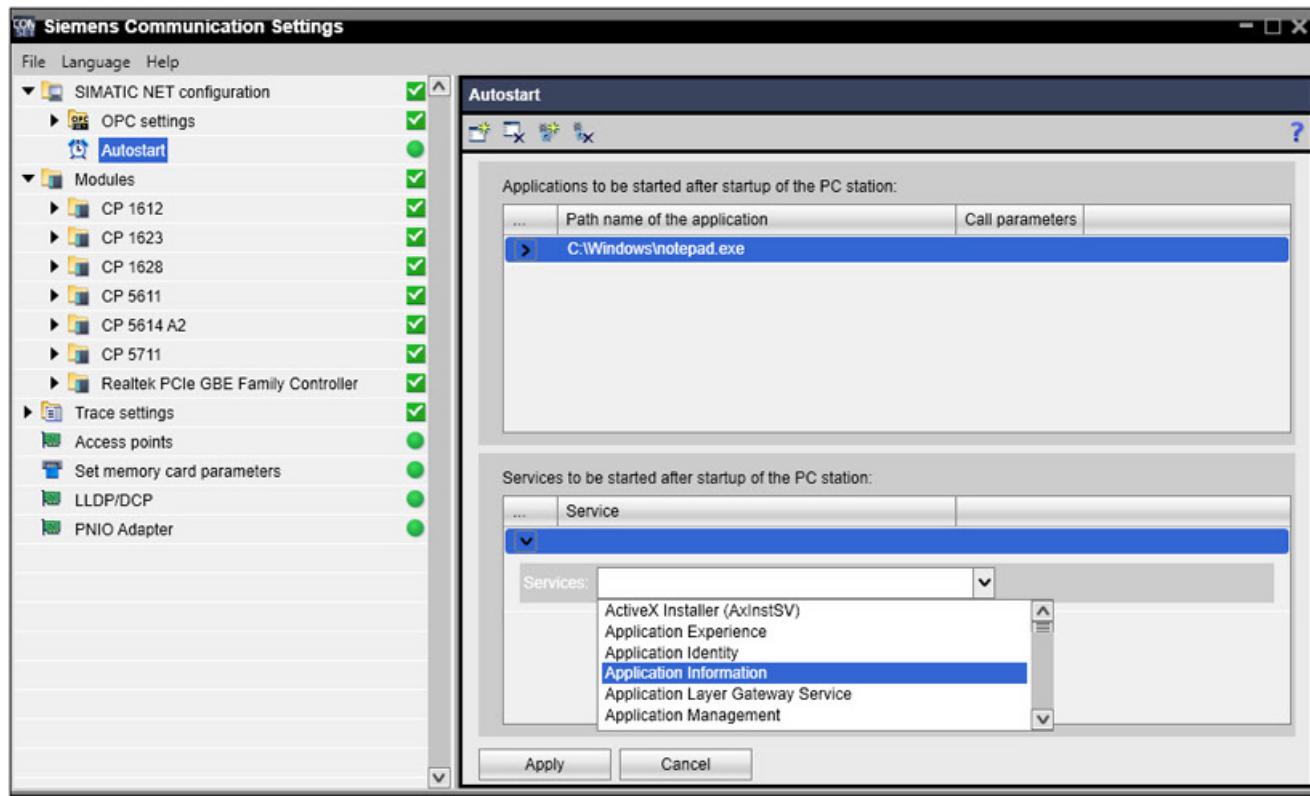
A new application entry appears in the list and its arrow symbol is already open. Click the "... " button.

4.5 "Communication Settings" configuration program

The file selection dialog of the operating system then appears. Here, you can select the application. After exiting the file selection dialog, the path of the application is in the list. Any application-dependent call parameters can be entered in the text box below this. You will find help on the call parameters in the help file of the application.

4. To enter a service in the list, right-click in the lower list. In the menu that appears, select "New".

Reaction: A new service entry appears in the list and its arrow symbol is already open.



5. The programs registered as services in Windows must be entered in the lower box. Select the required service from the "Services" drop-down list. The service then appears in the list of services to be started.
6. Selecting the "Delete" menu item removes the selected entry from the corresponding list.
7. Click the "Apply" button to activate the data you have set.

Note for software developers:

Applications can be synchronized with the startup and shutdown using global events.

- Event "SimaticNetPcStationUpEvent":

The global event "SimaticNetPcStationUpEvent" is in the "signaled" state when the PC station has started up and is ready for OPC communication. Applications that require a started PC station and functioning OPC communication that previously had to wait for an undefined time can wait for the event and therefore be synchronized with the startup of the PC station.

- Event "SimaticNetPcStationDownEvent":

The global event "SimaticNetPcStationDownEvent" is in the "signaled" state when the PC station has not started up and is not therefore ready for OPC communication.

Applications can wait for the event and therefore be synchronized with the shutdown of the PC station.

The event objects "SimaticNetPcStationUpEvent" and "SimaticNetPcStationDownEvent" are never in the "signaled" state at the same time. As the state changes, however, both may briefly be in the "not signaled" state.

Application example (Win32API, see also MSDN Library):

```
...
HANDLE hUp = OpenEvent(SYNCHRONIZE, FALSE, "Global\\SimaticNetPcStationUpEvent");
DWORD dwResult;
dwResult = MsgWaitForMultipleObjects(1, &hUp, FALSE, INFINITE, QS_ALLINPUT);
// evaluate dwResult
```

4.5.2.9 Security setting (as of Windows XP SP2)

With Service Pack 2 for Windows XP, Microsoft has improved operating system security. The default settings of the operating system do not allow any communication from applications over the network.

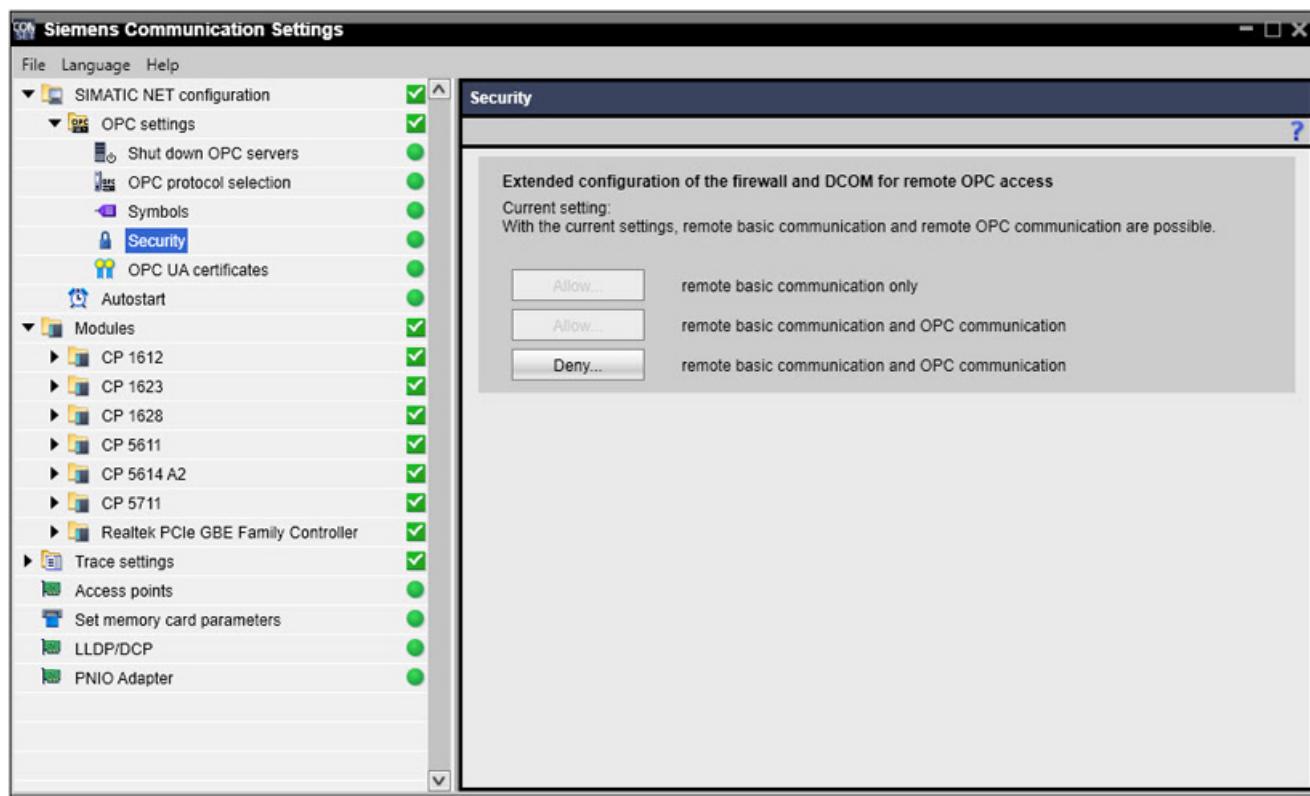
Although installing the SIMATIC NET DVD enters the OPC servers in the exceptions list of the Windows Firewall, this is not enough to allow operation with OPC again. General applications and ports as well as new DCOM settings are still missing in the firewall.

Follow the steps below to enter the missing applications and ports in the firewall and to make the new DCOM settings:

1. Open the "SIMATIC NET Configuration" > "OPC settings" > "Security" folder in the navigation area.
2. Click the "Allow..." button.

Note

Note that this allow also applies to applications that also use this access procedure and are not related to SIMATIC NET.



Note

The "Deny..." button cancels these settings.

You should also remember that this deny also affects other applications that use this access method.

4.5.2.10 Managing OPC UA certificates

OPC UA certificates are used so that OPC UA clients and OPC UA servers can identify themselves during the OPC UA connection establishment. The OPC UA servers each have a server certificate with which they can identify themselves to an OPC client. Each OPC UA client also has a client certificate with which it identifies itself to an OPC UA server.

Among other things, you can do the following:

- View OPC UA server certificates and OPC UA client certificates
- Reject or accept OPC UA client certificates
- Import OPC UA client certificates
- Export OPC UA server certificates and OPC UA client certificates
- Recreate the OPC UA configuration

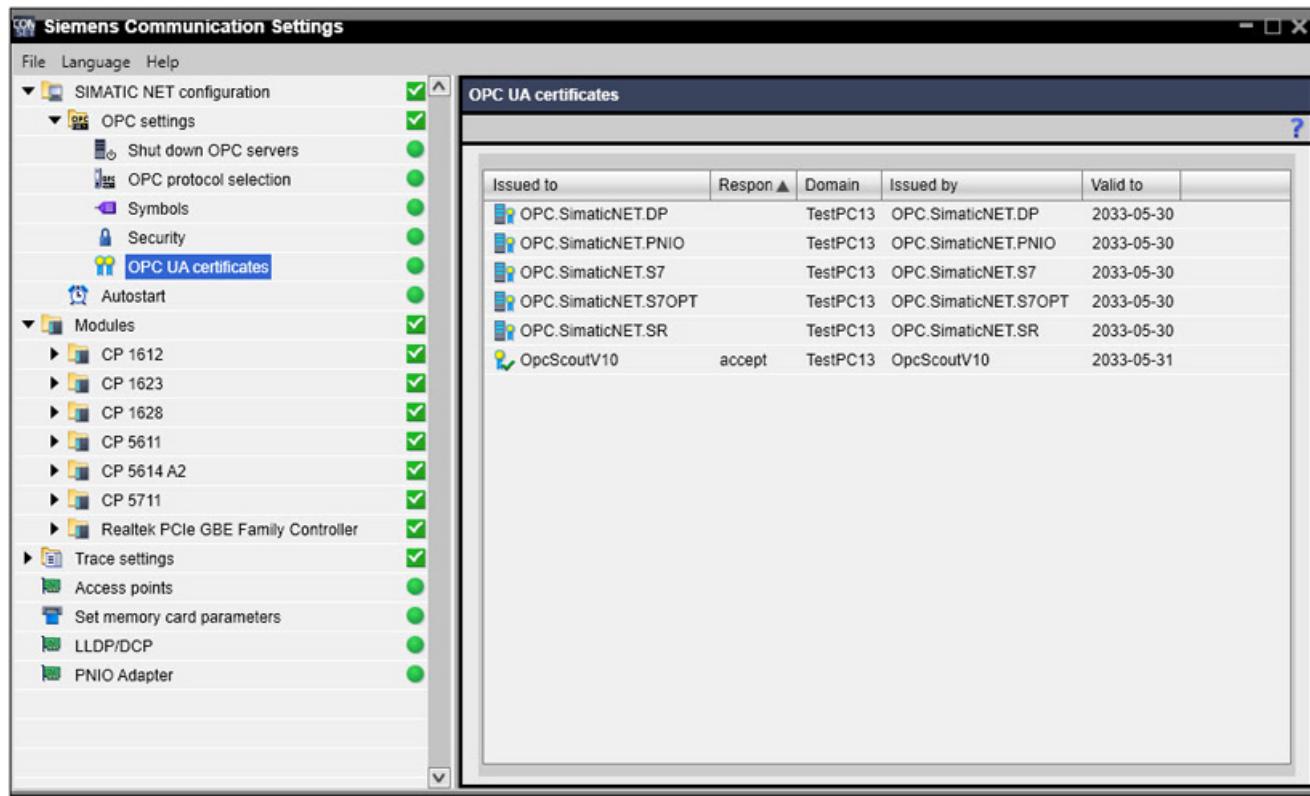
Note

If you change the computer name after installing the "SIMATIC NET PC Software", the certificates installed for OPC UA are invalid and OPC UA will no longer work. Remedy: Create a new UA configuration with the "Communication Settings" program in "OPC UA certificates" > shortcut menu "Recreate OPC UA configuration".

4.5 "Communication Settings" configuration program

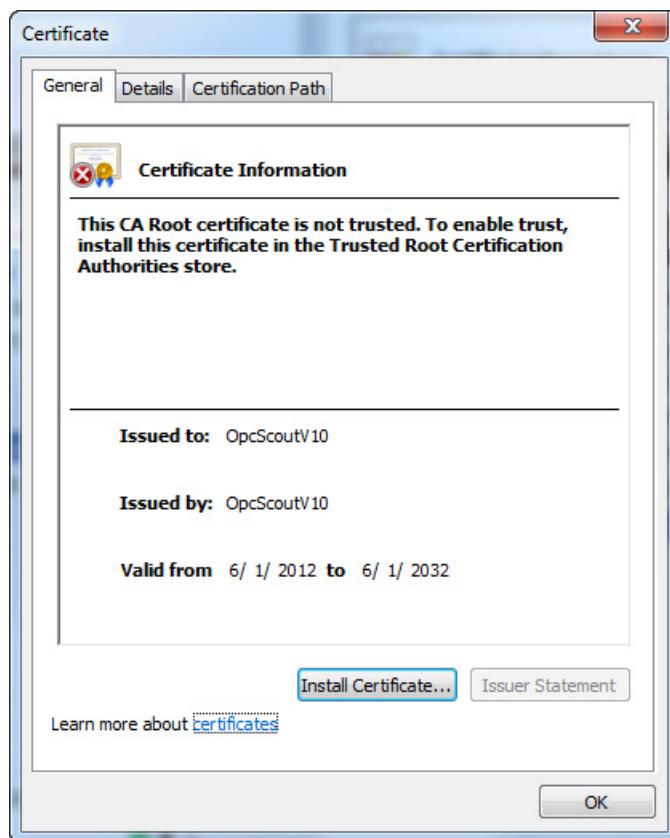
Follow the steps below if you want to view an OPC UA certificate:

1. Go to "SIMATIC NET Configuration" > "OPC settings" > "OPC UA certificates" in the tree structure.



2. To view an OPC UA certificate, right-click on an entry in the list. In the menu that is then displayed, select "Show".

Reaction: A dialog appears that displays the properties of the selected certificate.



3. Exit the dialog with "OK".

Note

OPC UA server certificates are displayed in the list with the icon.

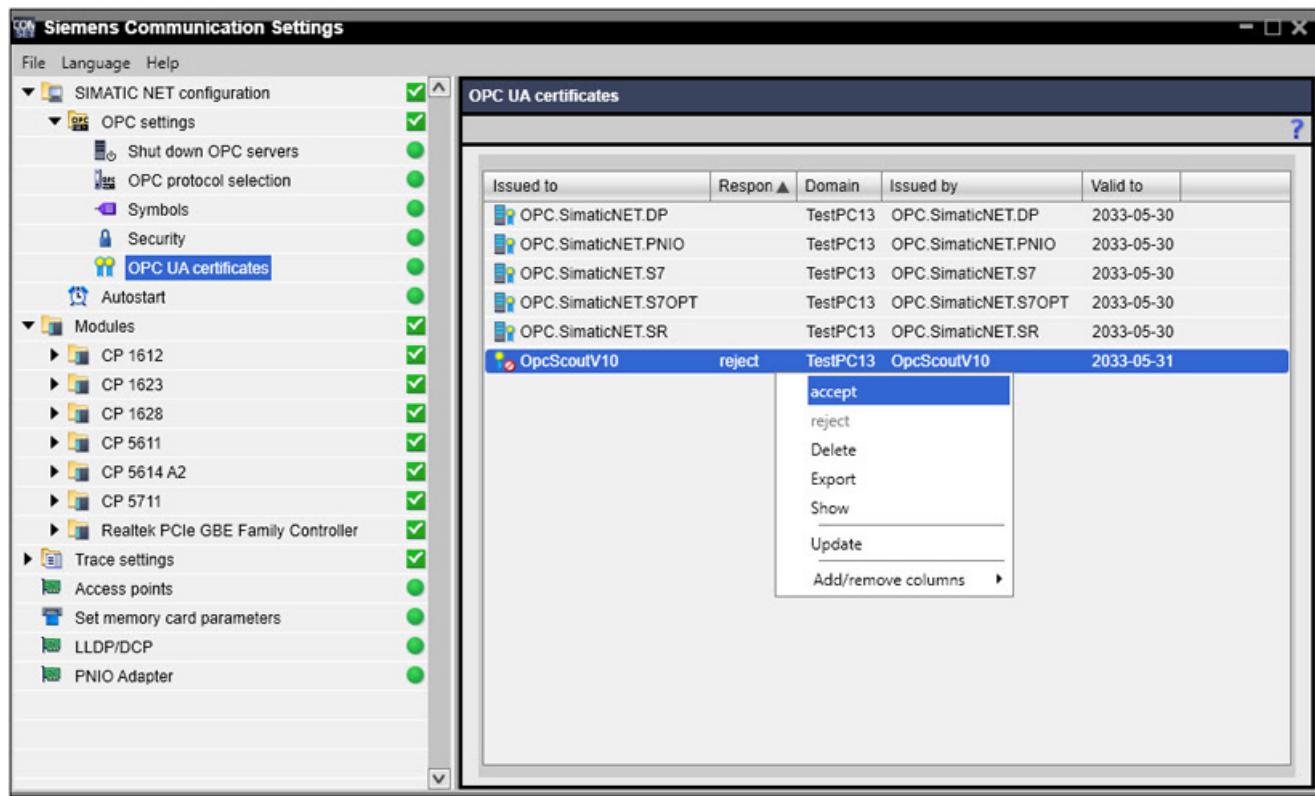
Depending on their current response, OPC UA client certificates are displayed with the icons , , or .

4.5 "Communication Settings" configuration program

Follow the steps below if you want to accept an OPC UA certificate:

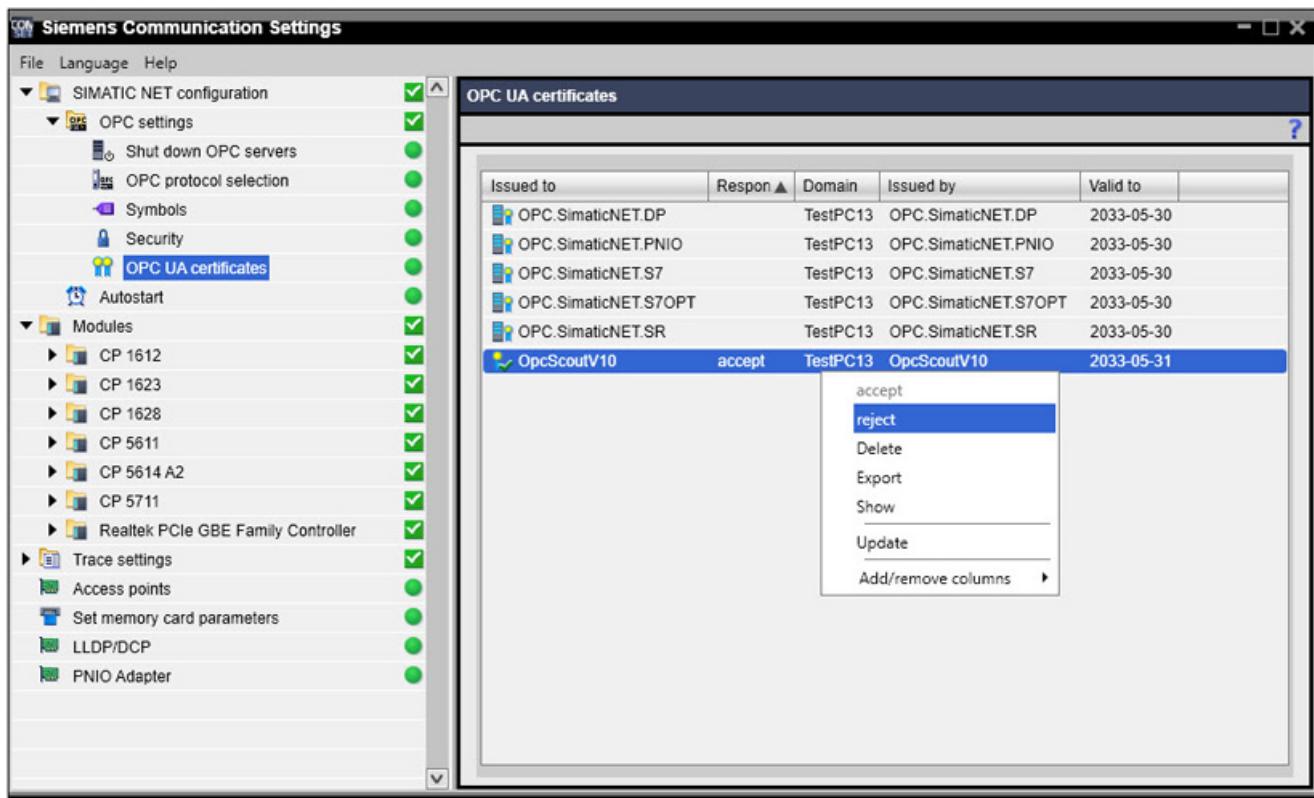
1. Go to "SIMATIC NET Configuration" > "OPC settings" > "OPC UA certificates" in the tree structure.
2. To allow the secure establishment of a connection between an OPC UA client and OPC UA server, right-click on the entry of the OPC UA client certificate in the list. Select "accept" in the displayed menu.

Reaction: "accept" is now shown in the "Response" column for the certificate and the icon appears as .



Follow the steps below if you want to reject an OPC UA certificate:

1. Go to "SIMATIC NET Configuration" > "OPC settings" > "OPC UA certificates" in the tree structure.
 2. To reject the secure establishment of a connection between an OPC UA client and OPC UA server, right-click on the entry of the OPC UA client certificate in the list. Select "reject" in the displayed menu.
- Reaction: "reject" is now shown in the "Response" column for the certificate and the icon appears as .



Note

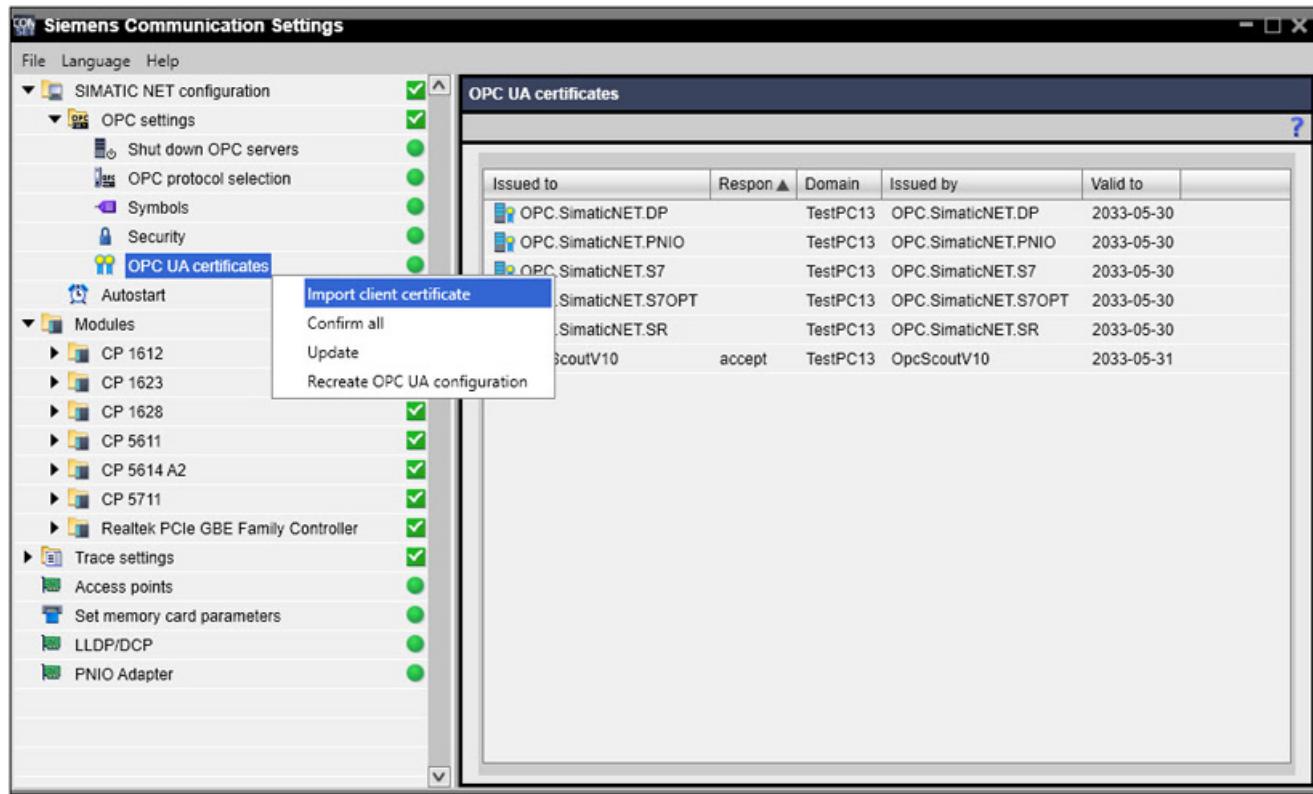
If an OPC UA server receives a connection establishment request from a client whose certificate it does not yet know, it initially rejects the establishment request.

The received OPC UA client certificate is then displayed with the "reject (new)" response and the icon appears as .

4.5 "Communication Settings" configuration program

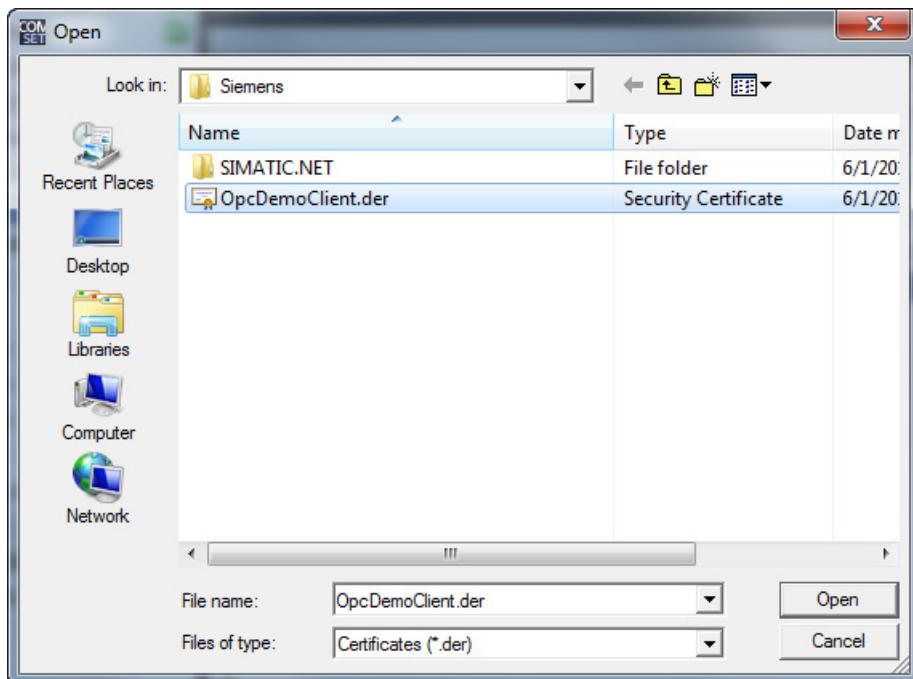
Follow the steps below if you want to import an OPC UA certificate:

1. Go to "SIMATIC NET Configuration" > "OPC settings" > "OPC UA certificates" in the tree structure.
2. Right-click in the list. In the menu that is displayed, select "Import client certificate".



Reaction: The following dialog box opens:

4.5 "Communication Settings" configuration program



3. Go to the ".der file". Confirm your selection by clicking the "Open" button. The selected certificate is now imported as an OPC UA client certificate to be accepted.

Note

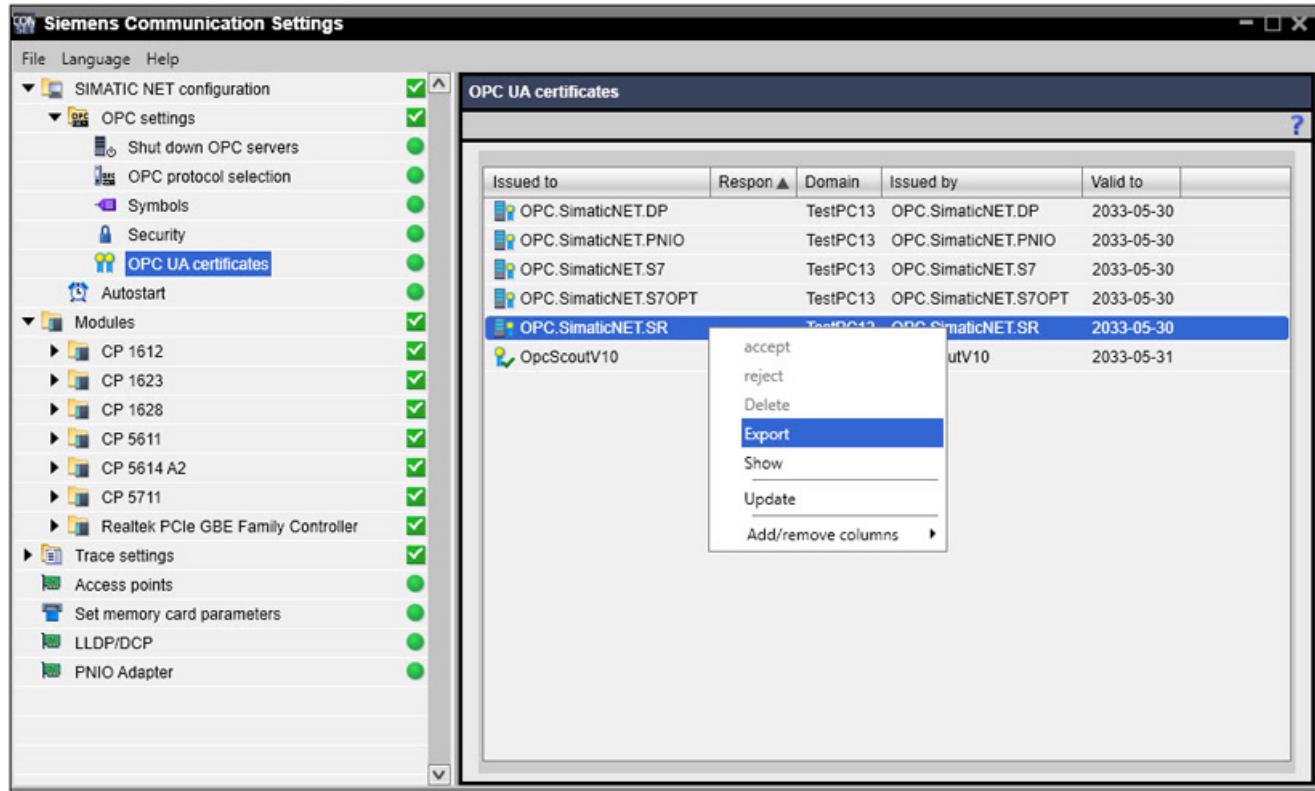
In the Communication Settings, the certificate is displayed not with the file name but rather with the name for which it was issued.

By importing an OPC UA client certificate you can familiarize the OPC UA server with the client certificate even before the first connection establishment by the OPC UA client.

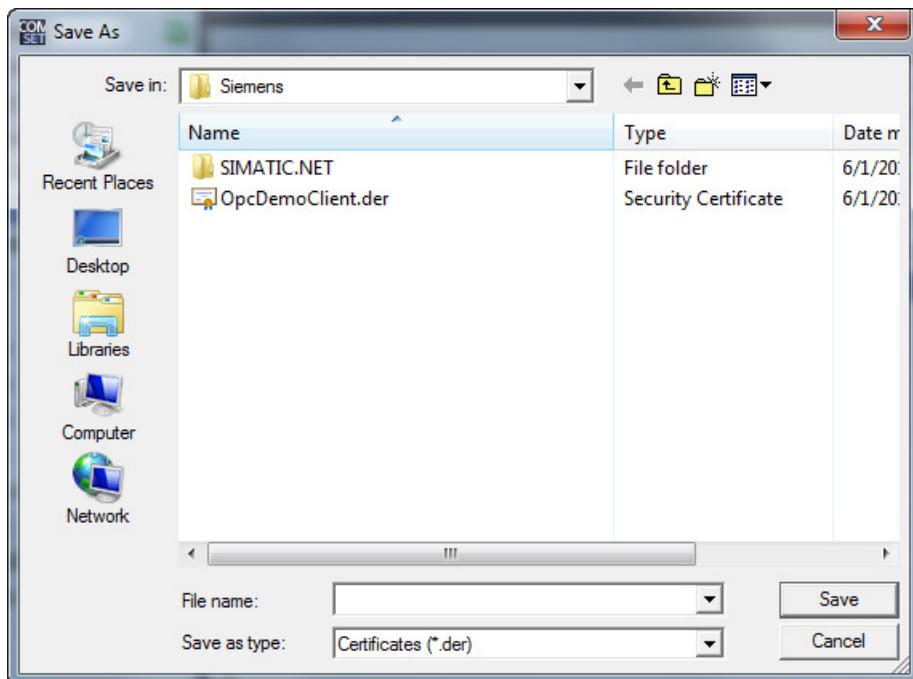
4.5 "Communication Settings" configuration program

Follow the steps below if you want to export an OPC UA certificate:

1. Go to "SIMATIC NET Configuration" > "OPC settings" > "OPC UA certificates" in the tree structure.
2. In the list, right-click on the entry of the OPC UA certificate you want to export. Select "Export" in the displayed menu.



Reaction: The following dialog box opens:



3. Select a folder and the name of a file to which you want to export the certificate. Confirm your selection by clicking the "Save" button. The OPC UA certificate is exported to the specified file.

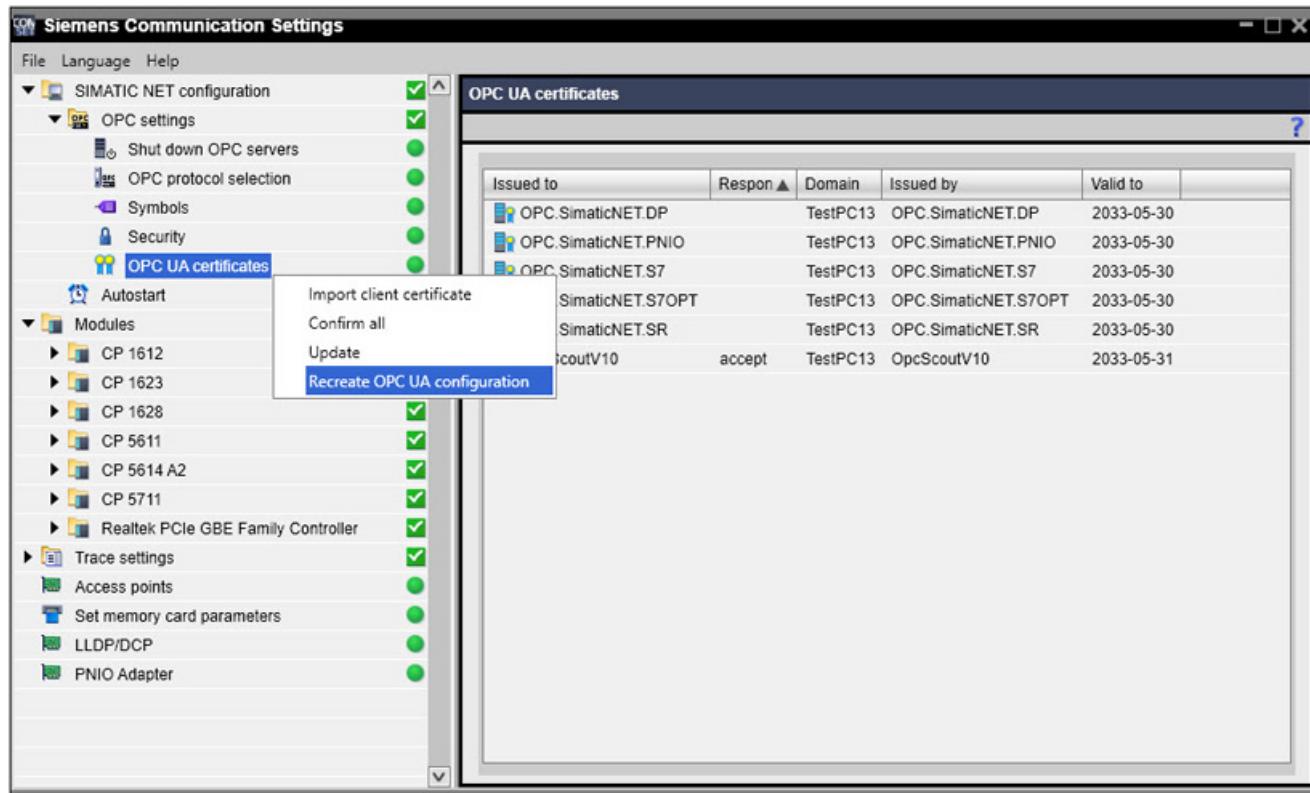
Note

You can import exported OPC UA certificates of an OPC UA server into the certificate management of your OPC UA client.

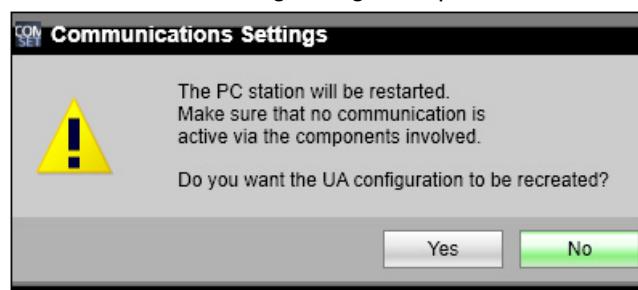
4.5 "Communication Settings" configuration program

Follow the steps below if you want to recreate an OPC UA configuration:

1. Go to "SIMATIC NET Configuration" > "OPC settings" > "OPC UA certificates" in the tree structure.
2. To recreate an OPC UA configuration, right-click in the list. In the menu that is then displayed, select "Recreate OPC UA configuration".



Reaction: The following dialog box opens:



3. To recreate the OPC UA configuration, select "Yes". All the OPC UA server certificates are also recreated. An OPC UA client must therefore accept the certificates of the OPC UA servers again if it wants to establish a secure OPC UA connection to one of the OPC UA servers.

Note

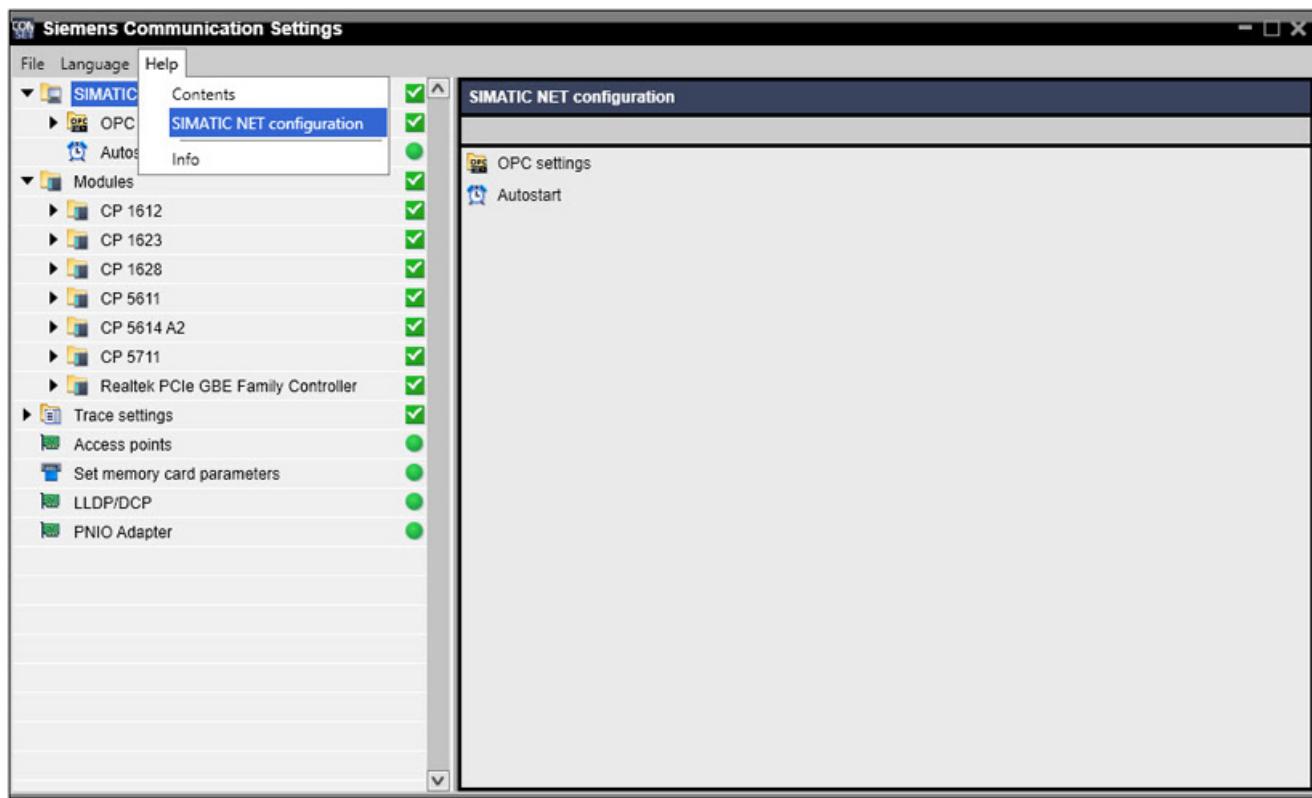
Recreating the OPC UA configuration is absolutely necessary if you have changed the computer name since this is included in the data of the OPC UA certificates.

4.5.2.11 Configuration examples

You can display examples of how specific use cases can be configured directly via the user interface.

Follow the steps below to display the configuration examples:

1. Select the entry "SIMATIC NET configuration" in the help menu.



In the left-hand part of the window that opens, you can select the procedures manual for your use case by clicking with the mouse. This is then displayed in the right-hand part of the window.

4.5.3 Editing the configuration

Overview

Among other things, you have the following configuration options available:

- Change the mode of the module and set the index
- Set the Industrial Ethernet network parameters for the CP 1613
- Set the Industrial Ethernet station addresses for Hardnet Ethernet modules
- Set the PROFIBUS station addresses and network parameters

- Set the PROFIBUS station addresses and network parameters for the "AUTO" and "MPI" profiles
- Set the IE PG access for SOFTNET IE modules
- Set parameters for the memory card
- Set the LLDP/DCP protocol
- Set the PNIO adapter
- Assign the application access points to the individual modules
- Set the PROFIBUS DP slave mode
- Set and edit the COML S7 connection lists

These options are described in the following sections.

4.5.3.1 General information on the configuration

Update Devices

With "File > Update Devices", you have the option of updating the module list, for example after a module has been enabled, disabled, installed or uninstalled.

Update

With "File > Update", you have the option of updating the content of a properties window. Some modifications, such as addresses are updated automatically.

Copying or deleting the interface parameter assignment of a module

With this function, you can copy or delete an interface parameter assignment of a module. Only copied interface parameter assignments can be deleted.

Note

This function is supported only by PROFIBUS and MPI profiles of the SOFTNET PROFIBUS CPs.

Copy Parameter Assignment of Interface

1. Select the interface parameter assignment to be copied.
2. Click the "Copy Parameter Assignment of Interface" command in the shortcut menu.
3. In the next dialog box "New interface parameter assignment" enter a unique name and then click "OK".

Note

In the "Description" input box, you can add a description of the new interface parameter assignment to store additional information.

Note

Below the box for the description of the interface parameter assignment, you can see which interface parameter assignment is being used as the source for copying.

Delete Parameter Assignment of Interface

1. Select the interface parameter assignment to be deleted.
2. Click the "Delete Parameter Assignment of Interface" command in the shortcut menu.

4.5.3.2 COML S7

General

Every module in the "Communication Settings" configuration program is assigned the "COML S7" program (COML S7" tab). COML S7 is local configuration software for S7 connections for PC communication. With COML S7, you can configure connections to S7 CPUs or PCs that are configured only at one end. With these connections, no additional connection configuration needs to be loaded on the partner station.

The COML S7 connections are stored in the COML S7 connection lists. You will find more detailed information on COML S7 and the COML S7 connection lists in the online help of COML S7.

Settings for COML S7 connection lists

The following basic settings are possible:

- Enable COML S7 connection lists
- Disable COML S7 connection lists
- Export COML S7 connection lists
- Import COML S7 connection lists

Follow the steps below to enable the COML S7 connection lists:

You enable all COML S7 connection lists located in the tree folder under "Modules". You can then operate S7 communication via the created S7 connections.

Note

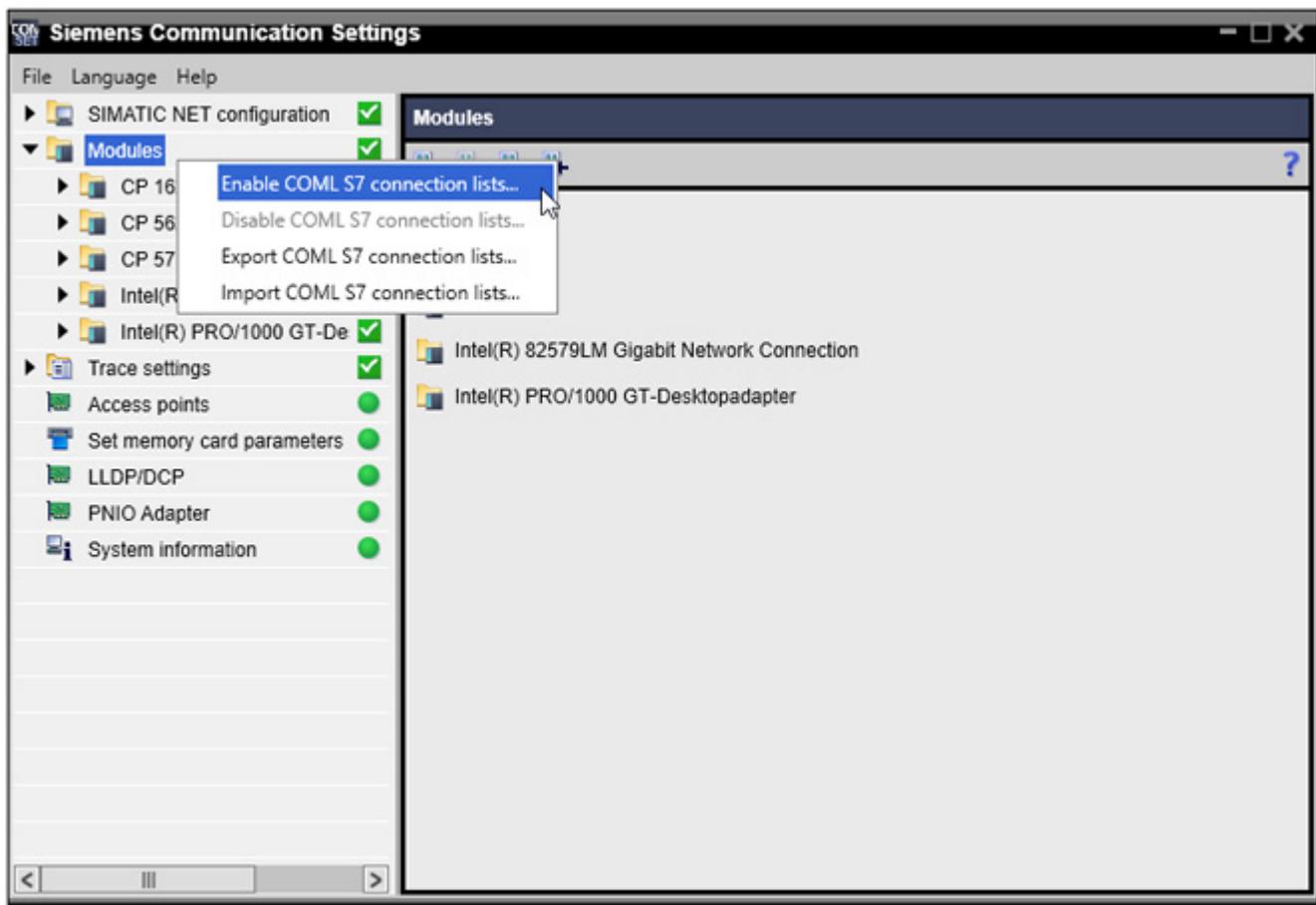
Remember that enabled COML S7 connection lists cannot be modified.

Note

S7 connections can be configured using STEP 7/STEP 7 Professional (TIA Portal) or COML S7.

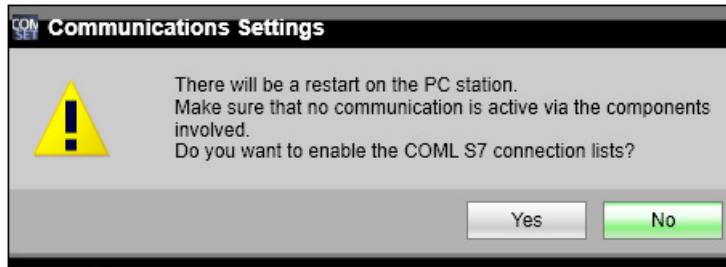
Simultaneous operation of these differently configured S7 connections is not possible. They are interlocked. After enabling the COML S7 connection lists, you cannot create any new components in the "Station Configuration Editor". This means that neither XDB import nor the downloading of a configuration in STEP 7/STEP 7 Professional (TIA Portal) is possible.

1. Open the "Communication Settings" program.
2. Right-click on "Modules" in the navigation area.



3. Select the menu entry "Enable COML S7 connection lists...".

Reaction: The following dialog box opens:



4. Confirm the action by clicking the "Yes" button.

Displaying the created S7 connections in the enabled COML S7 connection lists

You can view the created S7 connections of the COML S7 connection lists with an OPC client program, for example the OPC Scout V10.

Once you have started the OPC Scout V10, follow the steps below:

Display of the COML S7 connections to the partner stations S7-300/400 and S7-PC via the OPC COM interface:

1. Open the directory of the "OPC.SimaticNET" OPC server under "Local COM servers" in the navigation area of OPC Scout V10.
2. Now in the "\S7" folder, you will see all created S7 connections via which the OPC server communicates with the partner stations.

Display of the COML S7 connections to the partner stations S7-300/400 and S7-PC via the OPC UA interface:

1. Open the directory "UA servers" in the navigation area of the OPC Scout V10 and select the OPC UA server "OPC.SimaticNET.S7".
2. Now in the "Objects > S7" folder, you will see all created S7 connections via which the OPC UA server communicates with the partner stations.

Display of the COML S7 connections to the partner stations S7-1200, S7-1500 and S7-1500S (only reachable via the OPC UA interface):

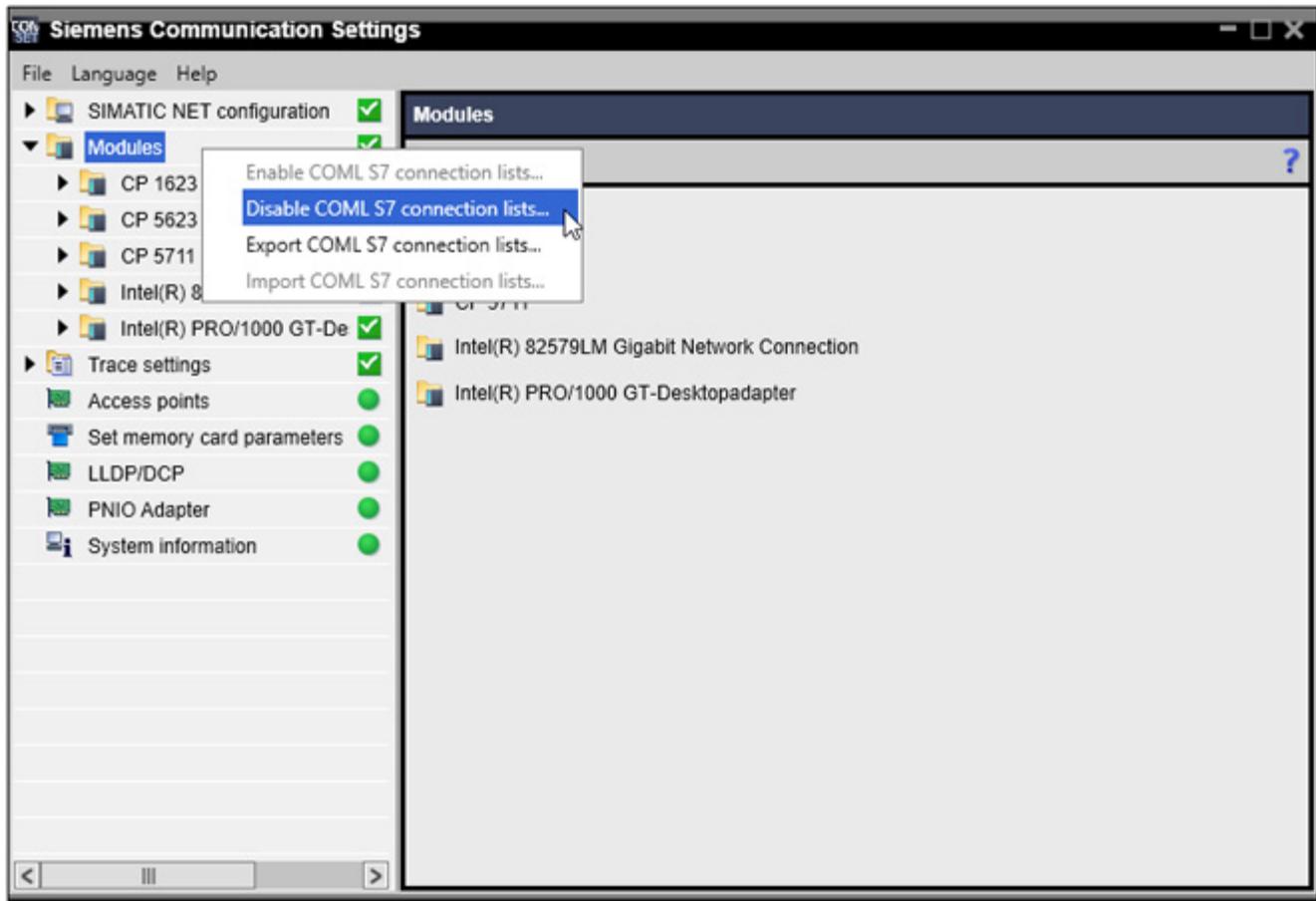
1. Open the directory "UA servers" in the navigation area of the OPC Scout V10 and select the OPC UA server "OPC.SimaticNET.S7OPT".
2. Now in the "Objects > S7OPT:" folder, you will see all created S7 connections via which the OPC UA server communicates with the partner stations.

