

SIMATIC NET OPC UA Server

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# 1 Introduction

### 1.1 Overview

### SIMATIC NET OPC server communication functions for OPC UA

OPC Server provides standardized access to the SIMATIC NET industrial communication networks.

SIMATIC NET OPC Server supports the interfacing of applications with any automation components networked over PROFIBUS or Industrial Ethernet. SIMATIC NET OPC Server offers the following communication functions for OPC UA:

- S7 communication
  - S7 OPC UA Server
  - S7OPT OPC UA Server
  - Open communication services (SEND/RECEIVE)
  - SR OPC UA Server
- PROFIBUS DP
  - DP OPC UA Server

### S7 communication services

The S7 communication of the SIMATIC NET OPC Server for OPC UA supports the following services, among others:

- OPC Alarms & Events
   Transfer of process alarms and events
- Historical data on OPC UA Reading of historical data from S7 tags stored in a database for up to 360 hours.

This application example shows how to use the above services.

The following components are used in this application example:

- SIMATIC NET OPC Server for OPC UA: S7OPT OPC UA Server
- OPC client: UA Expert
- S7-1500 CPUs

### 1.2 OPC Alarms & Events

OPC Alarms & Events is a specification for the transmission of process alarms and events. It is designed to be very flexible and can, therefore, be applied to a wide variety of event sources. The spectrum ranges from simple events to complex events and even events with an acknowledgement obligation.

The OPC specification defines the possible state transitions for conditional events in a state diagram.

The OPC Alarms & Events Servers have the following functions:

- Detection of events
- Determining the state of an event
- Acknowledging an event (acknowledgement)
- Monitoring the confirmation
- New events can also be reported without confirmation.

The standardized OPC Alarms & Events interface allows to use these requirements.

### 1.2.1 Events

Events are special states in the process that must be reported to a receiver.

#### Event message

Event messages provide the parameters defined by the OPC specification and, if applicable, accompanying values defined by the manufacturer.

There are the following types of event messages:

- simple event messages
- complex condition-based event messages with or without acknowledgement by the OPC Client

### Properties of an event

All information of an event is stored in its properties. The properties of an event are defined by the event type.

- Each event type defines which properties it offers.
- Each event type has its own properties or inherited properties. This results in an extensive event type hierarchy.



The event type hierarchy of the OPC Alarms & Events Server can be determined with an OPC client, e. g. UA Expert from Unified Automation.

The following figure shows an overview of the OPC UA event and alarm types of the SIMATIC NET S7OPT OPC UA Server in UA Expert.

Figure 1-2
Address Space
😏 No Highlight
🗀 Root
🗸 🛅 Objects
> 🛅 S7OPT:
> 🛅 STOPTAREAS:
> 🛅 SYM:
> 臱 Server
Y 🛅 Types
> 🖨 DataTypes
Figure 1
A BaseEventType
ConditionType
<ul> <li>ConditionType</li> <li>ConditionType</li> </ul>
<ul> <li>AcknowledgeableConditionType</li> <li>AcknowledgeableConditionType</li> </ul>
Acknowledge
> Carmoroup>
A CLUSTATE
V 1 DiscreteAlarm Type
V 🐒 OffNormalAlarmType
VormalState
S70PTOffNormalAlarmType
> 💑 S7OPTAddData1
> 💑 S7OPTAddData10
> 💑 S7OPTAddData2
> 💑 S7OPTAddData3
> 💑 S7OPTAddData4
> 👶 S7OPTAddData5
> 👶 S7OPTAddData6
> 🚕 S7OPTAddData7
> 🚕 S7OPTAddData8
> 뤚 S7OPTAddData9
S70PTAddDataCount
S7OPTAddText1
S7OPTAddText2
S7OPTAddText3
S7OPTAddText4
S70PTAddText5
S7OPTAddText6
S7OPTAddText7
STOPTAddText8
S7OPTAddText9
STOPTAlarmClass
STOPTAlarmId
STOPTConnection
STOPTDBName
STOPTDisplayClass
S7OPTInfoText
S7OPTStationPlcName
STOPTTime
> 🐒 S7OPTSysOffNormalAlarmType

### 1.2.2 Principle of operation

### **OPC Alarms & Events class model**

The class model of OPC Alarms & Events allows the adaptation of the OPC client to the requirements of an automation solution. OPC Alarms & Events distinguishes between three classes:

- OPC Event Server
- OPC Event Subscription
- OPC Event Area Browser

# **Note** Objects in the OPC Event Area Browser class are optional and are not supported by the SIMATIC NET OPC Alarms & Events Server.