After an S7 connection has been established to the partner device, you can then read, write or monitor the process variables with the OPC Scout V10.

Follow the steps below to disable the COML S7 connection lists:

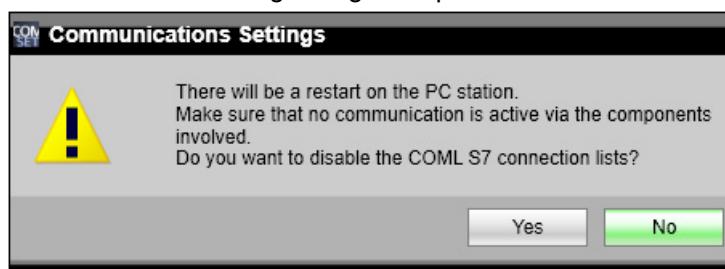
You disable all COML S7 connection lists located in the tree folder under "Modules". Before disabling, you should end existing S7 communication. After they have been disabled, you can once again make changes to the COML S7 connection lists.

1. Open the "Communication Settings" program.
2. Right-click on "Modules" in the navigation area.



3. Select the menu entry "Disable COML S7 connection lists...".

Reaction: The following dialog box opens:



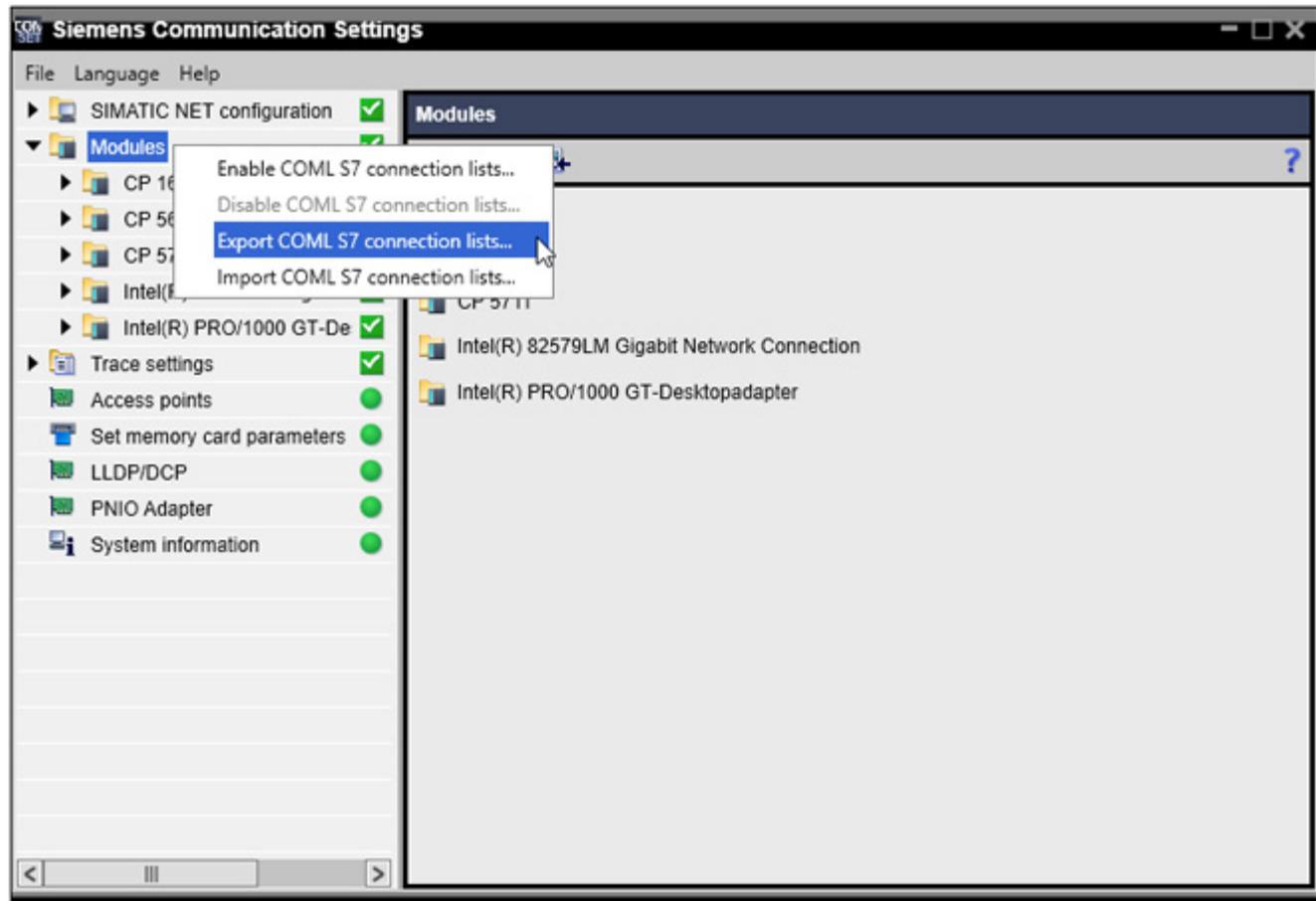
4. Confirm the action by clicking the "Yes" button.

4.5 "Communication Settings" configuration program

Follow the steps below to export the COML S7 connection lists:

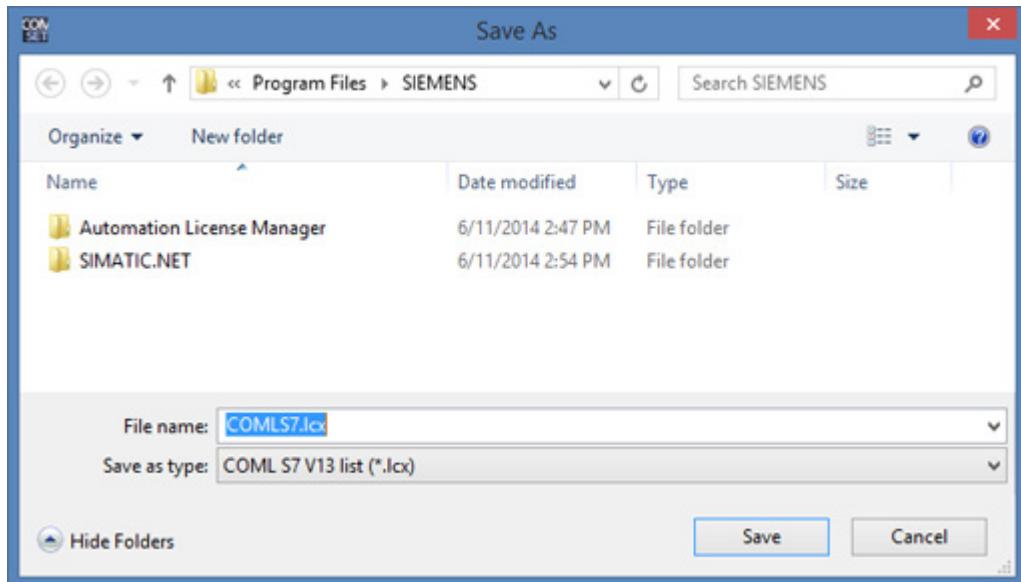
You export all COML S7 connection lists located in the tree folder under "Modules" to a backup copy with the file extension ".lcx" or ".lcc". The export function is used to back up all COML S7 connection lists on this PC. Subsequent modification of the backup copy is not allowed.

1. Open the "Communication Settings" program.
2. Right-click on "Modules" in the navigation area.



3. Select the menu entry "Export COML S7 connection lists...".

Reaction: The following dialog box opens:



4. In this dialog box, you select the storage location and the required file format (.lcx or .lcc) for the backup copy. Click "Save" to complete the export.

Note

Note on the selection of the file format

The preferred file format for exporting the COML S7 connection lists is ".lcx". This format contains the configuration of the earlier and newer generation of S7 CPUs (S7-300/400 or S7-1200, S7-1500, S7-1500S).

The ".lcc" file format only contains the configuration of the earlier generation of S7 CPUs (S7-300/400). This guarantees compatibility with older versions of "Communication settings" that only support the ".lcc" format.

Note

Note on password protected S7 connections

In COML S7 it is possible to configure S7 connections to partner stations protected by a password (S7-1200, S7-1500, S7-1500S).

Note that when exporting the COML S7 connection lists, these access passwords are not stored for reasons of data security.

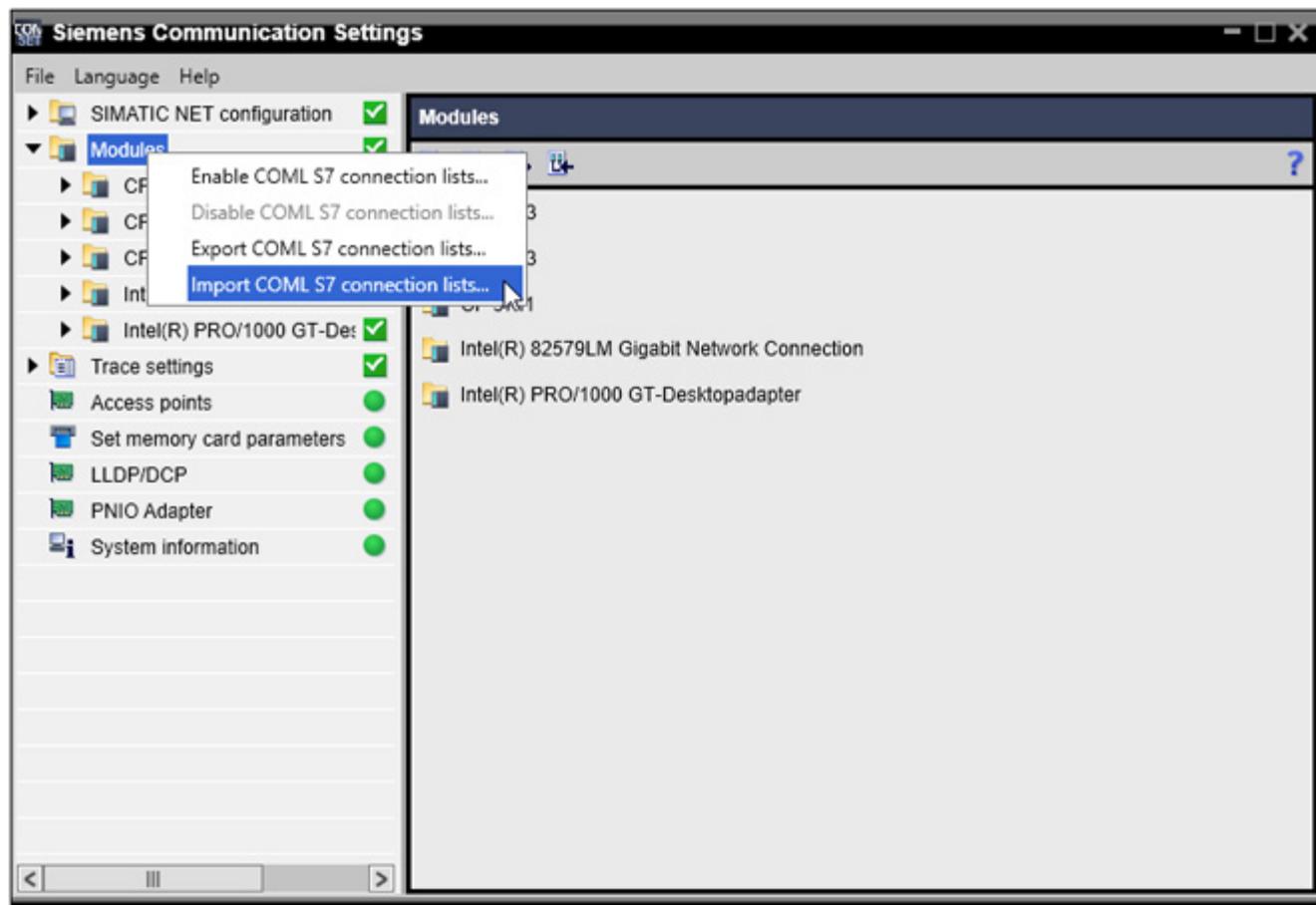
4.5 "Communication Settings" configuration program

Follow the steps below to import the COML S7 connection lists:

You import a backup copy with the file extension ".lcx" or ".lcc" that you exported earlier. The COML S7 connection lists to be imported are automatically assigned to the relevant modules and existing COML S7 connection lists are deleted.

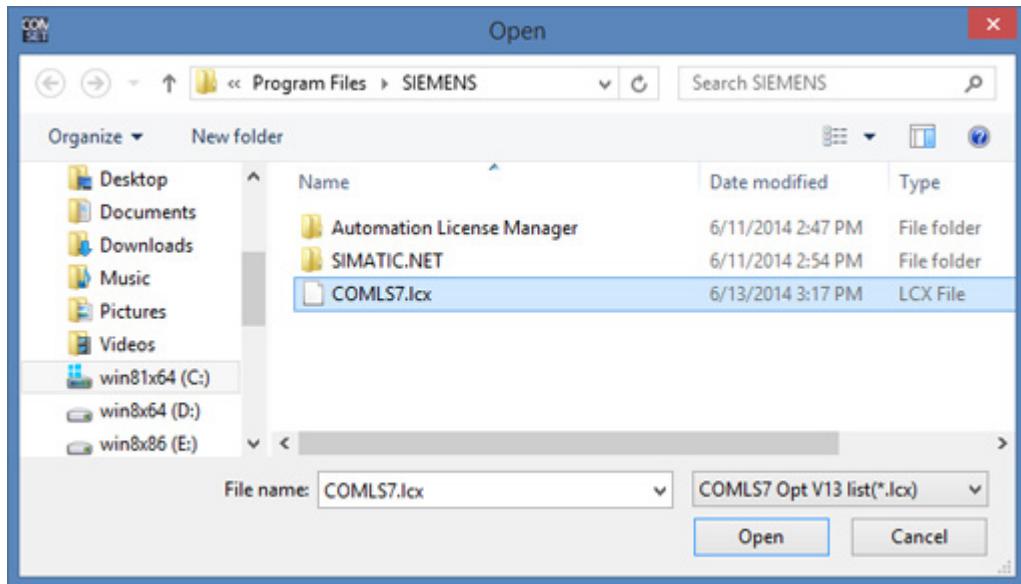
Importing is only possible if the COML S7 connection lists have not yet been enabled.

1. Open the "Communication Settings" program.
2. Right-click on "Modules" in the navigation area.



3. Select the menu entry "Import COML S7 connection lists...".

Reaction: The following dialog box opens:



4. Go to the "-lcx" or ".lcc file" and confirm the backup copy by clicking the "Open" button. The COML S7 connection lists are now imported into the "Communication Settings" configuration program.

Note

If a COML S7 connection list contains one or more S7 connections to partner stations that are protected by an access password, the following message appears:

"You have imported one or more password protected connections. These must be enabled by entering the password. Follow these steps to enable a password protected connection:

1. Under "Modules", select the CP with the protected connections.
2. There, open the COML S7 program.
3. Select the password protected connection.
4. Enter the password in the "OPC" tab.
5. Click the "Apply" button.

This message means that after importing the COML S7 connection list you need to enter the access password again for the corresponding S7 connections to enable access protection. If you do not enter a password, this connection is configured without access protection.

4.5.3.3 **Changing the mode of a module**

When you first commission a module (initial configuration), the mode is specified by using the "Station Configuration Editor".

In the following situations, it may be useful to change the operating mode of the module:

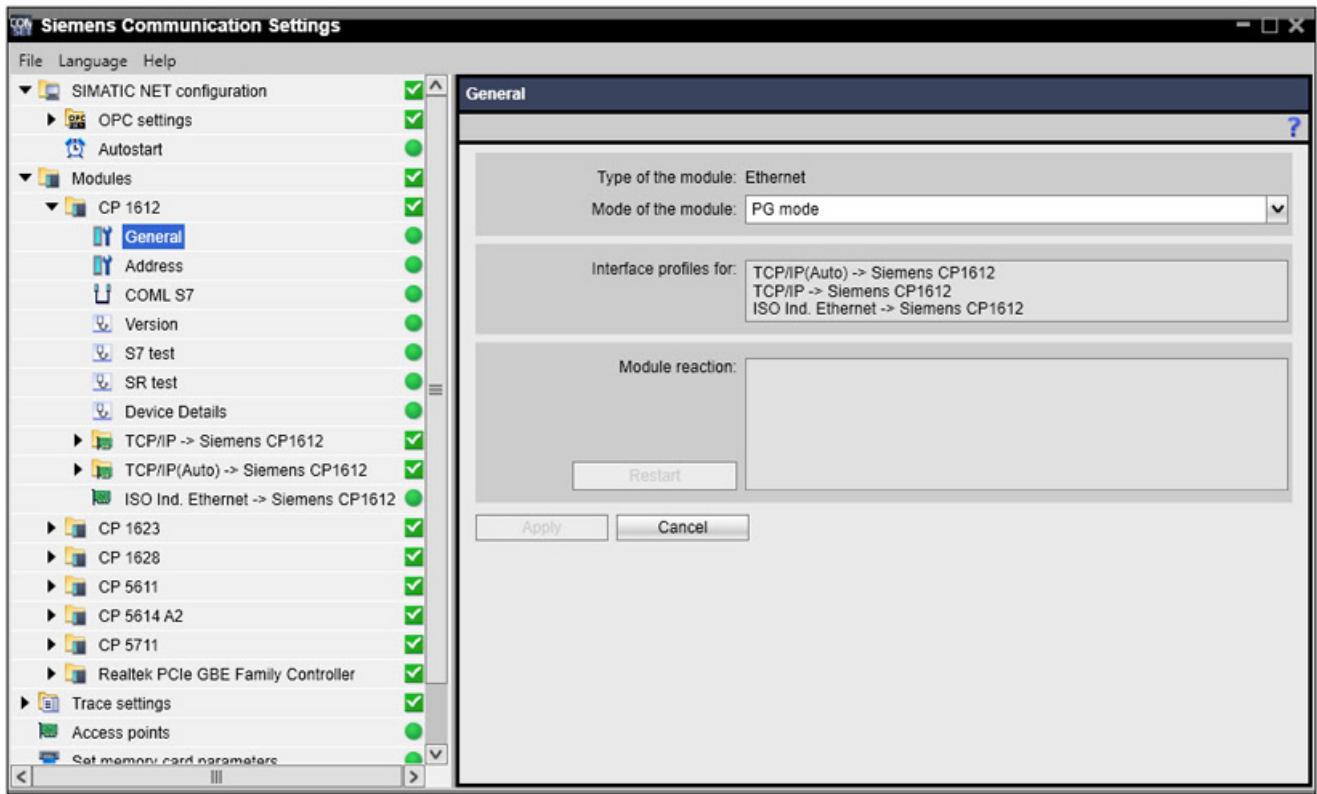
- If you want to use the module for other purposes
- If the bus parameters of the network were changed and you want to adapt the module to these parameters

Follow the steps below if you want to change the operating mode of a module:

1. Open the "Modules" folder in the navigation area.
2. Select the required module and click on the "General" property object.
3. Select the mode you want to use for the module:
 - Configured mode:
The parameters for the module are set in the project engineering.
 - PG mode
The parameters for the module are set in the "Set PG/PC Interface" or "Communication Settings" program.

4.5 "Communication Settings" configuration program

4. If you have selected "configured mode", set the index so that it matches the index in the configuration. Use the value from the project engineering configuration if this already exists. Otherwise, use the value selected here when you create the project engineering. If you changed from another mode to "configured mode", you can also set the index. We recommend that you use the default.



5. Click the "Apply" button to activate the values you have set.

4.5.3.4 Displaying and setting the Industrial Ethernet network parameters for a CP 1613

For the CP 1613 Industrial Ethernet module, the current settings for the following functions are displayed and can be changed:

- Duplex mode (half duplex, full duplex, automatic)
- Medium type (AUI, TP, automatic)
- Transmission rate (10 Mbps, 100 Mbps, automatic)

Three sets of option buttons are available with which the user can select the duplex mode (half duplex, full duplex, automatic), the type of transmission medium (AUI, TP, automatic) and the transmission rate (10 Mbps, 100 Mbps, automatic). The default for all boxes is "automatic". After changing the defaults, you are requested to perform a restart.

Note

If you select AUI as the medium type, you can no longer change the options for the transmission rate and duplex mode. In this case, 10 Mbps and half duplex are set. If, on the other hand, 100 Mbps or full duplex are selected, AUI can no longer be selected as the transmission medium.

Current setting

Transmission parameters (current setting)

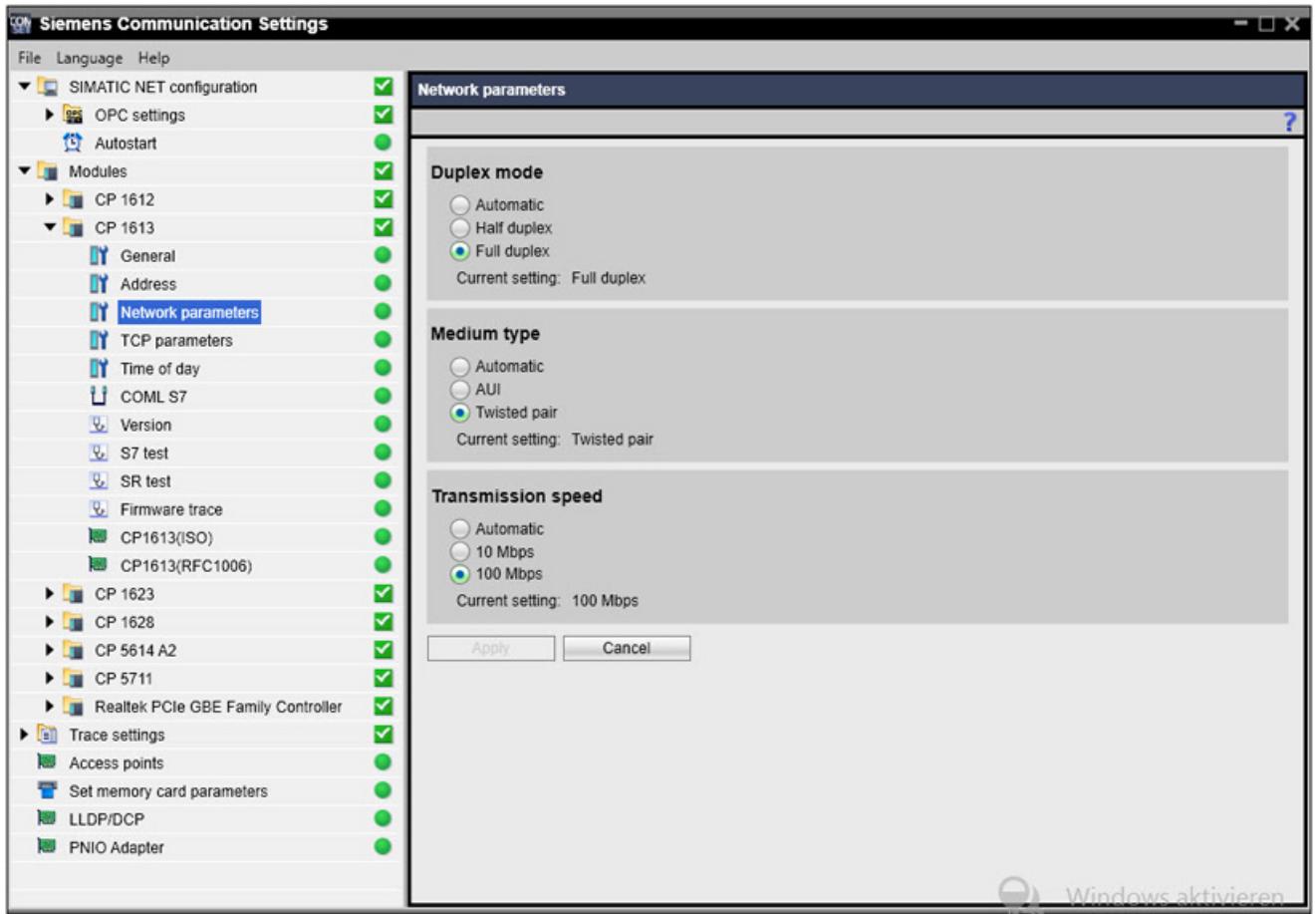
After restarting the CP 1613, the current transfer parameters are shown in the relevant boxes. As long as no valid link to the partner is detected, the output box displays "unknown".

Follow the steps below if you want to display and set the Industrial Ethernet network parameters of the CP 1613:

1. Open the "Modules" folder in the navigation area.
2. Select the Ethernet module "CP 1613" and click the "Network Parameters" property object.

4.5 "Communication Settings" configuration program

3. If you want to change the network parameters, select the required check box for each parameter. The default for all parameters is "Automatic".
4. Click the "Apply" button to activate the data you have set. You will see a message that the module needs to be restarted before the new values take effect.



4.5.3.5 Setting the Industrial Ethernet station addresses

Note

The modules for SOFTNET Industrial Ethernet are managed by the Windows operating system. This means that the station addresses of these modules must be set with the standard mechanisms of Windows.

Follow the steps below if you want to set the Industrial Ethernet station addresses of the CP 1613, CP 1623 or CP 1628:

1. Open the "Modules" folder in the navigation area.
2. Select a module of the type "CP 1613", "CP 1623" or "CP 1628" and click on the "Address" property.

3. Depending on the mode set for the module, you can modify or only check the address parameters.

- Configured mode: The parameters are set in the project engineering and cannot be changed.
- PG mode: The parameters can be changed.

If you have selected "PG mode", set the address parameters.

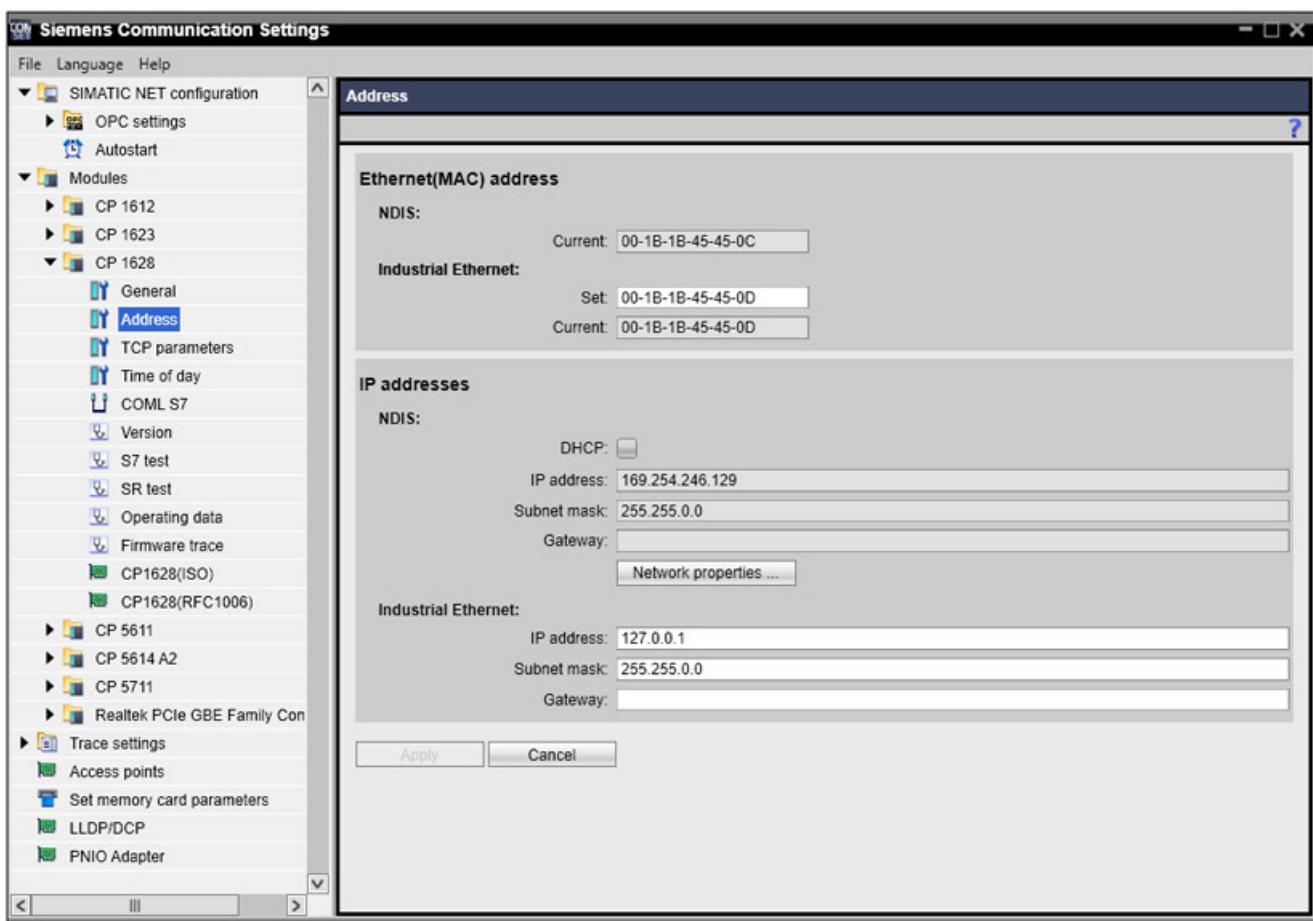
You set the address parameters for NDIS using the Control Panel of Windows that you can call using the "Network properties..." button.

Note

The CP 1613 A2 and CP 1623 have a MAC address that can be set and used for both NDIS and Industrial Ethernet.

In contrast to this, the CP 1628 has separate MAC addresses for NDIS and Industrial Ethernet. Only the Industrial Ethernet address can be set using the configuration.

4. Click the "Apply" button to activate the values you have set. When you apply the values, you will see a message indicating that the module must be restarted before the new values will become effective.



4.5.3.6 Setting the PROFIBUS station address and network parameters in the "PROFIBUS" profile

Follow the steps below:

1. Open the "Modules" folder in the navigation area.
2. Select the relevant PROFIBUS module and the "PROFIBUS" interface profile and click on the "Address" property object.
3. Depending on the mode set for the module, you can modify or only check the address parameters.
 - Configured mode
The parameters are set in the project engineering and cannot be changed.
 - PG mode
The parameters can be changed.

4. If you have selected "PG mode", set the following address parameters:

- "Address:" box:

Specify the required station address for the module.

- "Timeout" drop-down list:

Here, you can set the connection monitoring time for the CP 5611 A2, CP 5621, CP 5612, CP 5622 and CP 5711 modules. Increase the connection timeout, for example, if you have problems with high response times in the network.

- PG/PC is the only master on the bus

Select this option if your PROFIBUS module is the only master on PROFIBUS.

- Check address

For the CP 5611 A2, CP 5621, CP 5612, CP 5622 and CP 5711, this option enables an additional function for avoiding problems on the bus when the configured module is connected to the network. The driver checks whether or not the module address has already been assigned to a different node. The check includes the active and passive nodes. The driver monitors the address assignment in PROFIBUS. If you use this function, establishing the connection to the network takes little longer.

- Network parameters:

Set the same values for profile, highest station address and transmission speed for all modules in a PROFIBUS network. Otherwise trouble-free operation of the PROFIBUS network cannot be guaranteed.

If you have selected the "user-defined" profile, you can adapt the individual bus parameters to the specific structure of your PROFIBUS network.

The following bus parameters are displayed or can be edited with the "user-defined" profile:

Tslot

(wait to receive time)

The slot time specifies the maximum length of time the sender will wait for a response from an addressed partner.

Min Tsdr

(minimum station delay responder)

The minimum station delay responder determines the minimum length of time required by the responding node to process the protocol.

Max Tsdr

(maximum station delay responder)

The maximum station delay responder determines the maximum length of time required by the responding node to process the protocol.

Tset

(setup time)

The setup time is the time that can elapse between receiving a data frame and reacting to it.

Tqui

(quiet time for modulator)

The quiet time for modulator is the time required to switch from send to receive.

GAP factor

(GAP update factor)

4.5 "Communication Settings" configuration program

The Gap factor specifies how many token round trips occur before a new node is included in the token ring.

Retry Limit

(maximum number of call repetitions)

This parameter determines the maximum number of attempts allowed to access a node.

Trdy

(ready-time)

Confirmation or response time.

Tid1

(idle time 1)

The idle time 1 specifies the delay time after a response is received.

Tid2

(idle time 2)

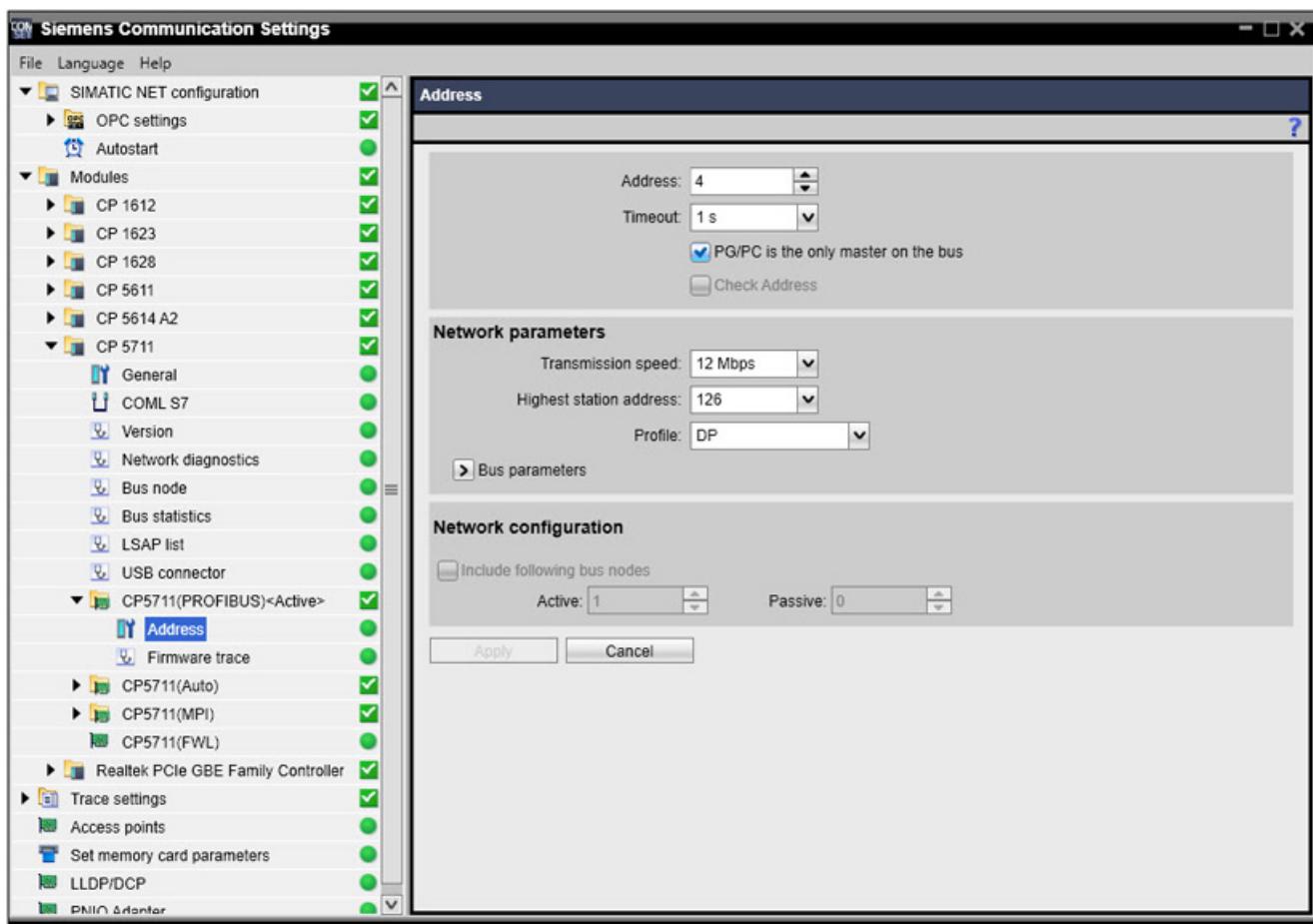
The idle time 2 specifies the delay time after sending a call without response.

Ttr

(target rotation time)

The target rotation time is the maximum time available for one token rotation. During this time, all active nodes (masters) are in possession of the token once. The difference between the target rotation time and the actual rotation time determines the length of time remaining for the masters to send data frames to the slaves.

5. If you enable the "Include following bus nodes" option, you can specify the number of masters or active bus nodes and slaves or passive bus nodes in the network. This can only be selected with the "Universal" or "Standard" bus profiles.
The "Active" and "Passive" input boxes can only be edited if the "Include following bus nodes" option is enabled. If you specify the number of masters or active nodes/slaves or passive nodes on the bus, the bus parameters will be calculated more accurately. If you do not provide any information, bus disruptions are possible.



4.5.3.7 Setting the PROFIBUS station address and network parameters in the "AUTO" profile

Follow the steps below if you want to set PROFIBUS station addresses and network parameters in the "Auto" profile:

1. Open the "Modules" folder in the navigation area.
2. Select the relevant PROFIBUS module with the "AUTO" interface profile and click on the "Address" property object.
3. Depending on the mode set for the module, you can modify or only check the address parameters.
 - Configured mode
The parameters are set in the project engineering and cannot be changed.
 - PG mode
The parameters can be changed.

4. If you have selected "PG mode", set the following address parameters:
 - "Address:" box:
Specify the required station address for the module.
 - "Timeout" drop-down list:
Here, you can set the connection monitoring time for the CP 5611 A2, CP 5621, CP 5612, CP 5622 and CP 5711 modules. Increase the connection timeout, for example, if you have problems with high response times in the network.
 - PG/PC is the only master on the bus
In the "AUTO" profile, this option is permanently disabled.
 - Check address
For the CP 5611 A2, CP 5621, CP 5612, CP 5622 and CP 5711, this option enables an additional function for avoiding problems on the bus when the configured module is connected to the network. The driver checks whether or not the module address has already been assigned to a different node. The check includes the active and passive nodes. The driver monitors the address assignment in PROFIBUS. If you use this function, establishing the connection to the network takes little longer.
5. Click the "Start network detection" button if you want to start the network detection of a module. If a master in the network supports the cyclic distribution of the bus parameters, you can set the network parameters automatically using the "Start network detection" button. As soon as the network parameters are detected, they appear in the "Module reaction" box.
 - If there is a master in the system that sets the bus parameters, all bus parameters are displayed in the "Module reaction" box.
 - If there is a master in the system that does not set any bus parameters, only the transmission speed is displayed in the "Module reaction" box.
 - If there is no master in the system, a message is displayed in the "Module reaction" box.

Bus parameters and value

Depending on the configuration, the following bus parameters are displayed:

Baud rate

Shows the baud rate of the PROFIBUS module in Mbps.

Highest station address

Shows the highest station address (HSA).

Profile

Shows the profile being used by the PROFIBUS module.

Tslot

(wait to receive time)

The slot time specifies the maximum length of time the sender will wait for a response from an addressed partner.

Min Tsdr

(minimum station delay responder)

The minimum station delay responder determines the minimum length of time required by the responding node to process the protocol.

Max Tsdr

(maximum station delay responder)

The maximum station delay responder determines the maximum length of time required by the responding node to process the protocol.

Tset

(setup time)

The setup time is the time that can elapse between receiving a data frame and reacting to it.

Tqui

(quiet time for modulator)

The quiet time for modulator is the time required to switch from send to receive.

GAP factor

(GAP update factor)

The Gap factor specifies how many token round trips occur before a new node is included in the token ring.

Retry Limit

(maximum number of call repetitions)

This parameter determines the maximum number of attempts allowed to access a node.

Trdy

(ready-time)

Confirmation or response time.

Tid1

(idle time 1)

The idle time 1 specifies the delay time after a response is received.

Tid2

(idle time 2)

The idle time 2 specifies the delay time after sending a call without response.

Ttr

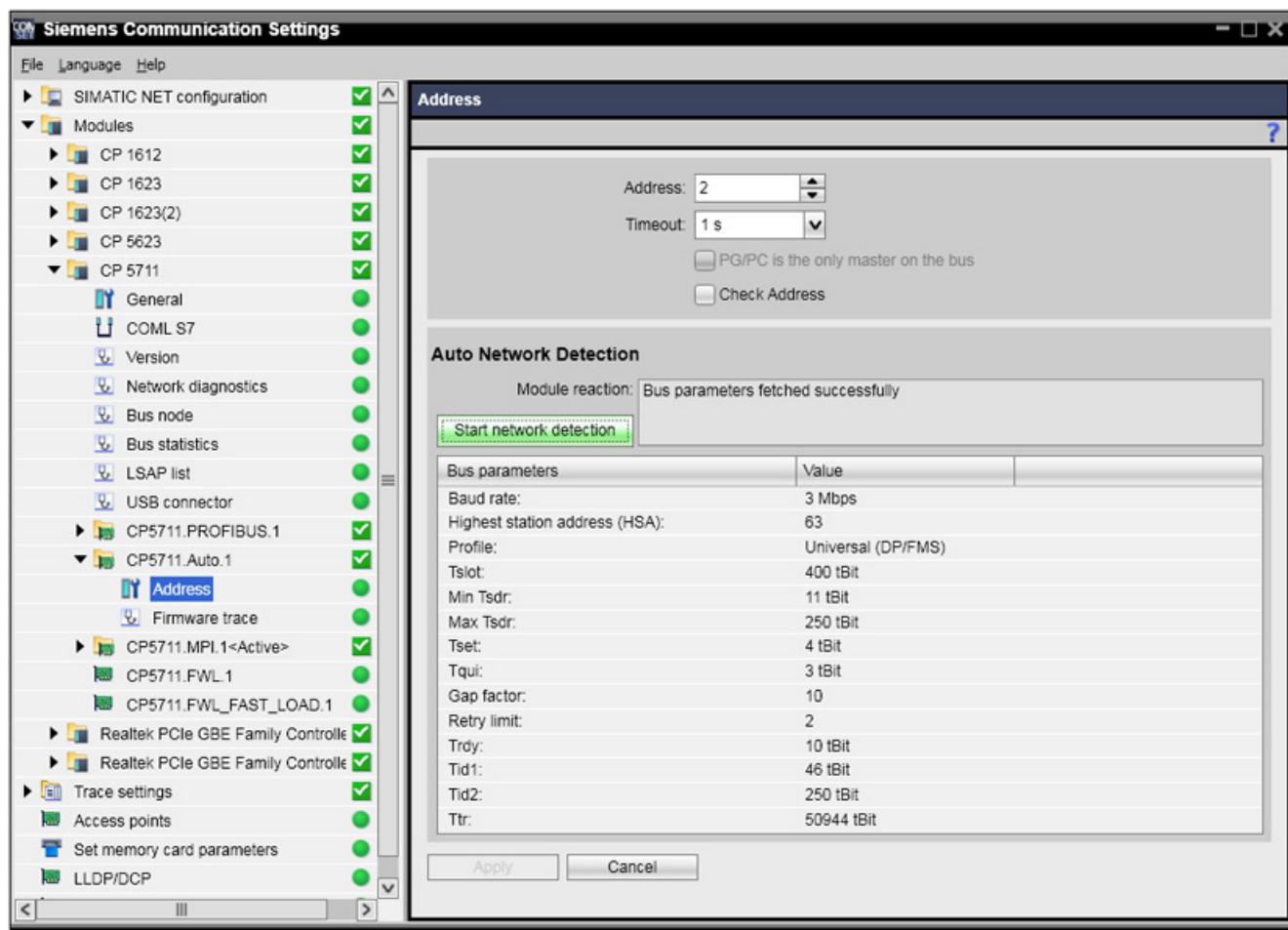
(target rotation time)

The target rotation time is the maximum time available for one token rotation. During this time, all active nodes (masters) are in possession of the token once. The difference between the target rotation time and the actual rotation time determines the length of time remaining for the masters to send data frames to the slaves.

"Value" column

In this column, you can see the values of the bus parameters.

4.5 "Communication Settings" configuration program

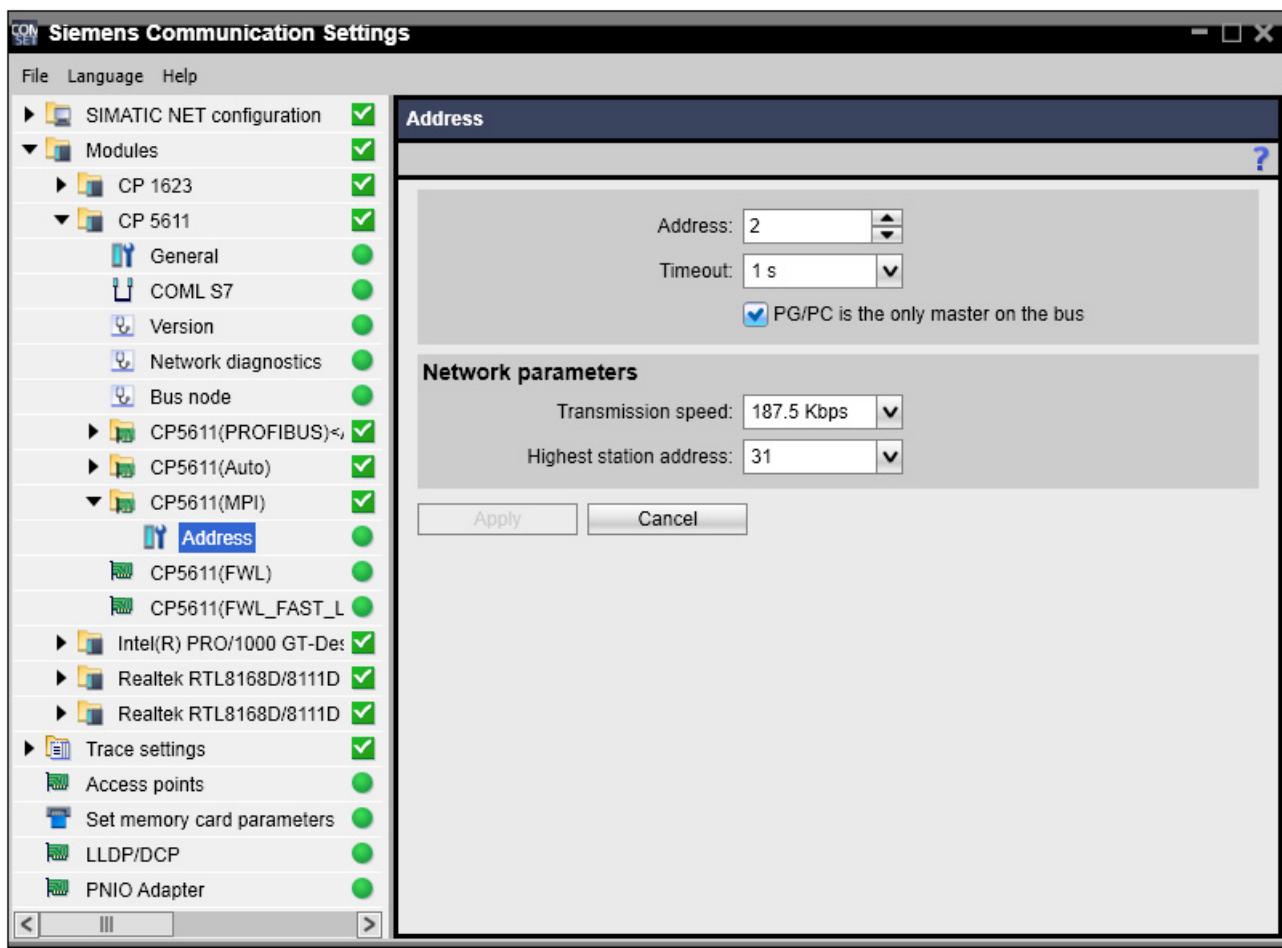


4.5.3.8 Setting the PROFIBUS station address and network parameters in the "MPI" profile

Follow the steps below if you want to set PROFIBUS station addresses and network parameters in the "MPI" profile:

1. Open the "Modules" folder in the navigation area.
2. Select the relevant PROFIBUS module with the "MPI" interface profile and click on the "Address" property object.
3. Depending on the mode set for the module, you can modify or only check the address parameters.
 - Configured mode
The parameters are set in the project engineering and cannot be changed.
 - PG mode
The parameters can be changed.

4. If you have selected "PG mode", set the following address parameters:
 - "Address:" box:
Specify the required station address for the module.
 - "Timeout" drop-down list:
Here, you can set the connection monitoring time for the CP 5611 A2, CP 5621, CP 5612, CP 5622 and CP 5711 modules. Increase the connection timeout, for example, if you have problems with high response times in the network.
5. With the "PG/PC is the only master on the bus" function, you disable an additional function that protects against bus problems when the module is connected to the network.
You should only enable this function if only slaves are connected to the selected module.
6. Set the same values for highest station address and transmission speed for all modules in a PROFIBUS network. Otherwise trouble-free operation of the PROFIBUS network cannot be guaranteed.



4.5.3.9 Set the IE PG access for SOFTNET IE modules

With TCP/IP networks, the address and the subnet mask decide which nodes belong to a subnet. Although many nodes can be connected to a physical network, these can be located in different subnets due to their address and subnet mask. If several subnets are defined, the PG/PC can only reach the nodes located in the same logical subnet as itself. So that you can also reach the other automation nodes, "Communication Settings" provides the option of detecting and adding further IP addresses and subnet masks for the local PG/PC. This means that you can reach all automation nodes on this TCP/IP network with the PG.

Follow the steps below if you want to set an IE PG access for SOFTNET IE modules:

1. Open the "Modules" folder in the navigation area.
2. Select the relevant SOFTNET IE module with the "TCPIP.Auto" profile and click on the "IE PG access" properties object.
3. Enable the "Do not assign IP addresses automatically" option if you do not require automatic address assignment. The IP addresses set up to now will be deleted.
4. Enable the option "Assign IP addresses unique to the project" if you would like further IP addresses to be added for the local PG/PC to allow it to address automation nodes in this TCP/IP network. With the "Delete project-specific IP addresses" button, you can delete existing project-specific IP addresses.

"IP addresses" shows you the IP addresses and subnet masks that were added for the local PG/PC for the specific project. The meaning of the columns is as follows:

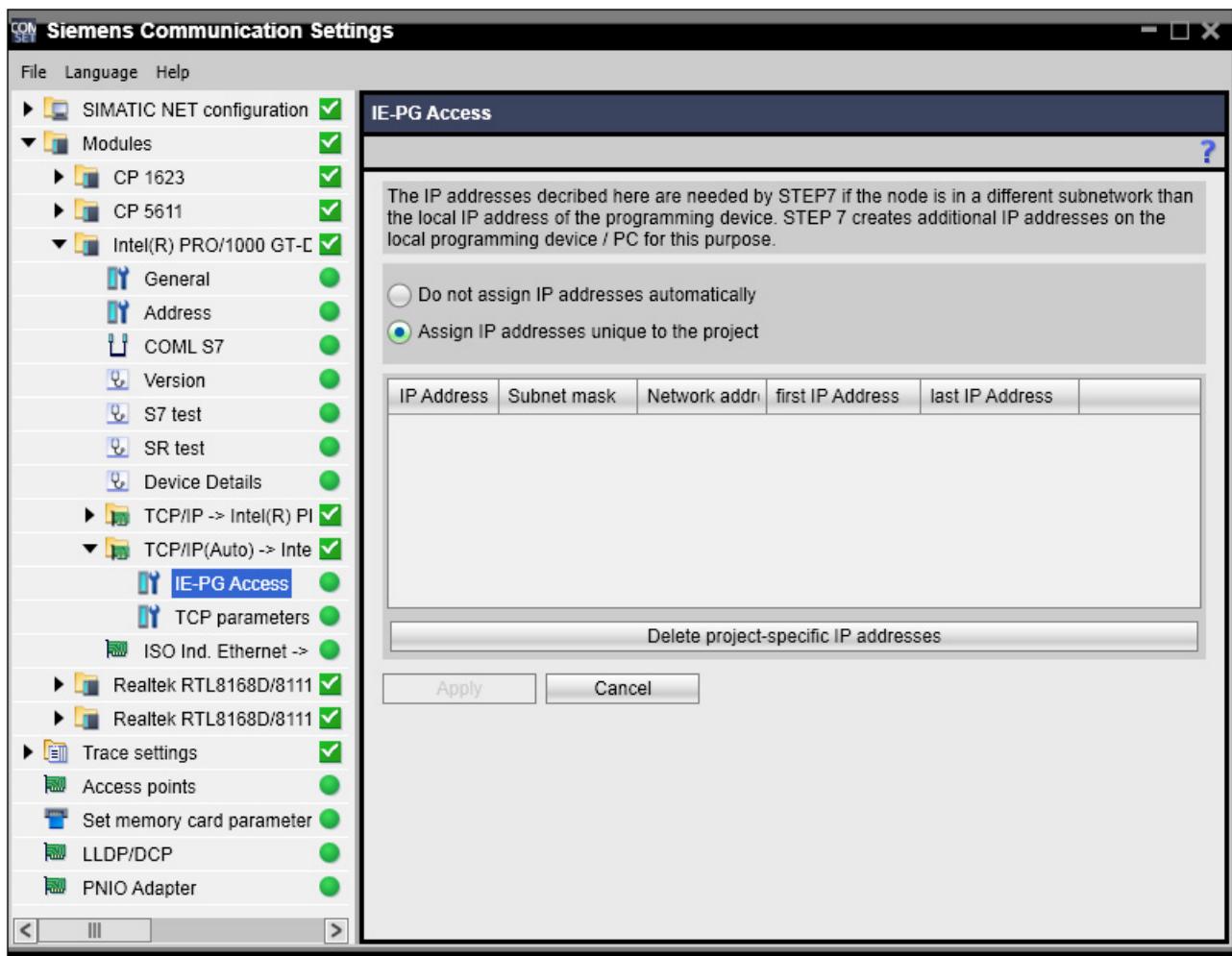
IP address: Here, you see the IP address obtained for access to an automation subnet. Adding IP addresses takes two steps. First, you set the IP address and the subnet mask of the destination node. During connection establishment, the IP address is then added if the subnet could not be reached with the existing IP addresses. In other words, the entry in this column can also be 0.0.0.0 meaning that no connection has yet been established or no free IP address could be found in this subnet.

Subnet mask: The subnet mask for the subnet in which an automation node is located is displayed here.

Network address: The address of the subnet in which an automation node is located is displayed here.

First IP address: Here, you see the IP address starting at which an attempt is made to find a free IP address in this subnet.

Last IP address: Here, you see the IP address up to which an attempt is made to find a free IP address in this subnet.