The following figure shows what the classes of OPC Alarms & Events do in order to report program alarms of an S7-1500 CPU to the S7OPT OPC UA server and display them in the OPC client.

Figure 1-3



In this example, the alarm block "Program\_Alarm" is called in the user program of the S7-1500 CPU in order to trigger the following program alarms:

- · Program alarm with required acknowledgement and 2 associated values
- Program alarm for information purposes only

The program alarms are transferred to the S7OPT OPC UA Server via an optimized S7 connection. In the S7OPT OPC UA server, the program alarms are mapped to objects of the OPC Event Server class and displayed in the OPC client.

The OPC client registers with the S7OPT OPC UA server for receipt of messages and creates one or more objects of the OPC Event Subscription class. An object of the OPC Event Subscription class is a subscription to several events.

Objects of the OPC Event Subscription classes manage the necessary filters and properties on a client-specific basis. Thanks to filtering, the OPC client can define which events are received.

Event messages requiring acknowledgement can be acknowledged in the OPC client.

#### Filtering

The OPC client can filter for events with certain properties and for the values of those properties.

The OPC client can define which events it wants to receive by using the following filter criteria:

- Event type
- Category
- Priority
- Event source

An event is only forwarded to the OPC client if it matches the filter values in all filter criteria.

### **Display events in UA Expert**

Figure 1-4



In this example, UA Expert is used as the OPC Client.

In UA Expert, the events reported by the S7OPT OPC UA server appear in the "Event View". In the "Event View" it is possible to acknowledge event messages requiring acknowledgement.

The "Event View" consists of 3 sections:

1. Configuration

To display events, drag & drop the object, e. g. server object, whose EventNotifier attribute is set to "SubscribeToEvents", into the Configuration section. When you expand the server object tree, you can define the properties of the event messages to be displayed in the "Details" section, such as associated values and additional informational texts.

2. Events

The Events section has 3 tabs:

Events

When an event message is triggered, the event is displayed in the "Events" tab. Select the event to display more properties of the event in the Details section.

- Alarms

In the "Alarms" tab, you have the option of acknowledging event messages.

Event History

The event history is displayed in the "Event History" tab.

3. Details

The "Details" section displays the properties of the event messages, such as associated values and additional informational texts.

### 1.3 Historical data on OPC UA

OPC UA HA (Historical Data Access) enables access to historical data from S7 tags archived in a database for up to 360 hours.

### **Principle of operation**

The following figure shows how to use the S7OPT OPC UA Server to get historical data for one or more objects in the OPC client.

Figure 1-5



The S7OPT OPC UA server reads S7 tags from an S7-1500 CPU via an optimized S7 connection. The S7 tags are saved in the archive by the S7OPT OPC UA server. The timestamp and the quality characteristic of the S7 tags are stored together with the process value.

OPC clients, such as UA Expert from Unified Automation, use the "HistoryRead" function to access the process values of the archived S7 tags.

### Display historical data in UA Expert

### Figure 1-6



In this example, UA Expert is used as the OPC Client.

UA Expert has the "History Trend View" for getting historical data on one or more S7 tags.

Drag & drop one or more S7 tags containing historical data from the "Address Space" window into the "Configuration" section of the "History Trend View".

UA Expert has read access to the S7 tags stored in the archive of the S7OPT OPC UA server to graphically display the process values in the "History Trend View".

### 1.4 Components used

This application example was created with the following hardware and software components:

Ta	ble	1.	-1
	~.~		•

Component	Quantity	Item number	Note
CPU 1513-1 PN	1	6ES7513-1AL01-0AB0	Alternatively, you may use any S7-1500 CPU and ET 200 CPU (ET 200SP and ET 200pro).
SIMATIC NET DVD V16	1	6GK1704-1LW16-0AA0	In the Sales and Delivery Release you will find the item numbers for the SIMATIC NET products (see article <u>109775589</u> ).
TIA Portal V16	1	Package: 6ES7822-1AA06-0YA5 Download: 6ES7822-1AE06-0YA5	_
UA Expert	1	-	OPC Client from Unified Automation <u>https://www.unified-</u> <u>automation.com/products/developm</u> <u>ent-tools/uaexpert.html</u>

You can obtain the listed components from the Siemens Industry Mall.

# 2 Engineering

### 2.1 Hardware setup

The following figure shows the structure of the application example.

Figure 2-1



The SIMATIC NET OPC server for OPC UA and the OPC client are installed on the SIMATIC field PG that will be used as a PC station.

- SIMATIC NET OPC server for OPC UA: S7 OPT OPC UA Server
- OPC client: UA Expert

Note You will need an OPC client that supports OPC Alarms & Events and historical data about OPC UA.

With this application you get a ready configured TIA Portal project.

Note

- The project is protected. The login is:
- User: admin
- Password: Siemens.1

### 2.2 Setting IP addresses and subnet mask

### 2.2.1 Setting IP address and subnet mask for the PC station

In Windows, go to the Properties for the network adapter via which the PC station is connected to the S7 CPU, then set the IP address and subnet mask for the PC station.

Internet Protocol Version 4 (TCP/IPv4) Properties X						
General						
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.						
Obtain an IP address automatical	ly					
• Use the following IP address:						
IP address:	172 . 16 . 43 . 99					
Subnet mask:	255.255.0.0					
Default gateway:						
Obtain DNS server address auton	natically					
• Use the following DNS server add	resses:					
Preferred DNS server:						
Alternate DNS server:						
Validate settings upon exit	Advanced					
	OK Cance	!				

- 1. In the "Control Panel", open the "Network and Sharing Center" under "Network and Internet".
- 2. Select the function "Change adapter settings".
- 3. Right-click on the corresponding network adapter and select the "Properties" context menu. The Properties dialog for network adapter opens.
- Select the "Internet Protocol Version 4 (TCP/IPv4)" element and click the "Properties" button.

The Properties dialog box for the "Internet Protocol Version 4 (TCP/IPv4)" element will open.

- Set the IP address and subnet mask of the PC station and apply the settings with "OK", e. g.:
  - IP address: 172.16.43.99
  - Subnet mask: 255.255.0.0

Note You will configure the fixed IP address and subnet mask later during hardware configuration for TIA Portal.

### 2.2.2 Setting the IP Address of the S7 CPU

### Open the "Online & diagnostics" dialog

Figure 2-3



- 1. Open TIA Portal.
- 2. In the project tree under "Online access", click the arrow to the left of the network adapter that is connected to your S7 CPU.
- Double-click the "Update accessible devices" command. All devices available to the network adapter will be shown.
- 4. Click the arrow to the left of the S7 CPU to which you wish to assign the IP address and subnet mask.
- 5. Double-click the command "Online & diagnostics". The "Online & diagnostics" dialog will open.

### Assign IP address and subnet mask

### Figure 2-4

▼ Diagnostics					
Concerd	Assign IP address				
Bissestiestete					
Diagnostic status					
Diagnostics buffer	Assign IP address to the device				
Cycle time	Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation.				
Memory					
Display	For more information about industrial security, please visit http://www.siemens.com/industrialsecurity				
OPC UA					
PROFINET interface[X1]					
Virtual communication interface					
<ul> <li>Functions</li> <li>Assign IP address</li> <li>Set time</li> <li>Firmware update</li> </ul>	MAC address: 28 - 63 - 36 - 95 - 38 - 2F Accessible devices				
Assign PROFINET device name	- IP address: 172 . 16 . 43 . 35				
Reset to factory settings	Subnet mask: 255 . 255 . 0 . 0				
Format memory card					
Save service data	Router adt 72 . 16 . 43 . 35 Assign IP address				

- 1. Switch the S7 CPU to "STOP" mode.
- 2. Under "Functions", click "Assign IP address".
- 3. Set the IP address and subnet mask of the S7 CPU, e. g.:
  - IP address: 172.16.43.35
  - Subnet mask: 255.255.0.0
- 4. Click "Assign IP address" to set the parameters.
- Note You will enter the IP address and subnet mask later during configuration.

If you have an S7-1500 CPU, you can also set the IP address and subnet mask on the display.

### 2.3 "Communication settings"

Open the program "Communication Settings" via the Windows Start Menu "Siemens Automation > Communication Settings".

The "Communication Settings" program provides a number of ways to configure and diagnose PC hardware components, PC user programs and the SIMATIC NET OPC server.