4.5.3.10 Assigning access points to the individual modules

By assigning an access point to an interface parameter assignment, you specify the access path of an application. This assignment is necessary only for applications that use the C interfaces (for example, SAPI S7, SRLib) and that use the application access point to address a device.

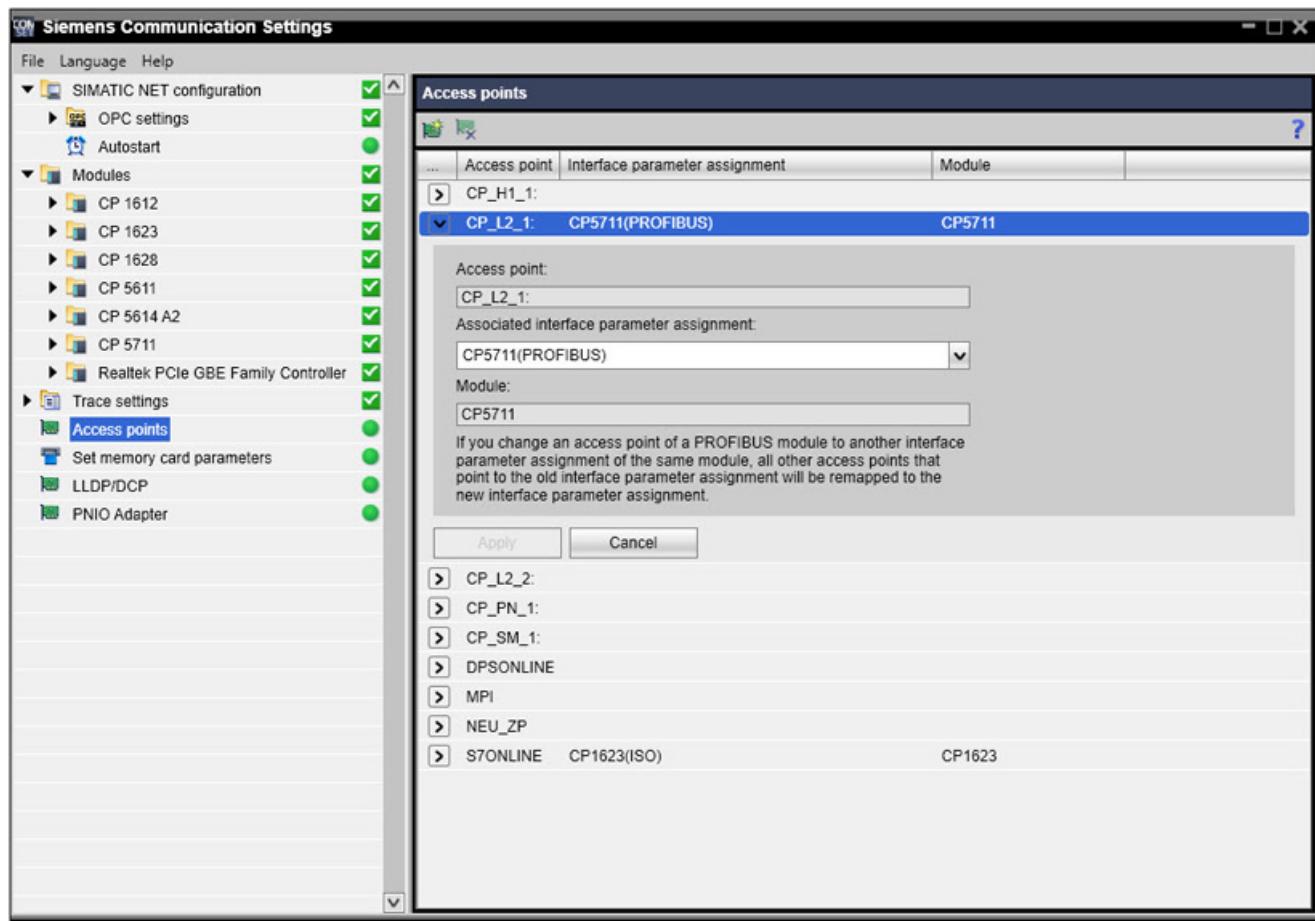
To operate the OPC server and for applications that handle their communication over configured connections, it is not necessary to assign access points.

Follow the steps below if you want to assign an access point of an interface parameter assignment to a module:

1. Open the "Access points" folder in the navigation area.
2. In the right-hand window, click on the arrow symbol of the access point you want to edit.

4.5 "Communication Settings" configuration program

3. Set the interface parameter assignment to be assigned to the access point. If the module is used in "configured mode", the active interface parameter assignment is fixed and cannot be modified.



4. Click the "Apply" button to activate the data you have set.

Note

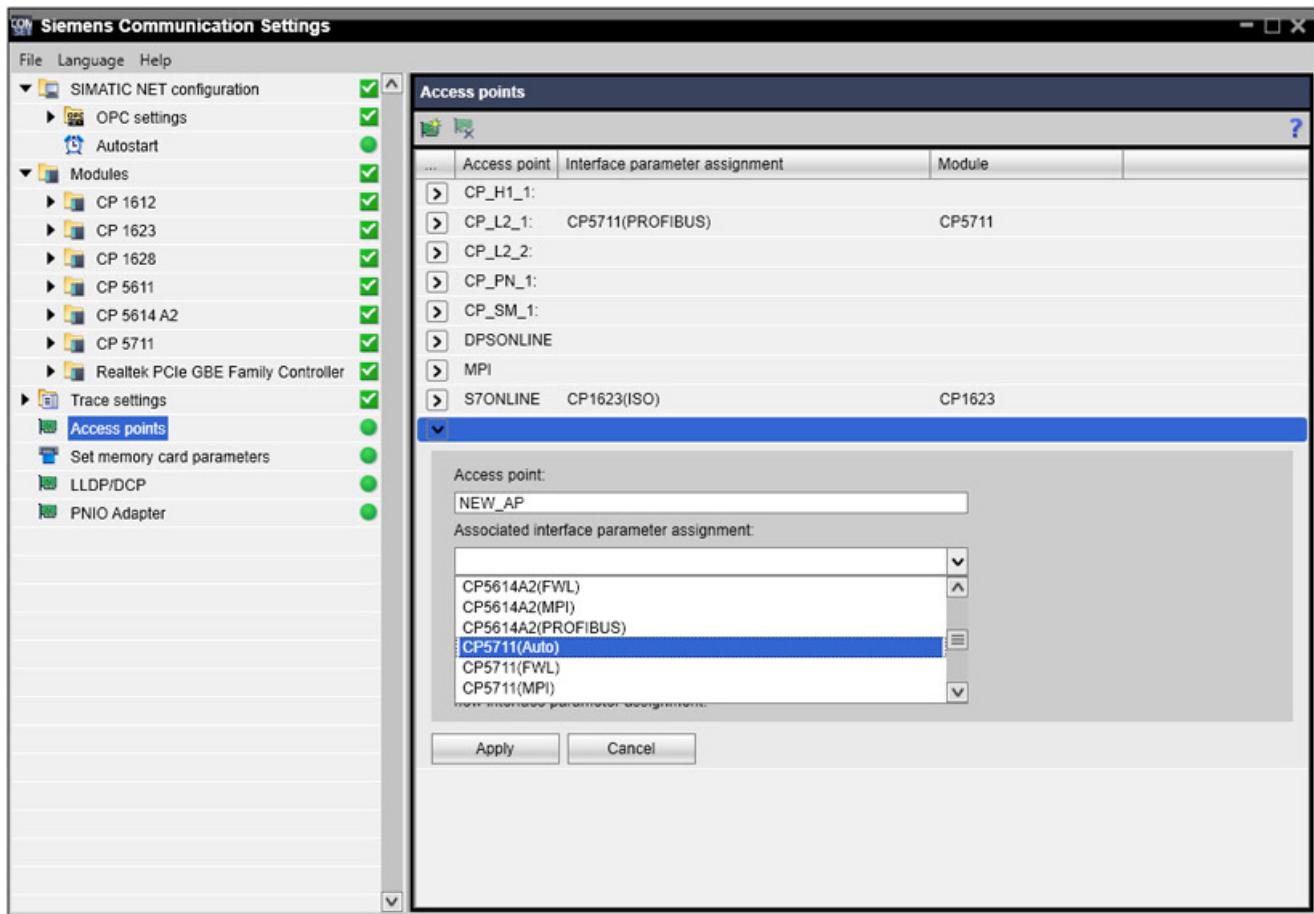
Access points must not be changed during operation.

Note**Important for PROFIBUS modules:**

With PROFIBUS modules, only one interface parameter assignment can be activated at any one time. If you select a different interface parameter assignment from the currently active interface parameter assignment when assigning an access point, this interface parameter assignment is activated and assigned to ALL access points!

Follow the steps below if you want to create a new access point:

1. Open the "Access points" folder in the navigation area.
2. In the right-hand window, right-click and select "New access point" in the displayed menu.
3. Enter a name for the new access point.
4. Set the interface parameter assignment to be assigned to the access point. If the module is used in "configured mode", the active interface parameter assignment is fixed and cannot be modified.

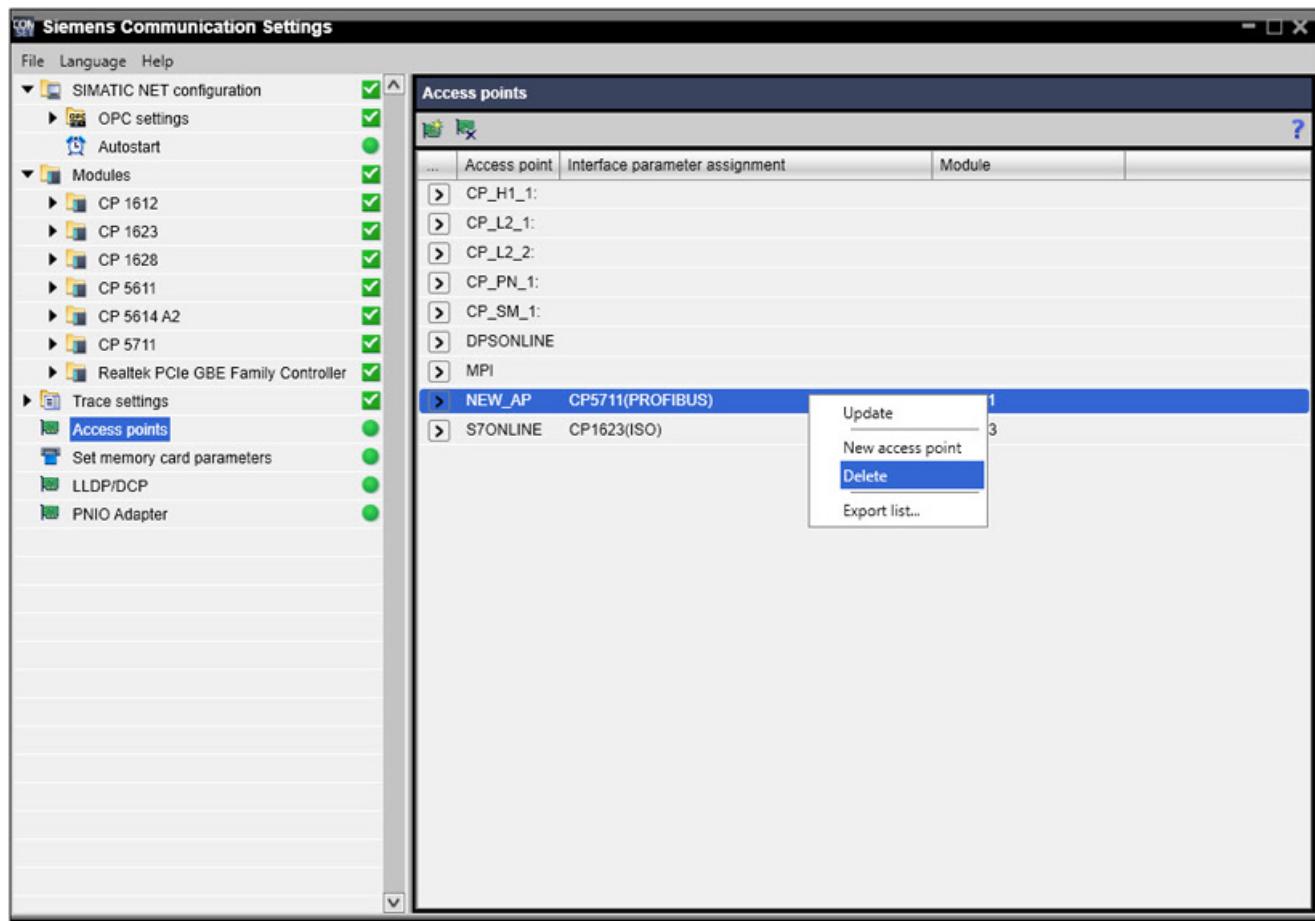


5. Click the "Apply" button to activate the data you have set.

4.5 "Communication Settings" configuration program

Follow the steps below if you want to delete an access point:

1. Open the "Access points" folder in the navigation area.
2. In the right-hand window, right-click on the access point you want to delete and click "Delete" in the displayed menu.



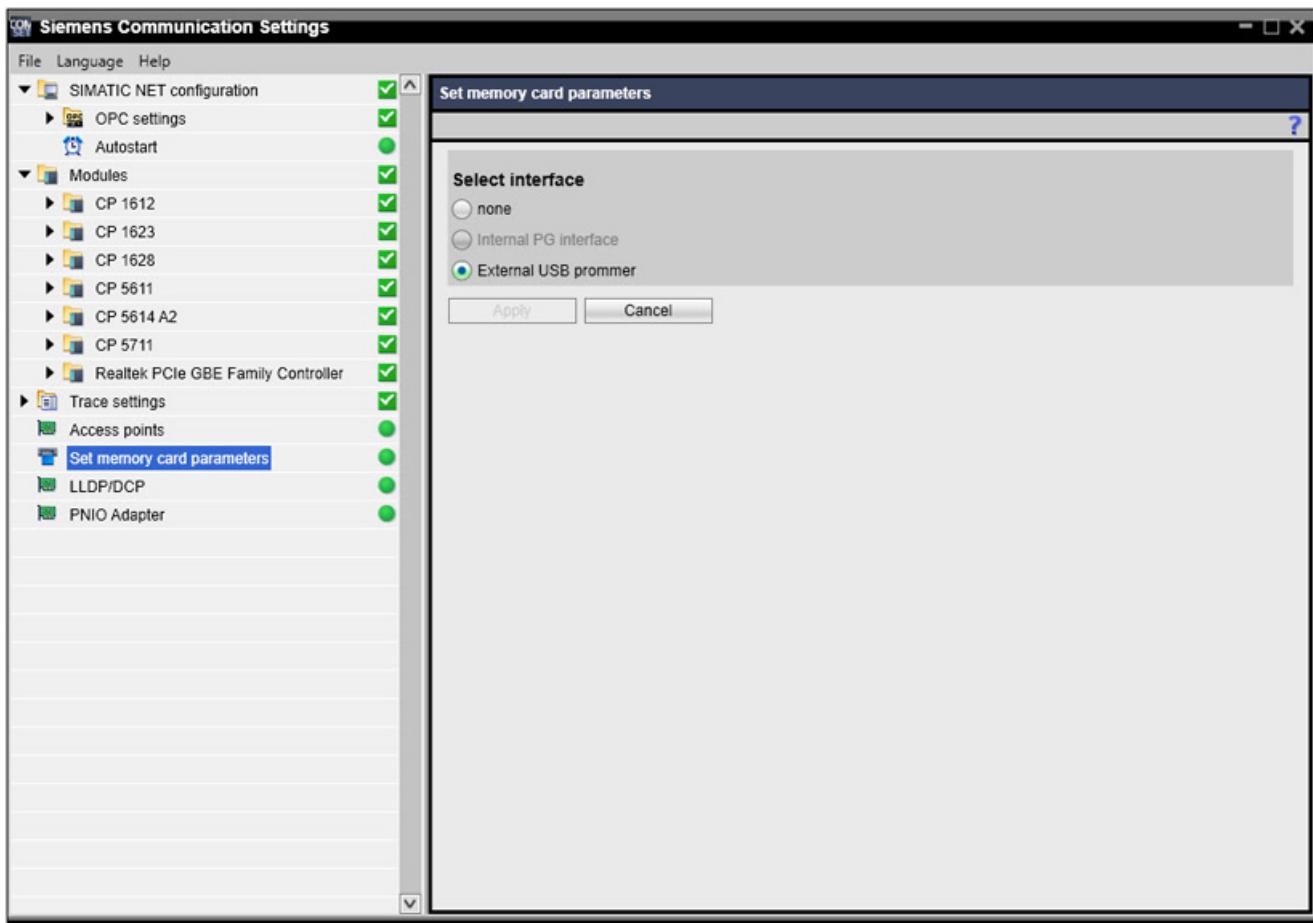
3. In the dialog that opens, confirm that you want to delete with "Yes".

4.5.3.11 Setting parameters for the memory card

On the properties page "Set memory card parameters", you can configure the interface of your PG/PC with which you can save user programs for S7 programmable controllers on memory cards. You can choose the following options:

- None
- Internal PG interface
- External USB prommer

Only the programming devices are shown that are available on the PC station.



4.5.3.12 Setting LLDP/DCP

The "LLDP/DCP" properties page shows you the Ethernet modules that support LLDP and that can respond to DCP queries. As default, all displayed modules are activated but they can be deactivated individually.

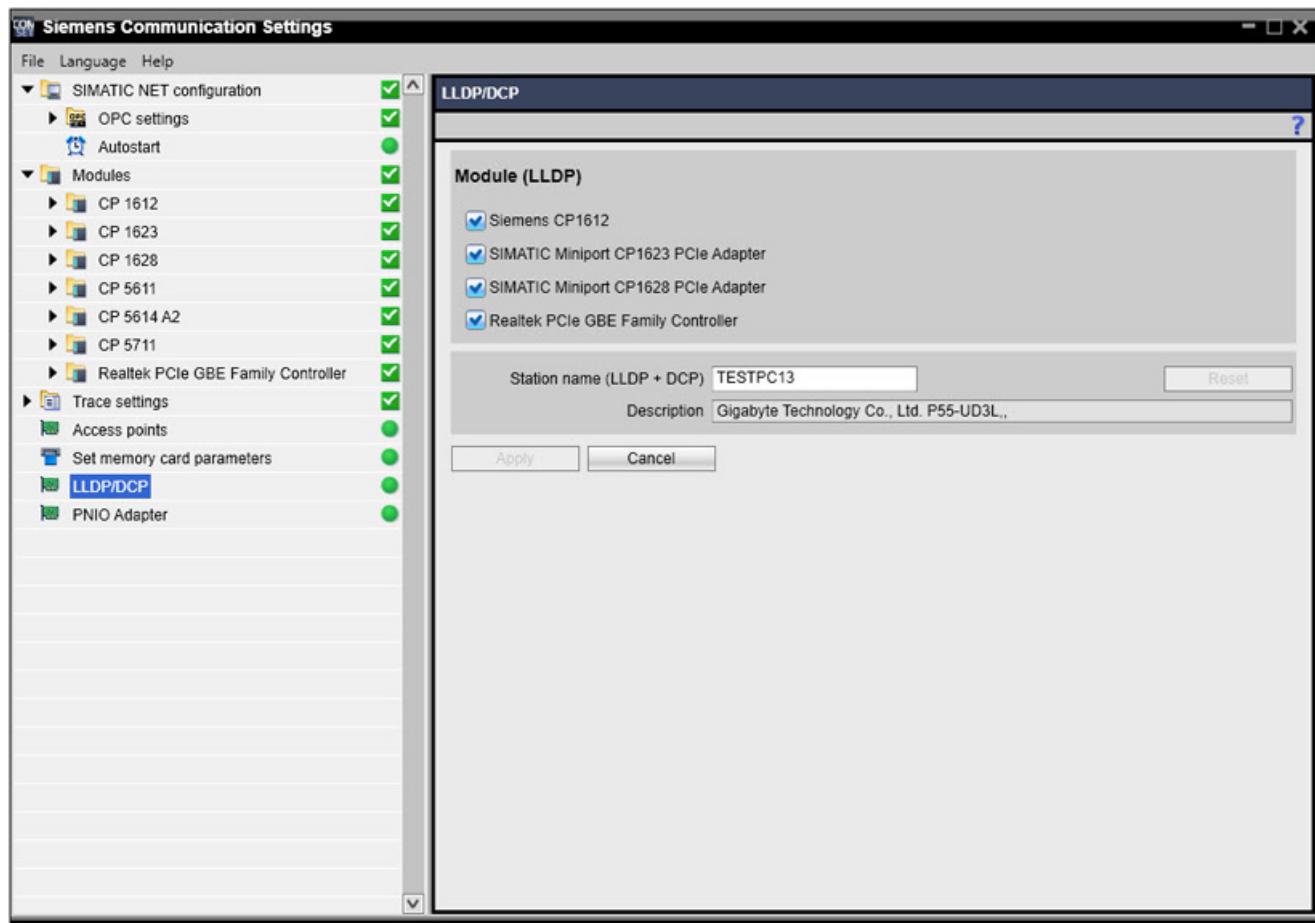
Note

You require administrator privileges to be able to make modifications.

Follow the steps below if you want to set the LLDP/DCP protocol for a module:

1. Select "LLDP/TCP" in the navigation area.
2. Disable the check box of the modules with which you do not want to use the LLDP/TCP protocol.
3. If required, enter a station name in "Station name". You can set the original computer name again with the "Reset" button. "Description" displays the automatically detected system description for LLDP/DCP.
The permitted characters are as follows: A-Z, a-z, 0-9 and the hyphen.

4.5 "Communication Settings" configuration program



If a PNIO controller configuration is loaded on the PC station, its station name will be used in the LLDP/TCP protocol.

4.5.3.13 Setting PNIO adapters

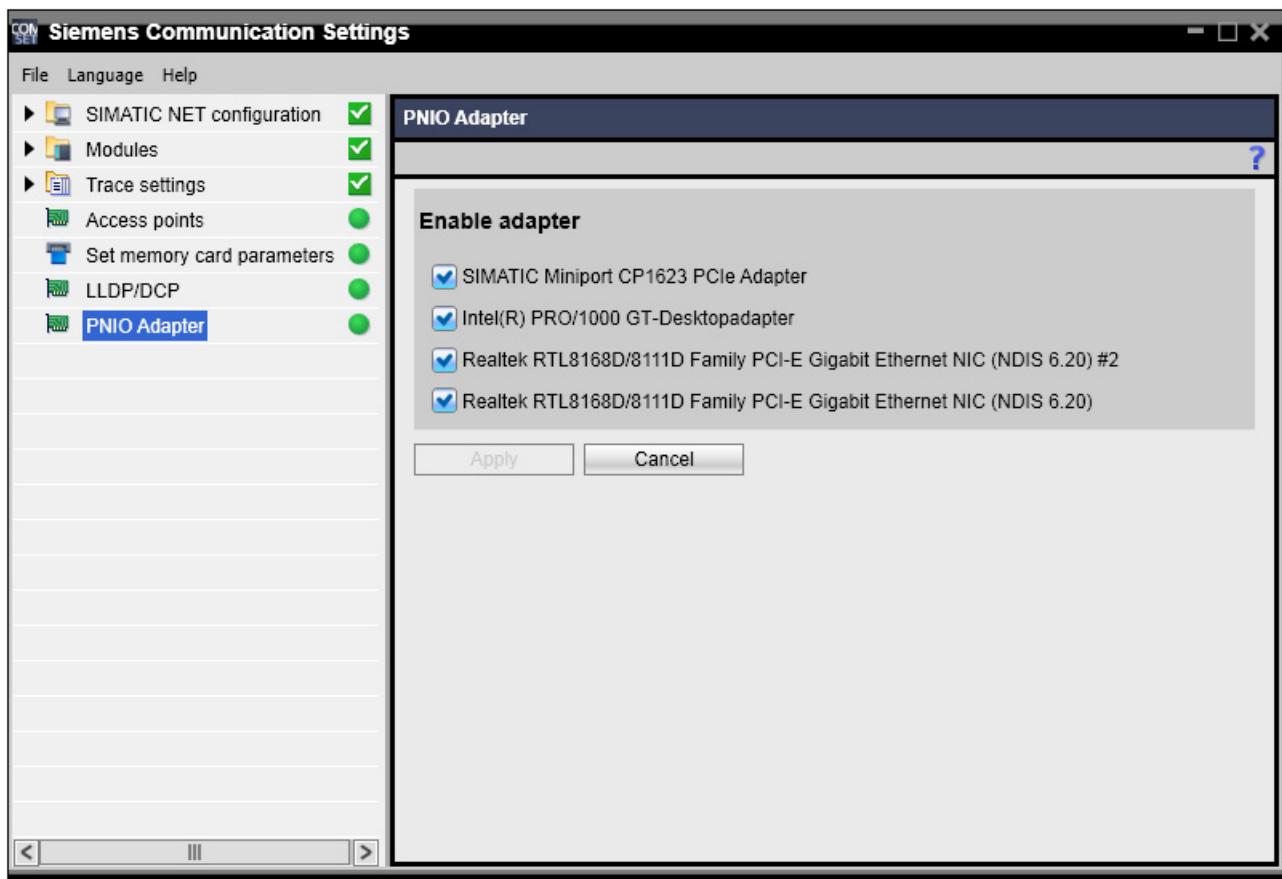
The "PNIO Adapter" properties page shows you the Ethernet modules released for PNIO. As default, all displayed modules are enabled but they can be enabled/disabled individually with the relevant check box.

Note

You require administrator privileges to be able to make modifications.

Note

After enabling or disabling the PNIO function of a module, the PC needs to be restarted.



4.5.3.14 Setting the PROFIBUS DP slave of the CP 5614 A2 / CP 5624

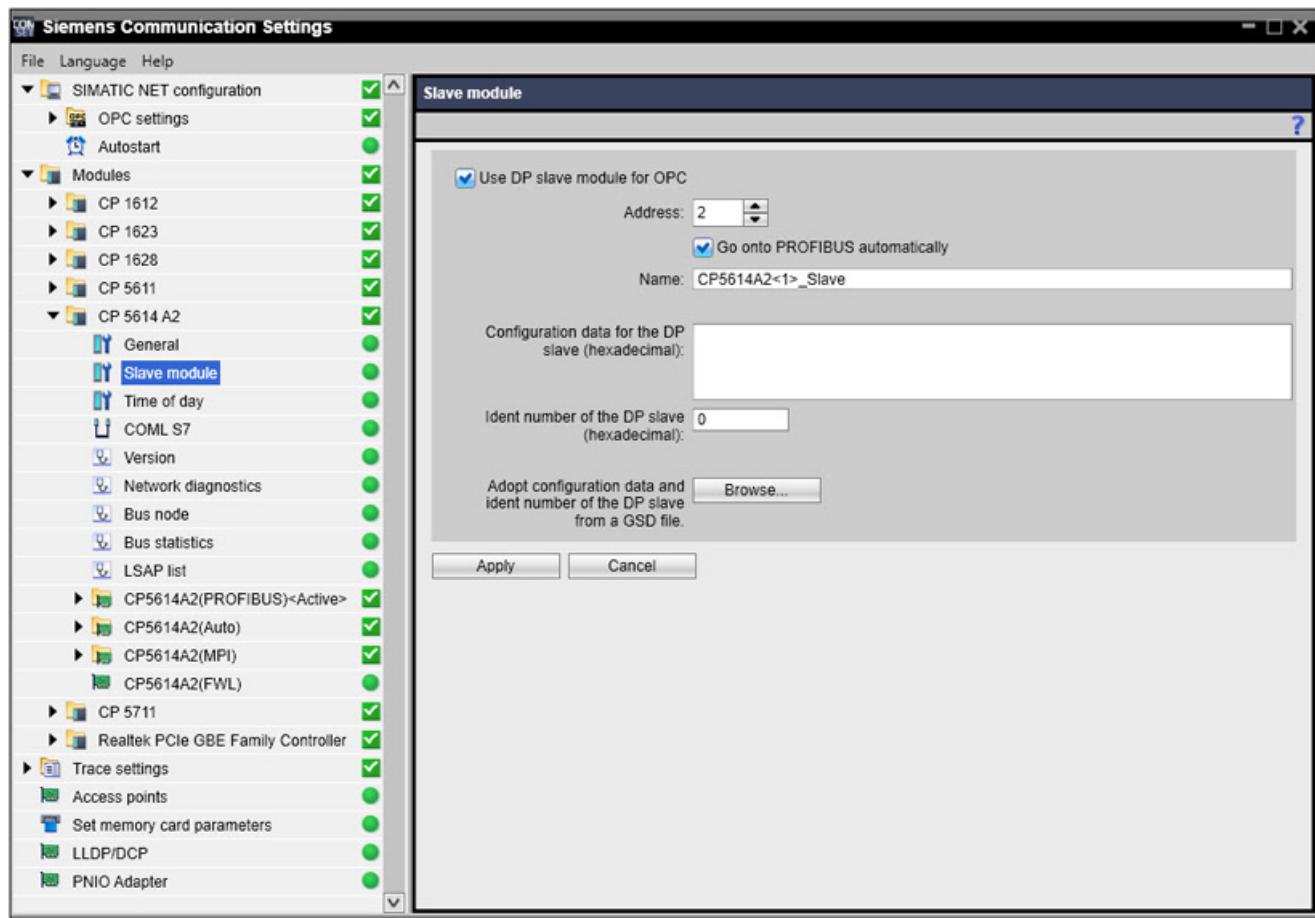
To be able to use the DP slave module of the CP 5614 A2 or CP 5624 with OPC, configure the module as described below. It is not possible to configure these settings in NCM PC / STEP 7.

The slave module configuration is effective only for use with the OPC interface.

4.5 "Communication Settings" configuration program

Follow the steps below:

1. Open the "Modules" folder in the navigation area.
2. Select the required module of type CP 5614 A2 or CP 5624 and click on the "Slave Module" property.



3. Select the "Use DP slave module with OPC" check box.
4. Set the remaining properties of the DP slave module as follows:
 - Use DP slave module with OPC:
With this check box, you decide whether or not the DP slave module is used for OPC.
 - Address:
The network address of the DP slave on PROFIBUS.
 - Go onto PROFIBUS automatically:
The slave module goes online immediately after the OPC server starts up and can then be accessed by a DP master. If the check box for this property is not activated, the OPC user program must set the DP slave to online using the "&devicestate" OPC item.
 - Name:
The name of the slave module that is also used to form the variable name of the OPC items.

This name must not be confused with the CP name that needs to be specified on the C programming interface of the DP slave library.

- Configuration data for the DP slave (hexadecimal):
The configuration data for the DP slave is displayed as a list of hexadecimal digits separated by commas and this can be edited. Generally, one pair of digits corresponds to the configuration of a submodule of the DP slave. For the coding of the submodule properties, please refer to the description of the DP Base programming interface (section, Structure of the configuration data). For information on creating and using GSD files, please refer to the description of the DP Base programming interface (section, significance of GSD files).
- Ident number of the DP slave (hexadecimal):
Enter the identification number of the DP slave as a hexadecimal number. The Ident number is assigned by the PROFIBUS Users Organization and is unique for each slave type. It is also in the GSD file.
- Browse:
Click the "Browse..." button if you want to use a GSD file as a template from which you can also take the Ident number and the configuration data for the DP slave. Please note that with a modular DP slave, only the configuration data of the first submodule definition are adopted.

5. Click the "Apply" button to activate the data you have set.

4.5.4 Diagnostics with "Communication Settings"

Overview

In diagnostics with "Communication Settings", you can, for example, do the following

- Display the operability of the modules
- Display the PROFIBUS network parameters
- Display the Industrial Ethernet network parameters
- Display the available network nodes
- Display the LSAP list of individual modules
- Display the bus statistics of individual modules
- Read out the diagnostics data of the firmware of individual modules
- Display the operating data of individual modules
- Display the USB connector data of USB modules
- Display the version information of hardware and software

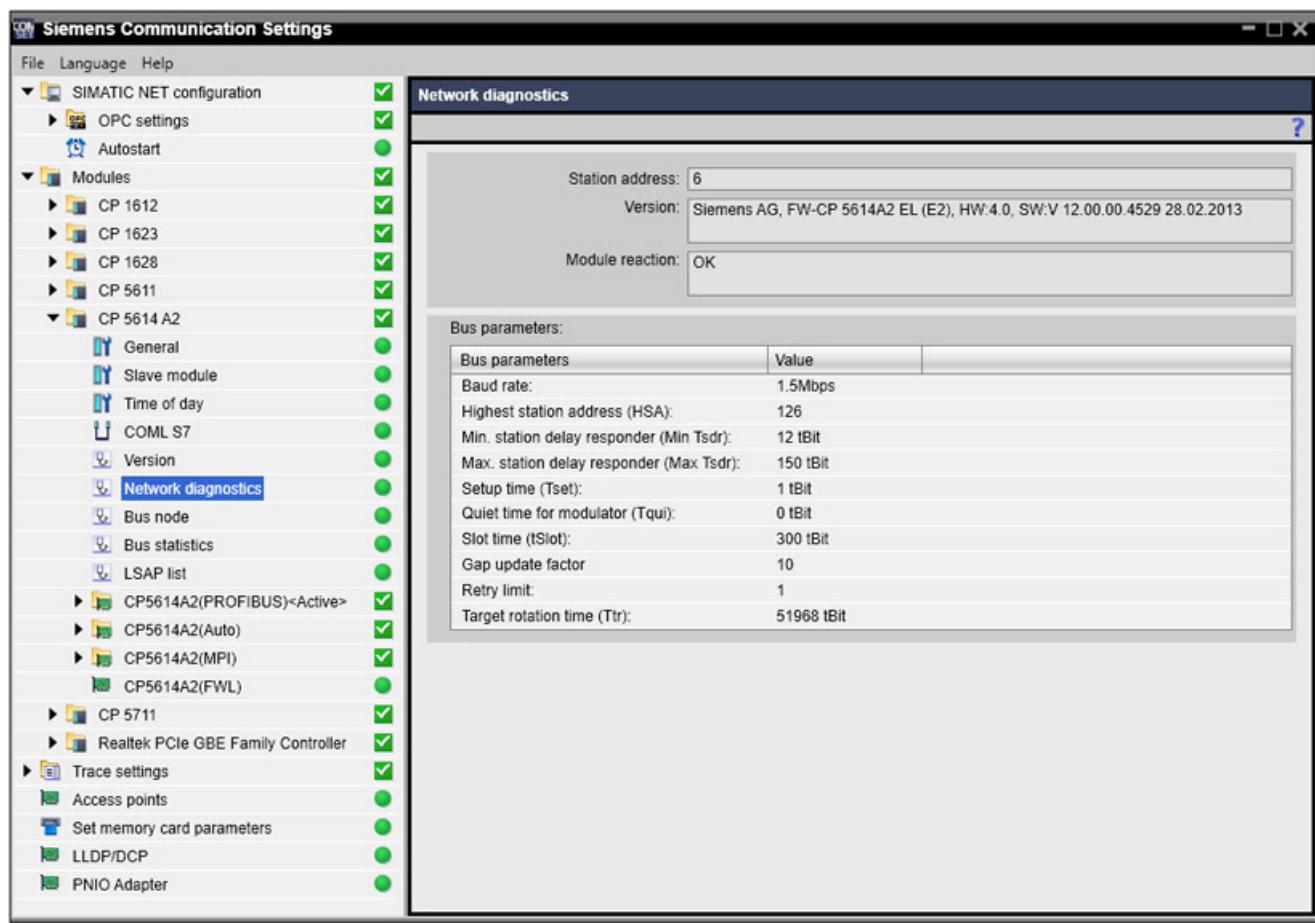
These options are described in the following sections.

4.5.4.1 Displaying the operability of a PROFIBUS module

Follow the steps below:

1. Open the "Modules" folder in the navigation area.
2. Select the module you want to diagnose and click on the "Network Diagnostics" property.
3. The bus parameters and the version information of the module are queried and displayed here.

By querying the module, the internal communication path is tested. The result of the operation is displayed.



4.5.4.2 Displaying the Industrial Ethernet network parameters for a CP 1613

For the Industrial Ethernet module CP 1613, the following current settings are displayed:

- Duplex mode (half duplex, full duplex, automatic)
- Medium type (AUI, TP, automatic)
- Transmission rate (10 Mbps, 100 Mbps, automatic)

As long as no valid connection to the module is detected, the output boxes display the entry "unknown".

Follow the steps below:

1. Open the "Modules" folder in the navigation area.
2. Select the module you want to diagnose and click on the "Network Parameters" property object.



4.5.4.3 Displaying PROFIBUS network nodes

If the module is operational, a list with all the nodes on the bus is created after starting this function.

If the module is currently communicating and the module supports the function, the list of bus parameters is created from local information of the module.

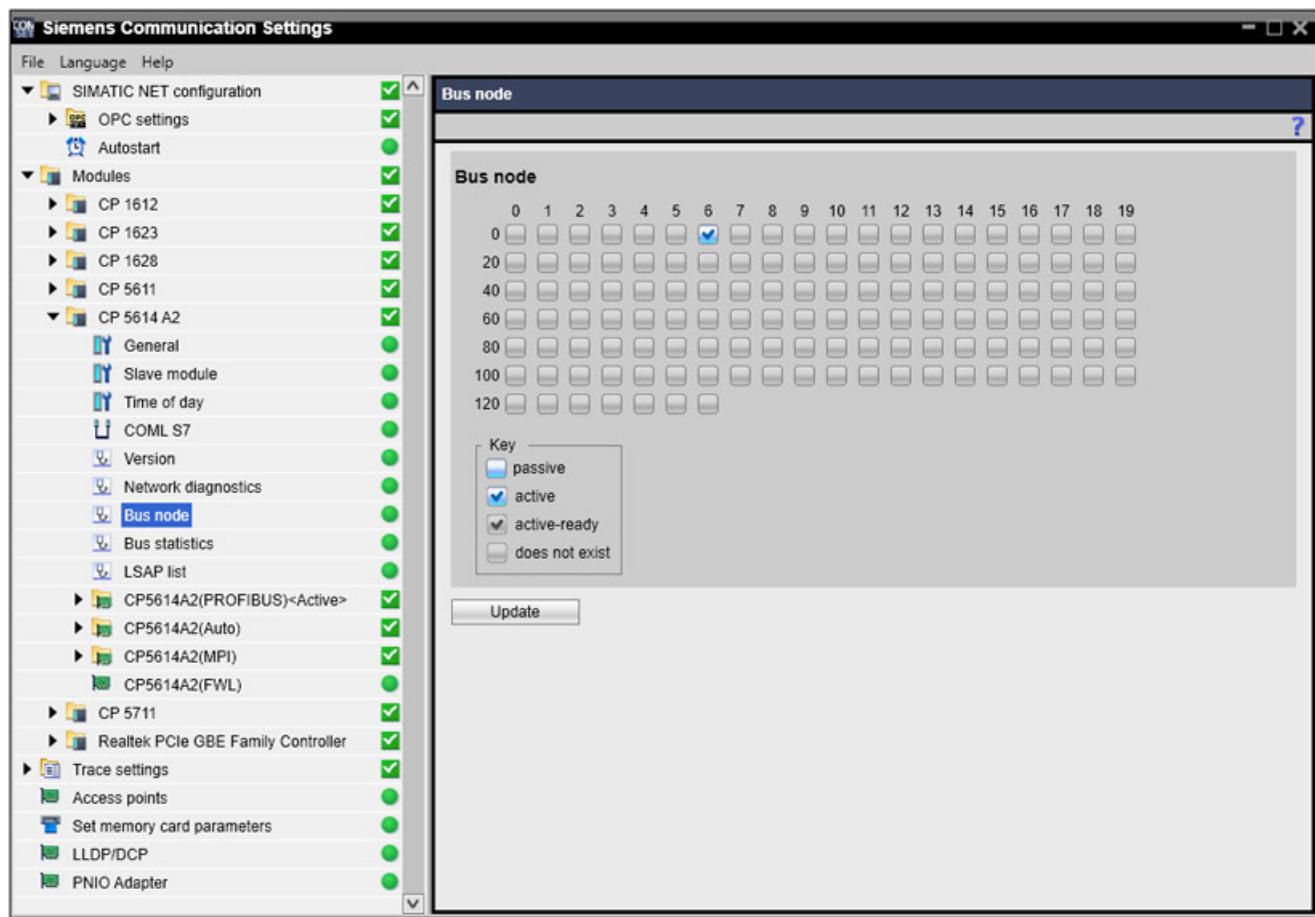
If the module is not currently communicating or the module does not support the creation of a local list, the station addresses are queried over the network.

This creates load on the bus and can take several seconds.

4.5 "Communication Settings" configuration program

Follow the steps below:

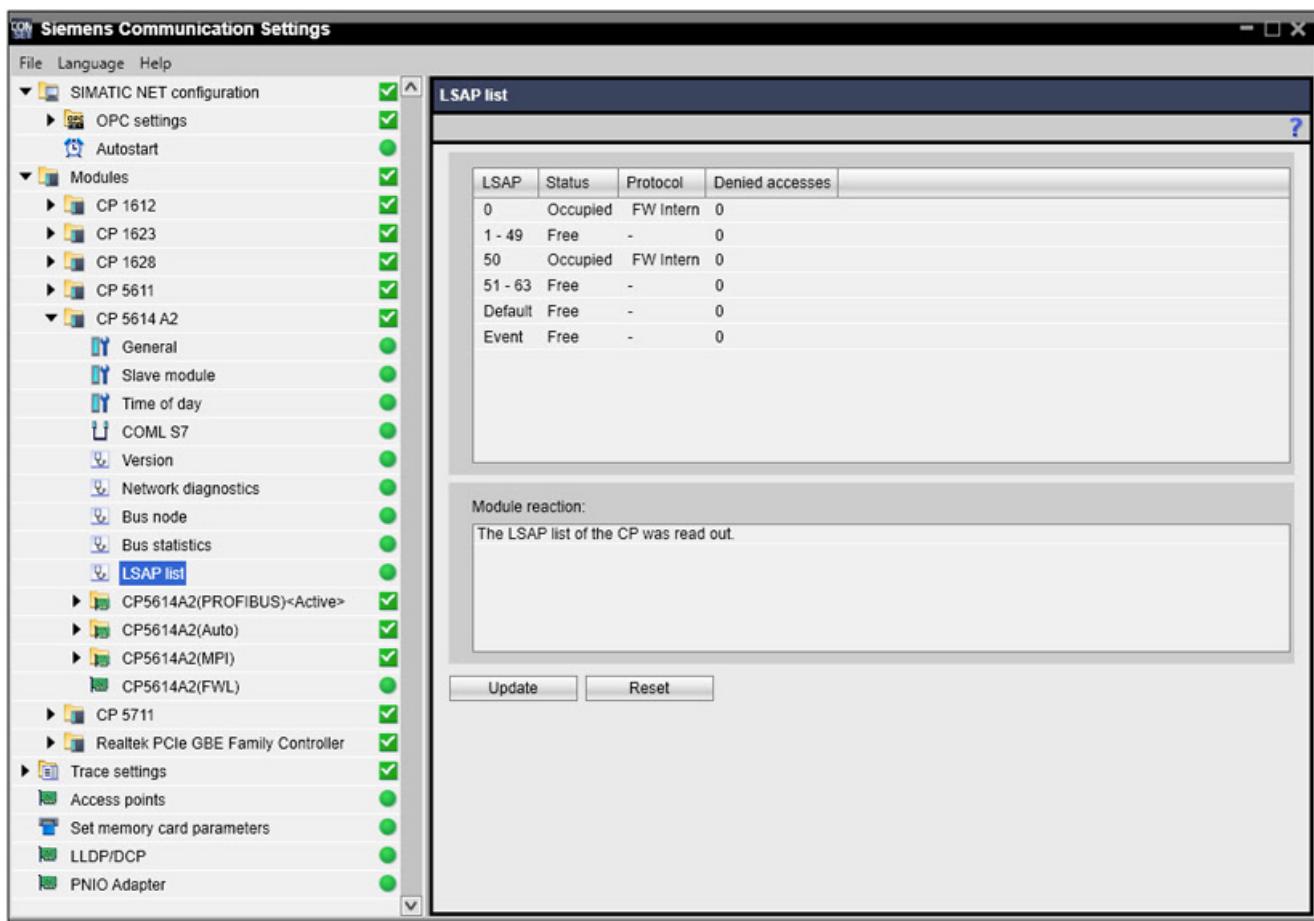
1. Open the "Modules" folder in the navigation area.
2. Select the relevant module and click on the "Bus Nodes" property object.
3. After the call, the bus nodes are queried and displayed. Four different symbols are used to indicate the operating mode of a station:
 - Empty box with gray background (the same background color as tabs): No partner device found;
 - Empty box on light background: Passive station (for example DP slave);
 - Check mark on light background: Active station (for example DP master);
 - Square on gray background: Active station ready to enter network.
4. Click the "Update" button again to access the module and query the bus nodes.



4.5.4.4 Displaying PROFIBUS LSAP list

Follow the steps below:

1. Open the "Modules" folder in the navigation area.
 2. Select the relevant PROFIBUS module and click on the "LSAP list" property object.
- After the call, the LSAPs of the module are listed with their relevant status.



4.5.4.5 Displaying PROFIBUS bus statistics

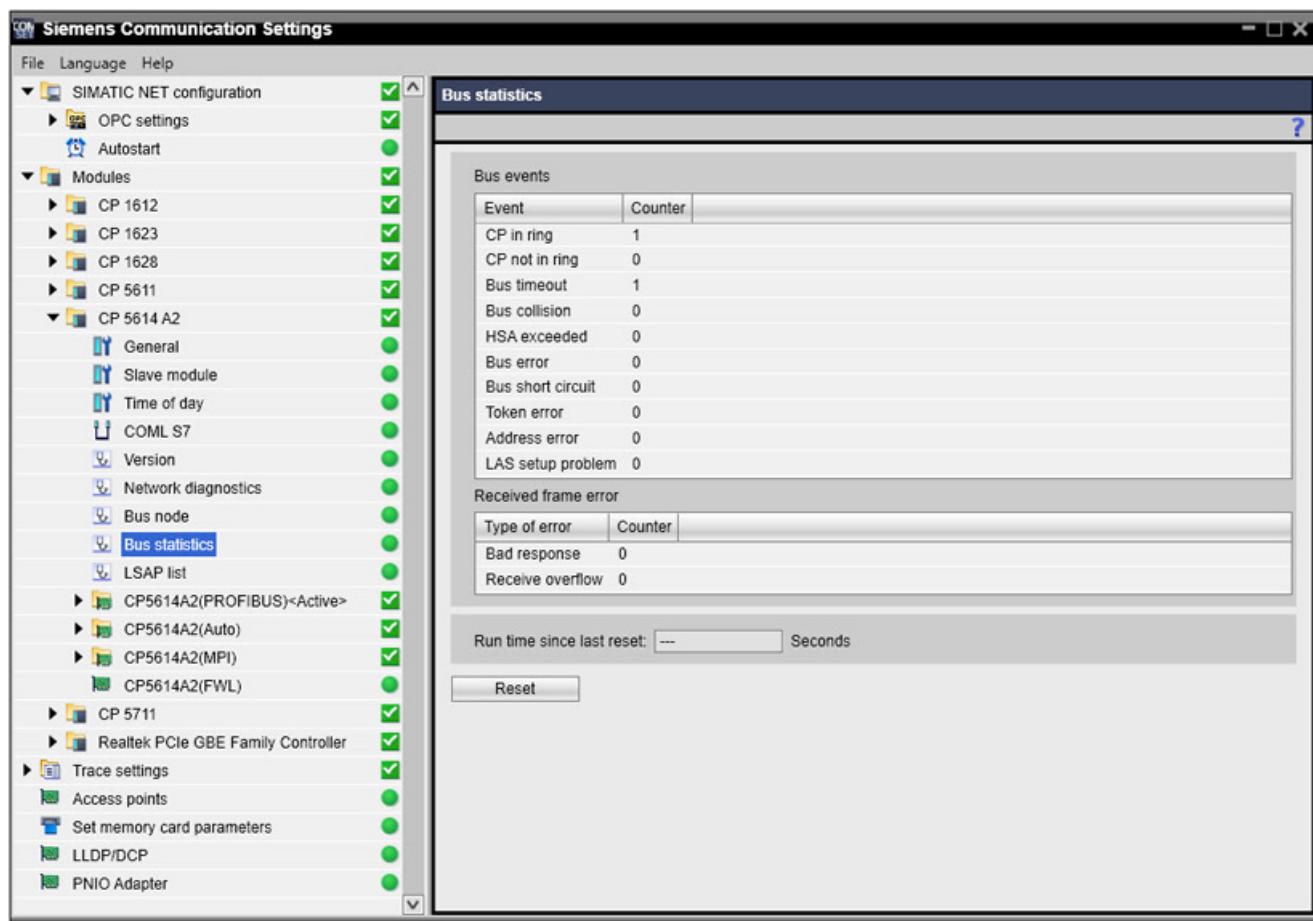
Follow the steps below:

1. Open the "Modules" folder in the navigation area.
2. Select the relevant PROFIBUS module and click on the "Bus statistics" property object.

After the call, the bus events detected for the module are displayed.

Note

The display of the "Run time since last reset" starts only after the "Reset" button has been clicked.

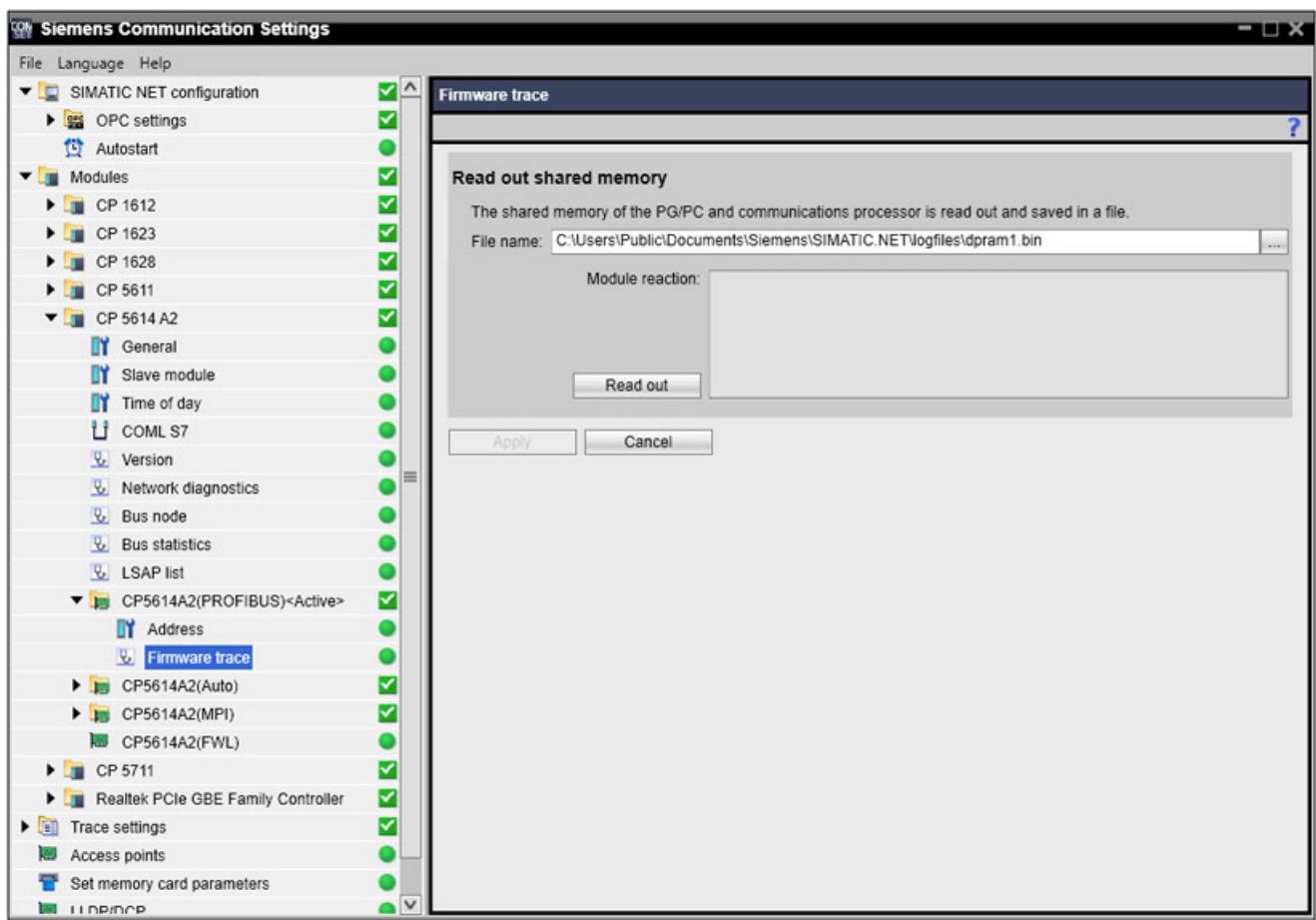


4.5.4.6 Reading our the trace of the module firmware

Follow the steps below:

1. Open the "Modules" folder in the navigation area.
2. Select the relevant module and click on the "Firmware trace" property object.
3. Click the "Read out" button.

The trace information of the module firmware is read out and stored in the file specified in "File name:".



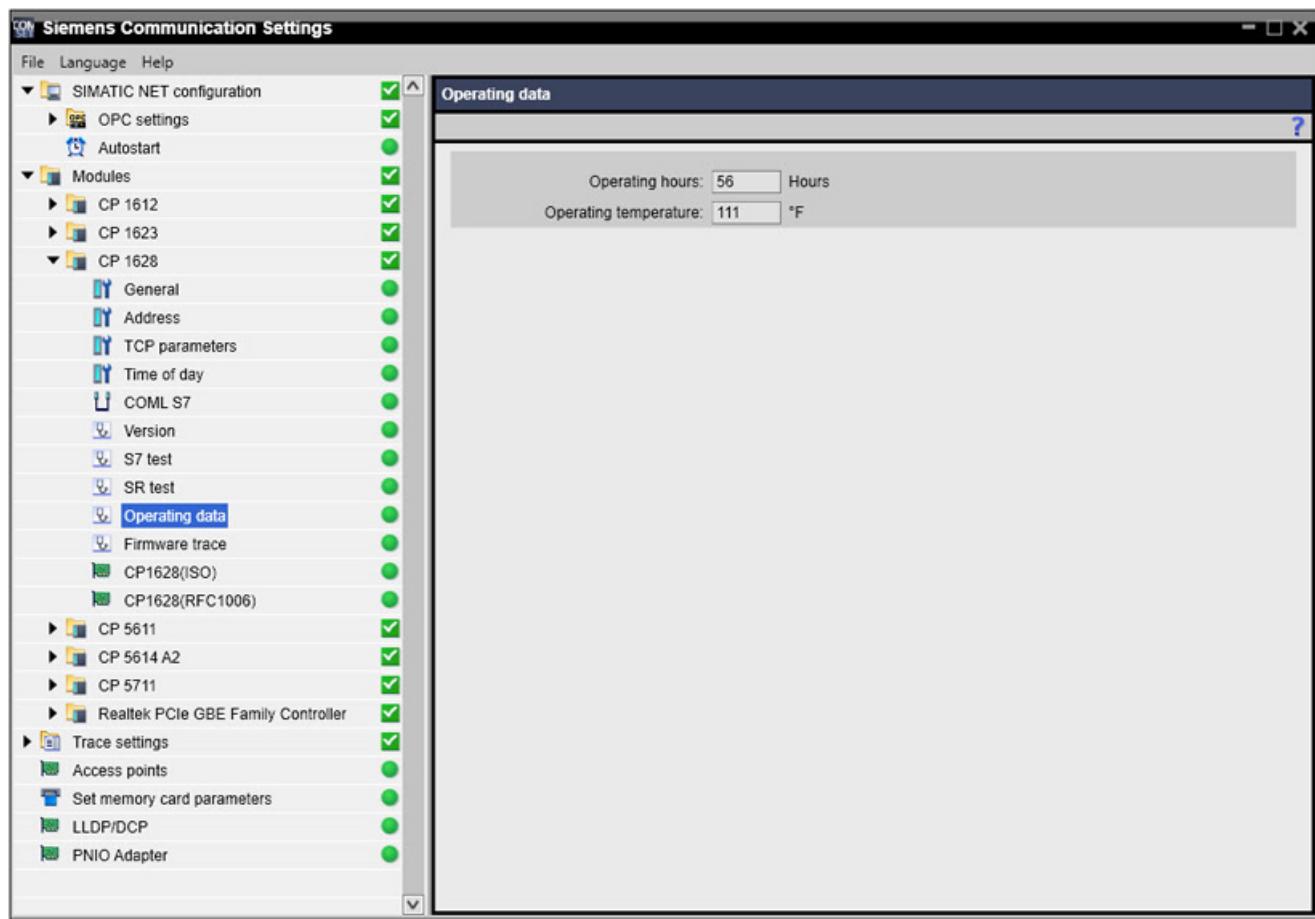
4.5.4.7 Displaying operating data

Follow the steps below:

1. Open the "Modules" folder in the navigation area.
2. Select the relevant module and click on the "Operating data" property object.

After the call, the operating data available for the module is displayed.

- Operating time in hours
- Operating temperature in degrees Celsius



4.5.4.8 SOFTNET IE - Show device details

This properties page shows you the following information about IE modules:

- **Name**
Shows the name of the device.
- **Device Type**
Shows the type of the device.
- **Manufacturer**
Shows the manufacturer of the device.
- **Location**
Shows the slot number of the device.
- **Network connection**
Shows the name of the network connection as was assigned in the Control Panel of the PC for the network adapter.
- **Compatible identifier**
Shows the compatible IDs of the device.
- **Device instance identifier**
Shows the instance ID of the device.
- **Hardware identifier**
Shows the ID of the device.
- **Service**
Shows the service used by the device.

4.5.4.9 Displaying USB connector parameters

Follow the steps below:

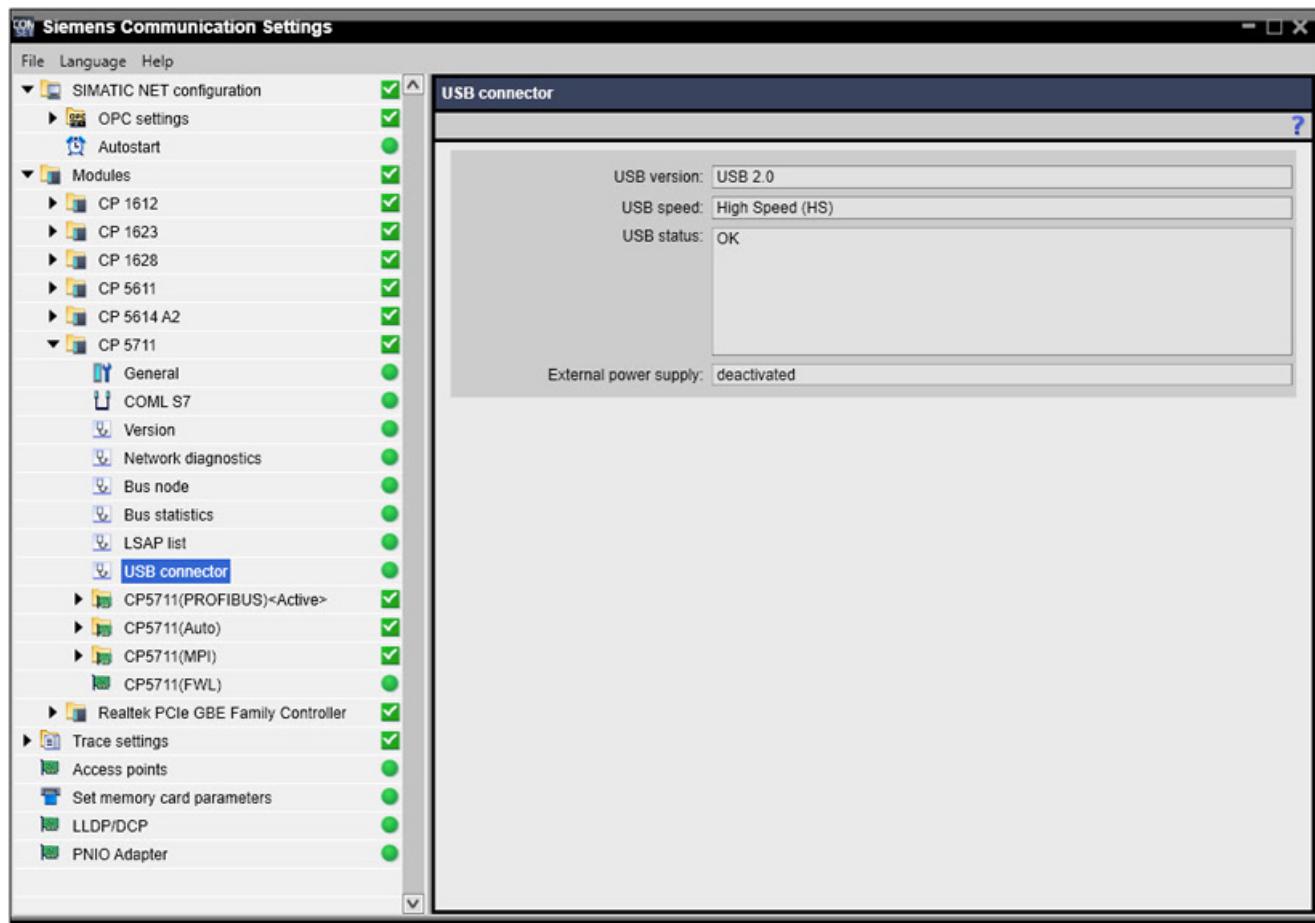
1. Open the "Modules" folder in the navigation area.
2. Select the relevant module and click on the "USB connector" property object

After the call, the USB connector parameters for the module are displayed.

- USB version
- USB speed
- USB status

You can also see whether the module is connected to an external power supply.

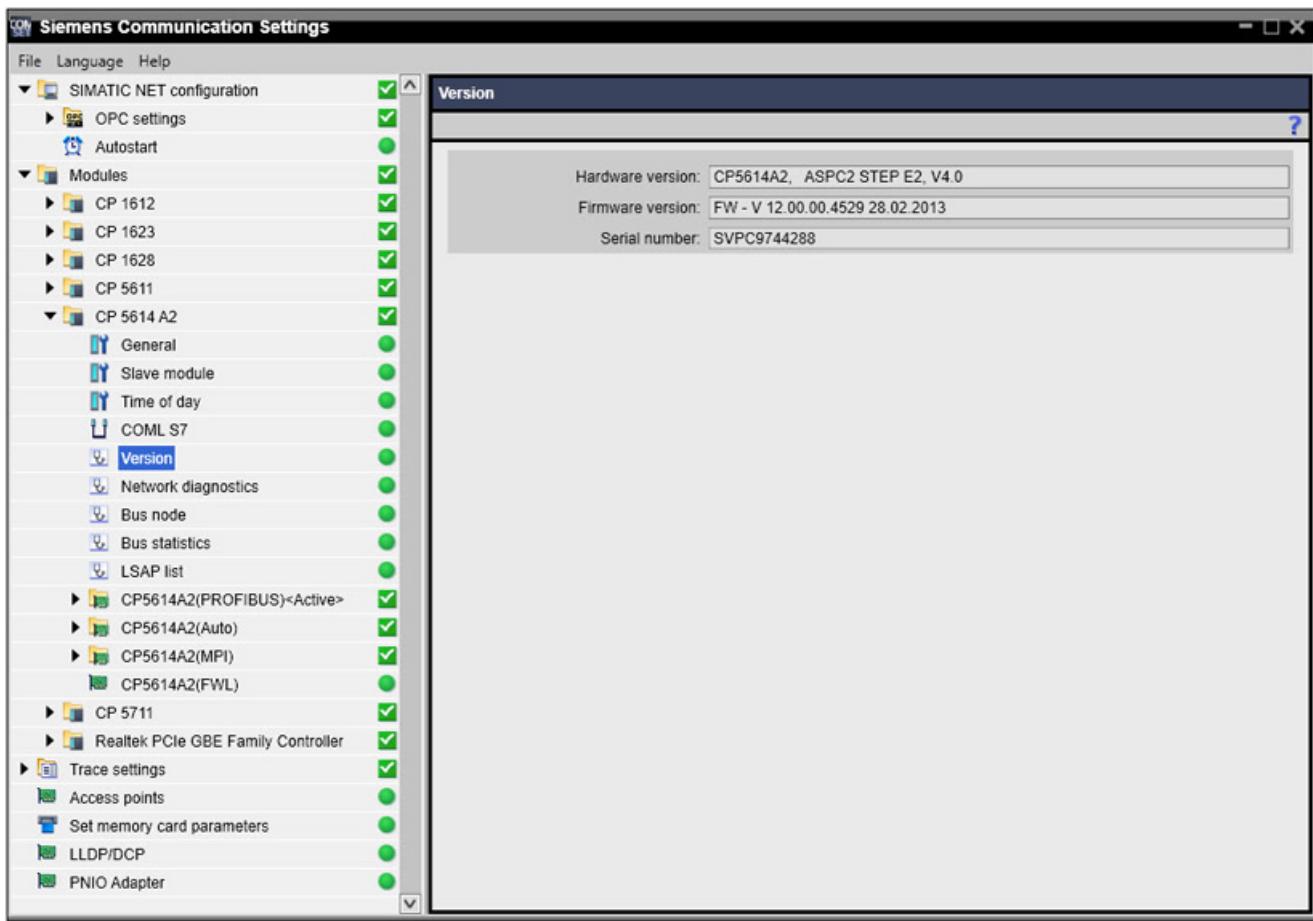
4.5 "Communication Settings" configuration program



4.5.4.10 Displaying version information of hardware and firmware

Follow the steps below:

1. Open the "Modules" folder in the navigation area.
2. Select the relevant module and click on the "Version" property object.
3. After the call, version information about the communications module is displayed.



4.6 OPC Scout V10

With the OPC Scout V10, you can test an OPC application or commission the OPC server.

The following description assumes that you are familiar with the terminology and mechanisms of OPC (OPC server and OPC client). You will find basic and detailed information on this topic in the "Industrial Communication with PG/PC" manual /1/.

4.6.1 Characteristics, functions and activation

Which functions does the OPC Scout V10 provide?

With the OPC Scout V10, you can execute various functions that support you during testing and commissioning of your OPC system.

- Browsing and displaying the OPC servers available on your PG/PC.
- For OPC UA, browsing for objects with the "Discovery" function is supported.

- Testing connections and objects
- Monitoring items
- Reading and writing items
- Displaying alarms
- S7 connection diagnostics
- Creating and saving views of the objects to be acquired. You can choose between the following views.
 - DA view for OPC Data Access, XML Data Access and OPC UA.
 - AE view for OPC Alarms & Events.
 - Diagnostics view, S7 connection diagnostics for OPC Data Access, XML Data Access and OPC UA.

Note

OPC Scout V10 has only been released for the use of up to 500 items and 500 field elements. If the number of items and field elements is exceeded, this may cause delays. Exceeding the released configuration limits must either be prevented by suitable configuration by the user or another client needs to be used. This also applies to other conditions that represent increased load for the OPC Scout V10 (for example value generation as performance test).

The following description will familiarize you with the user interface of the OPC Scout V10. Step by step, it shows you how to use the functions described above.

How to start the OPC Scout V10

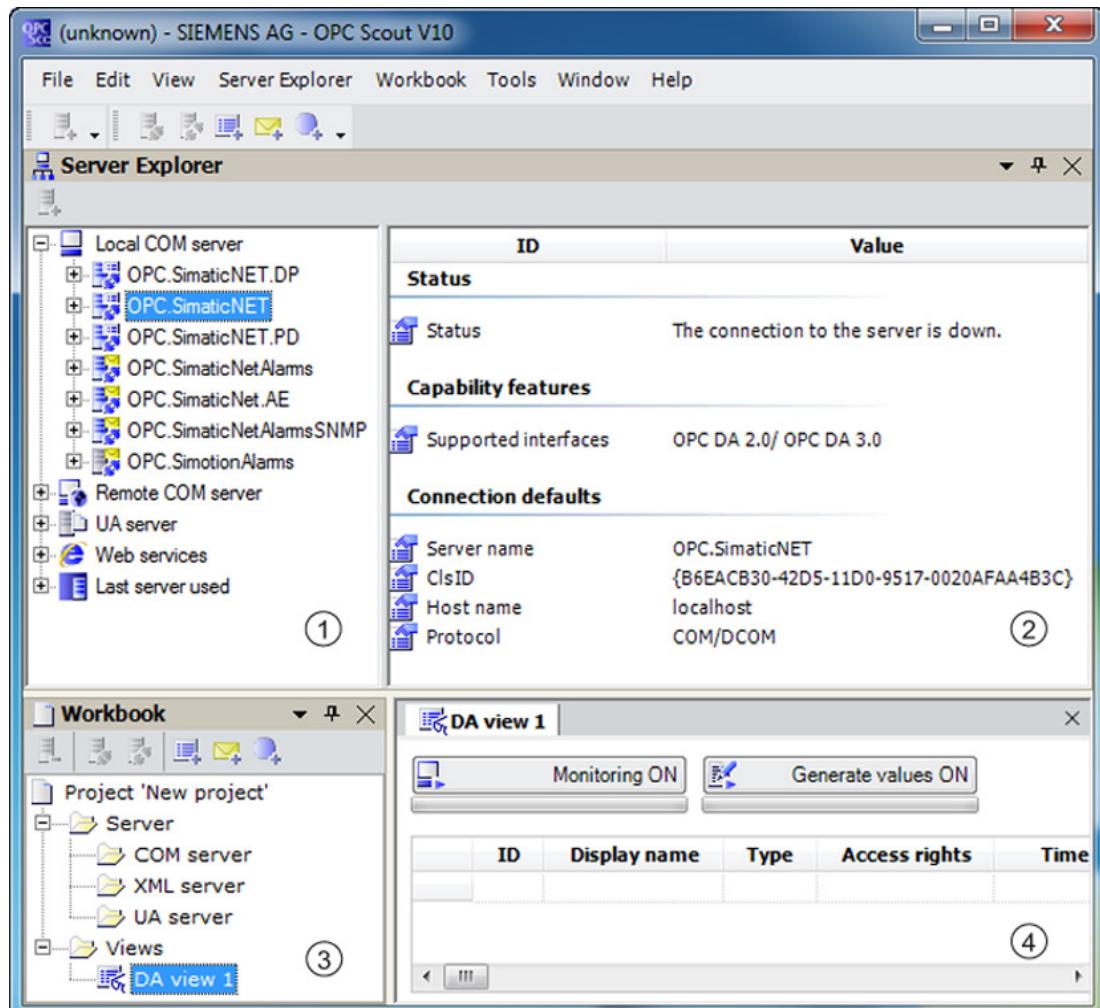
Select the following from the Start menu of the Windows operating system:

Start menu "Start" > "..." > "SIMATIC NET" > "OPC Scout V10".

The window of the OPC Scout V10 is divided into four areas:

- (1) Navigation area
- (2) Information area

- (3) Workbook
- (4) View area



Depending on the activities you perform during the session, the OPC Scout V10 can have the following menus:

File Edit View Server Explorer Workbook Tools Window Help

The menu	contains commands relating to the following topics
File	In this menu, you can create, save and load projects. You can also call up the projects on which you last worked.
Edit	With the menu commands in the "Edit" menu, you can copy, delete or select items or objects in the DA view. With this option, you can also copy selected items to other DA views.
View	Here, you can decide which areas and tools are displayed in the OPC Scout V10 window.
Server Explorer	Here, you can add a selected server from the navigation area to the workbook.

The menu	contains commands relating to the following topics
Workbook	Here, you can add DA, AE and diagnostics views to the workbook and connect, disconnect or remove servers.
Tools	In this menu, you can specify DA, AE and diagnostics settings.
Window	Here, you set the arrangement of the DA, AE and diagnostics views in the views area.
Help	Here, you can obtain general information and help.

Note

The OPC Scout V10 supports shortcut menus.

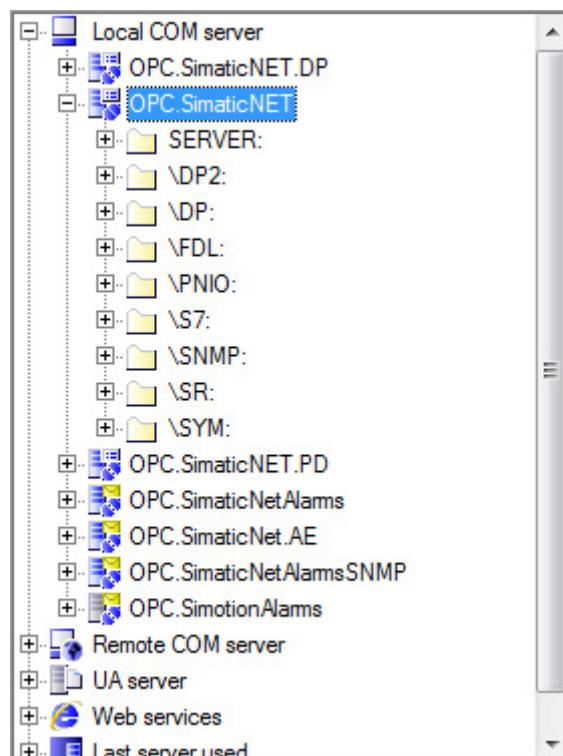
Click on an object and then click the right mouse button. You will then see a menu in which you can select the functions that are possible with the selected object.

4.6.2 Connecting the OPC Scout V10 to a local server

Before you can work with the OPC Scout V10, you must connect the OPC Scout V10 with a server.

Follow the steps below:

1. Open the "Local COM server" entry in the navigation area.
2. Select one of the following OPC server types:
 - "OPC.SimaticNET": Standard OPC server from SIMATIC NET;
 - "OPC.SimaticNET.DP": Highspeed DP inproc server;
 - "OPC.SimaticNET.PD": PROFIDrive OPC server.
3. Double click on the access point you selected earlier.
 - OPC Scout V10 is connected to the local OPC server "OPC.SimaticNET" for SIMATIC NET.



4.6.3 Connecting the OPC Scout V10 to a remote server

As an alternative to connecting to a local server, you can connect the OPC Scout V10 to an OPC server running on a remote computer using DCOM.

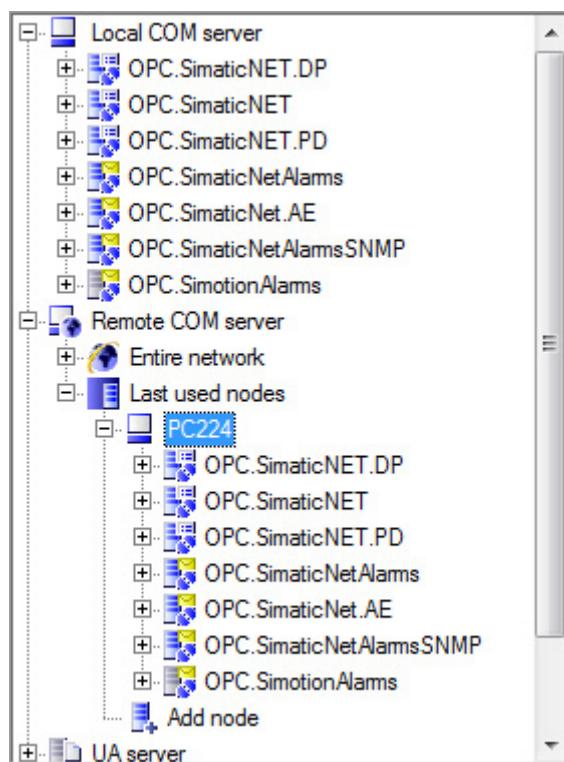
Note

Note that for access to a remote computer, operation with DCOM must be configured.

Follow the steps below:

1. Open the "Remote COM server" entry in the navigation area.
2. Open the "Last used nodes" entry.
3. Double-click on the "Add node" entry.
4. Enter the name of the remote server and confirm with the enter key.

Reaction: The OPC Scout V10 is connected to the remote OPC server.



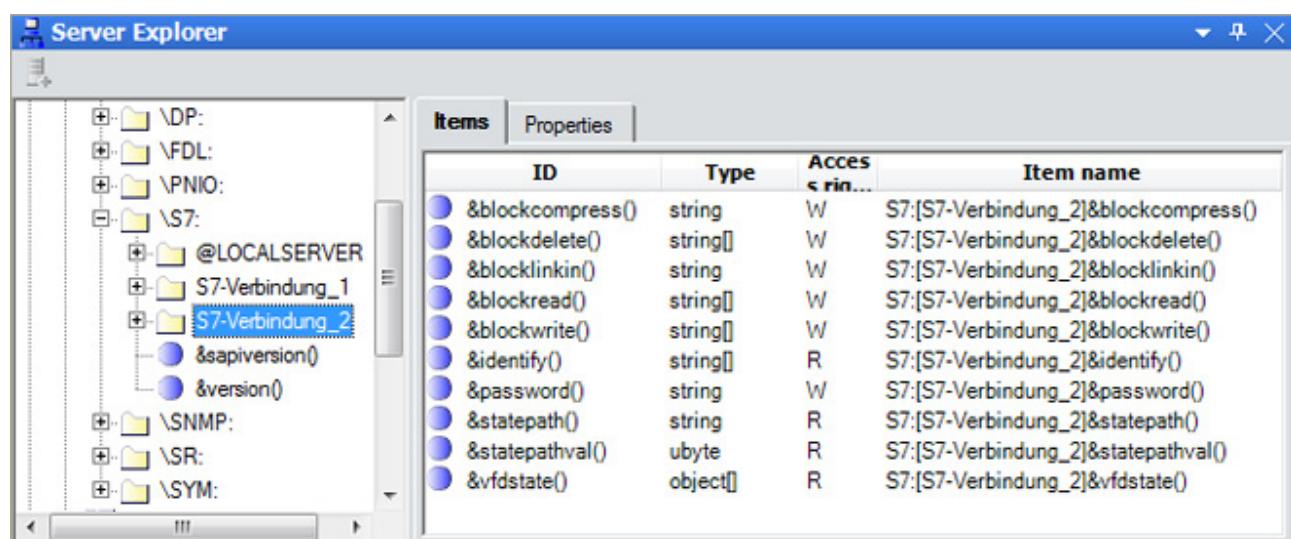
4.6.4 Browse the process space

You can browse the process space of the OPC server in the "Information area" window.

Follow the steps below:

1. Connect to a server in the navigation area. Double-click, for example on the "OPC.SimaticNET" server.
2. Select a group. Here in the example:
"\S7:" > "@LOCALSERVER" > "S7-connection_2".

The items of the group are now displayed in the information area. You can show the items that are not visible using the vertical scroll bar.

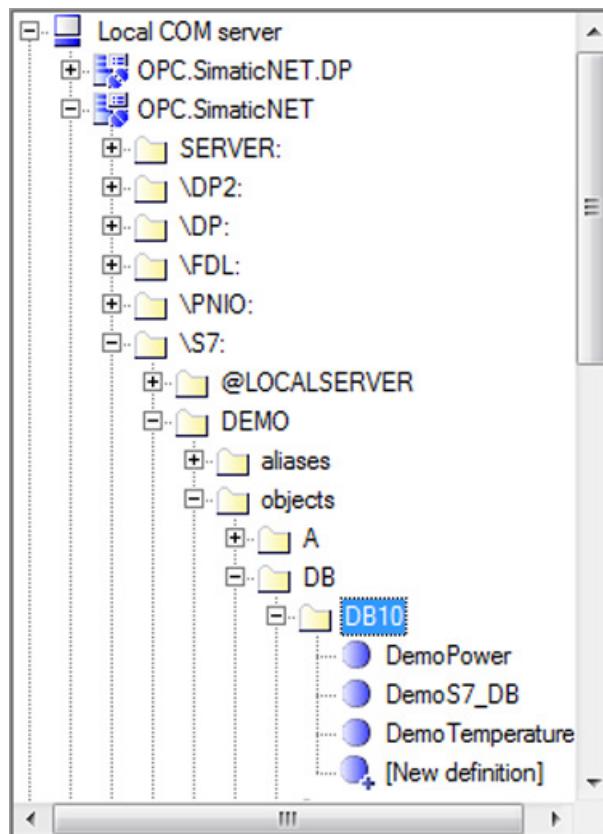


4.6.5 Creating a new item

With OPC DA servers, you can create a new item in the namespace from the navigation area.

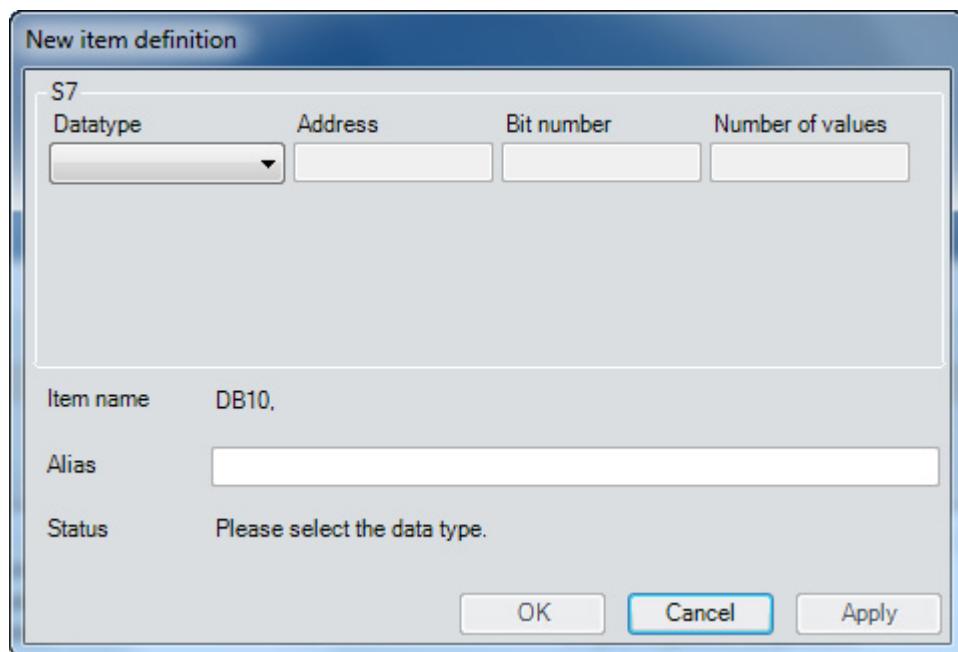
Follow the steps below:

1. Select the entry for which you want to create a new item in the left-hand column of the navigation area.



2. Double-click on the "New definition" entry.

Reaction: The "New item definition" dialog opens.



3. Enter the data type and the related information in the relevant boxes.
4. Enter a name (optional) for the new item in the "Alias" box.
5. Click "OK".

Reaction: The dialog is closed and the newly defined item is displayed in the navigation area.

Note

The graphics above are examples of the S7 protocol. The display can differ for other protocols. You will find more detailed information on the protocols in the "Industrial Communication with PG/PC" manual.

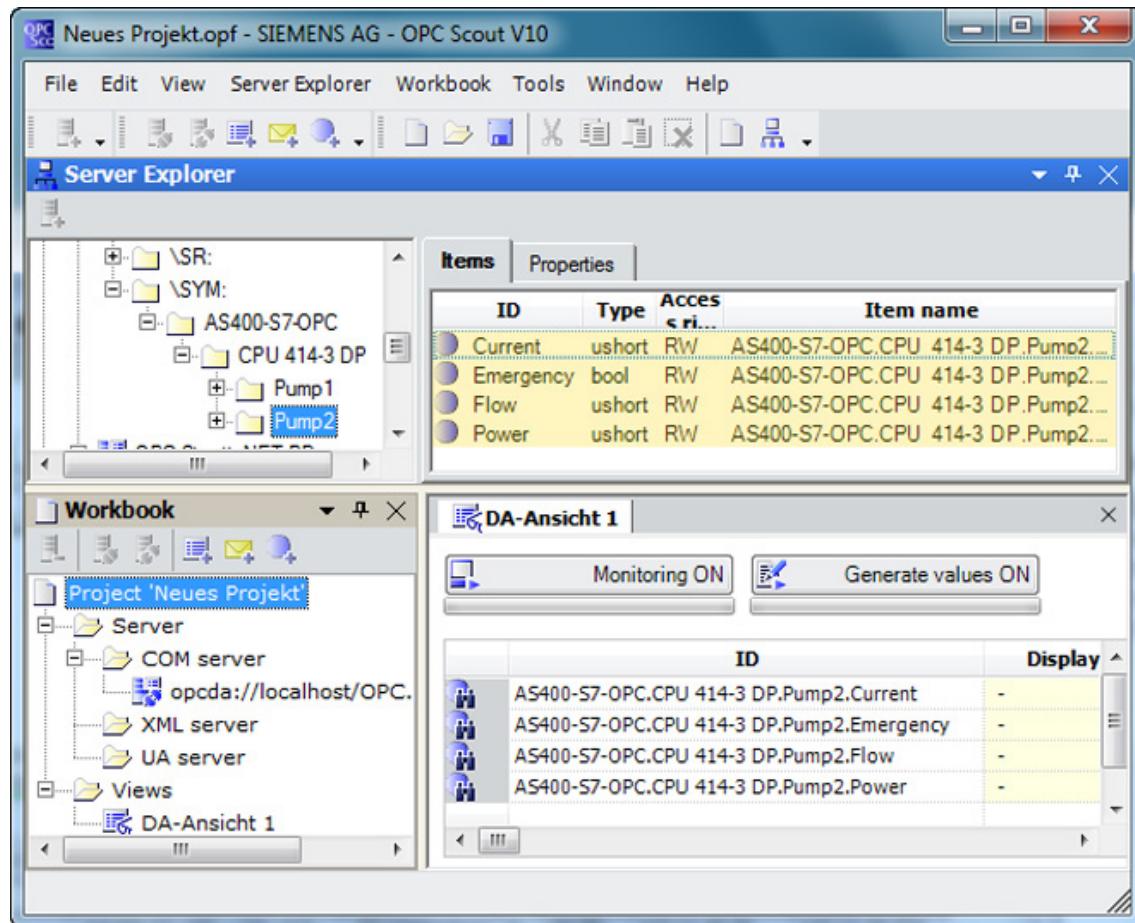
4.6.6 Add and monitor process variables

Follow the steps below:

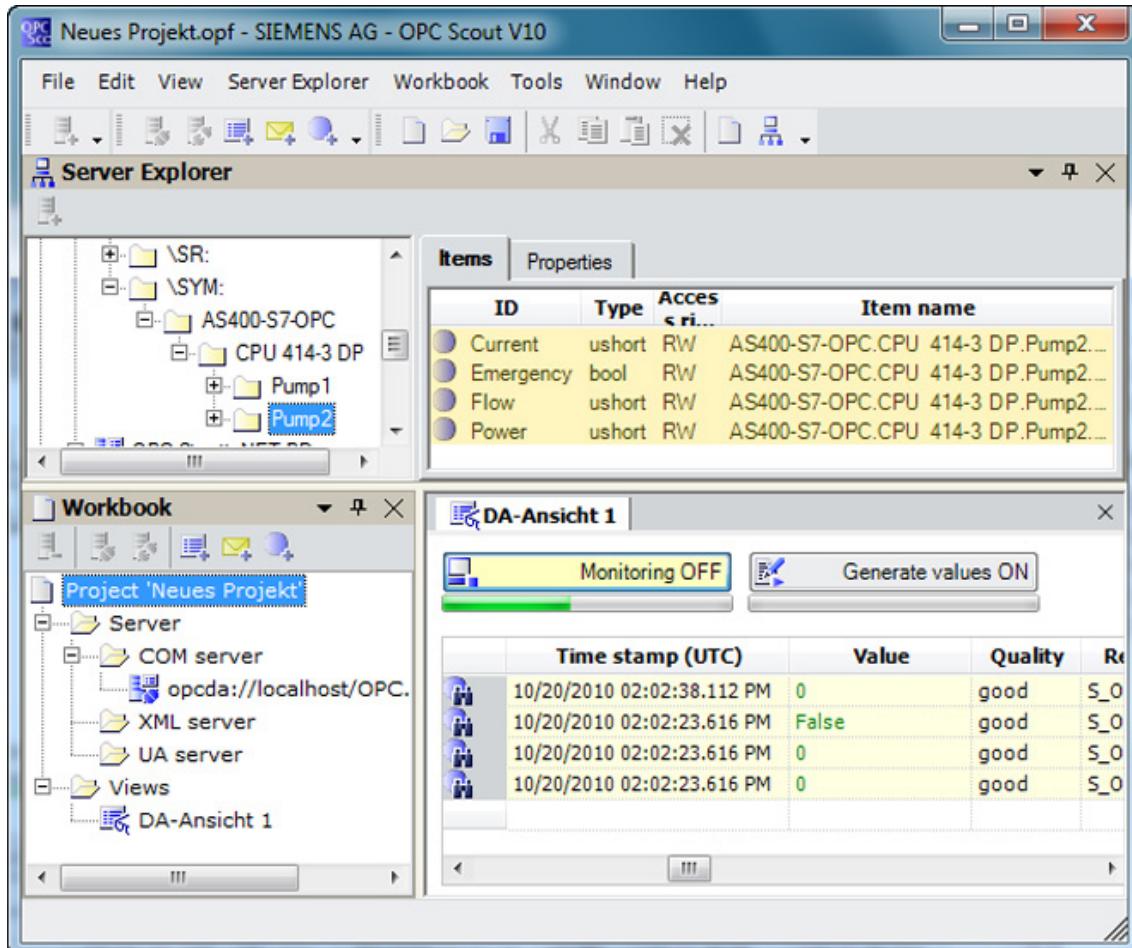
Note

You will find the full example in "OPC application for Industrial Ethernet (Page 103)".

1. Click on "\SYM:" > "AS400-S7-OPC" > "CPU 414-3 DP" > "Pump2" in the navigation area.
2. In the information area, select all the process variables (items) and drag these to the view area.



3. Click the "Monitor ON" button in the view area.



4. Click the "Monitor OFF" button to stop monitoring the items in the view area.

4.6.7 Properties for the views (DA, AE, Diagnostics)

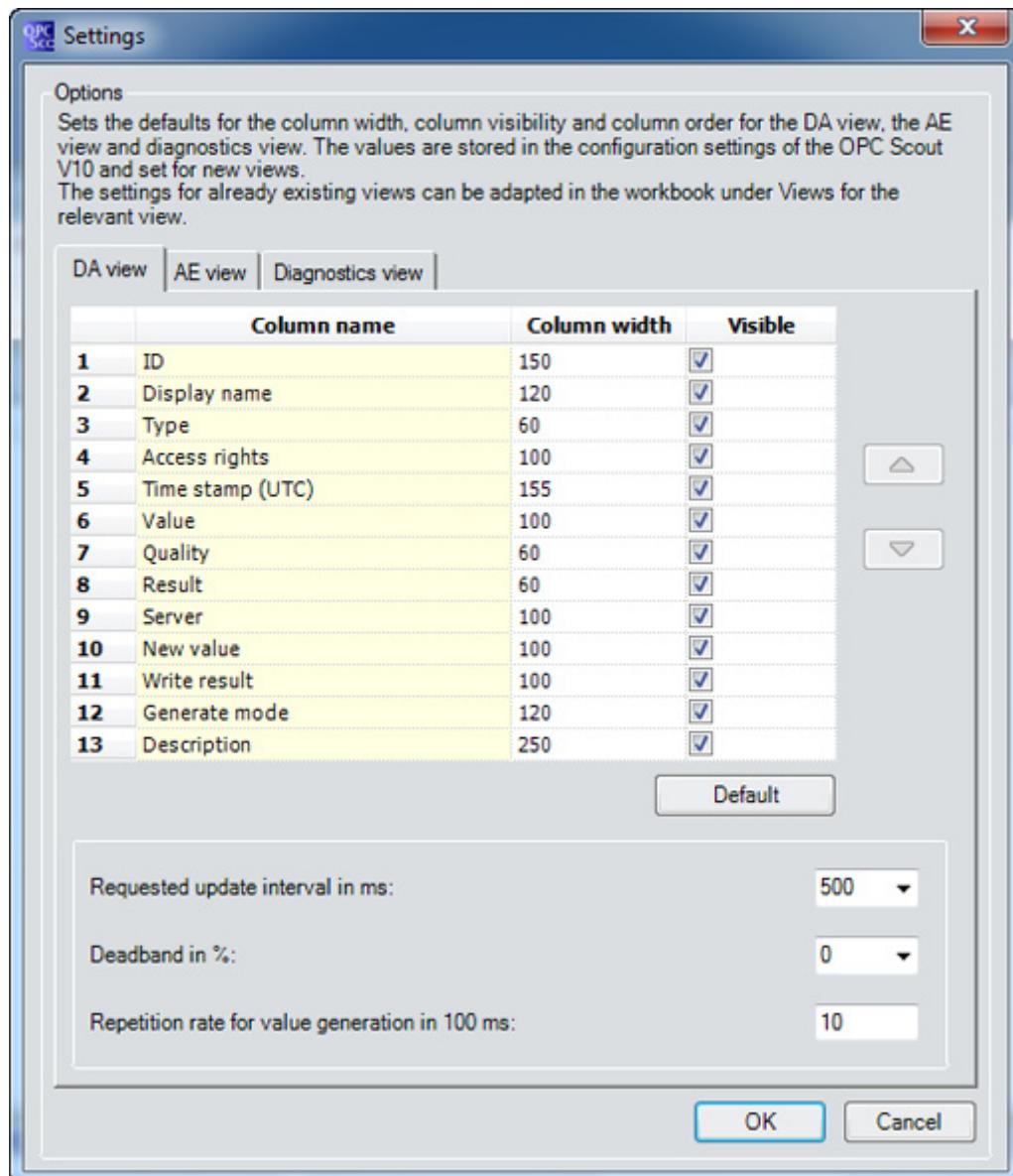
OPC Scout V10 provides the following types of view with which items and variables or alarms and events can be evaluated and processed in the project.

OPC Scout V10 makes three views available:

- DA view for displaying the data of COM, XML and UA servers.
- AE view for displaying events (Alarms & Events).
- Diagnostics view for displaying S7 connection diagnostics for OPC Data Access, XML Data Access and OPC UA.

Follow the steps below to change the settings for the views:

1. Click the "Tools" > "Options..." menu item.
Reaction: The "Settings" dialog box opens.
2. Make the basic settings for all new DA, AE and diagnostics views of the OPC Scout V10.
In the "DA view", "AE view" and "Diagnostics view" tabs, you specify the width, visibility and arrangement of the individual columns.
3. Click the "Default" button to set the default values.



DA view

In the "DA view" tab, you can also make the following settings:

Setting option	Function
Required update interval in ms	Here, you specify the update interval of the data transfer between OPC server and OPC Scout V10 in milliseconds.
Deadband in %	Here, you specify the tolerance range as a percentage of the set value range within which no value changes in the monitored items are displayed in the Scout (percent deadband).
Repetition rate for value generation in 100 ms	Here, you specify the interval at which the values of the "Generate values" function are generated in the DA view. The factor is 100 milliseconds.

4.6.8 Customize display

You can decide what information is displayed for variables in the OPC Scout V10 window.

Follow the steps below:

1. Open the "View" menu and click the "Options" command.

Reaction: The "Options" window is displayed and the "Columns to Display" tab is visible.

2. Select the information you want to have displayed for the variables in the OPC Scout V10.

If you want to set the default column width for the displayed information, select the "Standard Width" tab.

3. Select the information for which you want to specify the default width.

4. Click "OK".

Reaction: The "Options" window is closed and the selected information is displayed for the variables in the OPC Scout V10.

Meaning of the Columns

Name	Meaning
OPC item IDs	Unique name of the OPC item
Value	Value of the variable displayed in the format set in the Format column.
Format	Representation For integers, you can select between the original format, hexadecimal, or binary. The "Original" format for integers is decimal. All values that are not integers are always displayed in the original format (for example, string, date, floating point). It is not possible to change the format of these data types.
Type	Canonical data type of the OPC item.
Access	Access rights for the OPC item. ("R"= readonly, "W"= writeonly, "RW" = full access)
Quality	Qualifies the accuracy of the value. If the quality is "good", the value was acquired with certainty.
Time stamp (UTC)	Time at which the OPC Server last detected a change in the value. The time stamp is displayed in UTC format (Universal Coordinated Time). The UTC time corresponds to Greenwich Mean Time (GMT).
Write result	Result of the last write to this OPC item
Group	Name of the group containing this OPC item
Client handle	Handle of the OPC item assigned by the client.
Server handle	A handle assigned by the server
Error	Error messages involving the use of the OPC item that cannot be attributed to "Quality" or "Write Result".

4.6.9 Display attributes

You can display the attributes of individual OPC items.

Follow the steps below:

1. Select the OPCItemIDs of the variables whose attributes you want to display in the variable display.
2. Open the "Item" menu and click the "Properties" command.
Reaction: A dialog opens displaying the basic properties.
3. Click the "Query Available Properties" button.
Reaction: A dialog opens displaying all properties.

4.6.10 Change values

Using the OPC Scout V10, you can modify the values of writable variables directly.

Follow the steps below:

1. Select the variable whose value you want to change in the variable display in the main window of the OPC Scout V10.
You can also select more than one variable and assign a common new value.
2. Open the "Item" menu and click the "Enter Values" command.
Reaction: The "Write Values of Items" window opens.
3. Select the format of the value for the variable in the "Format Conversion" box.
4. Enter the required value in the "Value" box.
5. Close the window with the "OK" button.
Result: The variable receives the new value. The new value is displayed in the OPC Scout V10 window.

4.6.11 Menus of the OPC Scout V10 in detail

4.6.11.1 File menu

The "File" menu contains the following menu commands:

The menu command	has the following function
New project	Creates a new project. If a project is open, you are prompted to save it or discard changes when you exit the OPC Scout V10. If you do not save, all changes are lost. In a new project, the information area and the view area are cleared, the workbook is recreated and a DA view is opened.
Open Project	Opens an existing project.
Close project	Closes the currently open project. After you have made changes to the project, you will be asked whether you want to save these changes.
Save Project	Saves the current project. The following contents are saved: <ul style="list-style-type: none"> • The registered servers in the navigation area • The contents of the workbook • The settings in the views area for each view For the contents of a project and how to edit it, refer to Application and functions of the OPC Scout V10.
Save project as...	Saves the project under a new name or at a different location.
Last project files used	Here, you will find the projects that you opened last.
Exit	Exits the OPC Scout V10 If you have made changes and not saved them, you will be prompted to save or discard them.

4.6.11.2 Edit menu

The "Edit" menu contains the following menu commands:

The menu command	has the following function
Cut	The selected item is cut; in other words, it is deleted at its current position. With the "Paste" menu command, it can be inserted at another location or in a different DA view, more than once if required.
Copy	Copies the selected item. With the "Paste" menu command, it can be inserted at another location or in a different DA view, more than once if required.
Paste	Inserts the previously copied or cut object at the selected location.
Delete	Deletes the selected items.
Select All	Selects all items of a view.

4.6.11.3 View menu

The "View" menu contains the following menu commands:

The menu command	has the following function
Workbook	Opens the workbook.
Server Explorer	Opens the Server Explorer.
Toolbar	Here, you can set up the toolbars of the OPC Scout V10 individually by selecting them.

4.6.11.4 Server Explorer menu

The "Server Explore" menu contains the following menu commands:

The menu command	has the following function
Add selected server	With this menu command, you add a server selected previously in the navigation area to the workgroup of the project.

4.6.11.5 Workbook menu

The "Workbook" menu contains the following menu commands:

The menu command	has the following function
Remove server	Removes the server previously selected in the workbook from the workbook.
Connecting to a server	Connects a server selected previously in the workbook.
Disconnect server	Disconnects the server selected previously in the workbook. As long as the server is disconnected, you will not receive any current data from this server.
Create and add new DA view	Creates a new DA view.
Create and add new AE view	Creates a new AE view.
Create and add new diagnostics view	Creates a new diagnostics view.

4.6.11.6 Tools menu

The "Tools" menu contains the following menu commands:

The menu command	has the following function
Options ...	If you click on the "Options" menu item, the "Settings" dialog opens in which you can make the basic settings for all new DA, AE and diagnostics views of the OPC Scout V10. In the "DA view", "AE view" and "Diagnostics view" tabs, you specify the width, visibility and arrangement of the individual columns. Click the "Default" button to set the default values.

4.6.11.7 Window menu

The "Window" menu contains the following menu commands:

The menu command	has the following function
Close all windows	Closes all DA, AE and diagnostics views. The monitoring of items and value generation are stopped.
Cascade windows	Cascading of the views.
Arrange horizontally	Horizontal arrangement of the views.
Arrange vertically	Vertical arrangement of the views.
Tab view	Arrangement of the views in tabs (default).
Reset to default positions	All areas of the window are reset to the default positions.

You can select the active view in the "Window" menu.

4.6.11.8 Help menu

The "Help" menu contains the following menu commands:

The menu command	has the following function
Contents	Opens the online help.
About	Shows version information of the OPC Scout V10.
Language settings	<p>Here, you can change over the language of the OPC Scout V10.</p> <ul style="list-style-type: none"> • English • German <p>Changing the language requires a restart of the OPC Scout V10 and this is initiated automatically. When you confirm the restart, you will be asked whether you want to save changes made in your project before you close the OPC Scout V10.</p> <p>When it restarts, the OPC Scout V10 opens with a new project.</p>

4.7 DCOM configuration OPC client/server operation

Description

DCOM must be configured to allow network access by an OPC client to an OPC server.

- For a client to utilize a COM object on another PC, the properties of the COM object must be configured.
- The Windows system program "dcomcnfg" is used to configure DCOM and the required COM objects.

Below, you will find the settings required and examples of client/server mode of the SIMATIC NET OPC server.

We recommend that you keep to the following order:

1. Enable network discovery. (→ 4.6.1)
2. First close your OPC applications and OPC servers with the "Communication Settings" program in the branch "Exit OPC server".
3. Make the initial setting of the OPC-DCOM configuration with the "Communication Settings" program.
A general share should be set up in the "Security" branch of the "Communication Settings" program. This combines all the necessary general single steps in one action. (→ 4.6.2)
4. For the required users of SIMATIC NET OPC DCOM, it is advisable to use the existing user group SIMATIC NET.
Add the required users of the SIMATIC NET user group in the user management. (→ 4.6.3)
5. Make the settings with the "dcomcnfg" system program.
The possible settings and functionality depend on whether you are active in a domain or workgroup environment. (→ 4.6.4 and 4.6.5)
Examples of typical application configurations: (→ 4.6.6, 4.6.7 and 4.6.8)
6. Then restart your computer.

In this section, you will find information in the form of an example of configuring the client computer and configuring the PC with the OPC server for the situation where exactly one client is connected to the OPC server that is running on a different PC.

If you want to use more than one OPC server from a client, refer to the DCOM documentation.

4.7.1 Enabling network discovery (as of Windows 7)

For the various network profiles of Windows 7, (public, home or work, domain,...), network discovery and file sharing must be enabled to allow mutual visibility for DCOM operation.

Follow the steps below:

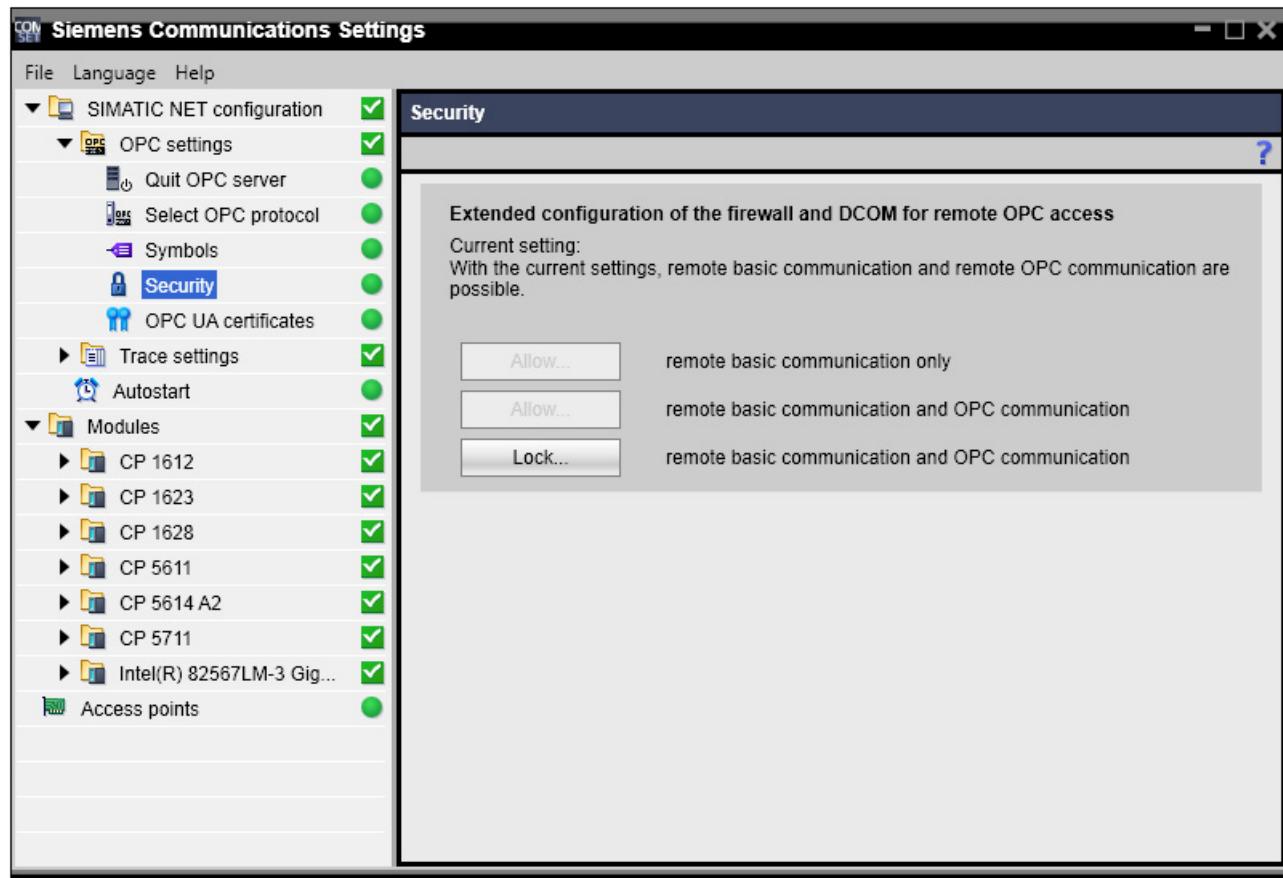
1. Go to the "Advanced sharing settings" menu (Start menu "Start" > "Control Panel" > "Network and Sharing Center" > "Advanced sharing settings").
2. Select "Turn on network discovery" and "Turn on file and printer sharing". The computers should then be able to see each other under "Network" in the Explorer and should be reachable with a "PING".

4.7.2 Enabling the DCOM configuration "Security" for OPC client/server operation

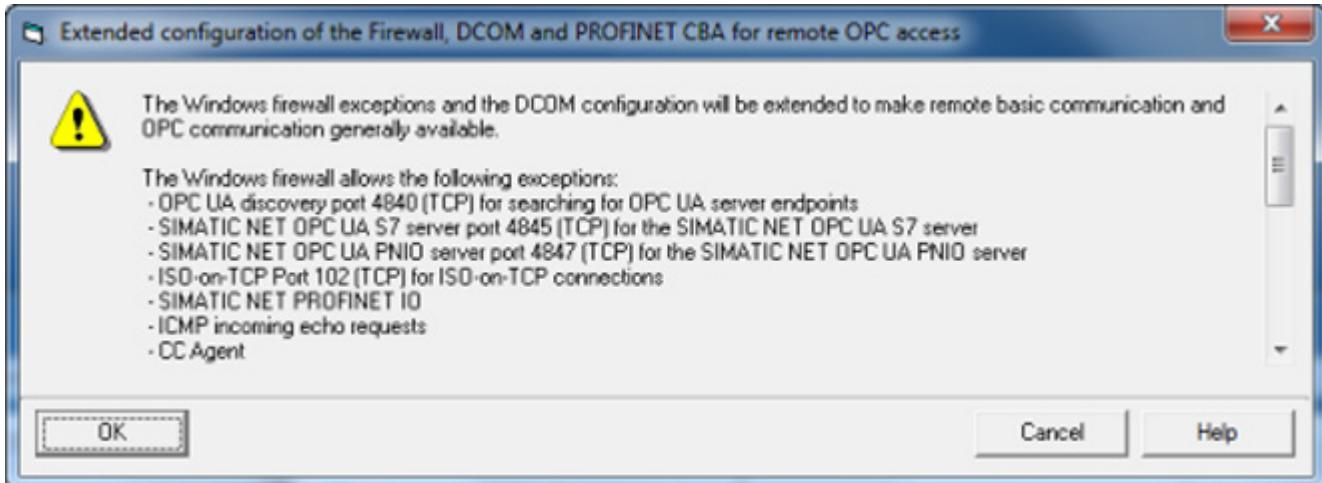
"DCOM configuration security" for OPC client-server mode can be set in advance with the "Communication Settings" program.

Follow the steps below:

1. Start the "Communication Settings" program (Start menu "Start" > "..." > "SIMATIC NET" > "Communication Settings").
2. Select the "Security" setting in the tree structure ("SIMATIC NET Configuration" > "OPC Settings" > "Security").



3. In the detailed window, click the "Allow..." button of the remote basic and OPC communication to allow the general settings of remote OPC DCOM communication. The message dialog "Advanced Configuration of Firewall, DCOM and PROFINET CBA for remote OPC access" with the list of actions taken is opened.



Note

Remember that the Allow function also affects applications, for example for DCOM port 135, that also use this access method.