### Enable protocols for the OPC server

The SIMATIC NET OPC server supports various protocols for the controller level. All protocols are activated in the initial configuration.

You can disable protocols that you don't want to use.





- In the navigation area, navigate to "SIMATIC NET configuration > OPC Settings > OPC protocol selection".
- 2. Enable the function "Allow remote OPC access" for OPC UA.
- 3. Enable the following protocol for OPC UA:
  - "S7 optimized": SIMATIC S7 communication with S7-1200 (V4 onward) and S7-1500 via Industrial Ethernet (access to optimized data blocks)
- 4. Click on the arrow symbol next to the protocol "S7 optimized" to access the extended parameter list for the protocol.

### Set parameters for the protocols

#### Figure 2-6



- 1. Port settings:
  - If the checkbox is selected, the default setting is used for the specified port.
  - If the checkbox is not selected, you can edit the input field for the port.
- 2. Security policies:
  - If the checkbox is selected, unsecured connections (none) to the OPC server are allowed.
  - If the checkbox is not selected, no unsecured connections (none) to the OPC server will be allowed.
- 3. Define which connections to the OPC server will be allowed and determine whether the messages will be signed (Sign) or signed and encrypted (SignAndEncrypted):
  - Secured connections based on the security policy "Basic128Rsa15"
  - Secured connections based on the security policy "Basic256"
  - Secured connections based on the security policy "Basic256Sha256"
  - Secured connections based on the security policy "Aes128\_Sha256\_RsaOaep"
  - Secured connections based on the security policy "Aes256\_Sha256\_RsaPss"

- 4. Check of the client certificates
  - Always check certificates
     Enabled: The certificates will always be checked.
     Disabled: The certificates will not be checked.
  - No strict certificate verification
     Enabled: Certain certificate checks will be ignored, e. g. CertificateRevocationUnknown,
     CertificateIssuerRevocationUnknown, NonceLengthCheck, TokenPolicyIdCheck.
     Disabled: The certificates will be fully checked.
  - Accept expired certificates
     Enabled: The certificates will be accepted even if the time stamp of the certificate is invalid, i. e. the certificates are not yet valid or have already expired.
     Disabled: The certificates are only accepted if the timestamp is valid.
- 5. Login settings
  - If the checkbox is selected, the SIMATIC NET OPC server allows anonymous login of OPC UA clients.
  - If the checkbox is not selected, anonymous logins are not allowed. User authentication with Windows login and password is then required.
- **Note** The SIMATIC NET OPC server uses the Windows user management for user authentication. In the OPC client, log in to the SIMATIC NET OPC server with your Windows username and password.
  - 6. Test and auxiliary tools
    - Provide templates for item definitions:
       If the checkbox is selected, the OPC server creates Templates for item definitions in its namespace, which can be used to easily define a new Item.
    - make virtual module (Demo) available for simulation: The SIMATIC NET OPC server gives you the ability to use the OPC interface for tests, presentations, and development work without a communication module. For this purpose, the OPC server provides a virtual module or "DEMO" connection, depending on the protocol (CP simulation). This option enables activation of the simulation function depending on the protocol.
  - 7. Click "Apply" to enable the settings you have made.

### "OPC UA certificates"

### Figure 2-7

Siemens Communication Settings						
File Language Help	_					
SIMATIC NET configuration						
Pige OPC settings						
📕 ු Shut down OPC servers 🛛 🔵						
🔤 OPC protocol selection	On this property page you can configure the settings for ODC 11A certificates					
- Symbols	OPC UA certificates are used for OPC UA clients and OPC UA servers to identify themselves to each other					
1 OPC UA certificates	when setting up the OPC UA connection.					
🔯 Autostart 🔰 🔪						
Modules	Overview of all OPC UA server certificates					
PC configuration	Issued to Applicant / DC Issued by Valid to Action					
Trace settings	OPC.SimaticNET.DP VM-PRUEFER OPC.SimaticNET.DP 2041-02-02 <u>Select</u>					
Access points	OPC.SimaticNET.S7 VM-PRUEFER OPC.SimaticNET.S7 2041-02-02 Select					
Set memory card parameters	OPC.SimaticNET.S7OPT VM-PRUEFER OPC.SimaticNET.S7OPT 2041-02-02 Select					
	OPC.SimaticNET.SR VM-PRUEFER OPC.SimaticNET.SR 2041-02-02 Select					
SIMATIC SHELL	Percente OPC IIA configuration Impact conver catificate (* n12)					
=1 System mormation						
	Overview of the OPC UA client certificates					
	i Issued to Accept/Decline Applicant / DC Valid to Action					
	UaExpert@VM-PRUEFER SR,S7OPT,S7,DP / O=Siemens AG, CN=UaE 2026-02-02 Select					
	UaExpert@VM-PRUEFER SR,S70PT,S7,DP / — O=Siemens AG, CN=UaE 2026-02-02 Select					
	OpcScoutV10         SR,\$70PT,\$7,DP / VM-PRUEFER         2041-02-02         Select					
	Import client certificate					
	Lindate certificates					