4. Confirm with "OK".

4.7.3 Configuration of the SIMATIC NET user group

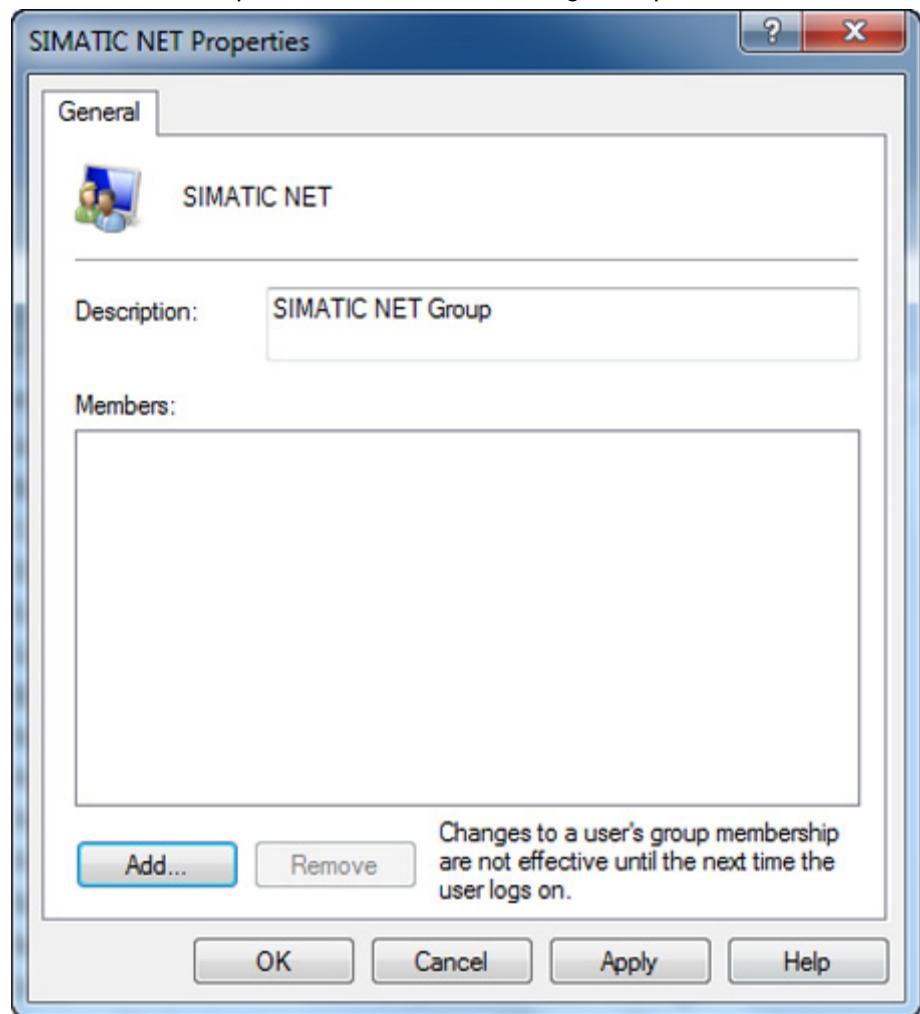
For the required users of SIMATIC NET OPC DCOM, it is advisable to use the existing user group SIMATIC NET.

Follow the steps below:

1. Go to the "Computer Management" menu (Start menu "Start" > "..." > "Computer Management").
2. In the tree structure of Computer Management, select "System Tools" > "Local Users and Groups" > "Groups".
3. In the detailed window, select the "SIMATIC NET" group.

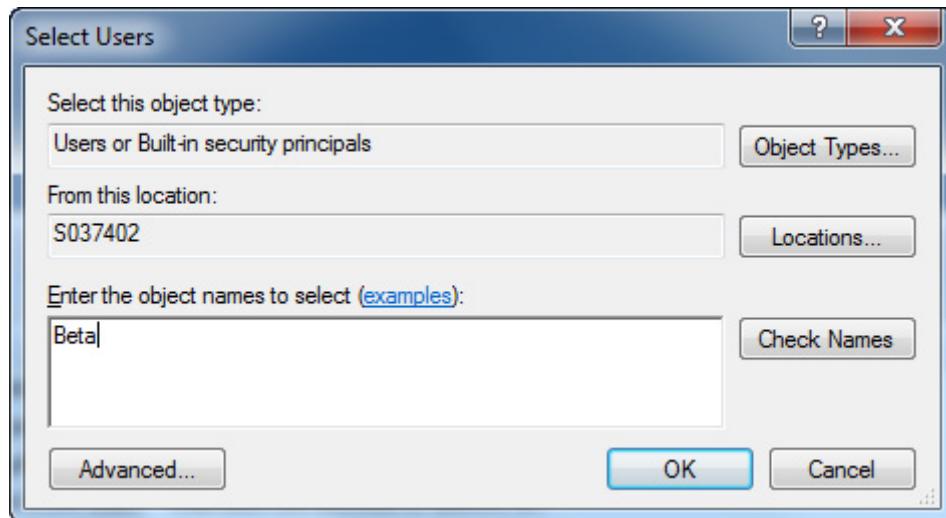
4. Select the "Properties" entry in the shortcut menu.

Reaction: The "Properties SIMATIC NET" dialog box opens.

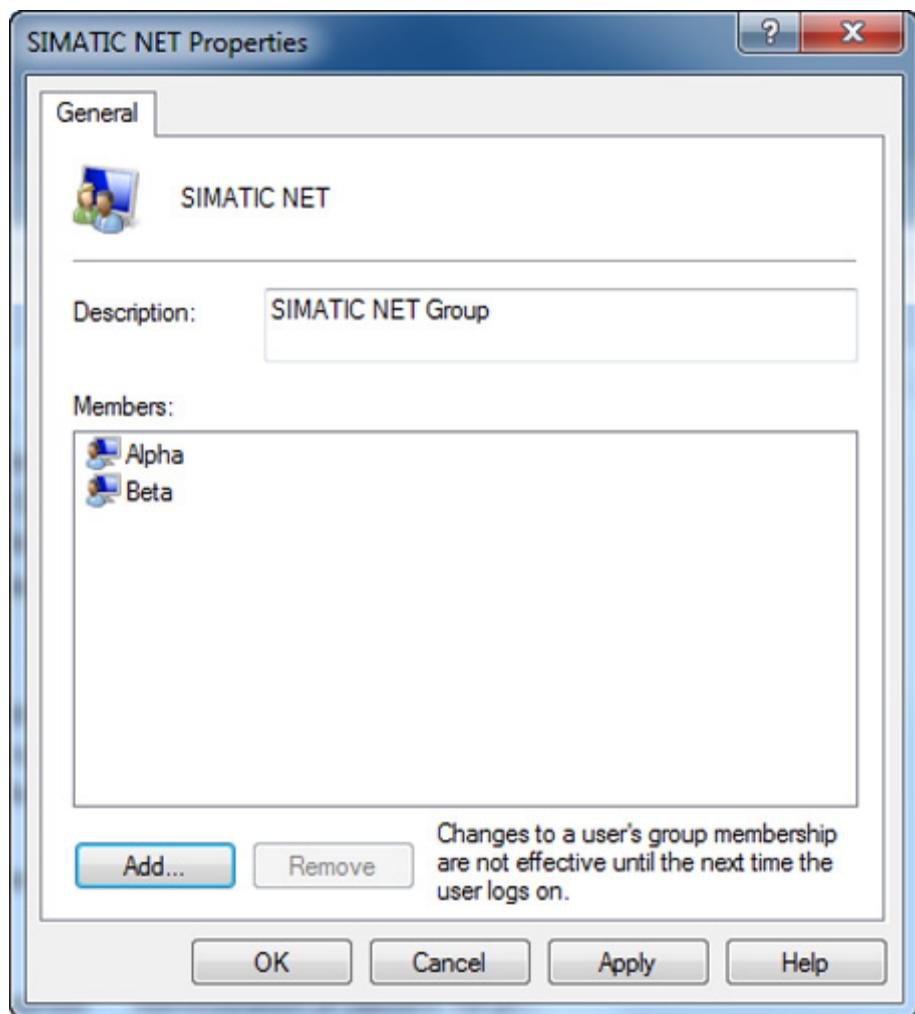


5. Click the "Add..." button.

Reaction: The "Select Users" dialog box opens.



6. Add the required DCOM users to the group, here, for example user "Alpha", member of the "Administrators" group and user "Beta" member of the "Users" group.



The group can now be selected by the COM server for launch and access permissions for DCOM configuration.

4.7.4 Turning off a COM server

Preventing OPC communication via COM

If for security reasons you do not want to allow any classic OPC communication via COM in addition to OPC UA communication, you can make this setting using the system program "dcomcnfg".

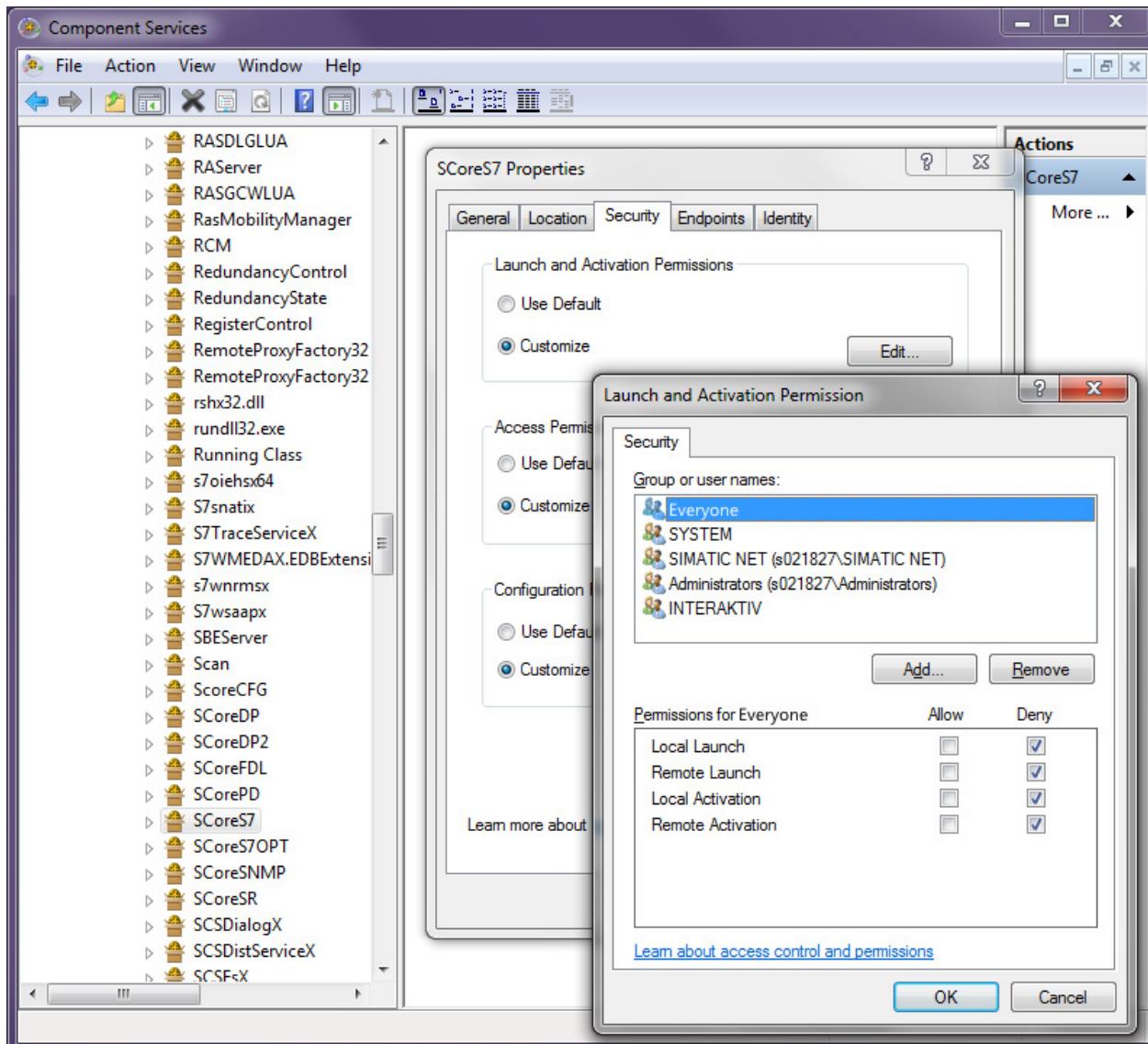
Follow the steps outlined below:

1. Start the system program "dcomcnfg" and go to "Component Services > Computers > My Computer > DCOM Config", where all COM servers of this computer are listed.
2. Select the relevant COM server and open its properties dialog box to prevent COM communication with one of the OPC protocol servers. The following table provides an overview showing which server is responsible for which communications protocol:

Communications protocol	COM server
S7	SCoreS7
DP	SCoreDP
SR	SCoreSR
PROFINET IO	SIMATIC NET core server PROFINET IO

3. In the properties dialog box of the COM server select the "Security" tab and there under "Launch and Activation Permissions", select the option "Customize".
4. With "Edit..." open the dialog box for setting the permissions. If the user group "Everyone" does not yet exist in "Groups and user names:".

5. Select the "Everyone" user group and set the selection for "Local Launch", "Remote Launch", "Local Activation" and "Remote Activation" to "Deny".



6. Click the "OK" button and answer the prompt for confirmation the with "Yes".
7. Then confirm the following properties dialog box with "OK". The launch and activation of the COM server is now explicitly denied for every user.

Note

Explicit "Deny" settings are also not overwritten by the OPC security settings with the "Communication Settings" program. These settings can only be reset using the "dcomcnfg" system program. To do this, set the settings in the "Everyone" user group to "Allow" or remove the "Everyone" user group. Then make the required OPC security settings with the "Communication Settings" program.

4.7.5 Functions of the "dcomcnfg" system program for the computer

This section describes the functions of the "dcomcnfg" system program for the computer.

NOTICE

Remember that after installing the SIMATIC NET PC software and enabling it as described in the earlier sections, the standard setting will assume an open system.

It is the responsibility of the user to adapt the security settings to meet the actual requirements.

4.7.5.1 Starting the "dcomcnfg" system program

With Windows XP + SP2 and Windows 2003 Server, follow the steps below:

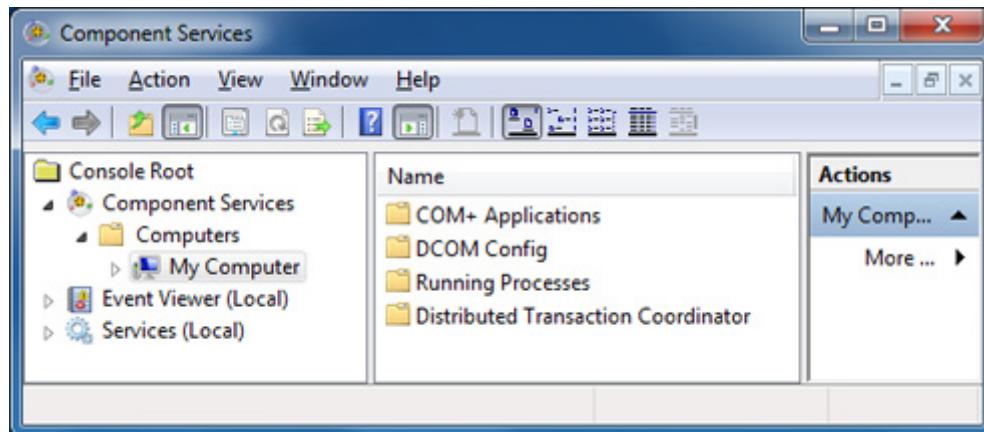
1. Type in "dcomcnfg" (Start menu "Start" > "Run" > Open: "dcomcnfg").
Confirm with "OK".
Continue at 2.

With Windows Vista, Windows Server 2008 and Windows Server 2012, follow the steps below:

1. Type in "dcomcnfg" (Start menu "Start" > "Start Search" > "dcomcnfg").
Confirm with "OK".
Continue at 2.

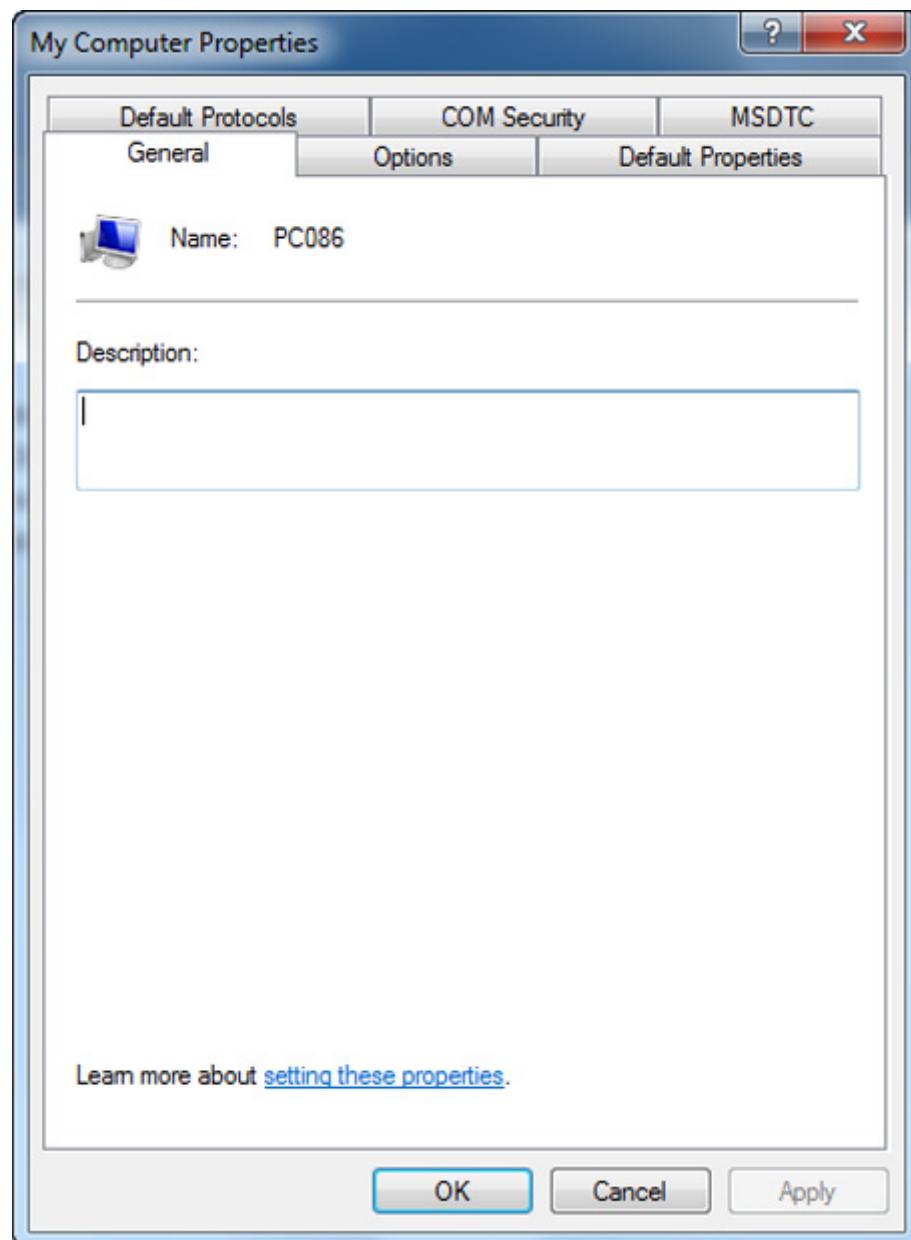
With Windows 7 and Windows 8, follow the steps below:

1. Type in "dcomcnfg" (Start menu "Start" > "Start Search" > "dcomcnfg").
Select the program from the list.
2. Open "My Computer" in the tree structure on the left ("Component Services" > "Computer" >"My Computer").
3. Right-click to open the shortcut menu and click "Properties".



Reaction: The "My Computer Properties" dialog opens with the following tabs:

- General
- Options
- Default Properties
- Default Protocols
- COM Security
- MSDTC



Note

The "General", "Options" and "MSDTC" tabs are not required for commissioning the DCOM protocol and not discussed further here.

4.7.5.2 "Default Properties" tab

Description of the settings

In the "Default Properties" tab, you specify basic properties of DCOM.

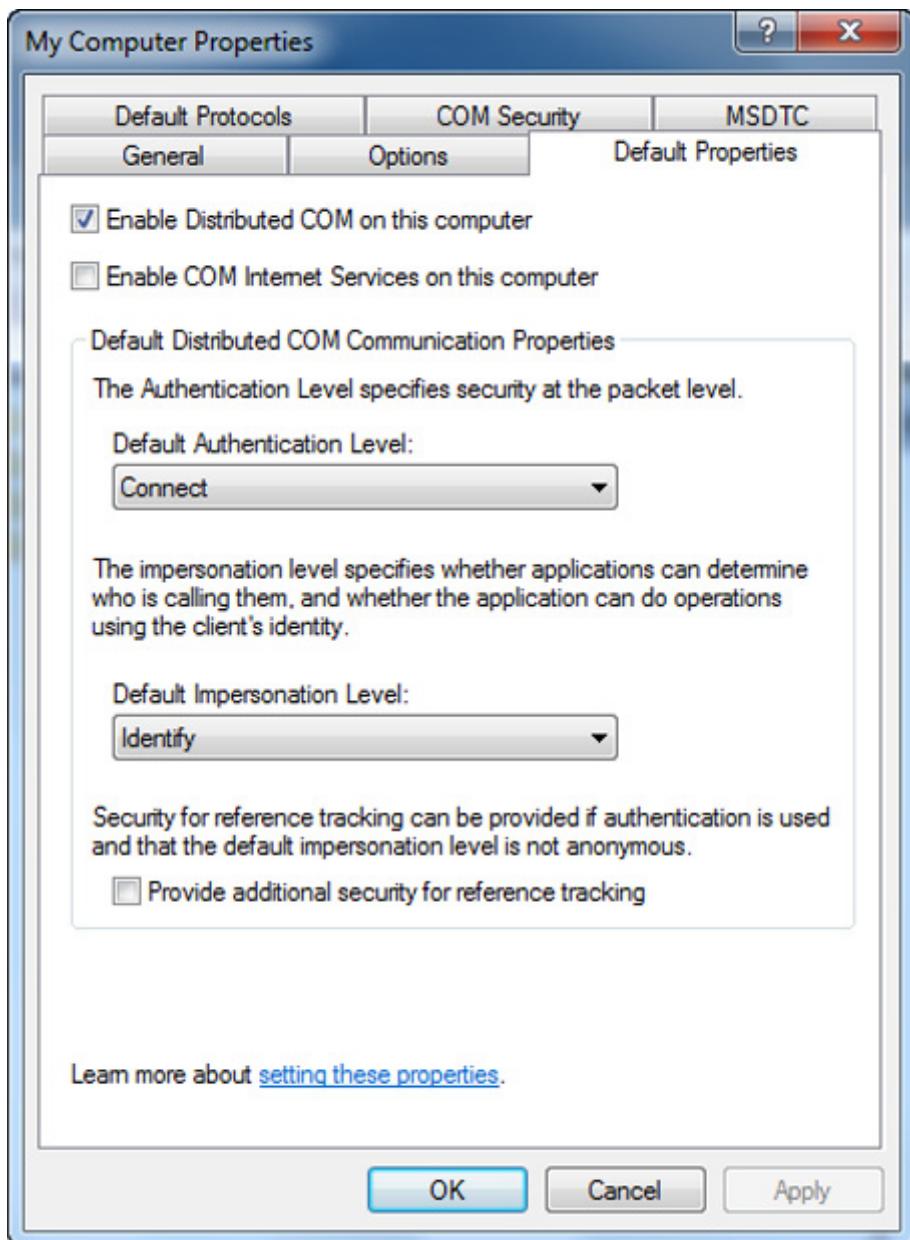
Operation on a domain server or in a workgroup

Note

The settings made in the DCOM configuration depend on whether the computer with the OPC Server is logged on in a domain or is operated within a workgroup.

If it operates within a domain, the server computer can check the configured rights of other accounts over the network (authentication). This is only possible when the accounts of the user are created with this domain.

If there is a domain controller, it is advisable to work in a domain.



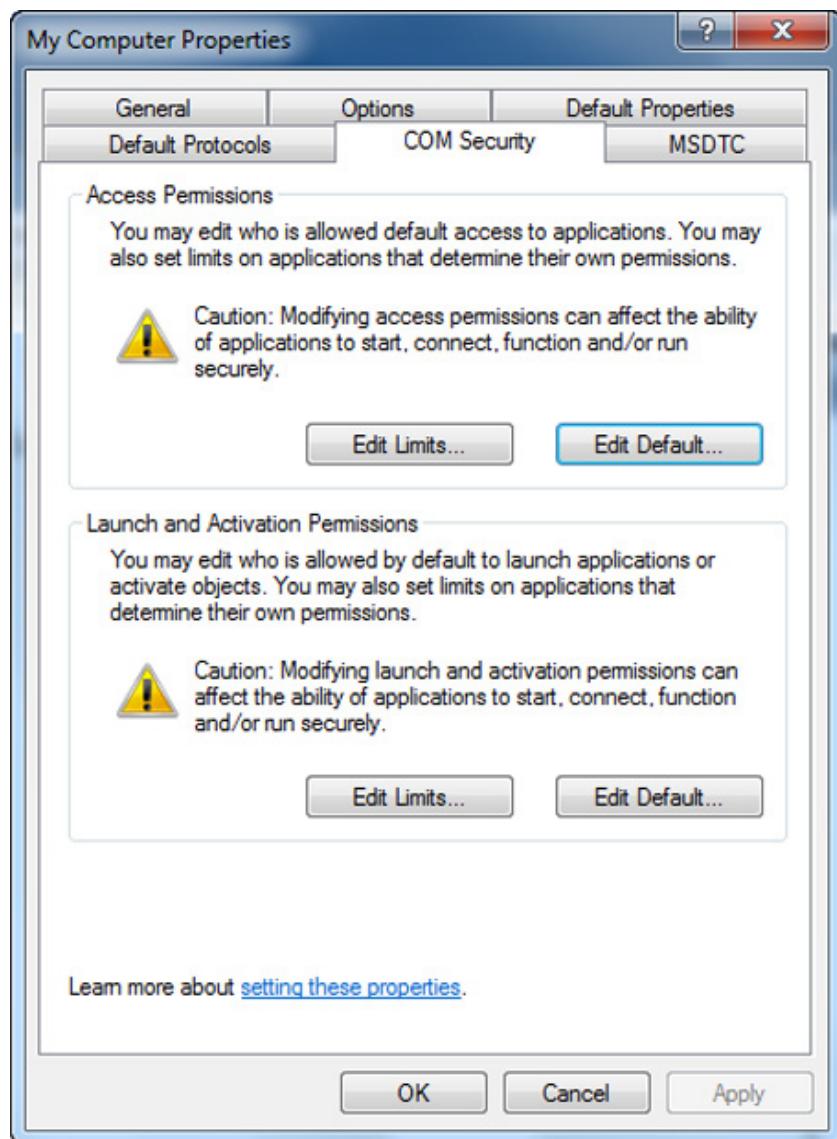
Follow the steps below:

1. For the sake of security, set the default authentication level to "Connect" and the default impersonation level to "Identify".
2. Select the "Enable Distributed COM on this Computer" check box.

4.7.5.3 "COM Security" tab**Description of the settings**

With the "COM Security" tab, you specify the permissions for DCOM. These properties are used by all COM objects that do not have their own settings.

These settings make sure that only clients with the correct permissions can use the server.

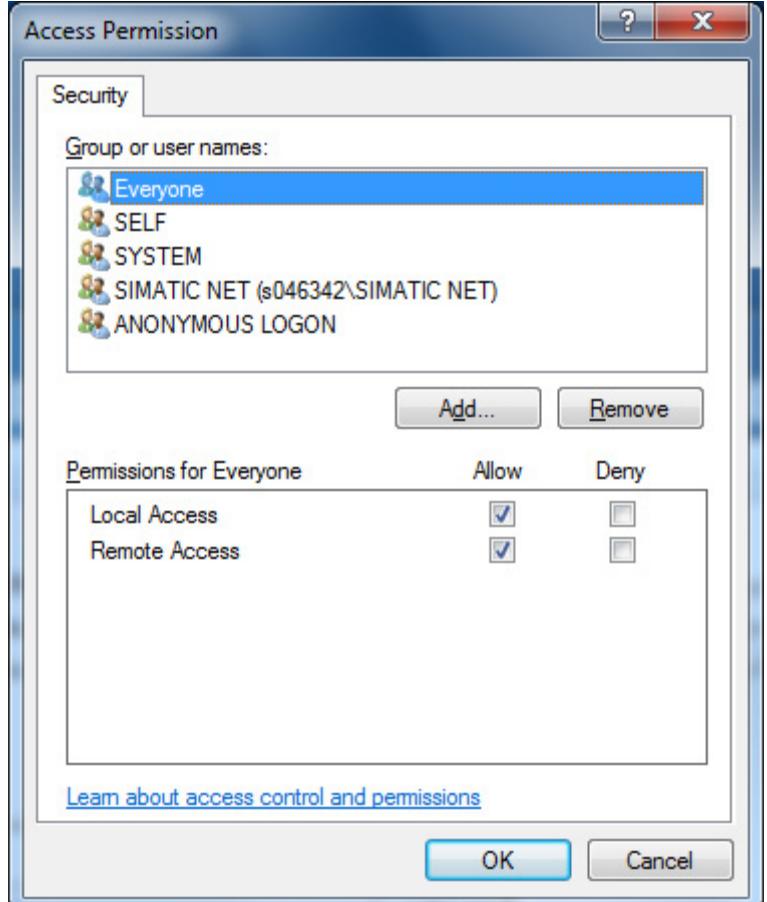
**Note**

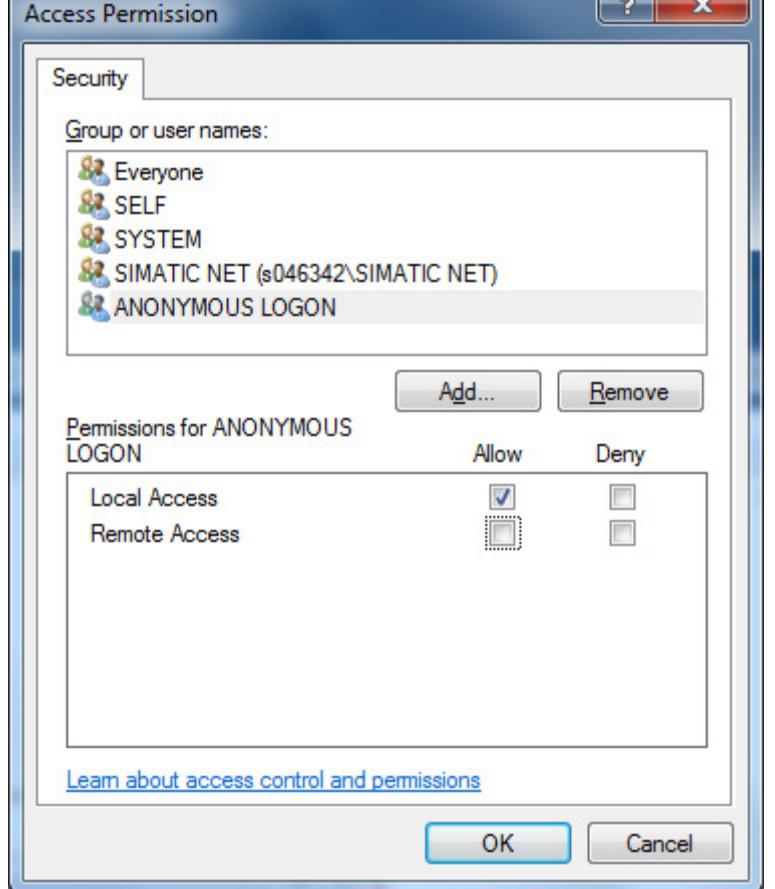
- The settings listed in this description guarantee simple installation and startup of the DCOM protocol. Some of the security settings of the operating system are reduced. To meet stricter security requirements, you must increase the settings according to the DCOM guidelines.
- The settings are different if you use domains and workgroups.

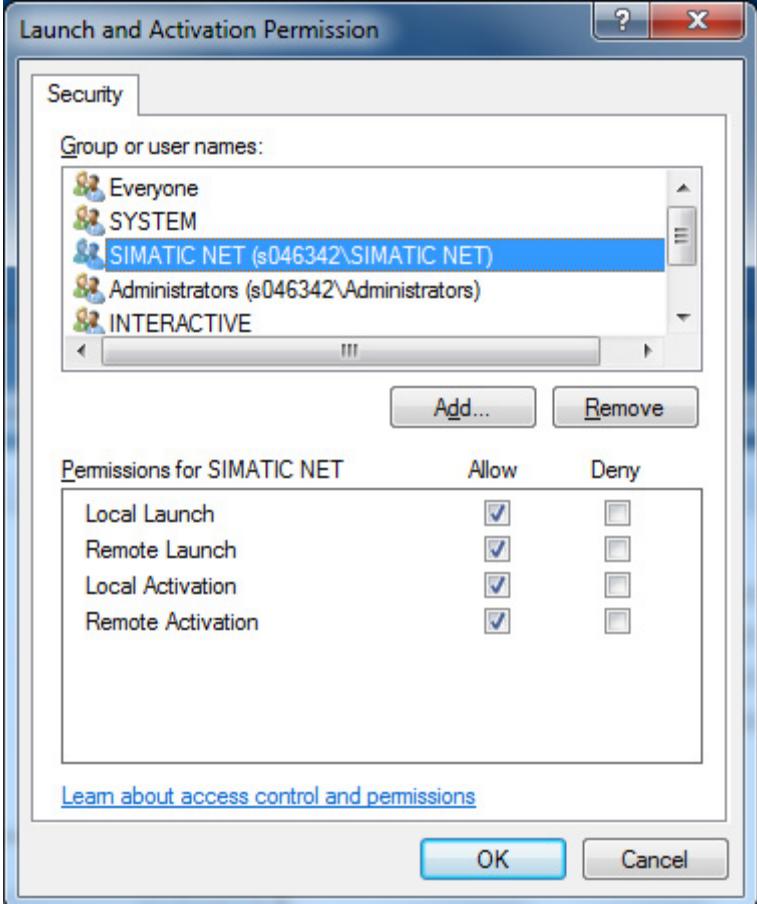
Note

- If you change the security settings, the system must be restarted to activate the changes.
- The settings are described in Example - Windows domain mode (Page 401) , Example - Windows workgroups mode (Page 420) and Example - Client only computer mode (Page 428).

The following default permissions are relevant in conjunction with DCOM:

Default permissions	Meaning
Access permissions with the "Edit Default..." button	<p>The default access permissions for all COM objects specify which accounts are allowed to access the object; in other words, call the methods and which accounts are explicitly denied access.</p>  <p>The screenshot shows the 'Access Permission' dialog box. In the 'Security' tab, 'Everyone' is selected in the group or user names list. Under 'Permissions for Everyone', 'Local Access' has 'Allow' checked and 'Deny' unchecked; 'Remote Access' has 'Allow' checked and 'Deny' checked. Buttons for 'OK' and 'Cancel' are at the bottom.</p>

Default permissions	Meaning
Access permission limits with the "Edit Limits..." button	<p>Here, the absolute limits for access permissions must be expanded.</p>  <p>The screenshot shows the 'Access Permission' dialog box. In the 'Security' tab, under 'Group or user names', 'ANONYMOUS LOGON' is selected. Below it, there are two rows of permissions: 'Local Access' (Allow checked, Deny unchecked) and 'Remote Access' (Allow unchecked, Deny checked). At the bottom, there is a link 'Learn about access control and permissions'.</p>

Default permissions	Meaning															
Launch and activation permissions with the "Edit Default..." button	<p>The default launch and activation permissions for all COM objects specify which accounts have the right to create the object and which accounts are explicitly denied this permission.</p>  <table border="1"> <thead> <tr> <th>Permissions for SIMATIC NET</th> <th>Allow</th> <th>Deny</th> </tr> </thead> <tbody> <tr> <td>Local Launch</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Remote Launch</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Local Activation</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Remote Activation</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>	Permissions for SIMATIC NET	Allow	Deny	Local Launch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Remote Launch	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Local Activation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Remote Activation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Permissions for SIMATIC NET	Allow	Deny														
Local Launch	<input checked="" type="checkbox"/>	<input type="checkbox"/>														
Remote Launch	<input checked="" type="checkbox"/>	<input type="checkbox"/>														
Local Activation	<input checked="" type="checkbox"/>	<input type="checkbox"/>														
Remote Activation	<input checked="" type="checkbox"/>	<input type="checkbox"/>														

These permissions can be set individually for each object and the default properties are then ignored.

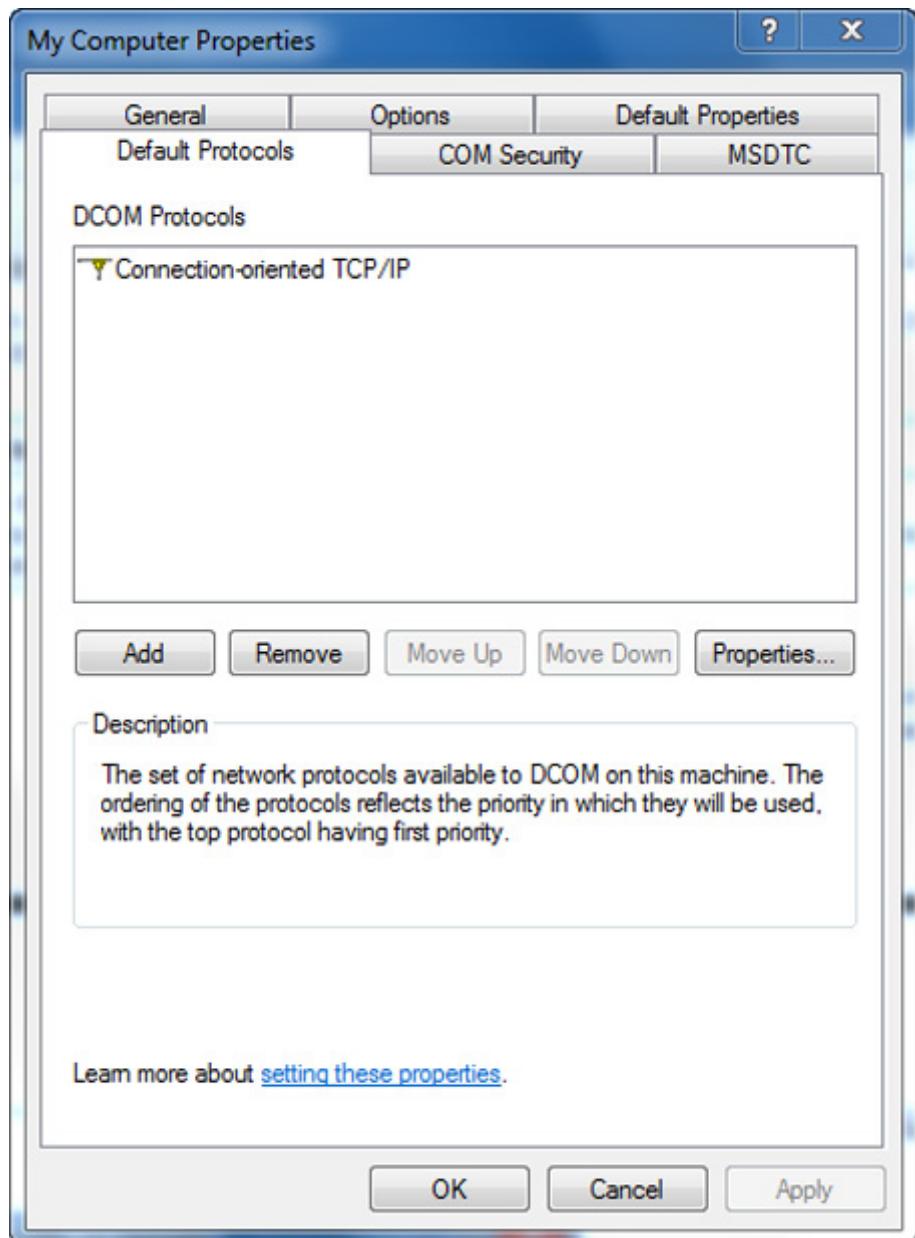
4.7.5.4 "Default Protocols" tab

Description of the settings

- In the "Default Protocols" tab, you specify the network protocols that are available for DCOM.
- The priority is set by the order of the protocols in the dialog. DCOM uses the top protocol if a protocol is available.

Note

To operate the PROFINET CBA OPC server, the "Connection-oriented TCP/IP" protocol must be at the top of the list of DCOM protocols.
If necessary, move the protocol to the top position.



4.7.6 Functions of the "dcomcnfg" system program for the DCOM configuration of the OPC server

This section describes the functions of the "dcomcnfg" system program for the DCOM configuration of the OPC server.

Description of the settings

1. First open the "DCOM Configuration" folder in "My Computer" to display all the COM objects available on the PC.
2. Select the COM object "OPC.SimaticNET" to configure the individual properties and select "Properties" in the shortcut menu.

Note

The Data Access OPC server for SIMATIC NET is listed as "OPC.SimaticNET".

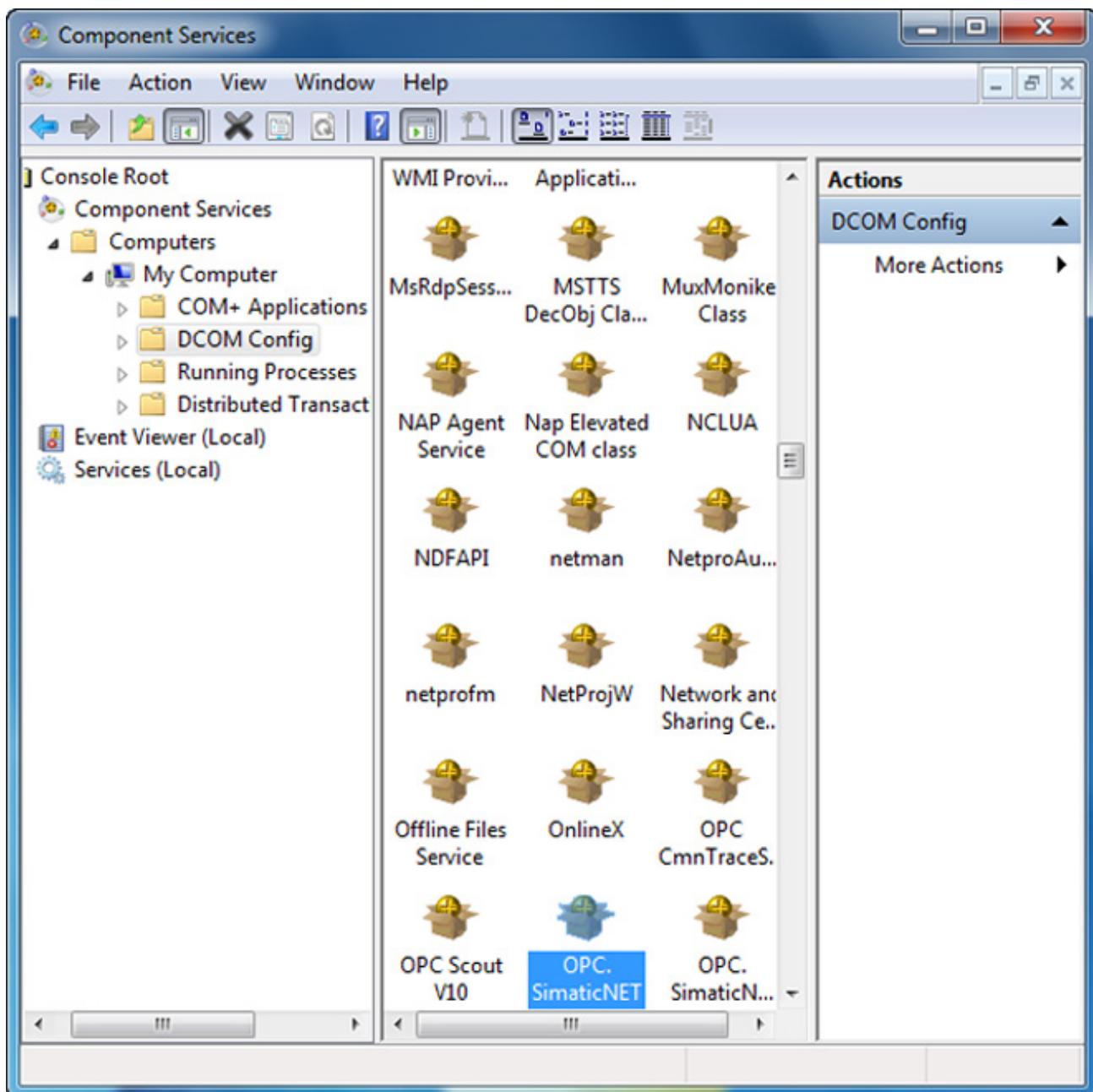
Note

The following description also applies analogously to the other OPC servers from SIMATIC NET listed below.

- OPC.SimaticNET.DP: High-speed data access server for the DP protocol
- OPC.SimaticNET.PROFIdrive: Data access server for PROFIdrive (bus server)
- OPC.SimaticNETAlarms: Alarms and events server for S7 protocol

4.7 DCOM configuration OPC client/server operation

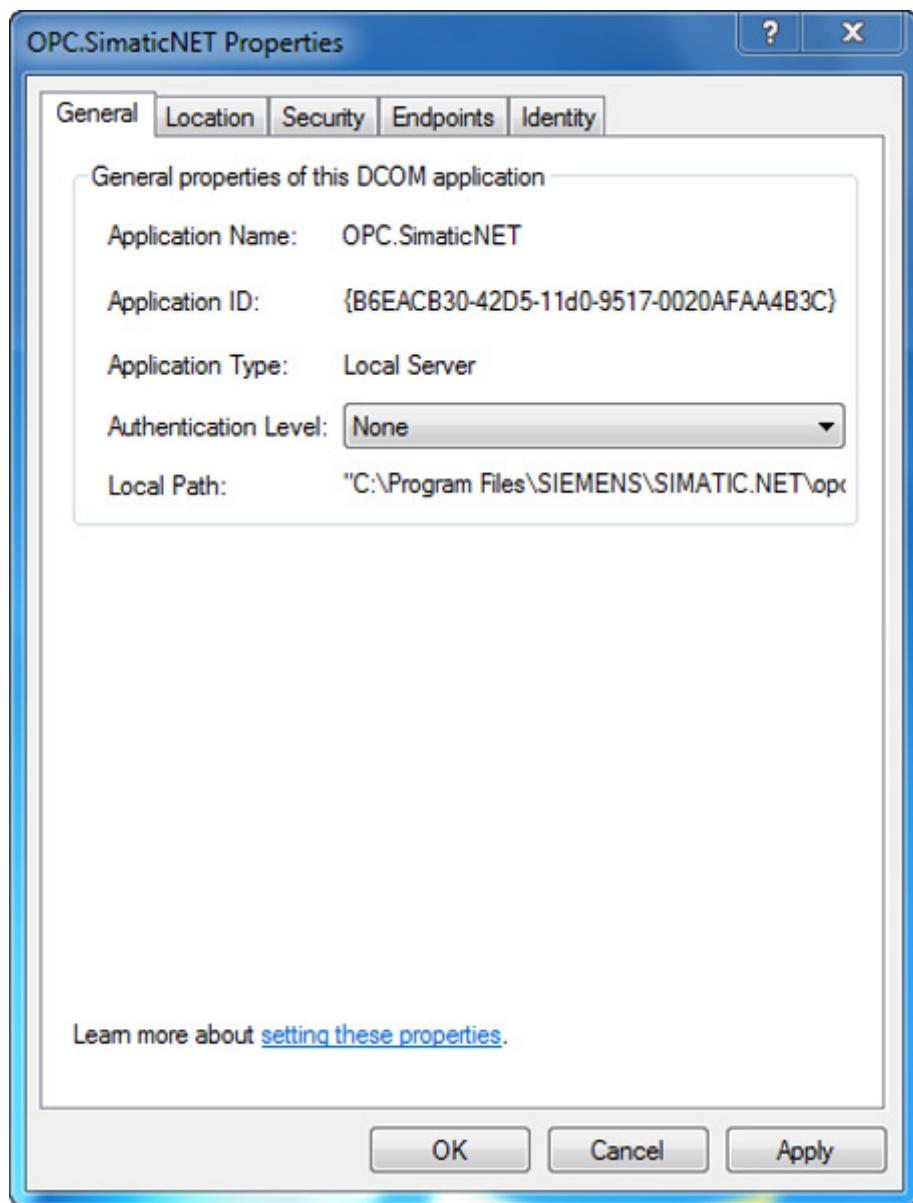
- OPC.SimaticNETAlarmsSNMP: Alarms and events server for SNMP protocol
- OPC.SimaticNET.AE: Alarms and events server for S7 and SNMP protocol



4.7.6.1 "General" tab

Description of the settings

On the OPC server, the default setting assumes an open system with the authentication level "None". It is up to the user to set the system to meet higher security requirements.



If you select the "Security" tab with this authentication level, you can adapt the permissions in the "Properties of OPC.SimaticNET - Security" dialog.

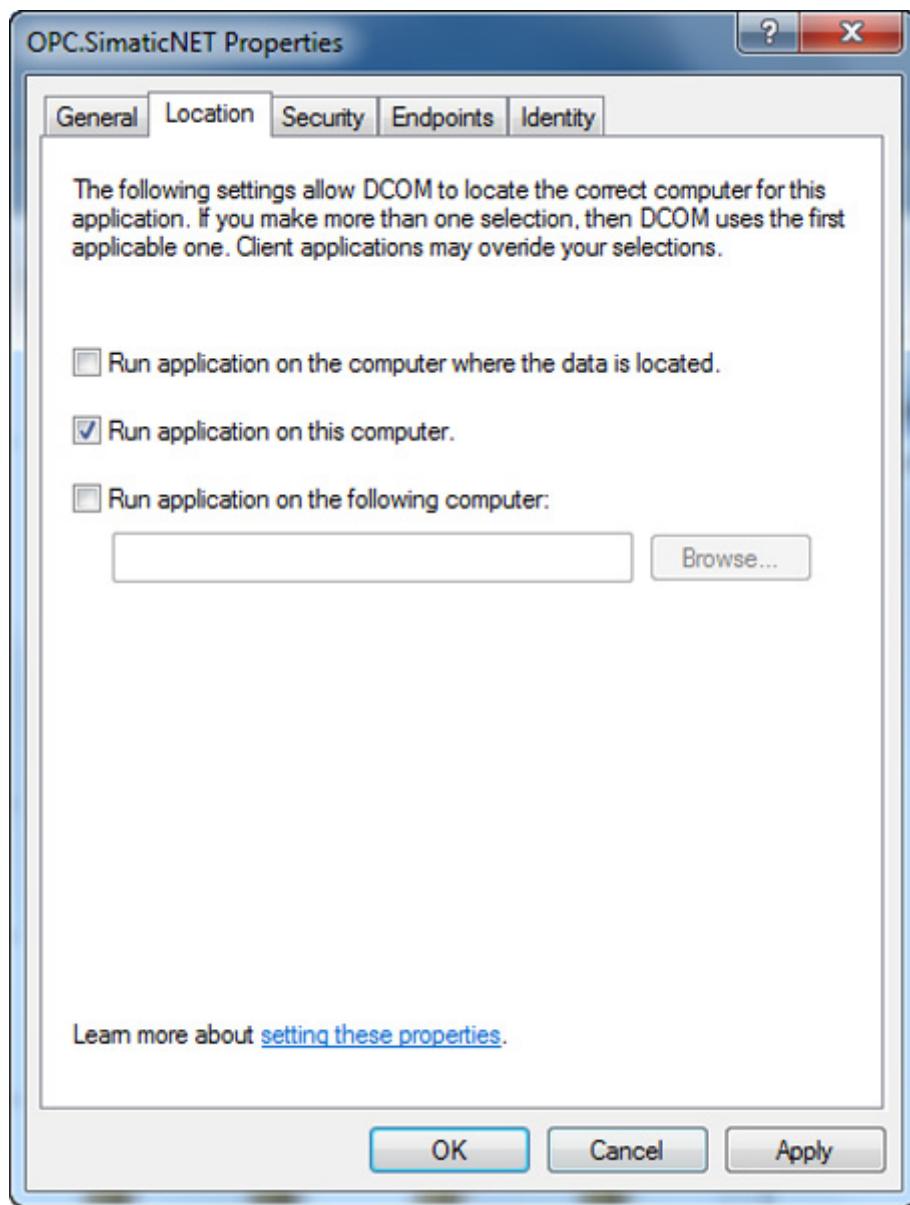
See also

"Security" tab (Page 394)

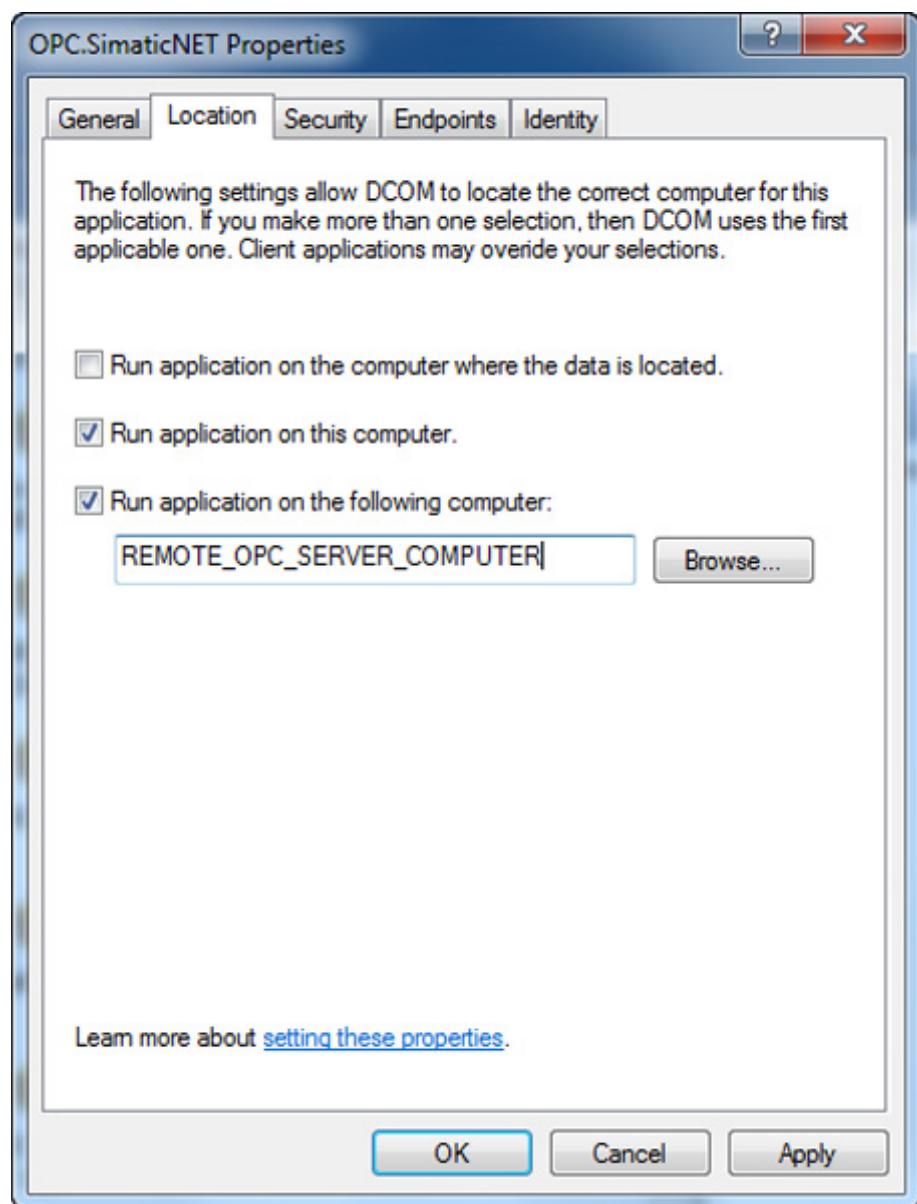
4.7.6.2 "Location" tab

Description of the settings

In the "Location" tab, you specify the PC on which the server is started. To configure the PC with the OPC server, select the "Run application on this computer" check box.