In the navigation area, navigate to "SIMATIC NET configuration > OPC settings > OPC UA certificates".
 The certificates of the local OPC UA server and the certificates the OPC clients used to

The certificates of the local OPC UA server and the certificates the OPC clients used to identify themselves to the server are displayed and managed here.

- 2. You can import other OPC client certificates, such as the certificate for the OPC client "UA Expert".
- 3. Accept the imported OPC client certificates.

### 2.4 Overview of the engineering steps

The following figure shows an overview of the steps performed during the engineering stage.

- Create configuration (see chapter 2.5)
- Configure the "Station Configuration Editor" (see chapter 2.6)
- Load the configuration into the PC station (see chapter 2.7.1)
- Load the configuration into the S7 CPU (see chapter 2.7.1)

When configuring the "Station Configuration Editor" and when loading the configuration into the PC station, there are multiple ways of performing the engineering step. Performing either one of the options for the engineering step is sufficient.

This application example describes all possibilities for the engineering steps.

### Figure 2-8



### 2.5 Creating the configuration

### 2.5.1 Create S7 CPU in TIA Portal

With this application you get a ready configured TIA Portal project.

The project is protected. The login is:

- User: admin
- Password: Siemens.1

### Requirements

Note

- TIA Portal is open.
- A new project is created, or an existing project is opened.

#### **Insert device**

1. Double-click the command "Add new device" in the project tree.

Project tree	
Devices	
	🔲 🖻
▼ 🔄 OpcUa	
🗳 Add new device	
🚠 Devices & network	
🕨 🔚 Ungrouped devices	
🕨 📴 Security settings	
Cross-device functions	
🕨 📑 Common data	
Documentation settings	
🕨 🐻 Languages & resources	
Version control interface	
Online access	
Card Reader/USB memory	

The dialog box "Add new device" opens.

Add new device Device name: PLC_1			
Controllers		Device: Article no.: Version: Description: CPU with disp 1,5 MB data; protection contro and measuri isochronous interfaces: tr Open User C S7 routing, IF OPC UA: Serv companion s controller, su PROFINET V2. isochronous	CPU 1513-1 PN 6E57 513-1AL01-0AB0 V2.8 V2.8 CPU 1513-1 PN (E57 513-1AL01-0AB0 V2.8 CPU 1513-1 PN (E57 513-1AL01-0AB0 (E57 513-
Open device view			OK Cancel

- 2. Click the "Controllers" button.
- 3. Select the S7 CPU according to your hardware setup, e. g. CPU 1513-1 PN.
- 4. Enable the option "Open device view".
- 5. Under "Version", select the firmware version of the S7 CPU.
- 6. Click the "OK" button.

The selected S7 CPU will be added.

**Note** If you enabled the option "Open device view", the "Device view" for the S7 CPU will open automatically in the hardware and network editor.

### Open the device view

- 1. In the project tree, open the device folder of the S7 CPU.
- 2. Double-click the "Device configuration" command.

Project tree	•
Devices	
	•
🔻 🚺 OpcUa	
💕 Add new device	
Devices & networks	
PLC_1 [CPU 1513-1 PN]	
🕅 Device configuration	
🖫 Online & diagnostics 👌 🌉 🍟	
🕨 🙀 Software units	
🕨 🛃 Program blocks	
🕨 🚂 Technology objects	
External source files	
🕨 🚂 PLC tags	
PLC data types	

The "Device view" of the S7 CPU opens in the hardware and network editor.

### Set address parameters

- 1. Select the S7 CPU in the device view.
  - The properties of the S7 CPU are displayed in the Inspector window.