To operate as pure OPC client computer, see "Example - Client only computer mode (Page 428)", a remote PC with SIMATIC NET OPC server can also be selected. If this is the case, check the "Run application on the following computer" box and select the required PC with the "Browse..." button or type in the PC name.



4.7.6.3 "Identity" tab

Description of the settings

The settings made in the "Identity" tab specify the account to be accessed to check the permissions of the user of the object. The following settings are possible in this tab:

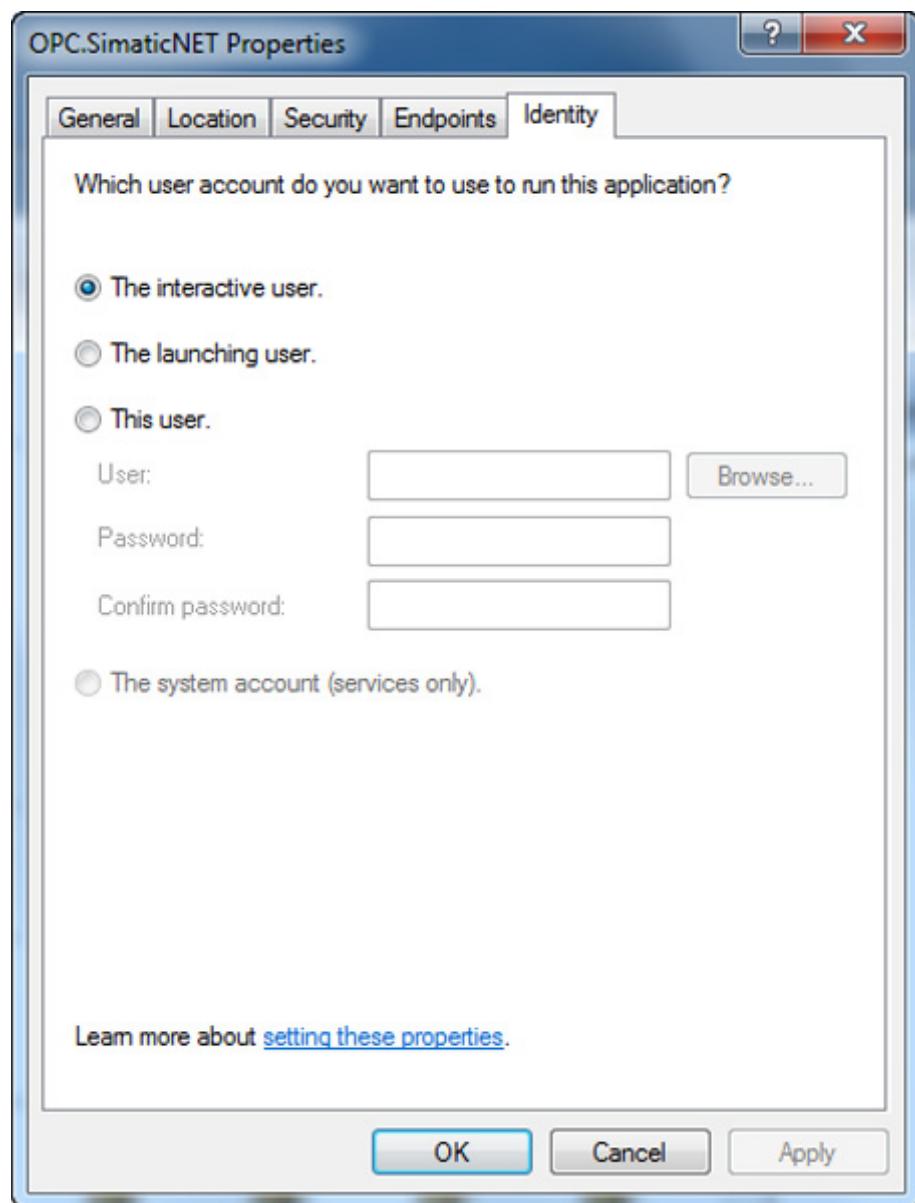
- "The interactive user"
- "The Launching User"
- "This User"

The following table describes the meaning of the identity settings:

Setting	Meaning
"The interactive user"	<p>The account of the user currently logged on at the PC is used. If, however, no user uses the computer, there is no interactive user and the COM object cannot be created. If you operate without a logged-on user, use the "This user" setting.</p> <p>"The interactive user" is the default setting for the OPC server for SIMATIC NET.</p>
"The Launching User"	<p>The account of the user that launched the OPC client is used. This user must then also have the required permissions; in other words, must be entered in the "Security" tab. The user must also have the default permissions entered in the user group on this PC, in other words must belong to the user group.</p> <p>Note: This mode must not be used with the OPC server for SIMATIC NET, since the OPC server would otherwise be started more than once by different user accounts and this is not permitted.</p>
"This User"	<p>The account of a specified user is used. This user must have the required permissions; in other words, must be entered in the "Security" tab. The user must also have the default permissions entered in the user group on this PC, in other words must belong to the user group.</p> <p>This setting must be used to operate the OPC server for SIMATIC NET (logged-on users):</p> <ul style="list-style-type: none"> • Multiterminal mode, more than one user logged on. • Server mode, user not logged on - Use the "This user" setting described here for Multiterminal and server mode if there is no interactive PC station user logged on.

"The interactive user" mode

In this situation, a user with suitable permissions is logged on. This user starts an OPC client with its rights. In this OPC application, the local OPC server is started and executed in the user context of the logged on interactive user.



"This User" mode (server or service mode)

In this situation, the PC has booted but no user is logged on.
The system then displays the logon dialog.

- In this case, in "This user" configure the user account with the rights with which the OPC server will be executed.
- Select a user with adequate launch and access permissions for the OPC server.

The OPC server can then be operated as a server to which one or more remote OPC clients with users with differing permissions have access over DCOM (server mode).

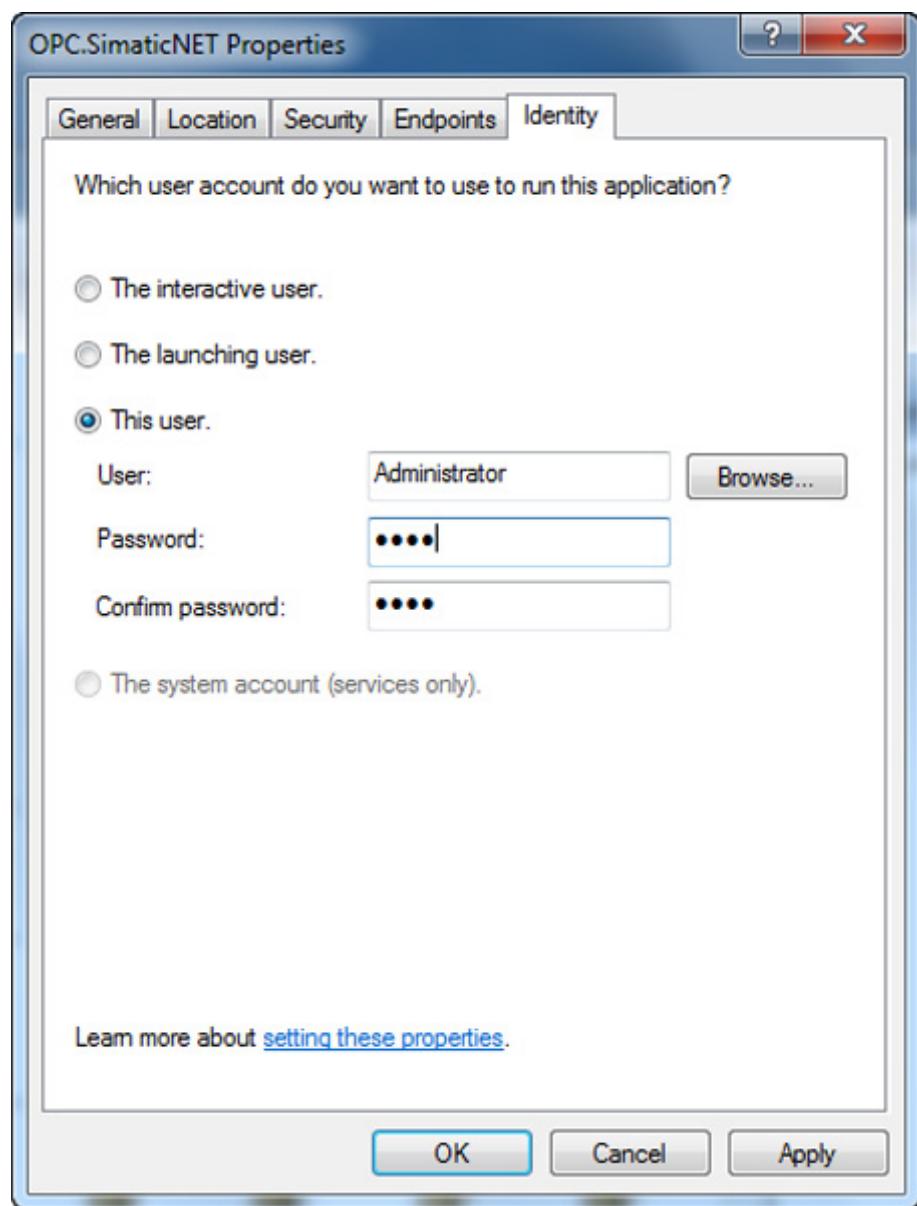
The OPC server can also be started and operated by a local service and the OPC server is then started automatically without a logged-on user when the PC boots (service mode).

Such an OPC application that is implemented as a service can also be started automatically by the SIMATIC NET configuration service after the SIMATIC PC station has booted.

Enter the values in the "Services to be started after starting at the PC station" dialog (Start menu "Start" > "..." > "SIMATIC NET" > "Communication Settings" and then in "SIMATIC NET Configuration" > "Applications" > "Autostart" > "Services which should be started after start-up of the PC station").

With the "This user" setting, the OPC server is started and executed exclusively in this user context even when no user is logged on.

With this setting, multiple instances of the OPC server are prevented since this would lead to illegal and inconsistent access.



"This User" mode (multiterminal server mode)

In this situation, several users are logged on at the terminal server and want to use the OPC server at the same time (multiterminal server mode). In this case, the OPC server must nevertheless be configured as "This user".

Select a user with adequate launch and access permissions for the OPC server. This does not need to be one of the logged-on users.

With the "This user", setting, the OPC server is launched and executed only in this user context even when several users are logged on. This setting prevents multiple instances of the OPC server since this would lead to illegal and inconsistent access.

4.7.6.4 "Security" tab

Description of the settings

You specify the access permissions for the OPC server in the "Security" tab.

For the three aspects relevant to COM objects, you can either use the default permissions or adapted permissions for the selected COM object.

Specifying the default permissions

The users that are allowed to use the OPC server must be entered in the default access permissions, launch permissions, and configuration permissions. Several users have been entered in the following examples of the required permissions.

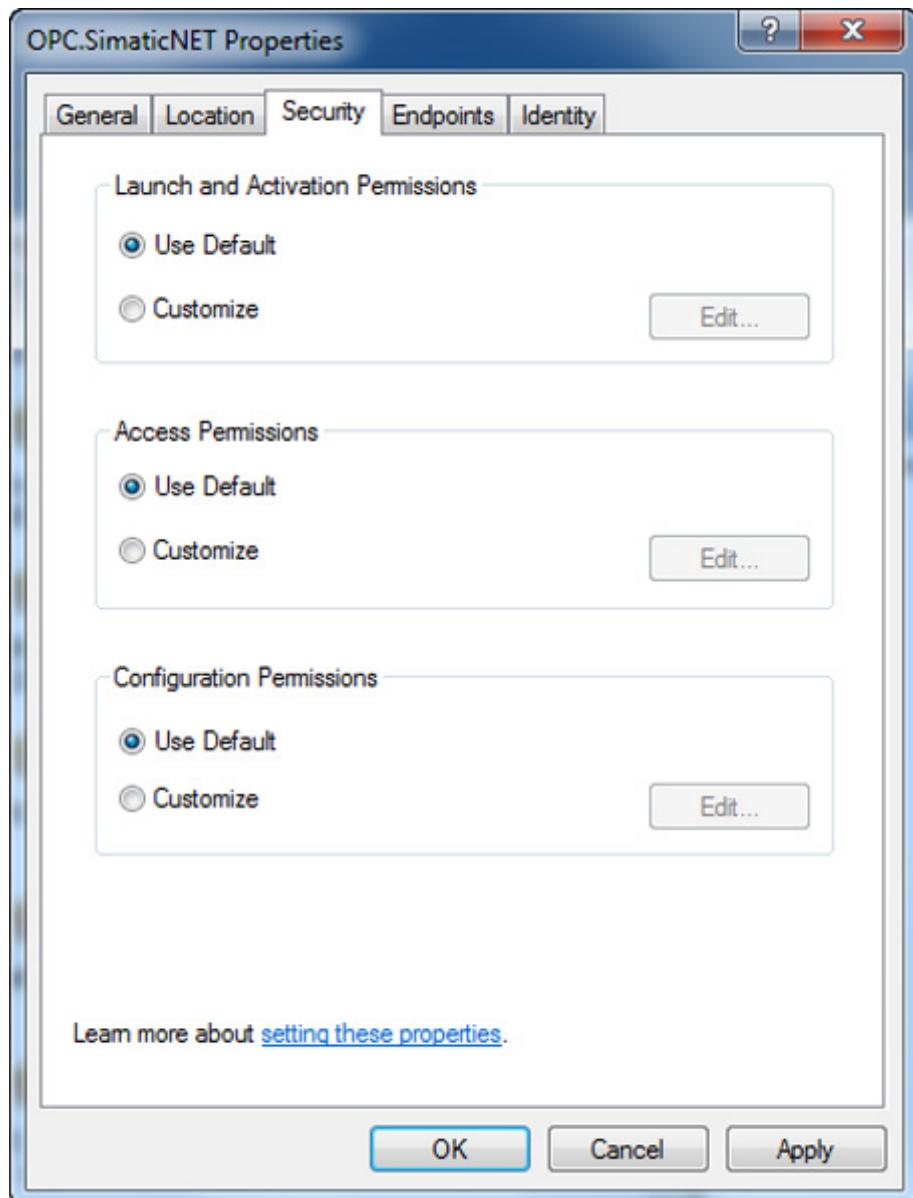
For workgroup mode, the logons and therefore the information about permissions in the logon of the other PC must exist both on the server and on the client PC.

Example of workgroup mode

User "Alpha" is logged on at the PC with the server and "Beta" is logged on at the PC with the client user. For DCOM operation a "Beta" account is required on the server PC (with the same password as on the client machine) and an "Alpha" account is required on the client PC (same password).

Example of domain mode

The use of a group with logons is advisable when using a domain. The information about permissions is then fetched from the domain server.

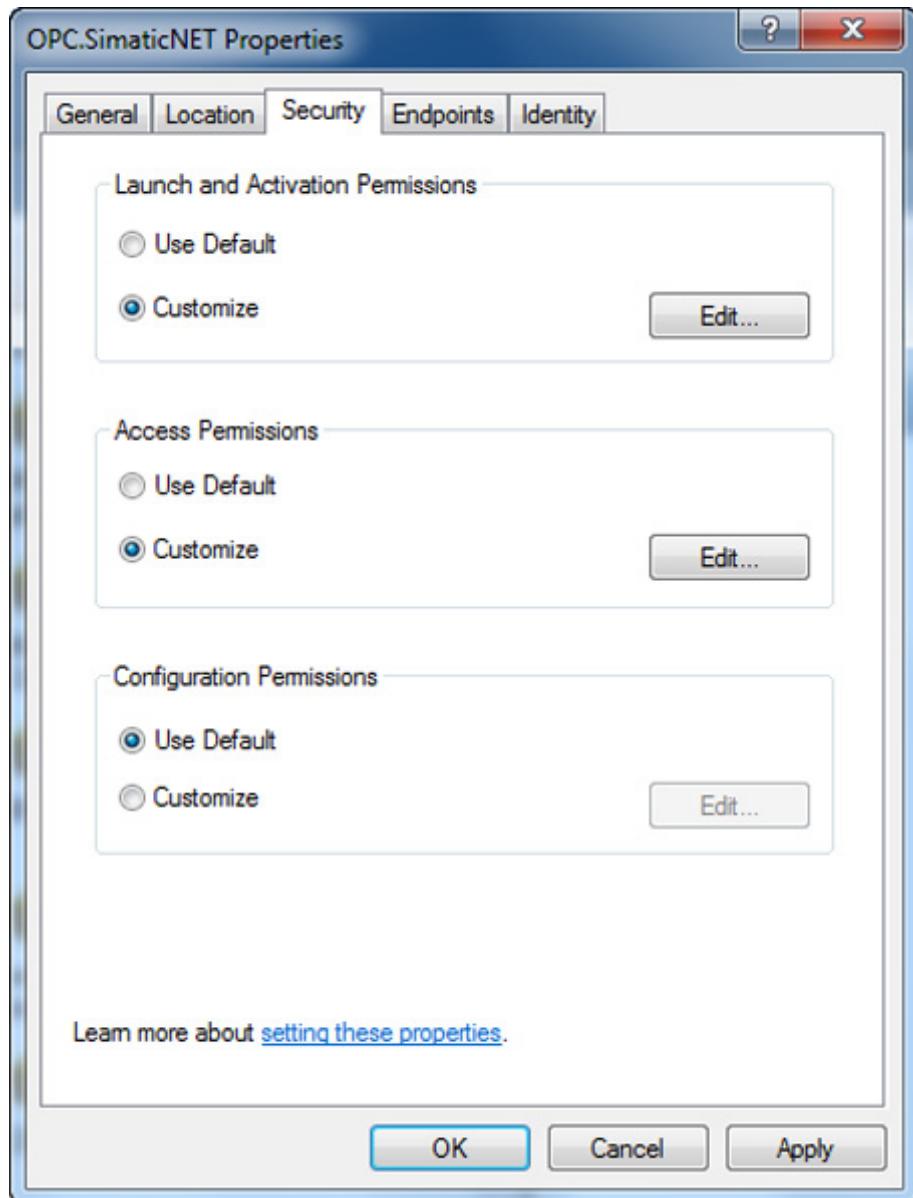


Adapted security settings

If, for security reasons, you do not want a particular user to have all COM objects of the system available, configure user-defined, adapted permissions.

Enter the users that are allowed to use the OPC server with the following permissions:

- Launch and activation permissions
- Access permissions



The use of a group with logons is advisable when using a domain. The information about permissions is then fetched from the domain server.

It is recommended that you use the SIMATIC NET user group. The required users are added as members of this group. This group can be used for the access and start permissions of the OPC server.

Additional rights for "ANONYMOUS LOGON"

Communication over OPC requires that the following additional rights are set up:

- Local and remote launch for the ANONYMOUS LOGON in launch and activation permissions;
- Local and remote activation for Anonymous Logon in the launch and activation permissions
- Local and remote access for the Anonymous Logon in the access permissions

These settings are implemented at the touch of a button by the "Communication Settings" (refer to the section "Enabling the DCOM configuration "Security" for OPC client/server operation (Page 367)").

Multiterminal server mode, service or server mode with the identity "This user" of the OPC server

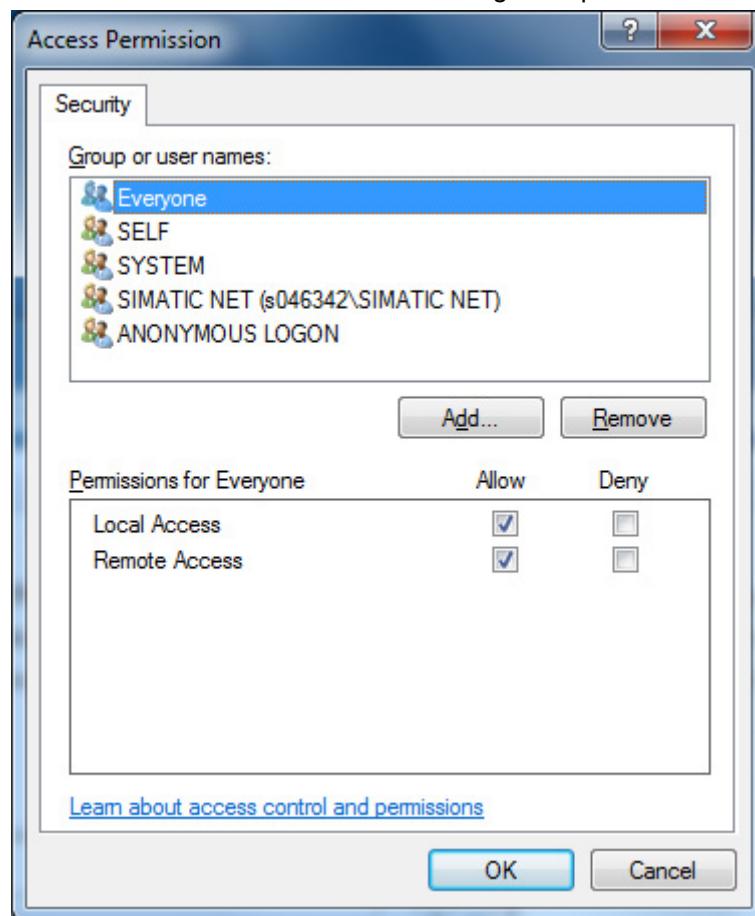
In multiterminal-server mode or service or server mode in which the OPC server is started with the identity of a certain user ("This user"), you assign access, launch and activation permissions to this user.

Specifying access permissions

Follow the steps below:

1. In the "Security" tab of the "OPC.SimaticNET Properties" dialog box, select the "Edit" button in the "Access Permissions" group box.

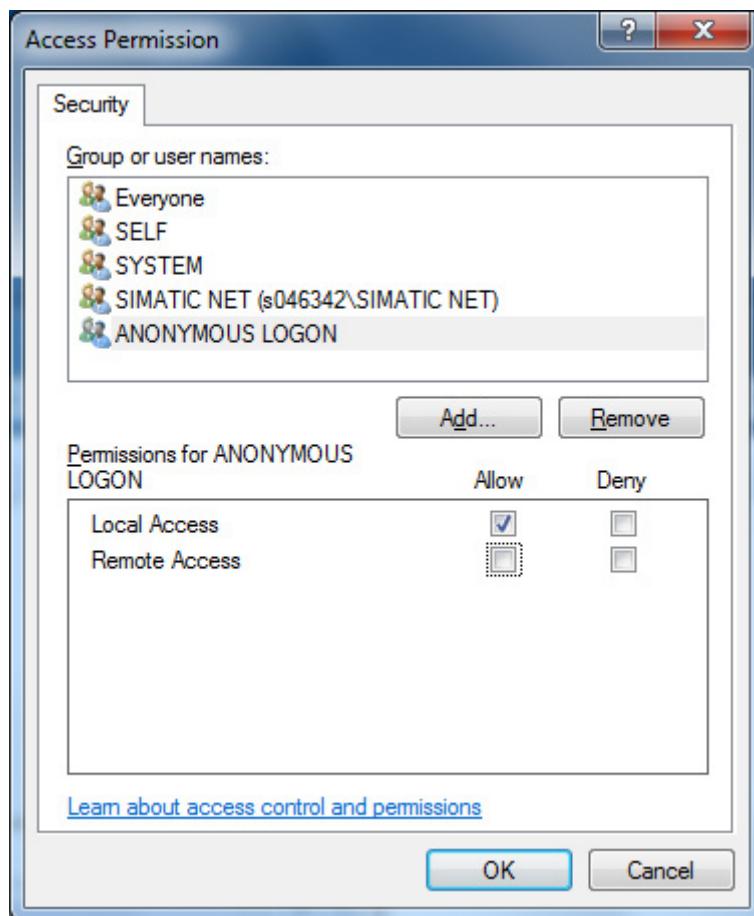
Reaction: The "Access Permission" dialog box opens.



2. Add the account of the user under which the OPC server will start.
Access must be permitted for the "SYSTEM" account to allow use of the SIMATIC NET system services.

Note

The default is "Everyone".

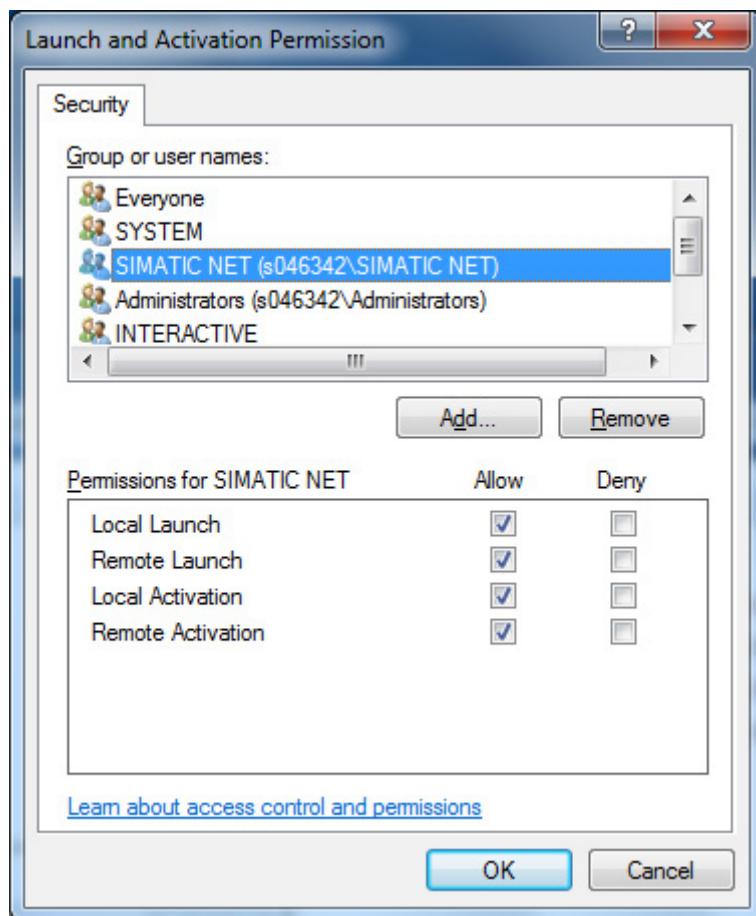


Setting launch and activation permissions

Follow the steps below:

1. In the "Security" tab of the "OPC.SimaticNET Properties" dialog box, select the "Edit" button in the "Launch and Activation Permissions" group box.

Reaction: The "Launch and Activation Permissions" dialog box opens.



2. Add the account of the user under which the OPC server will start. It is advisable to manage the user in the SIMATIC NET user group and to add the group here.

Note

The default is "Everyone".

Specifying configuration permissions

Here you can adapt the configuration permissions. Normally, it is not necessary to change these configuration permissions to use DCOM OPC.

4.7.7 Example - Windows domain mode

Windows domain mode is the recommended mode for OPC with DCOM because the users and their permissions are managed using a common domain server.

Note

Requirements for the examples

- The user must have extensive knowledge of computer administration.
 - The domain controller must be set up.
 - The terminal services must be working on the computers.
-

Follow the steps below:

1. Set up a SIMATIC NET group in the domain.
2. Enable security in the "Communication Settings" program.
3. Use one of the following examples for DCOM configuration:
 - Logged-on user, interactive mode
"Example of a logged-on user in the domain, interactive mode (Page 402)"
 - User not logged on, server mode, service mode
"Example of a non logged-on user in the domain - server mode, service mode (Page 415)"
 - Logged-on user, multiterminal server mode
"Example of multiple logged-on users in the domain - multiterminal server mode (Page 417)"

4.7.7.1 Example of a logged-on user in the domain, interactive mode

Configuration of the domain controller computer

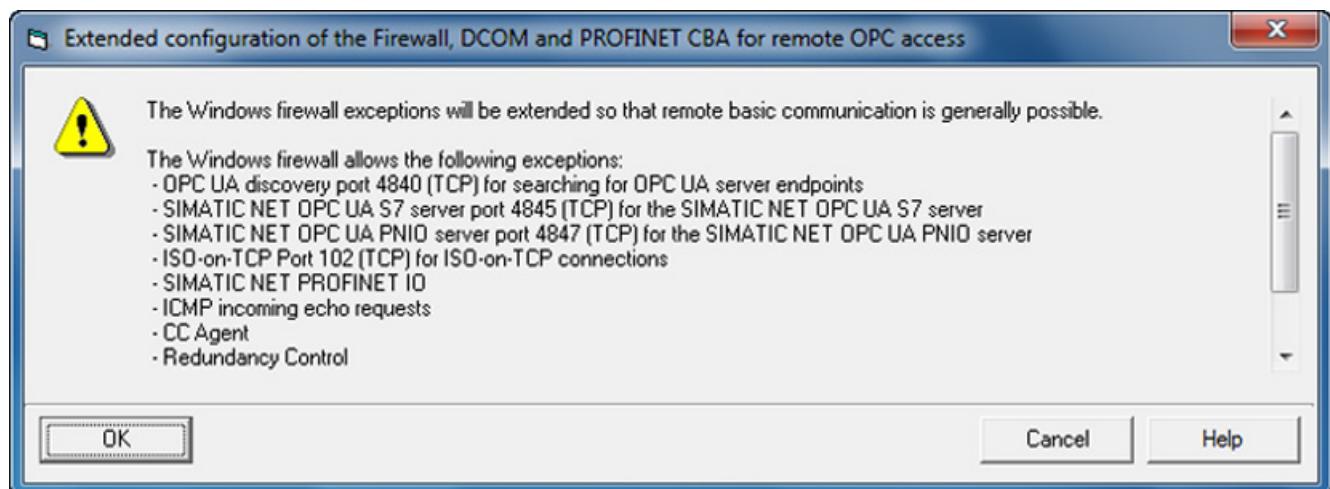
The following steps are necessary on the domain controller computer:

- Configuration of the domain controller computer
- General configuration of the client and server computer
- Configuration of the server computer
- Configuration of the client computer

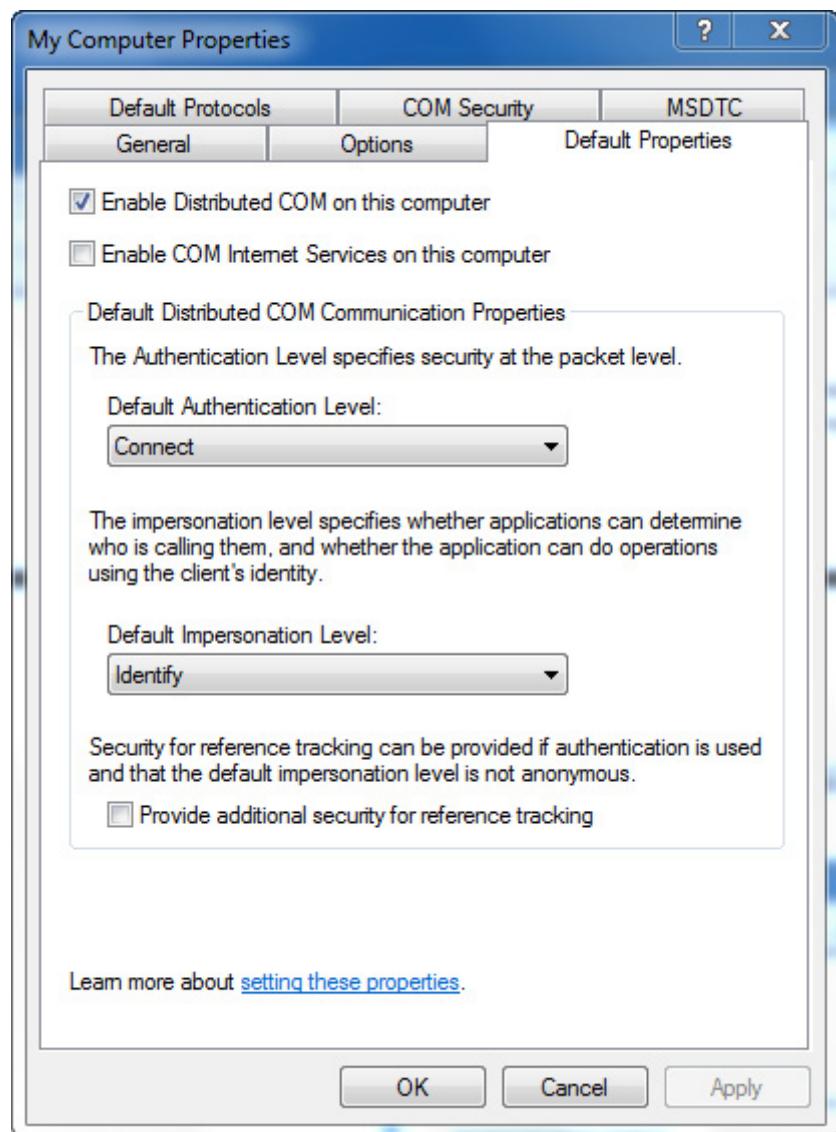
General configuration of the client and server computer

The following steps are necessary on the client and server computers:

1. First set the remote OPC DCOM configuration using the "Communication Settings".
Activate a general "Allow" in the security settings.
This combines many necessary general single steps in one action.

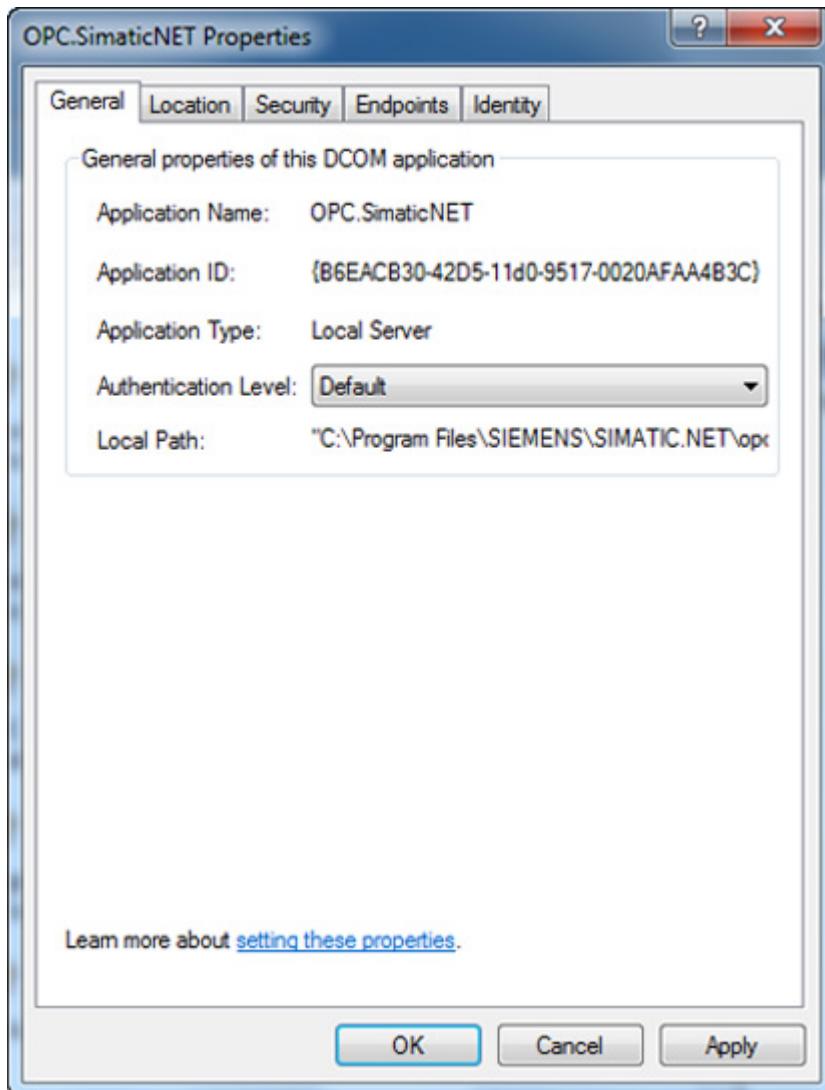


2. Set the DCOM configuration of the computer using the "dcomcnfg" program.
When operating in a domain, the "Default Authentication Level" can be set to "Connect" and the "Default Impersonation Level" to "Identify" for security reasons (should be the default setting).

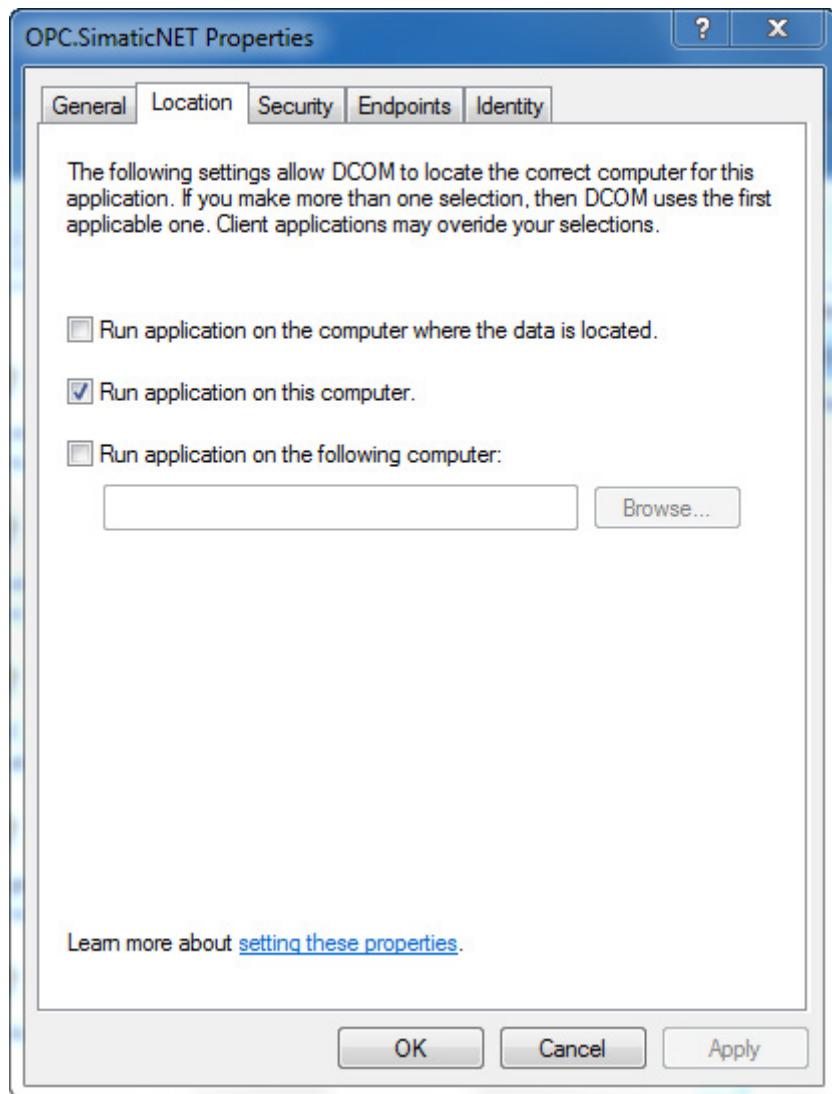


Configuration of the server computer

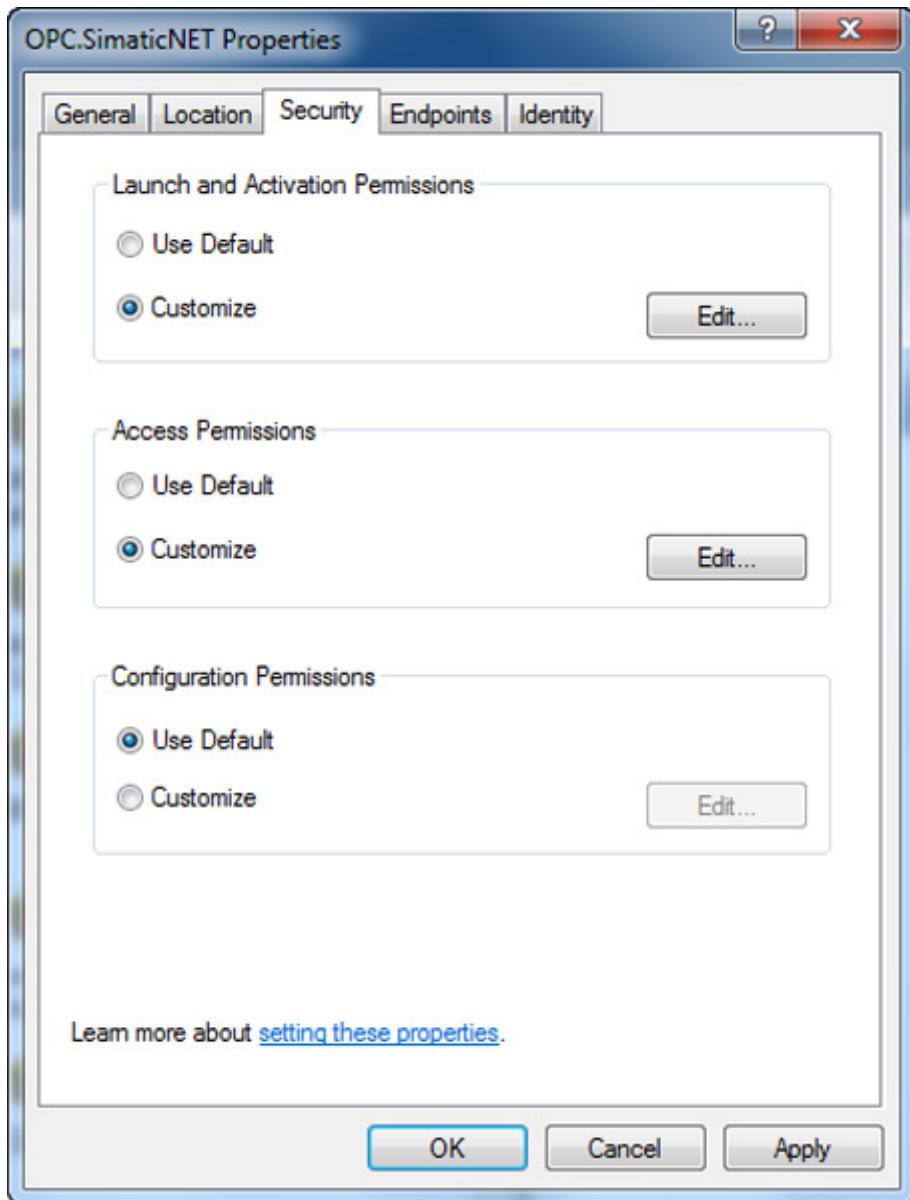
1. Set the DCOM configuration of the OPC server "OPC.SimaticNET" using the "dcomcnfg" program.
2. Select "Default" in the "Authentication Level" drop-down list box on the "General" tab. The SIMATIC NET OPC server "OPC.SimaticNET" is installed with the authentication level "None". For DCOM mode in the domain, access can be restricted by setting the authentication level to "Default".



3. Check "Run application on this computer" in the "Location" tab.



4. Adapt the security access and launch settings in the "Security" tab.



5. In the "Launch and Activation Permissions" group box, click the "Edit..." button.

Note

Do not add the "NETWORK" and local "Administrators" entries for the access and launch permissions otherwise all members of the domain will have access rights.

Reaction: The "Launch and Activation Permissions" dialog box is displayed.

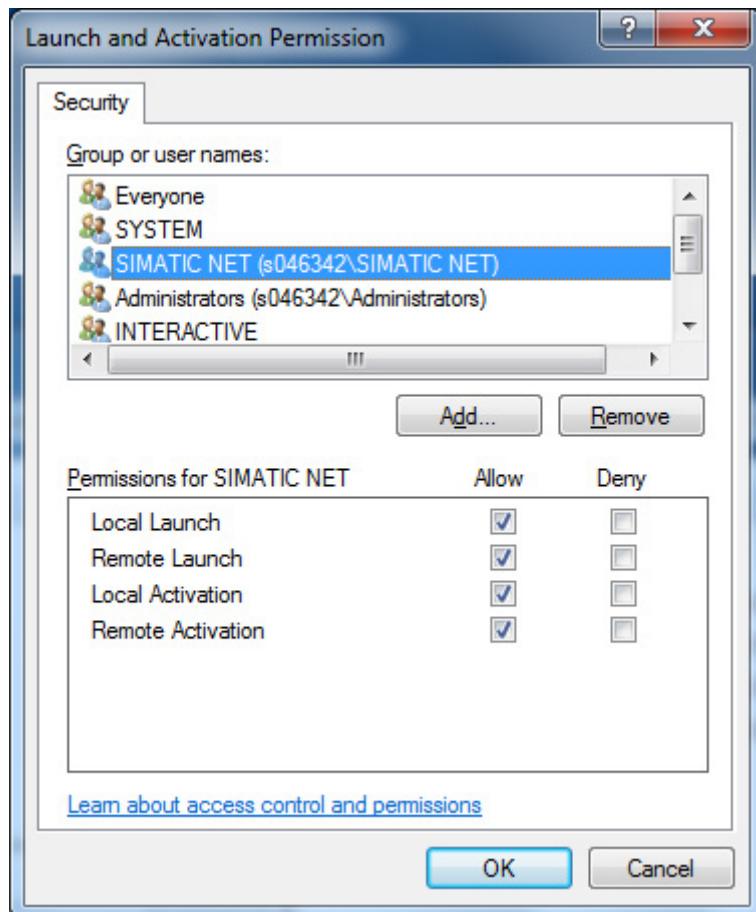
Instead of the "Everyone" entry, the users or groups on the OPC client computer and on the OPC server computer must be entered explicitly in the access and launch permissions of "OPC.SimaticNET" security and in COM default security. Remember that users or groups added to the launch and access permissions are assigned all the listed

permissions.

Use the domain group SIMATIC NET (with users Alpha and Beta) for the launch and access permissions. Further users such as "Gamma" are denied access even with domain administrator permissions.

As of Windows XP SP 2, the following launch permissions are also required for the ANONYMOUS LOGON:

- "Local Launch"
- "Remote Launch"
- "Local Activation"
- "Remote Activation"



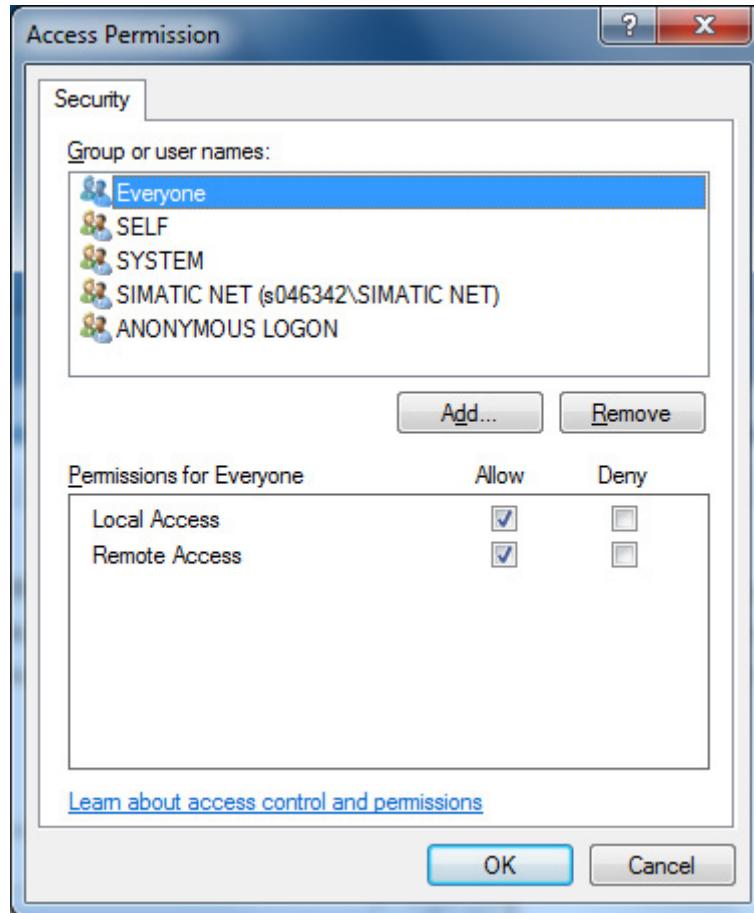
6. Click the "Edit..." button in the "Access Permissions" group box.

Reaction: The "Access Permission" dialog is displayed.

The various OPC protocol servers are implemented as services and therefore require "Local Access" permission for the SYSTEM account.

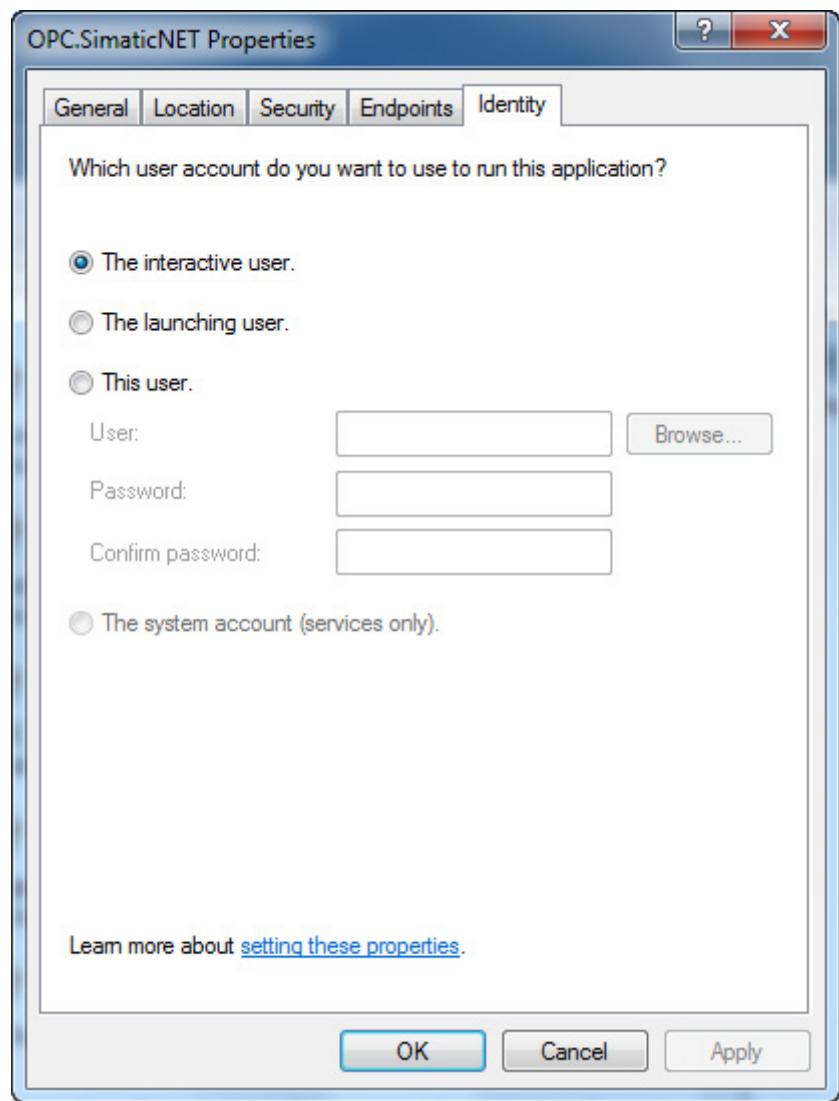
The following is required for the access permission for "ANONYMOUS LOGON":

- "Local Access"
- "Remote Access"



7. "Identity" tab

In this application example, the identity remains "The interactive user".



Configuration of the client computer

Configure DCOM of the OPC client

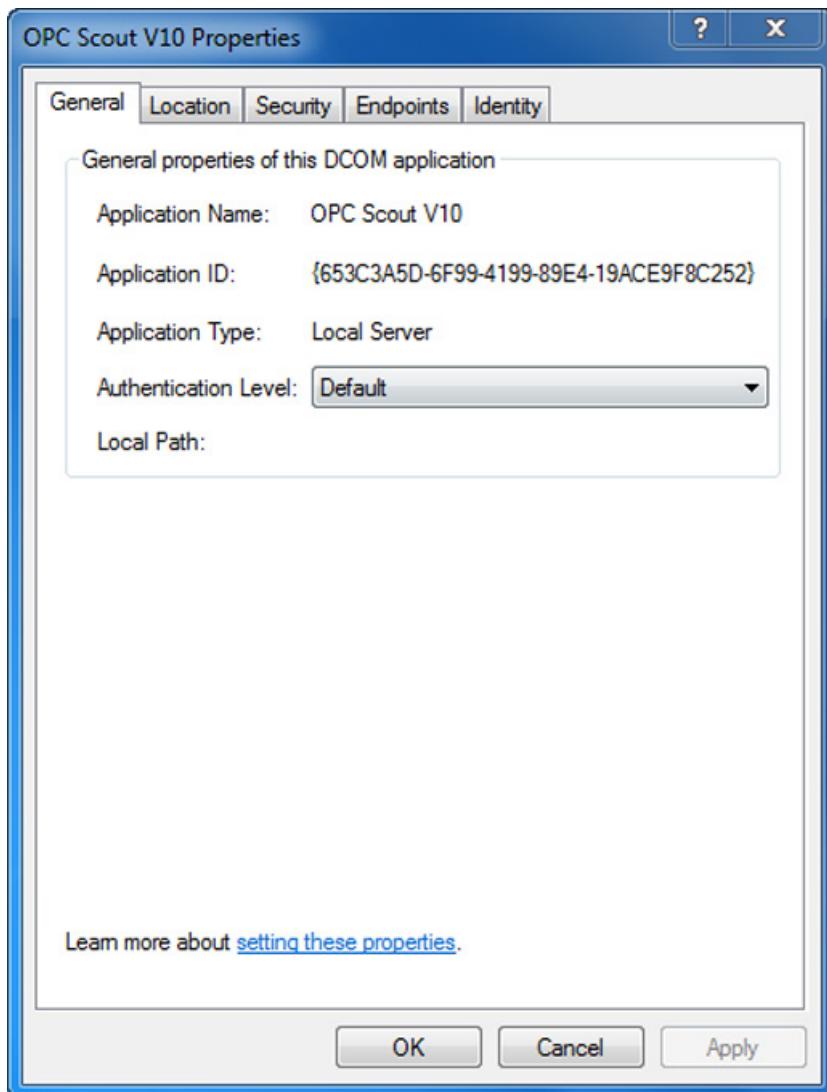
"OPC Scout V10" using the "dcomcnfg" program.

1. DCOM object "OPC Scout V10"

Select the DCOM object "OPC Scout V10" and select "Properties" in the shortcut menu.