- 2. In the "General" tab, navigate to "PROFINET interface [X1] > Ethernet addresses".
- 3. Enter the following address parameters:
  - IP address: 172.16.43.35
  - Subnet mask: 255.255.0.0
- 4. Click on the "Add new subnet" button to create a new subnet or select an existing subnet.

### 2.5.2 Create PC station in TIA Portal

### Adding a PC station

1. Double-click the command "Add new device" in the project tree.



The dialog box "Add new device" opens.



- 2. Click the "PC systems" button.
- 3. Select the user application "OPC server".
- 4. Enable the option "Open device view".
- 5. Set the version of the "OPC server" user application, e. g. "SWV16...".
- 6. Click the "OK" button.
- A PC station with the user application "OPC server" will be added.
- **Note** If you enabled the option "Open device view", the "Device view" for the PC station will open automatically in the hardware and network editor.

### Open the device view

- 1. In the project tree, open the device folder of the PC station.
- 2. Double-click the "Device configuration" command.

The "Device view" of the PC station opens in the hardware and network editor.

Project tree	
Devices	
- 1	🔲 🖬
🔻 🛅 OpcUa	
📑 Add new device	
📥 Devices & networks	
PLC_1 [CPU 1513-1 PN]	
PC system [SIMATIC PC station]	
Device configuration	
😨 Online & diagnostics 🛛 🦉 🗴	
🕴 🕨 🧊 OPC server [OPC Server] 💛	
🛓 🕨 🛄 Local modules	
🕨 🚂 Ungrouped devices	

### Configure PC station in the "Device view"

The "OPC server" user application has been automatically added to the slot. Figure 2-9



1. Insert a communications module, e. g. "IE general", into slot 2 of the PC station by dragging and dropping.

### Set address parameters

 In the device view, select the communications module "IE general". The properties of the communications module are displayed in the Inspector window.

IE general [IE General]								
General IO tags	System constants Texts							
<ul> <li>General</li> <li>PROFINET interface [X1]</li> </ul>	Ethernet addresses							
General	Interface networked with							
Options           Ethernet addresses           Advanced options           OPC configuration	Subnet: PN/IE_1 Add new subnet							
	ISO protocol							
	Use ISO protocol MAC address: 08 -00 -06 -01 -00 -00							
	•							
	IP protocol							
	IP address: 172 . 16 . 43 . 99 Subnet mask: 255 . 255 . 0 . 0							

- 2. In the "General" tab, navigate to "PROFINET interface [X1] > Ethernet addresses".
- 3. Enter the following address parameters:
  - IP address: 172.16.99
  - Subnet mask: 255.255.0.0
- 4. Click on the "Add new subnet" button to create a new subnet or select an existing subnet.

### Set the name of the PC station

 Select the PC station in the device view. The properties of the PC Station are displayed in the Inspector window.

SIMATIC PC-Station [Rail]							
General IO tags	System constants Texts						
<ul> <li>✓ SIMATIC PC Station</li> <li>General</li> <li>XDB config</li> </ul>	General						
	Computer name: Author: Admin Comment:						

- 2. In the "General" tab, navigate to "General".
- 3. Enter the name of the PC station, e. g. "PC station".

### 2.5.3 Configuring a connection

### S7 CPU and PC station are created in the same project

### Add S7 connection

1. Double-click "Devices & networks" in the project tree.



The graphical area of the "Network view" opens in the hardware and network editor.



- 2. In the function bar, click "Connections" to enable the connection mode.
- Select the connection type "S7 connection" in the nearby dropdown menu. All devices that are relevant to an S7 connection are highlighted in color in the "Network view".
- 4. Click and drag the mouse from the OPC server to the S7 CPU.
- 5. Release the mouse button on the target device to create the S7 connection between the OPC server and the S7 CPU.

### Result:

A specified S7 connection is created and is configured on both sides.

• The connection path is highlighted.

Network Connections S7 co	onnection 🔽 🔡 🖫 🔛 🛄 🔍 🛨
	4 Highlighted: Connection
_	
PLC_1 CPU 1513-1 PN	PC station SIMATIC PC Stat
T	
	S7 connection

• The S7 connection is entered in the connection table.