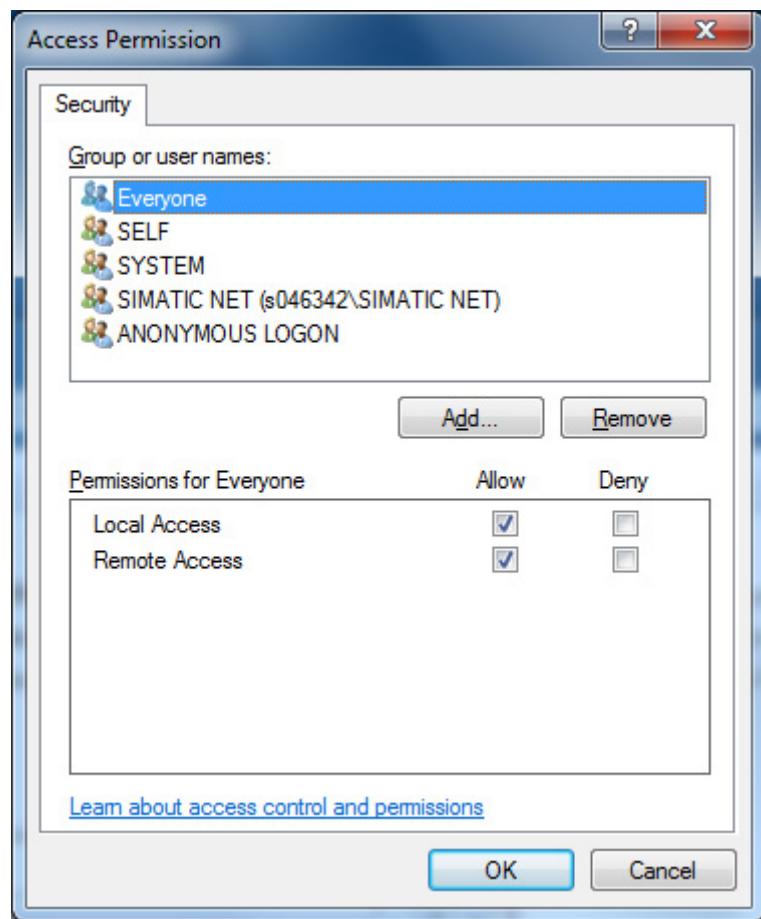
Reaction: The "OPC Scout V10 Properties" dialog box opens.

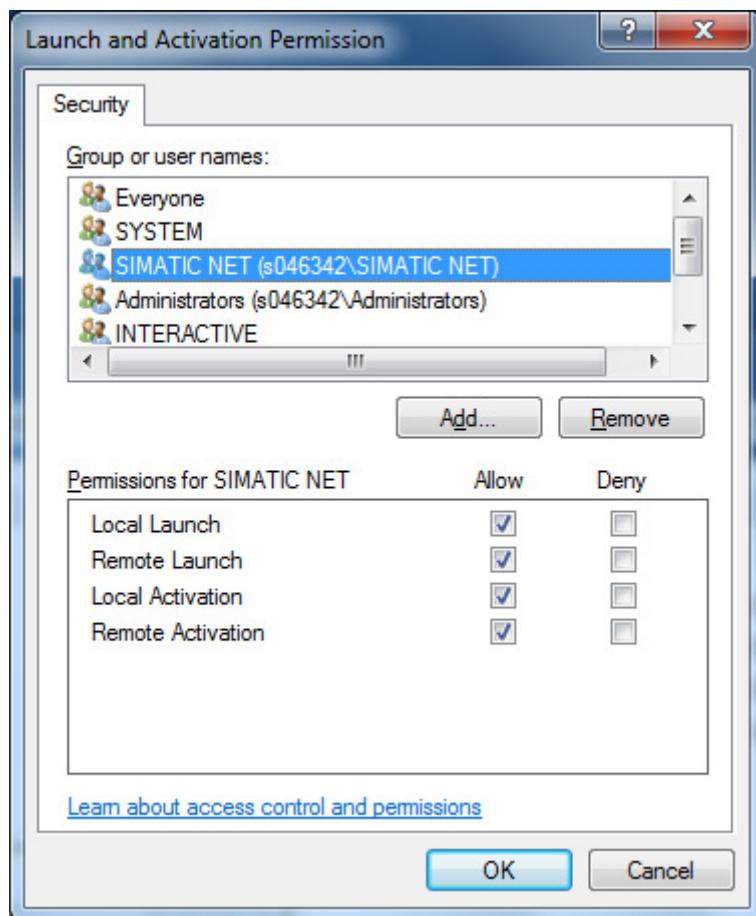
Select the "Default" entry in the "Authentication Level" drop-down list box.



2. "Launch and Activation Permissions" and "Access Permissions" dialog boxes with the "Security" tabs

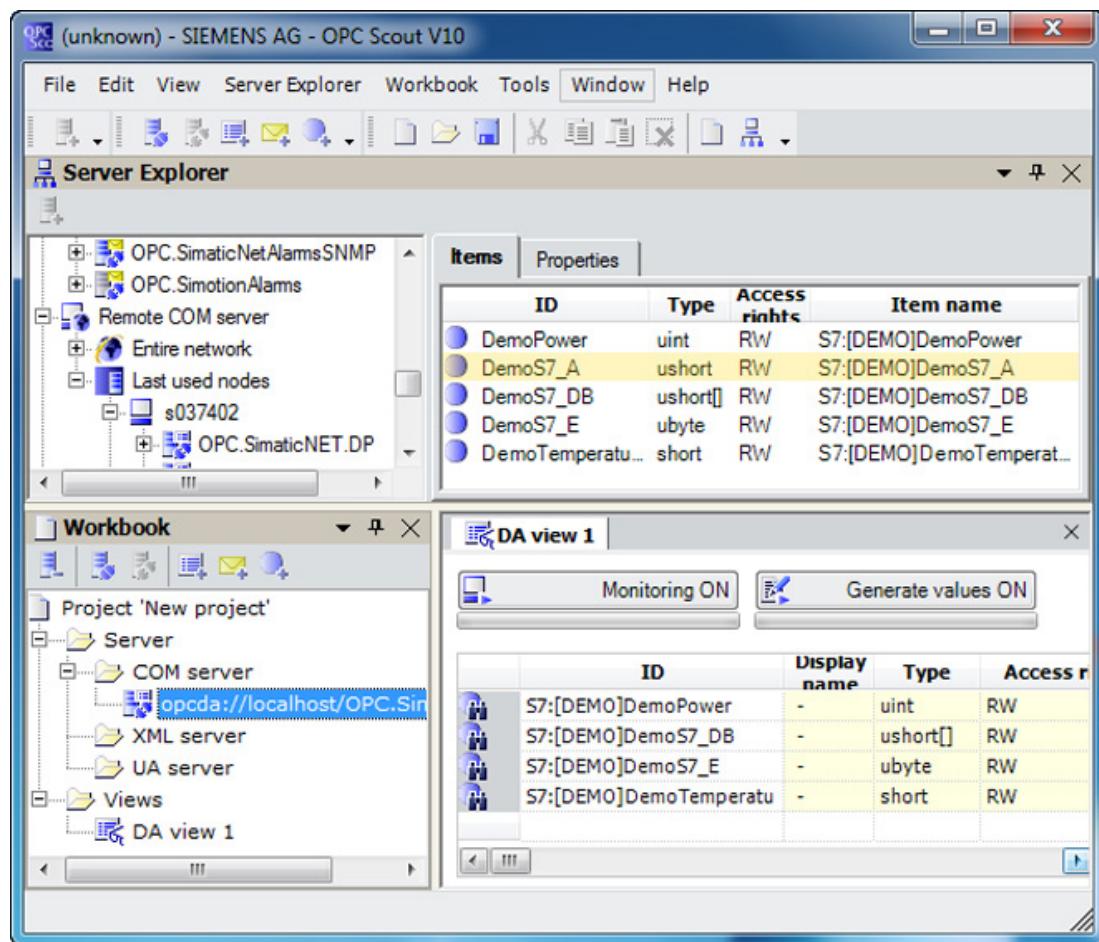
Use the domain group SIMATIC NET (with users Alpha and Beta) for the launch, activation and access permissions. Further users such as "Gamma" are denied access even with domain administrator permissions.





3. Testing the settings made up to now

This means that the logged-on domain user "Beta" on the client computer can access the server computer (here address 192.168.1.11) over DCOM and can therefore access the OPC server "OPC.Simatic.NET".



Note

OPC security settings when changing domains

In the "Communication Settings" configuration program, you can enable the OPC security settings for the Windows firewall and DCOM. Remember that the settings for the Windows firewall and DCOM configuration depend on the Windows logon. If, for example, you later join a Windows domain with the PC, it may be necessary to enable the OPC security settings for the Windows firewall and DCOM again in "Communication Settings".

4.7.7.2 Example of a non logged-on user in the domain - server mode, service mode

In this situation, the computer has booted but no user is logged on.

The system displays the logon dialog.

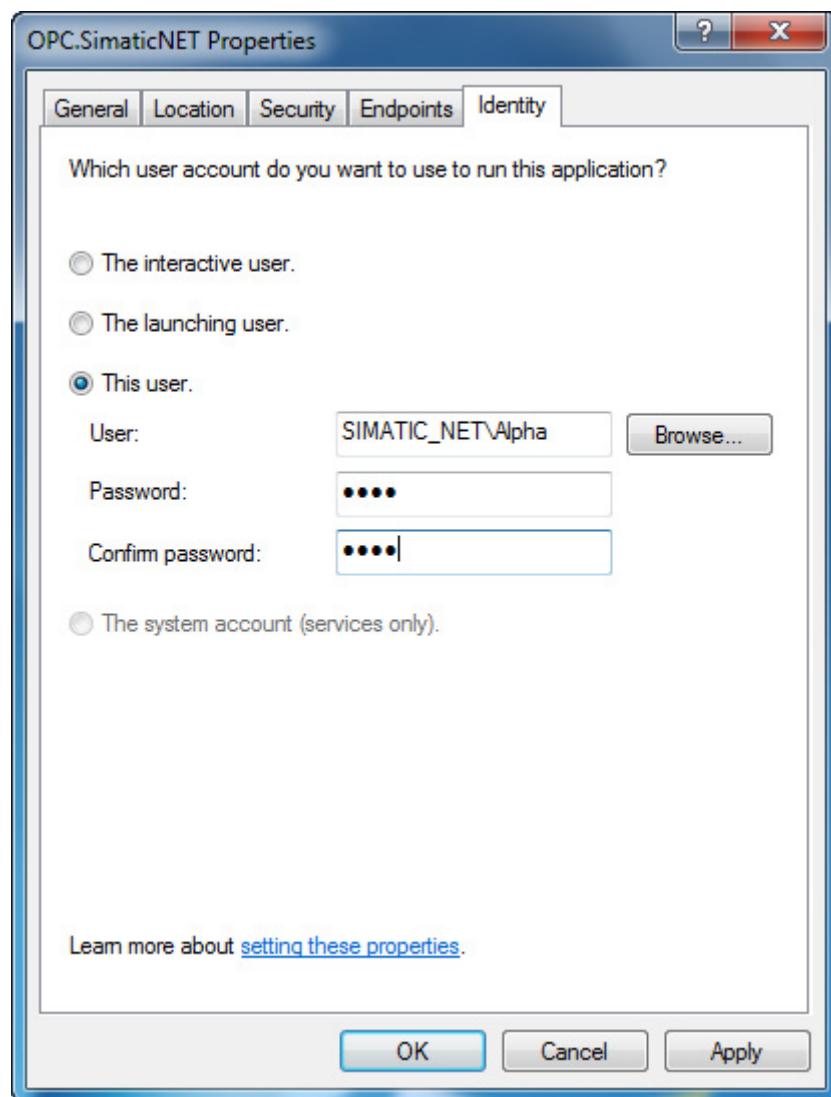
The OPC server can:

- then be operated as a server to which one or more remote OPC clients with users with differing permissions have access over DCOM ⇒ server mode.
- also be launched and executed by a local service that is started automatically even without a logged-on user when the PC boots ⇒ service mode.

Advanced configuration of the server computer

Apart from the settings in the "Identity" tab described below, the settings are the same as those in "Example of a logged-on user in the domain, interactive mode (Page 402)".

1. Set the DCOM configuration of the OPC server "OPC.SimaticNET" using the "dcomcnfg" program.
2. Select the "This user" check box in the "Identity" tab of the "OPC.SimaticNET Properties" dialog of the OPC server.
3. Click the "Browse..." button and select a user with adequate launch and access permissions for the OPC server and enter the password and password confirmation.



4.7.7.3 Example of multiple logged-on users in the domain - multiterminal server mode

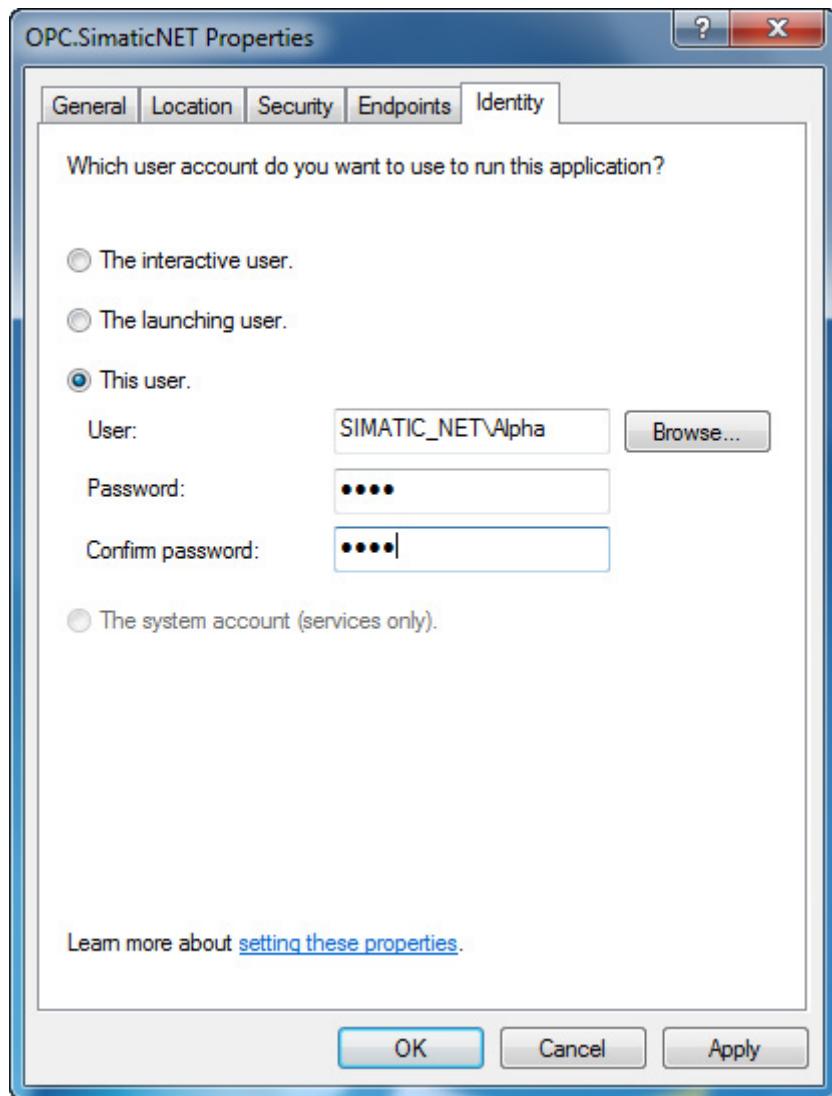
In this situation, more than one user is logged on at the terminal server (Windows Server 2003) and they want to use the OPC server at the same time ⇒ multiterminal server mode.

Advanced configuration of the server computer

Apart from the settings in the "Identity" tab described below, the settings are the same as those in "Example of a logged-on user in the domain, interactive mode (Page 402)".

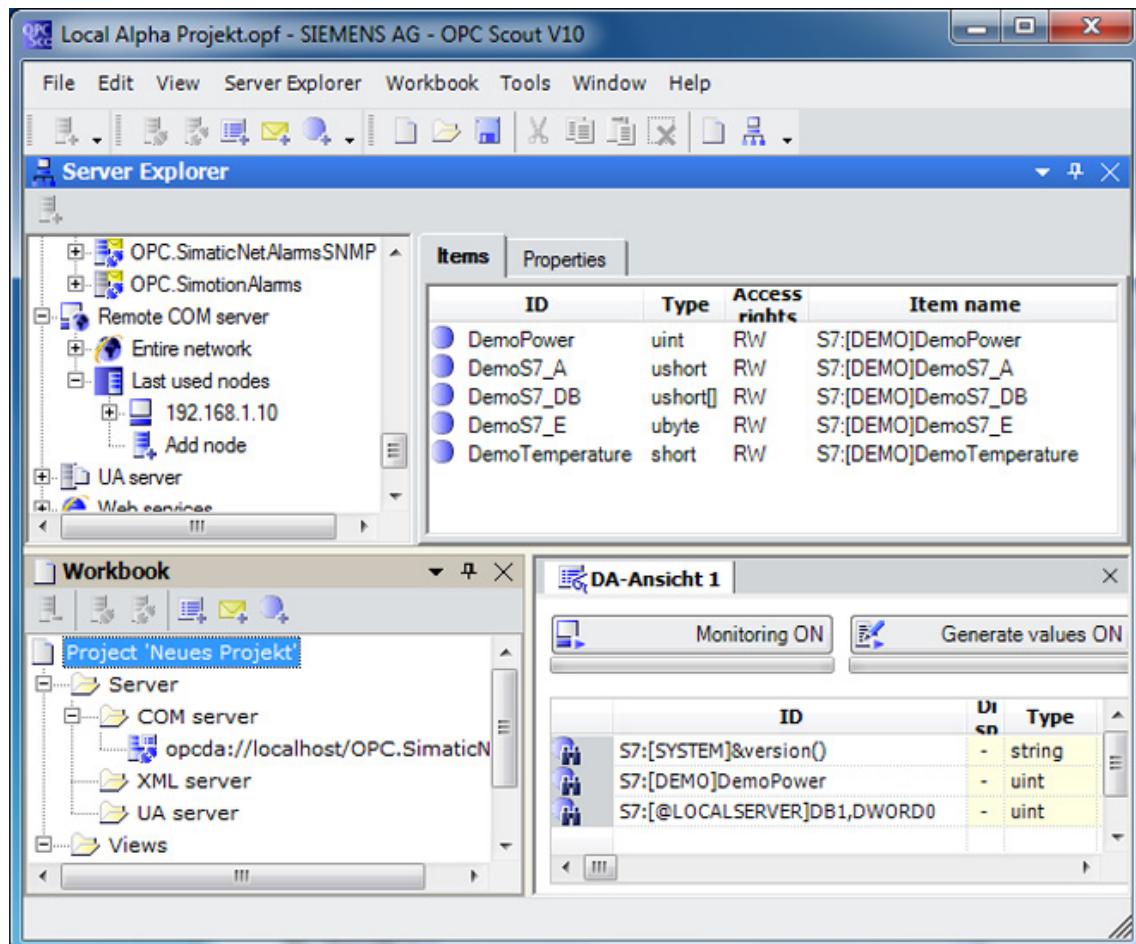
Set the DCOM configuration of the OPC server "OPC.SimaticNET" using the "dcomcnfg" program.

1. Select the "This user" check box in the "Identity" tab of the "OPC.SimaticNET Properties" dialog of the OPC server.
2. Click the "Browse..." button and select a user with adequate launch and access permissions for the OPC server and enter the password and password confirmation. This does not need to be one of the logged-on users. With the "This user", setting, the OPC server is launched and executed only in this user context (even when several users are logged on).



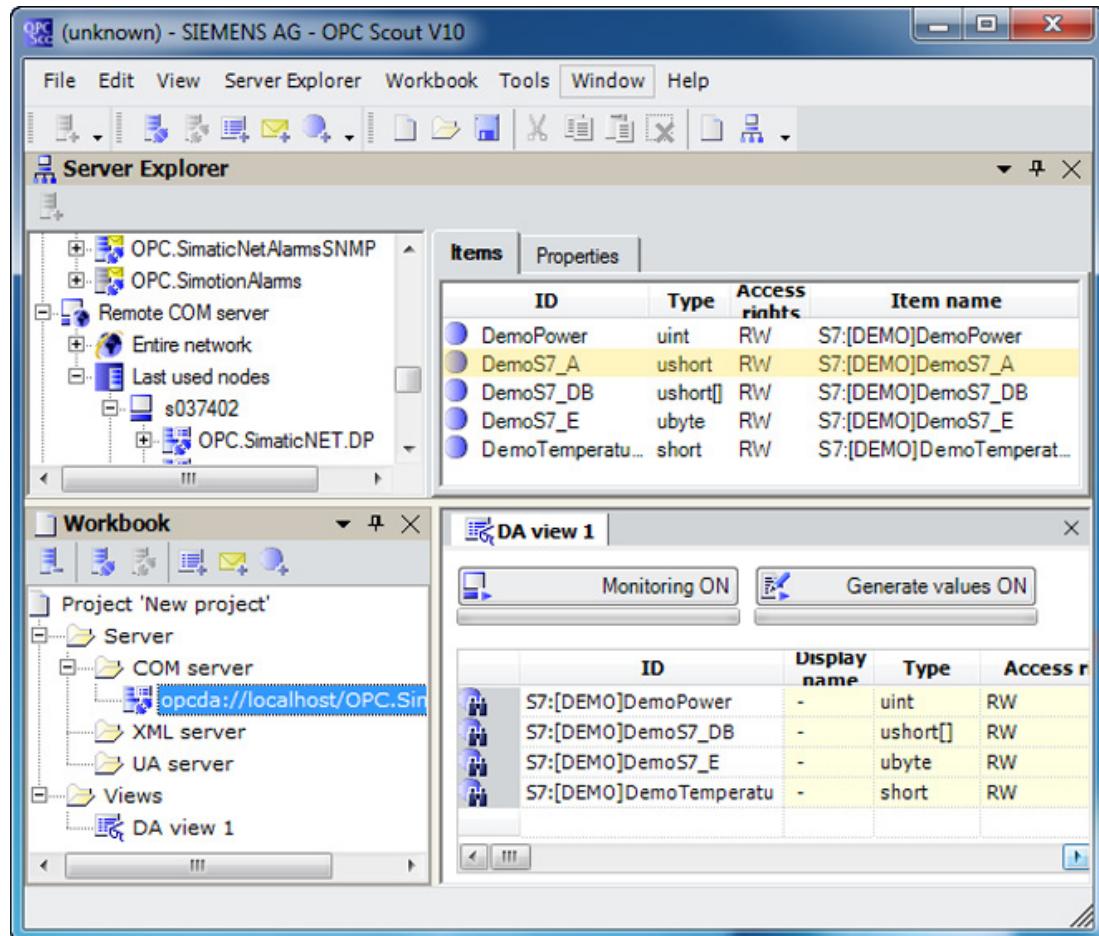
Testing on the server computer with terminal user "Alpha"

A user "Alpha" logged on at the local terminal server can access the local OPC server "OPC.SimaticNET" over a remote connection.



Testing on the client computer with user "Beta"

User "Beta" accesses the OPC server "OPC.SimaticNET" (here address 192.168.1.11) from a remote computer over DCOM.



4.7.8 Example - Windows workgroups mode

Windows workgroup mode is the simple but not recommended mode for OPC with DCOM because the users and their permissions are managed only locally.

To use DCOM, the security checks must be reduced or disabled.

Follow the steps below:

1. General configuration of the client and server computer (Page 421)
2. Configuration of the server computer (Page 424)
3. Configuration of the client computer (Page 425)

4.7.8.1 General configuration of the client and server computer

Follow the steps below:

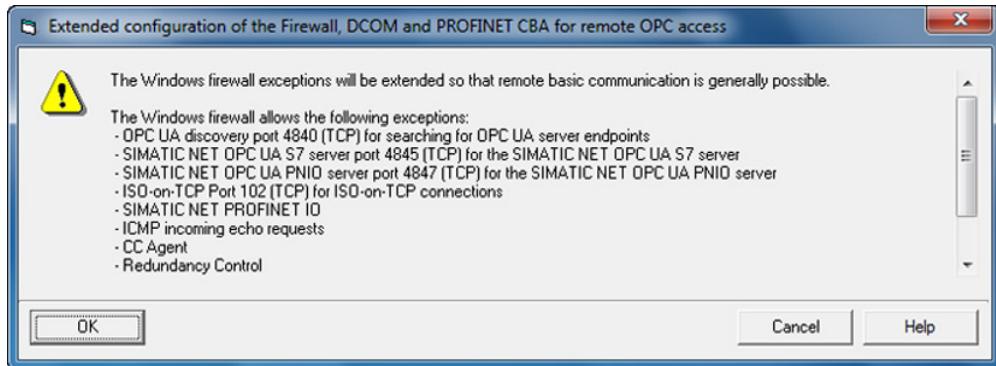
1. Communication Settings - Allow security.
2. Set the DCOM configuration for the workgroup.

Configuring the client and server computers

1. Allow

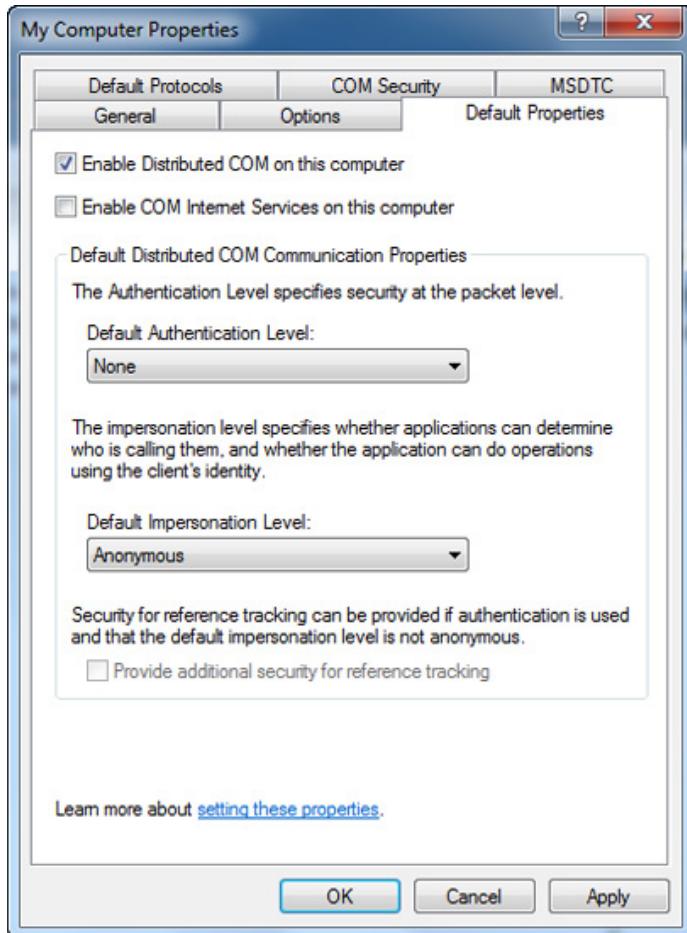
First set the remote OPC DCOM configuration using the "Communication Settings".
Activate a general "Allow" in the security settings.

This combines many necessary general single steps in one action.

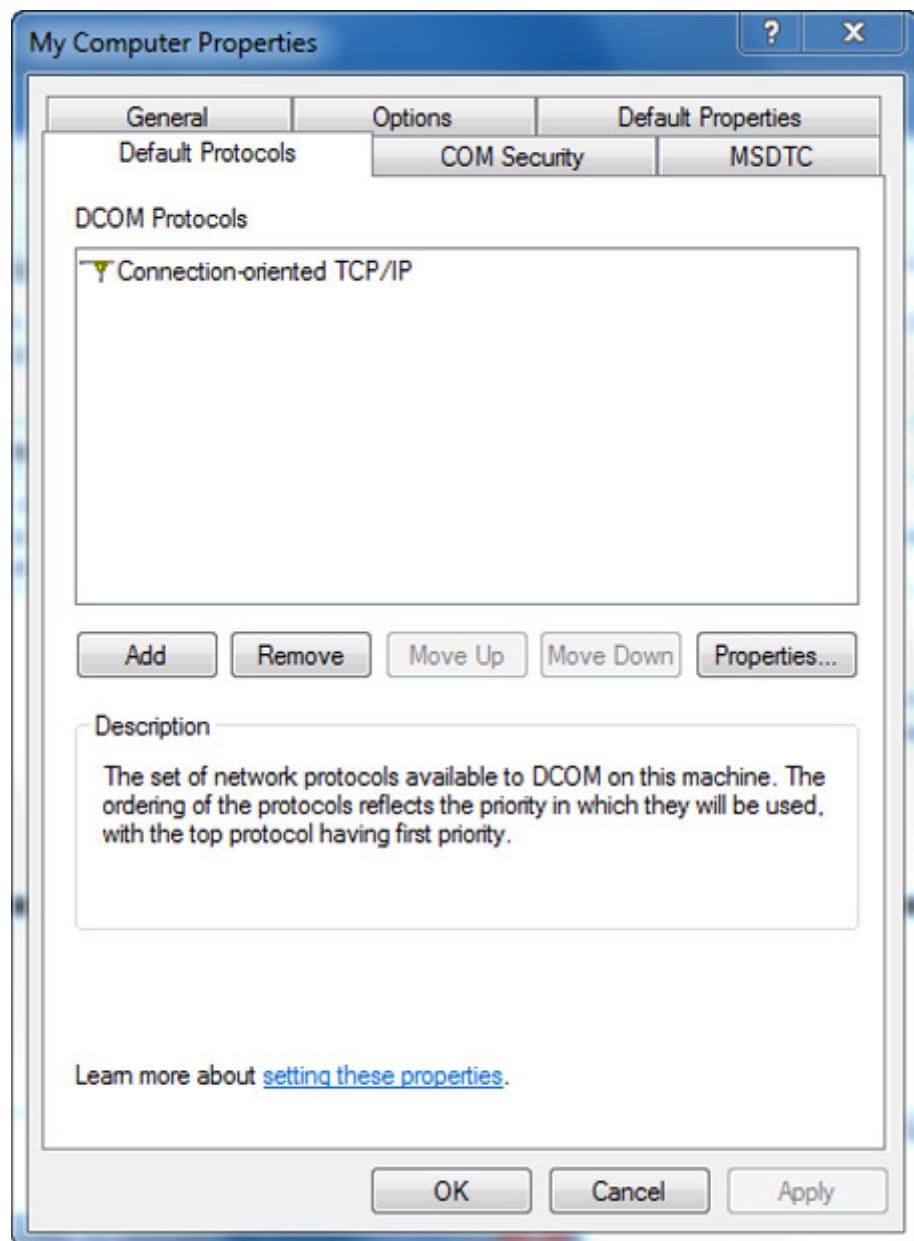


2. Set the DCOM configuration of the workplace using the "dcomcnfg" program.

When working in a workgroup, due to the enable in the "Default Properties" dialog, the "Default Authentication Level" must be set to "None" and the "Default Impersonation Level" to "Anonymous".



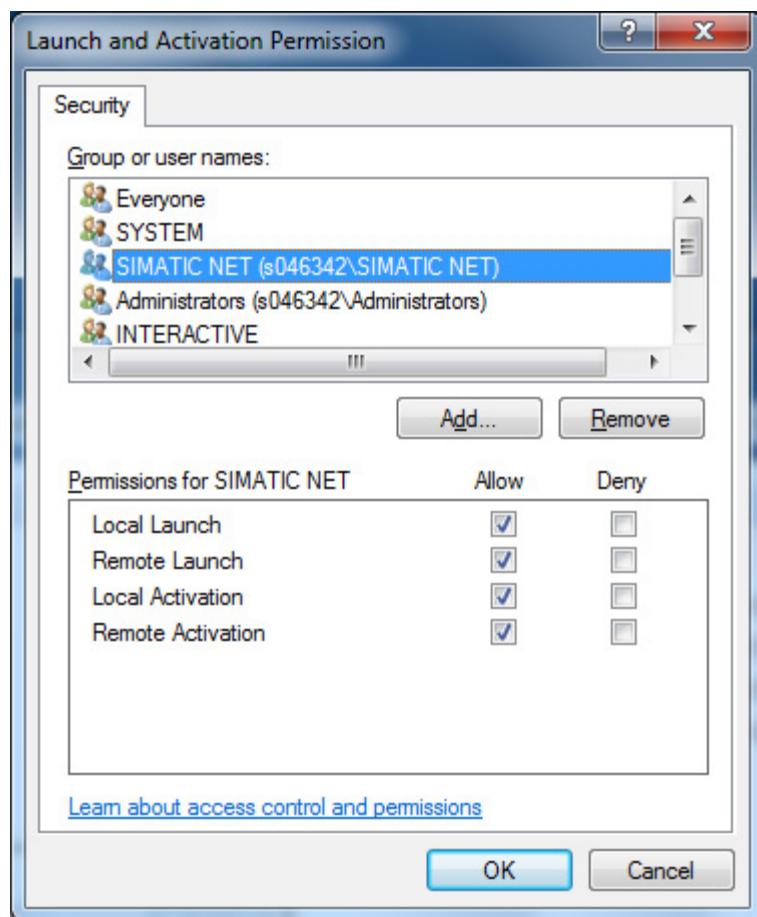
3. In the "Default Protocols" tab, you specify the network protocols that are available for DCOM. The "Connection-oriented TCP/IP" protocol must be set at the top.

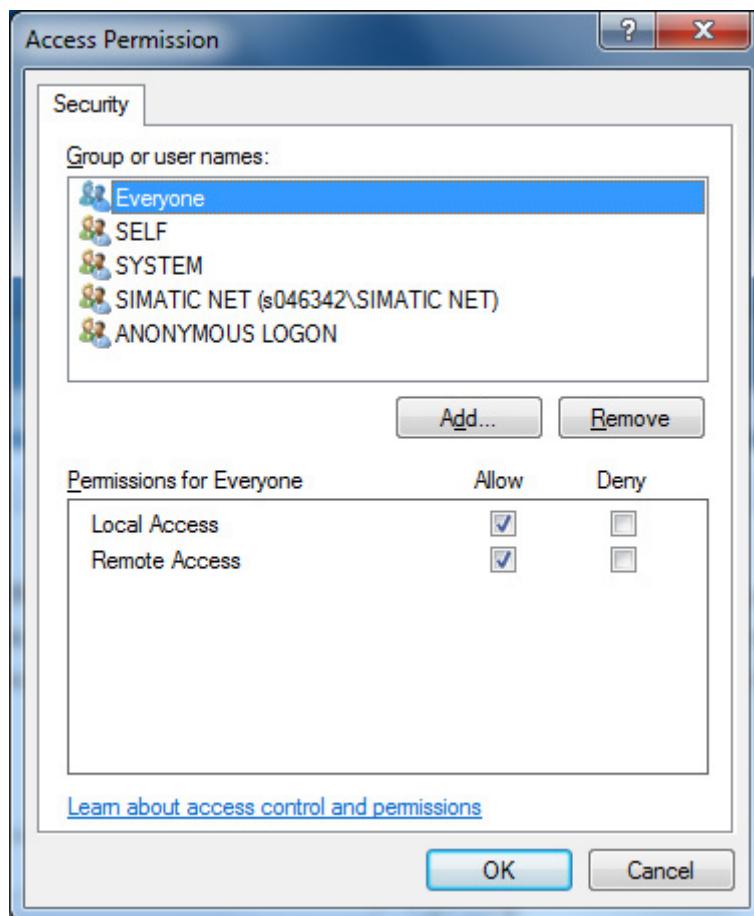


4.7.8.2 Configuration of the server computer

The following table describes the settings for the server page of the OPC server "OPC.SimaticNET".

Setting	Meaning
"Launch and activation permissions"	Allow launch and activation for administrators, everyone, network, system, ANONYMOUS LOGON and interactive (if not already set) - local!
"Access permission"	Allow access for administrators, everyone, network, system, ANONYMOUS LOGON and interactive (if not already set) - local!

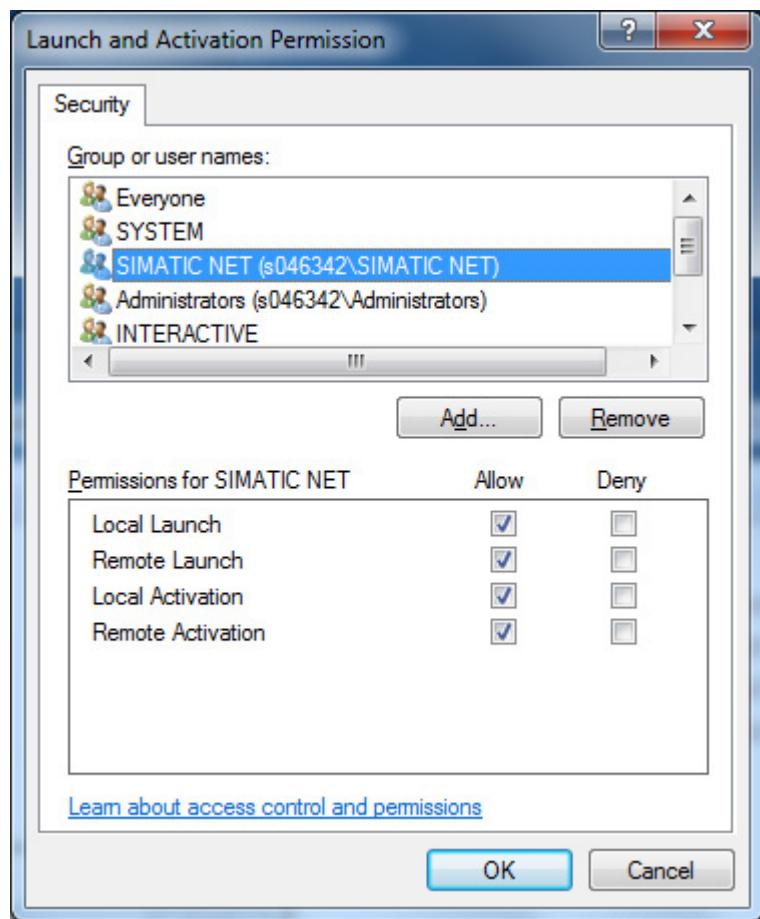


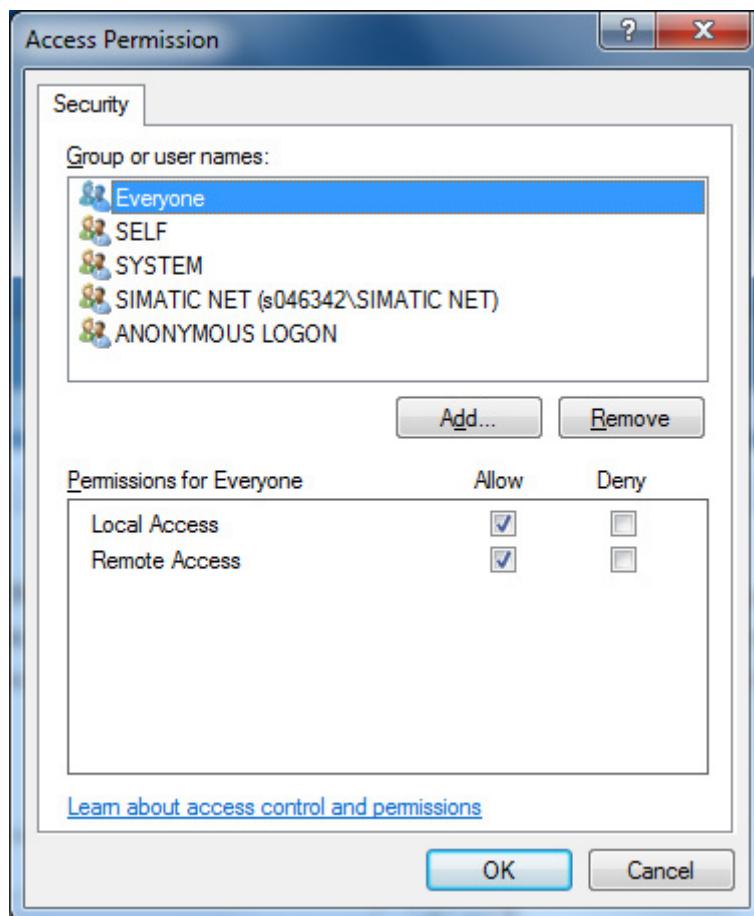


4.7.8.3 Configuration of the client computer

The following table describes the settings for the client page of the "Default Security" tab.

Setting	Meaning
"Launch and activation permissions"	Allow launch and activation for administrators, everyone, network, system, ANONYMOUS LOGON and interactive (if not already set) - local!
"Access permission"	Allow access for administrators, everyone, network, system, ANONYMOUS LOGON and interactive (if not already set) - local!





With these extensive default permissions, every OPC client in the workgroup can now access the OPC server over DCOM. This also applies to non-registered DCOM clients.

First test DCOM access with the registered client "OPC Scout V10" and then with your OPC client.

You can now replace the general user "everyone" with the users or user groups you require.

Note

Recommendation: Replace "Everyone" with the "SIMATIC NET" group.

Remember that the users must exist on all machines involved.

4.7.9 Example - Client only computer mode

4.7.9.1 Example - Set client computer mode

Overview

When operating with DCOM, the OPC server runs on a different PC from the OPC clients (applications). This is why no process for the OPC server is visible in the Windows Task Manager of the client computer.

To allow the OPC clients to access the OPC server, the following requirements must be met for this mode:

- Registering the OPC server

The OPC server and its location must be registered on the client computer.

This registration is necessary so that the COM library knows the required object making configuration possible.

Specify the user account that will be used to access the OPC server.

- Registering the OPC client

When necessary access permissions and security settings must be made for the OPC clients.

NOTICE

Higher security requirements

As shown below in the example of the OPC Scout V10, the default setting assumes an open system and assumes that the user will adapt the settings when higher security is required.

Make the required settings analogous to the description of configuring the server computer in the section "Functions of the "dcomcnfg" system program for the DCOM configuration of the OPC server (Page 385)".

Below, you will find instructions on registering, for example the OPC Scout V10 as a client.

- Providing "OPC proxy" libraries

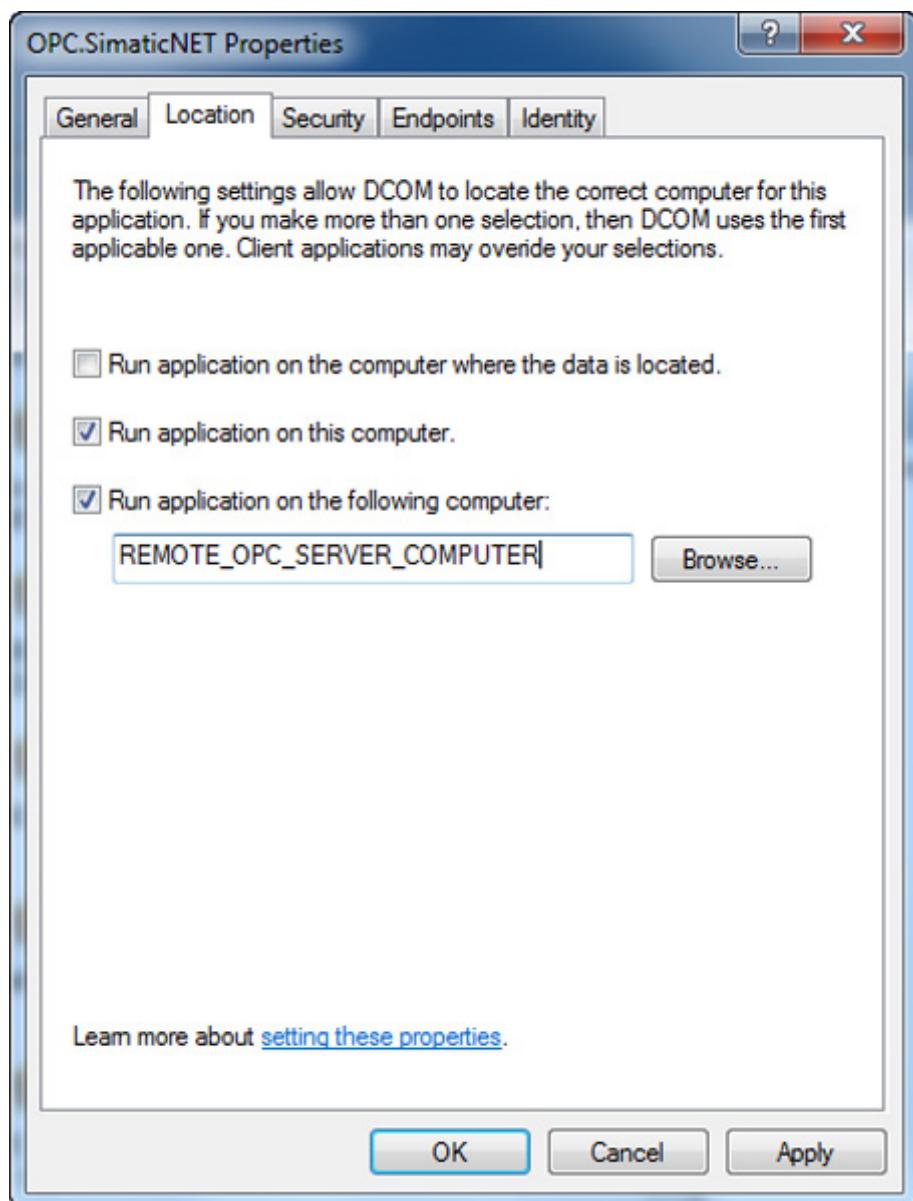
The OPC Proxy libraries ("OPC Core Components") provided by the OPC Foundation are required on the client computer. These libraries are used to convert the COM calls to a data stream so that they can be transferred over the network.

Registering the OPC server

Specify the location of the server in the "Location" tab.

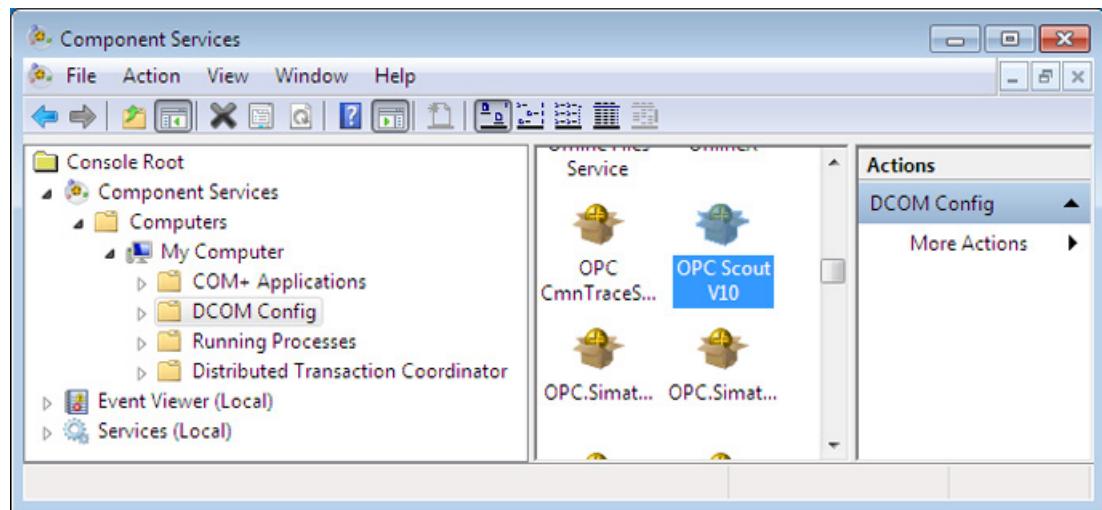
For DCOM operation, only the check box "Run application on the following computer" may be selected.

Click "Browse..." to select the server computer.

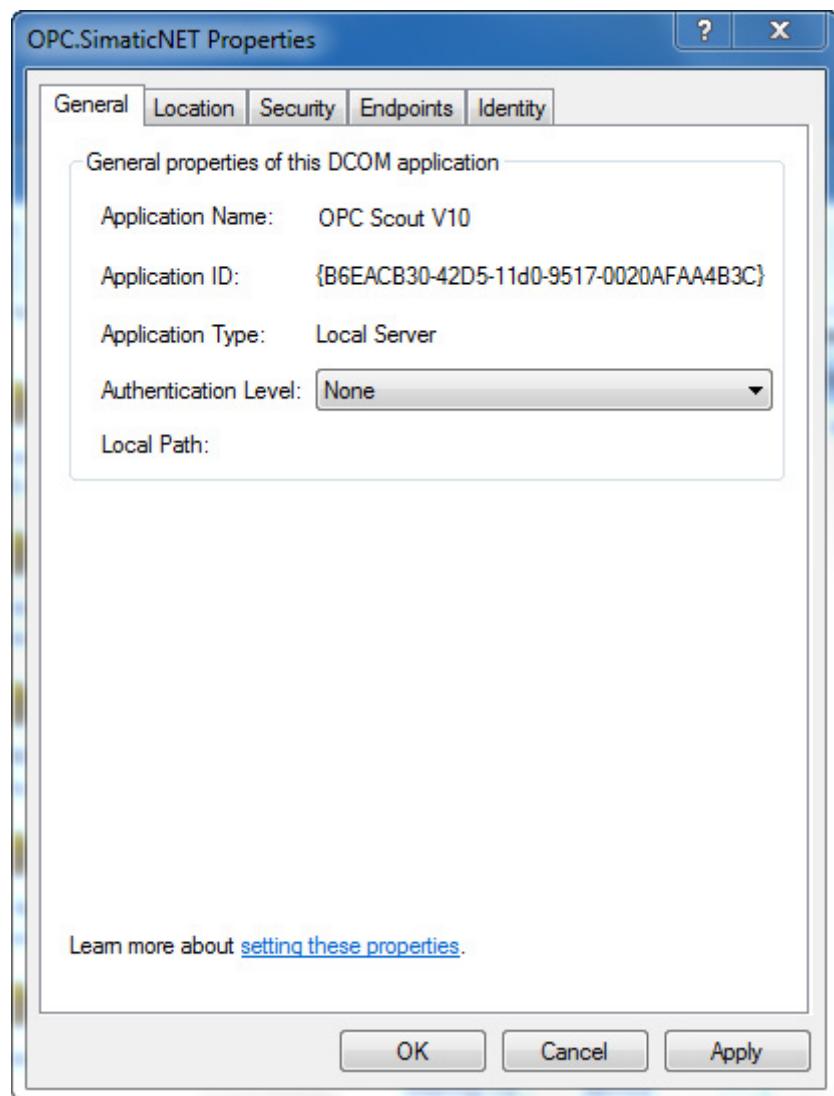


Register the OPC client, for example OPC Scout V10

The OPC Scout V10 is an OPC client that you will find in DCOM as a registered object.



If you display the properties of the OPC Scout V10 application in DCOM, "None" is displayed as the authentication level.



The default setting therefore assumes an open system and assumes that the user will adapt the settings when higher security is required.

Register other OPC clients as DCOM objects. The advantage of this is that you can configure the security settings with "dcomcnfg" without needing to modify systemwide settings.

Security settings per user program

You can also make the security settings described in the earlier sections using the user program. To do this, you use the "CoIntializeSecurity()" call from the Windows programming interface with which you can specify the DCOM security.

Note

Remember that the security settings made in the user program have priority over the settings made in the DCOM dialog!

4.7.9.2 Example - Setting up the OPC client for client-computer mode

Scope and purpose of the software package

If you only want to access remote SIMATIC NET OPC servers over your intranet, you do not need to install the entire SIMATIC NET software product CD. In this case, you only need to install the OPC client setup for DCOM.

Installation for DCOM mode

To use DCOM, a minimum installation is required on the client computer. The necessary components (provided by the OPC Foundation) and the OPC Scout V10 are installed and registered.

Following installation, DCOM must be set up. Please note the section "OPC Scout V10 (Page 349)".

Installing the software for the OPC client computer

Follow the steps below:

1. Start your computer.
2. Log on as administrator in your Windows system.
3. Insert the "SIMATIC NET PC Software" CD in your CD-ROM drive.

Note

If the SIMATIC NET-CD installation program starts up automatically, exit the program immediately with the "Cancel" button because the intended installation is then not possible.

4. Open the SIMATIC NET CD in the Explorer and start the "Setup.exe" program in the "\sw\OPC_Scout" folder.

Follow the instructions in the installation dialogs.

After successful installation of the software, if required set the DCOM configuration for the OPC client computer as described in the manual.

4.7.9.3 Advanced firewall settings as of Windows XP SP2 and as of Windows Server 2003 SP1

Advanced firewall settings as of Windows XP SP2 and as of Windows Server 2003 SP1

The advanced settings as of Windows XP SP2 and as of Windows Server 2003 SP1 require advanced firewall settings to use DCOM OPC.

Two changes must be made in the Windows firewall:

- Add the OPC Scout as an exception.
- Add Port 135, type TCP as an exception.

The following sections describe the steps involved.

Adding the OPC Scout as an exception

Follow the steps below:

1. Open the configuration of the Windows firewall in the Control Panel.
2. In the "Exceptions" tab, click the "Add Program" button and then "Browse...".
You will find the OPC Scout program in "<Installation path>\simatic.net\opc_client\opc_scout\opc_scout.exe".

Add Port 135, type TCP as an exception

Follow the steps below:

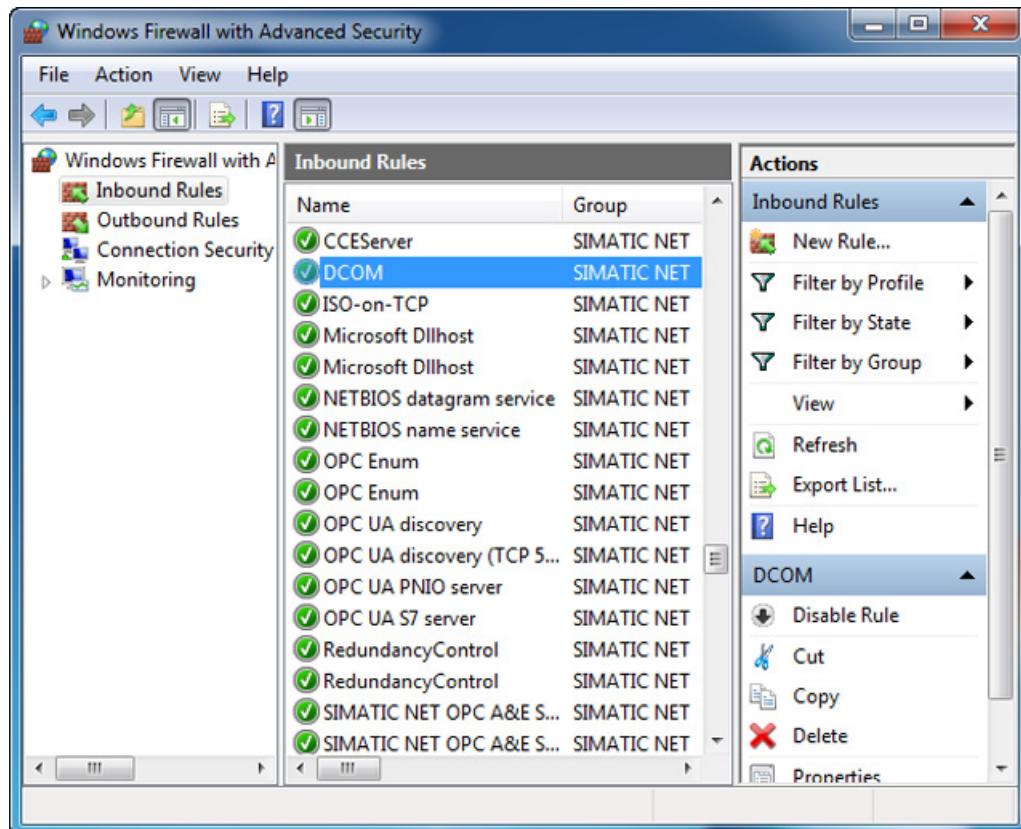
1. Open the configuration of the Windows firewall in the Control Panel.
2. Go to the "Exceptions" tab, click the "Port" button and select Port 135, type TCP.
3. Select a name, for example "DCOM".

DCOM Port 135, type TCP as an inbound rule in Windows 7 and Windows 8

Follow the steps below:

1. Start the Windows Firewall with Advanced Security program "WF.msc".
2. Click on "Inbound Rules" on the left.

3. Right click on "Inbound Rules" and then on "New Rule...".



4. In answer to the question "What type of rule would you like to create?", click the "Port" button.
5. Click the "Next" button.
6. In answer to the question "Does this rule apply to TCP or UDP?", click the "TCP" button.
7. In the "Specific local ports" text box, enter the port with number 135.
8. Click the "Next" button.
9. In answer to the question "What action should be taken when a connection meets the specified conditions?", click the "Allow the connection" button.
10. Click the "Next" button.
11. In this dialog, select the buttons "Domain", "Private" and "Public".
12. Click the "Next" button.
13. Enter a name in the input box for your inbound rule, for example the name "DCOM".
14. Click the "Finish" button.

4.7.9.4 Advanced DCOM settings

Advanced DCOM configuration as of Windows XP SP2 and as of Windows Server 2003 SP1

The advanced settings as of Windows XP SP2 and as of Windows Server 2003 SP1 require advanced settings to use DCOM OPC.

Make sure that newly added users or groups are assigned all listed permissions in the launch and access permissions.

Changes need to be made:

- Restriction of the access permissions for COM security
- Launch and activation permission for OPC.SimaticNET

The following sections describe the steps involved.

Making the settings to restrict the access permissions for COM security

Follow the steps below:

1. Go to the COM security settings as described in the section "Enabling the DCOM configuration "Security" for OPC client/server operation (Page 367)".
2. Click on the "Add User" button.
3. Add the "ANONYMOUS LOGON" user.
4. Check the "Local Access" and "Remote Access" boxes.

Make the settings for launch and activation permission for OPC.SimaticNET

Note

As of Windows 7, the step "Launch and Activation Permission for OPC.SimaticNET" is no longer necessary.

Follow the steps below:

1. Go to OPC.SimaticNET as described in the section "Functions of the "dcomcnfg" system program" for the DCOM configuration of the OPC server.
2. Click on the "Add User" button.
3. Add the "ANONYMOUS LOGON" user.
4. Check the "Local Launch", "Remote Launch", "Local Activation" and "Remote Activation" boxes.

See also

Functions of the "dcomcnfg" system program for the DCOM configuration of the OPC server (Page 385)

Here, you will find the most common questions asked about the following topics.:

- General FAQs
- OPC Server
- CP 1613/CP 1623
- SOFTNET Industrial Ethernet
- Open communication services (SEND/ RECEIVE) for Industrial Ethernet
- CP 5613/CP 5614 and CP 5623/CP 5624
- Changing from CP 5412 to CP 5613/CP 5614
- SOFTNET PROFIBUS (general)
- CP 5512
- CP 5611/CP 5621
- SOFTNET S7
- SOFTNET DP
- SOFTNET FDL

A.1 General FAQs

A.1.1 Licenses

I have installed SIMATIC NET on a compressed drive. An error message appeared when installing the license key. Can I not install on compressed drives?

You can install the product files on a compressed drive but not the license key. To install the license key, specify, for example, the host drive of the compressed drive.

Do I need a license key for "S7-RECONNECT"?

Yes, this is included in the form of license keys in the S7 REDCONNECT products.

A.1.2 Windows versions

How real-time capable are Windows operating systems?

Windows operating systems are not real-time operating systems. As a result you may find, for example, when starting programs, reading files or accessing the local area network, your application does not execute for several 100 ms. You can improve the behavior of Windows for real-time applications by making sure that

- the computer you are using has enough main memory so that the Windows operating system seldom needs to access the swap file.
- there is no intensive diskette, hard disk or CP access activity caused, for example, by starting large additional programs.

Where can I get service packs for Windows operating systems?

On the Internet pages of Microsoft: (<http://www.microsoft.com>)

A.1.3 Miscellaneous

What do I need to remember when an application is started?

Do not start an application using the AUTOSTART program group of Windows, but use the AUTOSTART function of the "Communication Settings" program instead. Otherwise, you may encounter problems with the license server. When booting, the license server requires a certain time before it is up and running.

How can I find out the version of the SIMATIC NET products?

Open the "Add/Remove Software" entry in the Control Panel:
"Start" > "Settings" > "Control Panel" > "Add/Remove Software"

During the installation of SIMATIC NET under a Windows operating system, various services are set up and always started automatically. Are these services necessary?

These services are absolutely necessary for SIMATIC NET operation. Do not disable or remove the services that have been set up under any circumstances. SIMATIC NET cannot function correctly without these services.

How can I check whether or not my hardware was correctly installed?

Use the diagnostics options provided by the "Communication Settings" program or use the supplied sample program for testing. You will find a detailed description of the examples in this documentation.

A.2 OPC server

A.2.1 Product characteristics

Is parallel operation of more than one protocol possible with the OPC server of SIMATIC NET?

Yes! To do this, you must configure the required protocols.

Why are incorrect error messages displayed when there is more than one active protocol?

A *write* call via the IOPCSyncIO OPC Interface with an invalid server handle returns the incorrect error code *S_OK* instead of *S_FALSE*.

Asynchronous writing to a symbolic OPC item that was assigned write permissions by the Symbol Editor but actually only has read permissions does not deliver a correct write return value (Write Result). The return value is "Unknown error" instead of "Inadequate access rights".

Adding nonexistent OPC items with the OPC Scout or with the *AddItem* OPC function results in the error message "An internally used service has completed" instead of "Invalid item".

Workaround: Use only one active protocol and no symbols or correct your configuration.

Why is the DP communication system blocked?

If an OPC client terminates unexpectedly, without previously releasing the OPC server in the DPInproc variant, the DP communication system remains blocked even after the end of the program. You must reboot your computer to cancel this interlock. If an OPC client is not yet stable, for example during the development phase, you should use the Outproc variant of the OPC Server.

How can interruptions on connections be avoided?

With passive connection establishment, the connection monitoring (see Error Timeout for OPC Jobs during Operation) can cause the connection to be closed.

To avoid the connection being closed, we recommend that you configure an active connection establishment in STEP 7. If necessary, the connection monitoring times for connection establishment should be modified.

A.2.2 Operating and programming the OPC server

How can I achieve improved performance when reading and writing?

By using group calls when reading and writing OPC items, in contrast to quick successions of individual calls, the throughput can be significantly improved since in many cases, the OPC server can make an internal optimization. A series of individual jobs at short intervals will normally result in poorer performance.

I have developed a program in C++ using the custom interface. How can I check whether all OLE interfaces are released again after my program closes?

If your program releases all interfaces correctly, the OPC Server automatically removes itself from memory after you close your program. Start the Task Manager of the Windows operating system (for example with <CTRLALTDel>, "Task Manager" button) and click on the "Processes" tab. If the OPC server is still running, you will see a process with the name "OPCDASERVER.EXE" in the list.

How can I close down the OPC Server if it remains in memory due to a client error after closing all the clients?

Open the page "Close OPC Server" in the "Communication Settings" and click the "Close OPC Server" button. You should NOT close the OPC Server using the Task Manager!

Are OPC cache values retained even after an OPC client has logged off?

The OPC cache values of items are retained even after an OPC client has logged off as long as the OPC server is not exited. A second OPC client therefore receives these values with the value "good" immediately after logging on since these are the best possible known values. The values are, however, updated immediately afterwards with current values within the agreed update time.

What do I need to remember if I abort an application with OPC or the DataOCX in the development environment with the debugger?

If an application is aborted, the chances are that it will not be able to tidy up internal references to the OPC Server. As a result, the OPC Server continues to run and communication is not shut down. To close down the OPC server, open the page "Close OPC Server" in the "Communication Settings" and click the "Close OPC Server" button.

Which header files do I need to include to be able to use the custom interface of the OPC Server?

Include all the header files from the "Simatic Net\opc2\inc" folder. You will also find the C file "opc_i.c" in this folder. This file defines classes containing the interface methods. If you include this file in your project, you can access the interface methods directly.

You should also have a look at the sample programs!

How should I design my program for the OPC Custom interface so that communication over OPC is as efficient as possible?

Use the OPC concept of monitoring the items in groups. Use the CACHE for read commands and activate the groups only when you really want to read values. Your application is then only involved in communication tasks when values actually change.

What errors does the SIMATIC NET OPC server return when AddItem is called if I have a bad path section in the ItemID? (for example DP:[CP_WRONG])

Although the path causes the error, the ItemID parameter is wrong. As a result, the OPC_E_UNKNOWNITEMID error is returned.

Which return values need to be checked with group operations over the OPC Automation Interface in Visual Basic?

In the function result, Visual Basic does not distinguish between a fully successful function (i.e. for all elements of a group operation) or only partly successful result. You should therefore check the arrays with the return values of the individual elements when using group operations in Visual Basic. (Example: Errors with SyncRead)

What information is used by the OPC Server if a different path section is specified in the AccessPath parameter compared with the path in the ItemID parameter?

The OPC Server puts together the full name of the variable from the AccessPath and ItemID. If an ItemID is used in the AccessPath, this must NOT be included in the ItemID as well. Otherwise, the item cannot be inserted in a group.

What does a time stamp with the value "1.1.1601 12:00" mean?

This date is the initialization value 0 of a time specified in Windows. The OPC Server returns this time stamp if no variable has been read up to now. Variables that can only be written have this time stamp.

Does an older time stamp mean that the value may be out of date?

No. An older time stamp says that the value has not changed since the time indicated by the time stamp. The validity of the value is monitored constantly by the server. A new time stamp is entered only when the value changes. The SIMATIC NET OPC Server enters the time at which the OPC Server receives the process variable as the time stamp. You obtain an older time stamp, of course, only when you read from the cache. If you read from the device, the time at which the value is received is used as the time stamp, regardless of whether or not the value has changed.

How can I tell whether or not a variable is valid?

Evaluate the quality flag.

The OPC Server returns some error codes that are not described in the supplied OPC specifications. What do the error codes mean?

Internal communications problems are coded by the SIMATIC NET OPC Server using specific error keys (HRESULT). These are as follows:

- C0048003 (hex): Timeout, for example due to aborted connection
- C0048004 (hex): An internal server has not started
- C0048006 (hex): Unexpected communication error

As with other errors, applications can call the *IOPCServer::GetErrorString* method to get a textual description of the problem.

You should also refer to the section "Error messages for OPC DA process variables" in the "Industrial Communication with PG/PC volume 2" programming manual.

How does the OPC Server check the syntax of transferred numeric values?

The OPC Server tolerates certain errors in transferred numeric values. An integer "123.45" is accepted without error as "123". The real value "1.22" is accepted as "1" if the comma is set as the separator in the Windows system.

I have set 200 ms as the value for the scan cycle. The update rate of the group should be 500 ms. in reality, however, some update times are 700 ms.

In some situations, the update times of the protocol and the group are added together. This conforms with the OPC Specification that stipulates that a group must not be reported faster than the specified update rate. If necessary, reduce the update time of the group.

How should symbolic variable names be defined with the OPC Server of SIMATIC NET?

There are two basic ways of defining symbolic names:

1. Entry in the protocolspecific configuration file by using OPC Scout V10
2. Taking symbols from STEP 7 and creating new symbols with the Symbol Editor

These two different procedures have the following features:

Alias definitions	<p>Simple and fast entry of symbolic names Only the part of the ItemID containing the variable name can be replaced by an alias. The protocol ID and the connection name cannot be replaced The startup phase of the OPC Server is longer when a large number of alias names is defined.</p>
Symbol Editor	<p>The Symbol Editor simplifies the entry of large numbers of symbols by entering them in table form. The symbols can be hierarchically structured. Symbols are not dependent on the structure of the ItemIDs or the protocol. The startup phase of the OPC Server does not depend on the number of variables.</p>

To retain expandability and independence from protocol properties, the use of the Symbol Editor is advised.

If the FDL protocol is activated alongside the DP protocol in the configuration of the OPC Server, a slight loss of performance can result.

If two protocols are activated at the same time, a multiplexer is started automatically. This can also cause a slight loss in performance. You should only activate the protocol you require.

In the SEND/RECEIVE and FDL protocols, there are readonly variables (for example Receive). When I enter these variables in the Symbol Editor, it is possible to declare these variables as writeonly. Why isn't it possible to insert these variables in a group?

When specifying the access rights with the Symbol Editor, the rights can be restricted but not expanded. As a result, it is not possible to declare an item that is readonly by virtue of its properties (such as the Receive buffer) as writable using the Symbol Editor. By specifying access rights in the Symbol Editor, it would, on the other hand, be possible to further restrict the read rights of a previously readonly item. Such an item that can neither be read nor written cannot be entered in a group with AddItem. This also applies to items whose access rights were restricted in NCM PC.

An OPC client uses the OPC server continuously, other OPC clients start and close again continuously. A slight loss of memory can be observed in the OPC Server.

The memory losses resulting from the configuration described above cannot be influenced by the OPC client or OPC Server and have been observed on very differing servers. The reason for this is the internal memory handling of Microsoft COM. In this case, it is advisable to close down the OPC Server when necessary and then to restart it.

Flat browsing with the OPC server

- Hierarchical browsing

All items of the currently selected level are returned.

- Flat browsing

All items of the selected level and all items of the levels below are returned. The elements of the individual levels are separated by a backslash (\). The resulting string represents the item. This separator can, however, differ from server to server; the SIMATIC NET OPC Server always returns the backslash as separator.

A.2.3 Project engineering and configuration

How is the *MinimumUpdateRate* of the OPC server obtained?

Since the SIMATIC NET OPC Server can use variables of different protocols at the same time, the *MinimumUpdateRate* of the OPC Server is the lowest value set for the scan cycle time for the active protocols.

Example:

A scan cycle time of 100 ms is configured for DP. No other protocol is being used. 100 ms is

used by the OPC server as the *MinimumUpdateRate*. The S7 protocol is now activated and the scan cycle time configured for this protocol is 50 ms. Result: The OPC Server now uses the value 50 ms as the *MinimumUpdateRate* for all protocols.

How can I change the access rights of OPC variables?

Local OPC information variables (such as *&statepath()*, see section "OPC process variables for SIMATIC NET" in the "Industrial Communication with PG/PC volume 2") have fixed access rights, normally only read rights. This can be extended or restricted by creating and assigning a symbol to an information variable in the Symbol Editor.

Regardless of this setting, the correct access rights will be used for this local OPC information variable and displayed in the OPC Scout.

This does not apply to remote communication variables, the access rights configured for these variables with the Symbol Editor are displayed in the OPC Scout. The actual rights are checked only during run time.

How can I access the component management of the PC station?

The "Station Configuration Editor" is the user interface of the Station Manager. It allows access to the component management of the PC station.

The "Station Configuration Editor" is started automatically after logging on with the operating system. It enters itself as a separate icon at the far right of the task bar (system tray).

Doubleclicking on the icon opens the "Station Configuration Editor". The "Station Configuration Editor" can, however, also be started manually using the "Station Configuration Editor" shortcut on the desktop.

Which settings do I need to make for the OPC Alarms & Events server and DPInproc server for OPC data access?

The DCOM configuration settings described in the "Commissioning PC Stations" manual apply analogously to the OPC Alarms & Events server and the DPInproc variant of the OPC server for data access.

In the "Applications" tab, however, the name of the relevant server must be selected instead of the "OPC.SimaticNET" server, as follows:

- OPC.SimaticNET.DP for the DPInproc variant of the OPC Data Access server
- OPC.SimaticNet.PD for the OPC PROFIdrive Data Access bus server
- OPC.SimaticNetAlarms for the OPC Alarms & Events server
- OPC.SimaticNetAlarmsSNMP for the SNMP OPC Alarms & Events server

Why should "DEMO" and "SYSTEM" not be used as connection names?

If the demo mode is enabled in "Communication Settings with "SIMATIC NET configuration > OPC settings > OPC protocol selection", a connection with the name "DEMO" is displayed automatically in the browser of the OPC Scout. If you have configured a real connection with the same name in a STEP 7 configuration and downloaded this successfully to the PC station, the connection will be hidden.

As a result, when the demo mode is inactive, you see a real connection with the name DEMO in the browser, and when demo mode is active, you still see a connection with the name DEMO in the browser, however this is then only the demo connection and the real connection is not visible.

This also applies to the (connection) name SYSTEM under which information variables such as `&version()` are displayed.

A.2.4 The Symbol Editor

What is the maximum permitted length for the path of a symbol file?

The path including the drive and file name of a symbol file must not exceed 180 characters.

Otherwise, the symbol file is not accepted by the OPC Server; the symbolic namespace cannot be investigated and it is not possible to insert symbolic names.

Which values are returned when querying access rights with the OPC methods "ValidateItem" and "GetProperties" when the access rights differ?

If access rights are specified for symbolic items in the Symbol Editor that differ from those that actually exist, when the access rights are queried

- using the OPC method *ValidateItem*, the actual rights are returned,
- using the *GetProperties* method, the rights assigned in the symbol file returned.

A.2.5 Special features of the DP OPC server

Which slaves can be addressed with the OPC Server for SIMATIC NET?

All the standard slaves supported by the configuration tools SIMATIC STEP 7 or SIMATIC NCM PC can be addressed by the OPC Server. Nonstandard slaves can be addressed, however, no structured access to the inputs and outputs of these slaves is possible.

A.2.6 Special features of the S7 OPC server

How does the OPC Server optimize access with S7 functions? Is the optimization of the S7 variable access active following installation? If it is not, how can I activate it?

The OPC Server collects the communications jobs (read/write jobs, variable monitoring jobs) from all active clients in a central queue. The individual jobs are then grouped together:

1. If individual jobs on a connection represent a contiguous memory area (for example all bytes from 1 to 100 of a data block), these jobs are put together to form one job accessing an array. This optimization is active as default but can be deactivated since it

puts load on the CPU of the PC. To deactivate the optimization, the connection-specific option "Optimize read access" or "Optimize write access" must be deactivated in the configuration.

2. Jobs to access the noncontiguous areas or different data types are grouped together for the specific connection. The number of jobs that can be put together depends on the PDU size and the length of the requested data. This optimization is always active.
3. Credits (the number of parallel network jobs that can be configured in NCM PC / STEP 7) are used; in other words, the number of jobs processed at the same time on one connection depends on the number of available credits.
4. Jobs on different connections are handled at the same time.

When I browse the S7 items, I only see the connection names. The blocks and variables are not displayed. Why is this?

To allow browsing, the OPC Server must already have established communication connections to the S7 partners. If this is not possible (for example because the S7 PLC is not ready for communication), the browser displays only the connection names. Make sure that the S7 partner is ready for communication.

Is it possible for two PCs to communicate using the S7 protocol?

The buffer send/receive and server services of the S7 protocol also allow a PC/PC link using the S7 protocol. A connection for the server functionality must be configured on one PC. The following settings must be made for this connection in the configuration:

Disable "Active connection establishment"

On the server PC, the S7 OPC Server must be started by a client (for example OPC Scout) and suitable BSEND/BRECEIVE variables must be set up for the connection.

For the client PC, a suitable connection must be configured as follows:

- Enable "Active connection establishment"
- Select "Always establish connection"

What consistency is guaranteed in communication with an S7 partner?

The S7 devices guarantee that data records up to a certain size are consistent within the controller (depending on the type of controller). With larger data packets, it is possible that the program of the controller will be interrupted and that another program section will change the data.

When accessing arrays over the OPC Server that are longer than the length of a PDU, the data transfer must be distributed over several jobs. As a result of handling the job over several cycles, not only changes to the data by the program of the controller are possible but also changes resulting from a write job over the network. When you design your system, you should take such possible inconsistencies into account.

The following consistency limits apply depending on the PDU size:

PDU size (bytes)	Maximum length of the user data when reading	Maximum length of the user data when writing
240	222	212
256	238	228
480	462	256 *)
960	942	256 *)

For more detailed information on consistency, refer to the S7 communications manual supplied with STEP 7.

A.2.7 Special features of the SR OPC server

Why does the S5 partner station terminate the connection to the OPC server when the OPC Scout is used to monitor a write connection?

Just like other OPC clients, OPC Scout continuously sends read jobs to the partner device. An S5 controller reacts to a read job on a write connection by terminating the connection. This is also the reaction to a write job on a fetch connection. Configure the mode of the SEND/RECEIVE connection accordingly.

Is it possible to read and write SEND/RECEIVE OPC items simultaneously?

SEND/RECEIVE OPC servers always require two items for reading and writing. This is a system characteristic of the SEND/RECEIVE protocol. This can lead to display problems on the visualization clients that often have only one field for displaying and setting a value. In this case, it is advisable to use the S7 protocol for displaying values.

Which error messages can occur with FETCH and WRITE when using SEND/RECEIVE?

If you use the SEND/RECEIVE OPC server, the following error messages can occur with the FETCH and WRITE operations (the causes are listed below the messages):

Error message text:

"The desired operation (read or write) is not permitted by the access right of the item".

Cause:

- You do not have any rights (normal situation)
- DB (data block) or PB (I/O module) does not exist
- Although the area exists (RS, I, Q, M, PB, T or C), it is addressed outside the maximum permitted area limits

Error message text:

"Unexpected communication error"

Cause:

- Bus cable not plugged in (normal situation).
- Other communication errors (normal situation).
- DBs or PBs are addressed outside the existing limits.

A.2.8 Special features of the FDL OPC server

If write jobs are sent to a communications partner in quick succession (for example with "Generate Values" in the OPC Scout), some of these jobs are rejected. What is the cause and how can I get round the problem?

Write jobs to a partner device can only be accepted when a receive resource (Await indication) is prepared on the partner device. This receive resource is filled with data when it is received and then passed to the processing application. This application is then responsible for preparing a new receive resource. In the situation described here, the receiving station cannot prepare receive resources quickly enough. With the connection-specific "Maximum retries" parameter, the number of repetitions in case of "No resource" can be set for the FDL OPC Server.

Why does the OPC Server not always obtain the actual value of a SEND/RECEIVE variable correctly?

The SEND variable has the access right RW. This variable can be written and read although the SEND/RECEIVE partner does not provide for the item being read back. When this item is read back, the OPC Server returns the last successfully written value.

If no value has yet been written successfully for this item, the quality "bad" is returned. The actual value of the variable cannot therefore be obtained by the OPC Server.

A.2.9 DCOM configuration

Is it possible to eliminate connection establishment problems involving DCOM configuration?

If the establishment of a connection between the OPC client and remote OPC server is rejected in DCOM operation within a Windows workgroup, the reason may be the security authentication. This case, it is advisable to restrict the security authentication.

The security setting can be specified and fixed with the *CoInitializeSecurity()* function call. Add this to your OPC client program:

```
CoInitializeSecurity(
    NULL, -1, NULL, NULL,
    RPC_C_AUTHN_LEVEL_NONE,
    RPC_C_IMP_LEVEL_IDENTIFY, NULL, EOAC_NONE, NULL);
```

The authentication level is set to "None", the impersonation level to "Identify". This call must be made with *CoCreateInstanceEx()* before connection establishment.

The programmed setting of the security level overrides the setting made with the "dcomcnfg" system program.

You should remember this behavior even with OPC clients you have not programmed yourself.

Despite restricting the security level, connection establishment can nevertheless take several seconds.

A.2.10 SIMATIC NET OPC data OCX

Why is no event message output on connection establishment?

When using the "Automatic connect" property (default setting) of the Data OCX, the time at which the OPC server establishes the connections to the communication partner and the time at which the VB application is ready to receive an event message on the connection establishment are not synchronized.

It is possible that the connection establishment takes place before the application is ready to receive events so that an event message on the connection establishment cannot be received.

Remedy:

Deactivate the "Automatic connect" property in the Data OCX and call the *Connect* method in the program when the application is initialized.

Outofdate values are displayed in the visualization control. Why?

When you interconnect process variables with controls for visualization, the *Value_Changed* callback is not synchronized with the transfer of the data value to the control for visualization. It is therefore possible that when the value is read out in the visualization control within the *Value_Changed* callback, an outofdate value is read.

Remedy:

Use the current value transferred in *Value_Changed*.

Which data types are accepted when writing with the SIMATIC NET Data OCX in VB.NET?

When writing data values with the SIMATIC NET Data OCX in VB.NET, only the data types of the correct size are accepted, for example, no LONG value (64 bits) can be written to an 8-bit item such as MB0. The opposite assignment is also impossible. Always use the correct data type and the correct sign or the use the OBJECT data type.

A.2.11 OPC XML-DA

How is the OPC XML DA server enabled?

If you want to use the OPC XML DA server, you will need to open the "Communication Settings" program and in "SIMATIC NET configuration >OPC settings > Security click the "Allow - remote basic communication and OPC communication" button.

Which requirements must be met so that trace output can be created for OPC XML-DA Web services?

To allow trace output for OPC XML-DA Web services, you must have write permission for the Microsoft Internet information services Web server ASPNET. The path of the trace file can be selected using the "Communication Settings" program. Assign this folder the required write permissions for the ASPNET user. Otherwise, no trace file can be created.

How can I exit the XML Web service?

The XML Web service cannot be exited with the "Exit OPC Server" button in the "Communication Settings" program. Instead, exit the Windows component "Internet Information Services (IIS)".

Which S7 strings cannot be read with OPC XML-DA Web services?

Reading S7 strings with OPC XML-DA Web services does not work if the S7 string contains a character that is invalid for XML strings. Characters with the following decimal code must not be used in an S7 string:

- 0 through 8
- 11
- 12
- 14 through 31

What can cause an unknown exception in the client program?

If a job sent to the XML DA Web service times out, a SOAP FAULT is generated that causes an exception in the client. It is not possible to ascertain the cause of the exception (timeout).

Under one conditions is a symbol file not locked?

If the OPC XML Web service does not have write permissions in the storage folder of a configured symbol file of the type "ATI", access to this is not locked during operation. The symbol file can be modified and saved in the Symbol Editor.

What happens when browsing a symbol file without adequate rights?

If you browse a symbol file without adequate rights, the value *E_FAIL* is returned with the default prefix and without default prefix, the value *S_FALSE* is returned.

How does the expanded OPC XML-DA Web service trace react to missing rights?

Normally the Web service writes its traces in two circulating files whose path can be set using the "Communication Settings". If these cannot be created or written to, for example due to inadequate rights, a context trace entry is created. This is only possible with the following entry in the configuration file

"<installationpath>\simatic.net\opc2\binxml\web.config":

```
<trace
    enabled="true"
    requestLimit="10"
    pageOutput="false"
    traceMode="SortByTime"
    localOnly="false"
/>
```

The *enabled=true* instruction enables the trace.

pageOutput=true means that in debug mode, the trace can also be displayed automatically on the start page of the Web service.

The context trace is an online trace made available by the Web service as long as it is running. It can be displayed with any browser, for example Internet Explorer.

To do this, you simply add "Trace.axd" as the URL to the corresponding virtual folder instead of the start page "SOPCWeb.asmx", for example
"http://localhost/OPC.Simatic.NET/Trace.axd".

When can XML-DA communication variables for PROFIBUS DP and PROFINET IO be queried successfully?

Communication variables for PROFIBUS DP and PROFINET IO can only be queried successfully when the information variables *DP:[<connectionname>]&Masterstate* or *PNIO:[controllername]&mode()* have the value *OPERATE*.

When using OPC XML-DA, it is advisable to query the variables *&Masterstate* (DP) or *&mode()* (PROFINET IO) until the value *OPERATE* is achieved. It is then possible to access process variables successfully.

A.3 Hardnet Industrial Ethernet

A.3.1 General information on installation

Note

All the FAQs in the section "Hardnet Industrial Ethernet" relate to the modules CP 1613 / CP 1623 and CP 1628. Even if only the CP 1613 is named.

A.3.2 Installation along with other modules

Why can you specify two TCP/IP addresses when configuring the CP 1613?

On the one hand, the CP 1613 communications processor is designed for operation with office communications protocols, for example, TCP/IP. In this case, the CP<SP>1613 NDIS adapter must be installed and office communications protocols will be assigned to it. The office communications protocols run on the PC.

The CP 1613 is used mainly for automation with the SIEMENS industrial protocols, for SEND/RECEIVE, SAPI S7 and STEP 7. These protocols can be handled via the ISO transport protocol or TCP/IP. Both transport protocols run in the firmware of the CP 1613. The adapter between the TCP/IP transport protocol and the SIEMENS industrial protocols is implemented according to RFC 1006.

On the CP 1613, a total of two TCP/IP transport protocol functions can be operated at the same time:

- The office communications adapter
- The adapter of the SIEMENS industrial protocols

Both adapters must be assigned different TCP/IP addresses to identify them uniquely.

A.3.3 CP 1613 SNMP agent

What does the CP 1613 SNMP agent do?

As of product version V6.0.5, the firmware of the CP 1613 includes the "CP 1613 SNMP agent" (Simple Network Management Protocol agent). The agent replies to the requests of an SNMP manager, for example the SNMP OPC server. No installation is necessary. It is always active.

The CP 1613 SNMP agent supports SNMPv1 (SNMP version 1.0) and RFC 1213 MIBII objects (MIB: Managed Information Base).

Addressing

The "CP 1613 SNMP" agent is accessible over the IP address of the CP 1613 (IP address for the automation protocols over ISO-on-TCP, same significance as TCP/IP (RFC 1006)).

The "Windows SNMP agent" is also available over the NDIS-IP address (IP address for communication over PC networks if this is configured). For more detailed information on the Windows SNMP service, refer to the Windows online help.

Configuration

It is not necessary to configure the CP 1613 SNMP agent. The user can, however, set the objects *sysLocation*, *sysContact* and *sysName*. This is done over the network with an SNMP manager. This data is stored on the CP 1613. If you replace the CP 1613, these objects must therefore be set again.

Security

For security reasons, only the objects *sysLocation*, *sysContact* and *sysName* can be set. Access to all other objects is read-only.

The integration of the SNMP agent into the firmware provides additional security. Access to the data of the computer using SNMP is therefore not possible.

Restrictions

Only the communities *public* (read-only) and *private* (can be read and written) are supported. Reconfiguring or adding communities is not possible. Traps are not sent by the CP 1613 SNMP agent.

A.3.4 Miscellaneous

Are there special points to remember about connection monitoring with ISO-on-TCP (same significance as TCP/IP (RFC 1006))?

If an application does not provide receive resources, the detection of a connection abort (caused by the partner on the connection) may take several minutes. Connection establishment between two PCs with CP 1613 modules may take several minutes, if there are more than 32 connections to be established.

Ping function - Why does the CP 1613 not reply?

You enter a "ping" for a CP 1613 installed in your own computer and it does not reply. The installed CP 1613 can only reply if the "ping" is sent by a different network adapter connected to the CP 1613 over Ethernet.
Otherwise, only CPs outside your own system can be "pinged" via the CP 1613.

Time-of-day frames and intervals -

Which intervals are approved for receiving timeofday frames?

- 1 s and
- 10 s

Plugging in different connecting cables (TP, ITP or AUI) -

What do I need to remember when plugging in different connecting cables?

If all the options for "network parameters" in the "Set PG/PC Interface" or "Communication Settings" programs are set to "automatic", the card will adapt itself automatically to the attached network.

Only one network cable can be connected to a CP 1613 at any one time.

What are the time limits for removing and plugging in the Ethernet cable without existing ISO connections being terminated?

For ISO data exchange, 16 repetitions at intervals of 1 second are set on the CP 1613; in other words, if the cable is disconnected for longer than 16 seconds, the ISO connections will terminate. If the time is kept below 16 seconds, no problems will occur.

If there is no data exchange on an established connection, a "sign of life" is sent at intervals of 10 seconds. If there is no response to this ten times in succession, the connection is automatically terminated. In the case of such a "quiet" connection, the cable can therefore be removed for up to 100 seconds without the connection being terminated.

The information above applies, as already mentioned, to the data transfer phase. In the connection establishment phase, the connection establishment request is sent every two seconds and up to 32 attempts are made. The interruption can therefore be up to approximately 64 seconds during the connection establishment phase. If this is exceeded, the connection establishment is aborted and no connection will result.

CAUTION: The information above does not apply to faulttolerant connections (H connections)!

A.4 SOFTNET Industrial Ethernet

When can data be lost during data transmission?

When using the TCP/IP transport protocol, if the connection is terminated (CLOSE_REQ) immediately following a SEND_DATA or SEND_EOM_DATA, the data can be overtaken by the close request and is then lost.

Remedy

We recommend that you implement your own acknowledgment mechanisms above the transport layer.

With the ISO protocol, transport data cannot be overtaken and no data loss occurs.

When using the RFC1006 adapter "S7ONTCP.DLL", if there is a high transmission load with short messages (< 10 bytes), the connections sometimes break down. How can you get round this problem?

- You should take measures to attempt to distribute the message load.
- At a higher layer, implement mechanisms to ensure that the CP has received and processed the messages.

When sending over the RFC1006 adapter, the sockets put the messages in a buffer if they cannot be sent immediately. The user is informed that the messages have been sent even though they have only been placed in the buffer of the socket (because they will be sent later).

What are the effects of a high transmission load with short messages (<10 bytes) with TCP (RFC1006)?

If send jobs are initiated in the user program more quickly than they can be processed by the recipient, this can lead to buffer overload and cause a breakdown on the connection. This problem occurs particularly with a high transmission load and short messages (<10 bytes).

Remedy

You can avoid the connection breakdown by reducing the number of send jobs at the user program end.

Why is the TCP/IP connection terminated in a Windows operating system 10 seconds after disconnecting the network cable regardless of the selected keepalive time?

In Windows operating systems, TCP/IP has a link monitoring function. As a result, removing the TP cable from the network adapter causes a *remote_abort* after approximately 10 s.

A.5 Hardnet PROFIBUS

Are there restrictions relating to the CP 5603, CP 5613 A2, CP 5613 A3 / CP 5614 A2, CP 5614 A3 and CP 5623 / CP 5624 as DP slave?

A CP 5603, CP 5613 A2, CP 5613 A3 / CP 5614 A2, CP 5614 A3 and CP 5623 / CP 5624 communications processor as DP slave can communicate over the DPC2 protocol with only 1 DP master. DPC2 data record jobs from other class 2 masters are rejected with communication errors. Reading I/O data and slave diagnostics are possible without any restrictions. When used as DP slaves, the communications processors listed above can also only be operated as DP-V0 slaves via OPC.

A.6 SOFTNET PROFIBUS

Is it permitted to operate SOFTNET PROFIBUS CPs together or combined with Hardnet CPs?

A maximum of two SOFTNET modules may be installed in one PC. Only one of these may operate in configured mode.

What do I need to remember when operating the CP 5512 and CP 5611 communications processors as PROFIBUS DP slaves?

The CP 5512 and CP 5611 communications processors can be configured as PROFIBUS SOFTNET DP slaves. If you use OPC as the interface, the SOFTNET DP slave submodule must not include any special identification formats in the configuration.

Check the configuration of each SOFTNET DP slave module in HW Config. If special identification formats exist, you can recognize this because the parameters "Output length byte" and "Input length byte" in the "Direct Entry" dialog box are grayed out.

You can display these parameters as follows:

Open the "HW Config" program > select the "SOFTNET DP slave" > select the slave module with the right mouse button > select the "Object Properties" menu command > click the "Direct Entry..." button in the "Properties - DP slave" dialog.

After I plugged the 5611 and CP 5621 into the PCI slot, the BIOS message Resource Conflict PCI Network Controller as Slot ... was displayed!

The resources required by the CP 5611 and CP 5621 (interrupt, memory ranges) are set by the PCI BIOS and mapped to suitable system resources.

The PCI BIOS has detected that the required resources are not available. Change the hardware configuration of the computer so that the required resources are free.

A.7 Programming instructions for the C interfaces

A.7.1 S7 protocols

How should I set the "dev_name" parameter when calling the "s7_init" and "s7_get_vfd" functions?

The "dev_name" parameter identifies the access point via which you will communicate. This device name is the same as the entry made in the "Access point of the application" box in the "Communication Settings" program. This can be the value "CP_L2_1:" that is installed as default.

Are there services that are not supported by all S7 CPUs?

Yes, the "S7_get_vfd_state_req" service is not supported by the S7300. The "BSEND/BRECEIVE" functions and alarms are not supported by the S7300.

Are the times of SAPIS7 jobs monitored?

Yes, with the AbortTimeout value. This value specifies the maximum time for retries if the remote station does not respond. For more detailed information, refer to the manual SIMATIC NET S7 Programming Interface (function s7_mini_db_set).

This is set in multiples of 51 ms (default: 3000). The parameter applies both to the connection establishment phase and the data transfer phase. In other words, if connection establishment is initiated to a station that is not attached to the bus, there is a negative acknowledgment after approximately 150 seconds.

If a job is sent to station that is no longer attached, the CP initiates a negative acknowledgment or an abort indication at the latest after 150 seconds.

The SOFTNET CP 5...11/5512 modules monitor the following:

Connection establishment, partner station does not exist

TimeOut	PersistenceCount	TimeOut after
500	5	25 sec
1000	5	50 sec
1000	10	50 sec

Connection breakdown, no data exchange:

TimeOut	PersistenceCount	TimeOut after
500	5	Immediately
1000	5	Immediately
1000	10	Immediately

Connection breakdown, data exchange:

TimeOut	PersistenceCount	TimeOut after
500	5	Immediately
1000	5	Immediately
1000	10	Immediately

What should I note about evaluating the return value of the "s7_receive" function?

If unexpected values occur for which no processing function is called, the "s7_discard_msg" function must be called (for example in the default branch of a suitable switch statement).

A.7.2 DP slave

Can I operate my SOFTNET DP slave purely as an input or output slave?

Yes, this is possible.

Closing an application that uses the DP slave interface in the Task Manager or in the debugger does not work. What can I do?

If you close the application without previously executing "dps_stop" and "dps_close", it can take quite a long time before the process is actually closed. Always execute "DPS_stop" and "DPS_close" before you close your application.

A.7.3 DP master

How many slaves can be operated with SOFTNET DP?

Number of SOFTNET DP slaves of the CP 5611/CP 5611 A2 and CP 5621:

Memory Size	Number of slaves
256 KB	64

Number of SOFTNET DP slaves of the PC card CP 5512:

Memory Size	Number of slaves
252 KB	64

What do I need to remember if I abort my DP application in the Task Manager?

Make sure that when the DP application is aborted, a "dpn_reset()" call is made. If Windows sends a "WM_CLOSE" message, the program must react and if it has not already done so, it must execute a "dpn_reset()" call.

Can I design my SOFTNET DP application with more than one thread?

In principle yes. However, to keep the load caused by constantly changing threads to a minimum, it is advisable to implement the SOFTNET DP application with only one thread. You will also find that this increases the performance of your DP application.

What are the most important points to remember when creating a SOFTNET DP PROFIBUS application?

Continuous polling on the DP interface (for example *while* instructions without inserting *sleep* functions) can lead to poor performance on the bus because the DP drivers no longer have adequate CPU capacity available.

If necessary, include pauses of a few milliseconds between the calls.

Note on the *dpm_slv_diag()* DP function!

The diagnostics data is not valid if the return parameter *slv_state* of the *dpm_interface* structure contains the value DPN_SLV_STAT_NOT_ACTIVE or DPN_SLV_STAT_OFFLINE.

Do I need to use the *dpm_set_slv_state* function in my DP application?

The use of this function is not normally necessary in a DP application since a DP slave is activated or deactivated automatically by the communications software (depending on the mode of the master). The function should only be used in exceptional situations to take a slave out of the DP cycle regardless of the mode of the DP master.

I receive error messages for *dpm_init* that are not listed in my manual on the DP programming interface. What do these mean?

Two new error codes have been introduced:

- DPN_LOAD_L2_VXD_ERROR (0x0097): The layer 2 drivers for the CP 5611 or CP 5411 (S7OASPCX.VXD) cannot be loaded.
- DPN_OPEN_L2_VXD_ERROR (0x0098): The layer 2 drivers cannot be opened. Possible causes:
 - Permanent bus disruption (for example, bus terminator missing);
 - another master station with the same station address is already active on the bus;
 - you will more information in the Windows event log.

I work with various groups of slaves. When I try to address group 1 by setting bit 0 as described in the manual, an error occurs.

Selecting groups 1 to 8 in the structure element *user_data[0]* functions as follows:

Set bit 0: Group 8 is selected

Set bit 1: Group 7 is selected

...

Set bit 7: Group 1 is selected

During DP operation, the message "Bus short-circuit or bad transmission rate" appears. The *dpm_reset* of my DP application is then no longer acknowledged.

This can only occur in isolated situations if there is a permanent (!) bus short-circuit.

Disconnect your CP 5...11 from the bus. The *dpm_reset* then terminates itself.

Eliminate the bus short-circuits and start your application again.

A.7.4 FDL protocol

I use the *SCP_receive* call in the synchronous mode but sometimes when the function returns there is no request block. Why does it do this?

Since the FDL interface with SOFTNET is available as of Windows NT, and because the asynchronous mode must be used for Windows programs, the *SCP_receive* no longer supports the *timeout* parameter.

This means that with *SCP_receive*, the value *SCP_NOWAIT* must always be used in the *timeout* parameter.

Which parameter assignment do I need if I want to communicate with FDL over PROFIBUS?

The FDL protocol can be used with all parameter assignments. You must, however, specify *FLC* with *SCP_open*.

If, for example, you set *CP_L2_1:* to DP master, you can run FDL if you execute *SCP_open* with the parameter */CP_L2_1:/FLC*.

With MPI, however, there is a special FDL parameter assignment that allows data lengths up to 246 bytes but does not tolerate any other protocol.

I use the GD (Global Data) S7 protocol in my PROFIBUS network.

When I open SAPs in the range of the GD protocol on my PC, they continuously receive broadcasts from the S7 PLCs.

The communication partner, however, always sends to this SAP. How can I filter to receive the correct frames?

Set *SAP_ACTIVATE* so that the PC only receives frames from the required partner. You can do this by specifying the station address of the partner in the *access_station* field in the *fdl_sap* structure. This filters the frames so that you only receive them from this station.

Can I use all the FDL services of the CP 5613/CP 5613 A2 and CP 5623/CP 5624 unchanged on the SOFTNET FDL interface?

The SOFTNET FDL interface is compatible with the FDL interface of the CP 5613/CP 5613 A2 and CP 5623/CP 5624.

However, the following services are not available:

- *FDL_READ_STATISTIC_CTR*
- *FDL_READ_LAS_STATISTIC_CTR*
- *LSAP_STATUS* (only local SAPs, no remote access)
- *FDL_IDENT*

Specifying the role with *SAP_Activate* under SOFTNET FDL is also restricted:

If *Responder* or *Both_Roles* is requested for one of the services, only this service is permitted and all others are blocked.

If, however, *Responder* or *Both_Roles* is specified for two or more services, all services are enabled.

When using FDL, SCP_get_errno returns error codes that are not documented in my FDL manual!

Here is a complete list of all the error codes

Error code	Hex Value	Explanation
E_SUCCESS	0x0000	
E_RESOURCES	0x012a	Not enough system resources (for example, work memory).
E_PAR_ERR	0x012e	Bad parameter - Check the function parameters.
E_DPRAM	0x0132	No dual-port RAM or it cannot be written to.
SCP_RESOURCE	0x00ca	Not enough system resources - Check your configuration.
SCP_CONFIG_ERR	0x00cb	Configuration error - Check your configuration.
SCP_ILLEGAL	0x00cd	Invalid function call
SCP_PARAM	0x00ce	Bad parameter - Check the function parameters.
SCP_DEVOPEN	0x00cf	Opening the device (SCP_OPEN) failed because it is already activated or using the device (SCP_SEND) failed because the device is not yet activated.
SCP_BOARD	0x00d0	Hardware (communications processor) not reacting. Check your configuration.
SCP_SOFTWARE	0x00d1	Undefined error in the driver
SCP_MEM	0x00d2	Lack of memory in the driver
SCP_NOMESS	0x00d7	No message exists
SCP_USERMEM	0x00d8	Access to the application buffer not possible.
SCP_TIMEOUT	0x00db	Timeout (SCP_receive) not relevant for SOFTNET
EUSERMAX	0x00e1	The maximum number of users for the device has been reached. Close a few applications.
SCP_EINTR	0x00e2	Job aborted
SCP_NO_WIN_SERV	0x00e9	A utility for initialization/synchronization could not be started. Reinstall.
EPROTECT	0x00ea	License error. Reinstall.
SCP_DB_FILE_DOES_NOT_EXIST	0x00f0	No database specified, irrelevant for FDL
SCP_DB_FILE_CLOSE_NOT_OK	0x00f1	Failed to close the database, irrelevant for FDL.
SCP_SEND_NOT_SUCCESSFUL	0x00f2	SCP_Send failed
SCP_RECEIVE_NOT_SUCCESSFUL	0x00f3	SCP_Receive failed
SCP_NO_DEVICE_AVAILABLE	0x00f4	No device available
SCP_ILLEGAL_SUBSYSTEM	0x00f5	Invalid subsystem specified
SCP_ILLEGAL_OPCODE	0x00f6	Invalid opcode specified
SCP_buffer_TOO_SHORT	0x00f7	Transfer buffer too short
SCP_buffer_1_TOO_SHORT	0x00f8	Transfer buffer 1 too short
SCP_ILLEGAL_PROTOCOL_SEQUENCE	0x00f9	Illegal protocol sequence, irrelevant for FDL
SCP_ILLEGAL_PDU_ARRIVED	0x00fa	Invalid PDU received, irrelevant for FDL
SCP_REQUEST_ERROR	0x00fb	Request failed

Error code	Hex Value	Explanation
SCP_NO_LICENSE	0x00fc	No license found, reinstall
E_INIT_COM	0x0301	Error in internal driver communication
E_NO_HW	0x0310	Module not found (module does not exist, bad settings on the module, incorrect configuration of the hardware resources or incorrect installation). Check the configuration of the access point in Set PG/PC Interface.
E_HW_DEFEKT	0x0311	Hardware error (possibly defective module)
E_CNF	0x0312	Bad configuration parameter
E_BAUDRATE	0x0313	Wrong baudrate or invalid interrupt. Reconfigure the CP with Set PG/PC Interface.
E_HSA	0x0314	Bad HSA set. You can modify the bus parameters in Set PG/PC Interface.
E_TS	0x0315	The station address set is already being used in the network. You can modify this in Set PG/PC Interface.
E_OCC	0x0316	Hardware device already assigned, irrelevant for SOFTNET.
E_INT_NOT_PROV	0x0317	The specified interrupt is not available. Reconfigure the CP with Set PG/PC Interface.
E_INT_BUSY	0x0318	There is an interrupt resource conflict. Reconfigure the CP with Set PG/PC Interface.
E_SAP	0x0319	SAP deactivate: SAP not in use
E_UNPLUGGED	0x031a	No active PROFIBUS network found. Check whether the option <i>PG/PC is the only master on the bus</i> is activated in Set PG/PC Interface. Deactivate this option.
E_SYN1	0x031b	This occurs when there are disturbances on the bus or when there is an interrupt conflict.
E_AMPRO	0x031c	Internal error
E_NO_FILE	0x0320	DLL/VxD file not found all the device is not active. Reinstall.
E_NO_ENTRY	0x0321	The loaded DLL does not have this entry. Reinstall.
E_VERSION	0x0330	Version conflict between SmartCable driver and SmartCable firmware
E_NO_SMC	0x0332	Problem with COM port configuration for SmartCable
E_ONLINE	0x0380	Internal error
E_LOGDEV	0x0381	The specified device parameter assignment could not be found. You can create and configure a logical device with the Set PG/PC Interface program.
E_L2DRIVER	0x0382	The layer 2 driver could not be started. Reinstall the product.
E_L4DRIVER	0x0384	The layer 4 driver could not be started. Reinstall the product.
E_SYSERROR	0x03FF	Windows system error. You can find out the error number with GetLastError().

A.8 Firewall and Security-CP CP 1628

A.8.1 Firewall settings in Windows and on the CP 1628

What do I need to remember about firewall settings in Windows when operating a CP 1628?

If you have made security settings (firewall, VPN) on the CP 1628 using the Security Configuration Tool (SCT) and you have communications problems, check that the firewall settings on the CP 1628 and in Windows do not conflict, in other words, are consistent and correct your settings if necessary.

Refer also to the section "Detecting errors in communication with the OPC Scout V10 (Page 52)" and section "Security setting (as of Windows XP SP2) (Page 294)".

A.8.2 Order when downloading a VPN configuration

What do I need to remember when downloading a VPN configuration?

When downloading a VPN configuration to the CP and if you have configured firewall/VPN tunnels, it is important to download all VPN partners first and only then to download the CP.

B

References and literature

- /1/ SIMATIC NET, manual
Industrial Communication with PG/PC
Part of
• the manual package Industrial Communication with PG/PC
• of the SIMATIC NET CD
Siemens AG
- /2/ SIMATIC NET, instructions
Commissioning PC Stations
Part of
• the manual package NCM S7 for Industrial Ethernet
• of the online documentation in STEP 7
Siemens AG
- /3/ SIMATIC NET IT CP, instructions
Part of
• the manual package NCM S7 for Industrial Ethernet
• of the online documentation in STEP 7 / Option NCM S7 for Industrial Ethernet
Siemens AG
- /4/ SIMATIC Configuring Hardware and Connections with STEP 7
Part of the STEP 7 documentation package STEP 7 Basic Knowledge
part of the online documentation of STEP 7
Siemens AG
- /5/ SIMATIC Programming with STEP 7
Part of the STEP 7 documentation package STEP 7 Basic Knowledge
Part of the online documentation in STEP 7
Siemens AG
- /6/ SIMATIC STEP 7 reference manuals with the manuals
• LAD / FBD / STL
• System software for S7-300/400 System and Standard Functions
Part of the online documentation in STEP 7
Siemens AG

- /7/ On setting up and operating an Industrial Ethernet network
SIMATIC NET manual Industrial Twisted Pair Networks
Siemens AG
- /8/ Ethernet, IEEE 802.3
(ISO 8802-3)
- /9/ On setting up and operating an Industrial Ethernet network
SIMATIC NET Manual for Triaxial Networks Industrial Ethernet
Siemens AG
- /10/ Lokale Netze -
Kommunikationsplattform der 90er Jahre
Andreas Zenk
Addison-Wesley
ISBN 3-89319-567-X
- /11/ TCP/IP
Internet-Protokolle im professionellen Einsatz
Mathias Hein
International Thomson Publishing
ISBN 3-8266-400-4
- /12/ RFC1006 (Request For Comment)
- /13/ RFC793 (TCP)
- /14/ RFC791 (IP)
- /15/ On the topic of programming:
Automation with STEP 7 in STL and SCL
User Manual, Programming Manual
Berger, H. / PublicisMCDVerlag, 2001
- /16/ On project engineering of PROFINET components and systems:
Basic help in the SIMATIC iMap engineering tool
Siemens AG
- /17/ On configuring PROFINET CBA components and systems:
Component based Automation - Configuring Systems with SIMATIC iMap
Manual
Siemens AG

- /18/ On the use of PROFINET IO and PROFINET CBA :
PROFINET System Description
system manual
Siemens AG
- /19/ On configuring and programming PROFINET IO:
From PROFIBUS DP to PROFINET IO
Programming manual
Siemens AG
- /20/ On programming PROFINET IO:
IO Base User Programming Interface
Programming manual
Siemens AG

Order numbers

- The order numbers for the SIEMENS documentation listed above can be found in the catalogs "SIMATIC NET Industrial Communication, Catalog IK PI" and "SIMATIC Programmable Logic Controllers SIMATIC S7 / M7 / C7, Catalog ST70".
- You can order these catalogs and obtain further information from your local SIEMENS office or national head office.
- Some of the documents listed here are also on the Manual Collection CD supplied with every CP and with the SIMATIC NET DVD.

Index

A

Access points, 331
 Configuration of, 55
Advanced PC Configuration, 13

C

Characteristics, 13
Communication Settings
 Configuration program, 19
Communication Settings, 269
Communication Settings
 Diagnostics, 339
Compatibility
 SIMATIC NCM PC and STEP 7, 207
Configuration
 DP master system, 214, 241
 PROFINET IO system, 217, 243
Configuration program
 Communication Settings, 19
Configuration tool STEP 7 Professional, 233
Configured mode, 19
 Commissioning, 23
 Getting started, 27
Configuring connections
 Procedure, 220, 245
Connection type
 FDL, 62
 ISO transport, 63
 ISO-on-TCP, 63
 S7, 62
CP 1613, 318, 340
CP 1616
 Controller, 67
 Device, 68
 Initializing, 69
 Installing Linux drivers, 94
PROFINET IO test program, 95
Router, 76, 76

D

Databases
 LDB, 14
DCOM, 366

DCOM settings, 19
Diagnostics
 Communication Settings, 339
Download, 16, 229, 250
Downloading project engineering data
 Online mode - networked, 229, 250
 XDB import, 200
DP master system, 214, 241

E

Engineering station, 13

G

Glossary, 4

I

Index, 17
Industrial Ethernet communication with OPC
 Hardware installation, 104
 OPC Scout V10, 113
 Software installation, 104
Information service, 19, 283
Initial configuration, 33, 197
 Remote configuration, 205, 234
 With an XDB file, 23, 24, 38
 with XDB file, 205, 234
 Without an XDB file, 24, 41
Installation and commissioning
 Guide to, 19
Installing hardware (PC modules), 27
Installing SIMATIC NET PC software, 27
Interface for open communication
(SEND/RECEIVE), 62, 63

M

Master, 214, 241
Mode of a module, 316

N

Name space prefix
 Changing, 263
 Deleting, 263
NCM PC and STEP 7, 207
NetPro, 204

O

Offline mode, 201, 232, 252
Online mode, 201
OPC Scout V10, 19, 349
OPC server, 16
 Connection properties, 61
 Errors when connecting with, 52
 Project engineering, 57
 Properties, 59

P

Partial loading, 203
PC station
 Configuring as DP slave, 222, 246
 Creating, 208, 235
PC stations
 In SIMATIC, 15
PG mode, 19
 Commissioning, 22
 Configuration, 44, 44, 47
 Getting started, 43
Process variables, 53
PROFIBUS communication with OPC
 DP master, 126
 DP slave, 127
 Hardware installation, 121
 OPC Scout V10, 129
 Software installation, 121
PROFIBUS DP slave, 337
PROFINET IO controller, 217, 243
PROFINET IO system, 217, 243
Project engineering, 16, 28

R

Remote configuration, 195, 205, 234
Remote configuration, 195, 205, 234
Remote configuration, 195, 205, 234
RFC 1006, 45, 50

S

Setting up the CP 1616, 67
SIMATIC NCM PC Config, 204
SIMATIC NCM PC Manager, 204
SIMATIC NCM PC project engineering tool, 203
SIMATIC NET, 13
SIMATIC NET glossary, 4
SIMATIC Shell, 34
SIMOTION, 53
Slave, 214, 241
SNMP, 65
SOFTNET Industrial Ethernet modules
 Points to note with, 56
Configuring connections
 S7 station,
 Substitute object,
 Unspecified,
Station Configuration Editor, 18, 33, 195
Station Configuration Editor, 18, 33, 195
STEP 7, 4, 13, 205, 208
STEP 7 Professional, 234, 235
STEP 7 Professional (TIA Portal)
 Help, 234
Symbol Editor, 19, 254
 Menu, 259
Symbols, 53, 258

T

Tools, 18, 203
 Help, 206

V

Variables
 Errors when adding, 53

X

XDB file, 205, 234
XDB import, 16