-1	Net	work overview	Connections	I/O cor	mmunication	VPN	Te	eControl		
	*	Local connection n	Local end point		Local ID (hex)	Partner ID	(hex)	Partner		Connection type
		S7 connection	OPC server [OI	PC Server]	S7 connection		1	PLC_1 [CP	U 1513-1 PN]	S7 connection

• The OPC server actively establishes the S7 connection. The S7 CPU is a passive participant as the connection is established.

S7 connection [S7 connection	1 Properties Linfo Lingnostics						
General IO tags Sys	stem constants Texts						
General	Special connection properties						
Local ID							
Special connection properties	Local end point						
Address details							
OPC	✓ One-way						
	Active connection establishment						
	The active connection establishment cannot be deactivated if the Partner TSAP in the address details has the value 3.						

### Set connection parameters

 Select the S7 connection in the connection table. The properties of the S7 connection are displayed in the Inspector window.



- 2. In the "General" tab under "OPC", enable the function "Maintain connection permanently".
- 3. Enable the following functions for alarms:
  - "Receive program alarms"
  - "Receive system alarms"
  - "Use own time stamp"

### S7 CPU and PC station are created in different projects

### Add an unspecified S7 connection

- 1. Open the project tree in the PC station's project.
- 2. Double-click "Devices & networks".



The graphical area of the "Network view" opens in the hardware and network editor.

### 2 Engineering



- 3. In the function bar, click "Connections" to enable the connection mode.
- Select the connection type "S7 connection" in the nearby dropdown menu. The OPC server that is relevant for an S7 connection will be highlighted in color in the "Network view".
- 5. Right click on the OPC server. The context menu opens.
- 6. Select "Add new connection". The "Add new connection" dialog will open.

Add new connection				×
Please select connection partner for O	PC server:		Type: S7 cor	nection 💌
Unspecified Unc server jurc	Local interface OPC server	:e[X1]		
Information	Local ID: 57 cd	innection PC	Establish active conne	ction One-way

- 7. Specify the following connection parameters: "Unspecified".
- Enter the local ID, e. g. "S7 connection PC". The local ID is visible in the OPC client if the OPC client has established the connection to the SIMATIC NET S7OPT OPC UA server.
- 9. Click "Add" to add the unspecified S7 connection; click the "Close" button to close the dialog.
## Result:

An unspecified S7 connection is created.

• The connection path is highlighted.



• The S7 connection is entered in the connection table.

Ne	twork overview	Connections	I/O coi	mmunication	V	/PN	TeleC	ontrol			
Y	Local connection name	Local end point		Local ID (hex)		Partner	ID (hex)	Partner			Connection type
	S7 connection PC	OPC server [O	PC Server]	S7 connection PC				[ Unspec	ified	•	S7 connection

• The OPC server actively establishes the S7 connection.

S7 connection PC [S7 connect	tion] 🖳 Properties 🚺 Info 👔 🗓 Diagnostics							
General IO tags Sys	stem constants Texts							
General	Special connection properties							
Local ID								
Special connection properties	Local end point							
Address details								
OPC	✓ One-way							
Own time stamp	Active connection establishment The active connection establishment cannot be deactivated if the Partner TSAP in the address details has the value 3.							
Diagnostics alarms								
Alarms								
	Send operating mode messages							

**Note** If the connection parameters are not yet fully set up, the S7 connection will be shown with errors in the connection table.

#### Set connection parameters

- Select the S7 connection in the connection table. The properties of the S7 connection are displayed in the Inspector window.
- 2. Enter the IP address of the communication partner in the "General" tab under "General", e. g. 172.16.43.35 (IP address of the S7-1500 CPU).

7 connection PC [S7 connection]										
General IO tags S	system constants Tex	ts								
General Local ID	General									
Special connection properties	Connection									
OPC	Name:	S7 connection PC								
	Connection path									
	_	Local	Partner							
		OPC Server	?							
	End point:	OPC server [OPC Server]	Unknown							
	Interface:	IE general, PROFINET interface[X1]	Unknown							
	Interface type:	Ethernet	Ethernet							
	Subnet:	PN/IE_1								
	Address:	172.16.43.99	172.16.43.35							
		Find connection path								

3. In the "General" tab under "Address details", enter the partner TSAP. The partner TSAP is composed as follows: 03. <slot of the CPU>, e. g. S7-1500 at port 1: 03.01

S7 connection PC [S7 connect	ion]		🔍 Propertie	s 🛛 🗓 Info 🤢 🗓 Diag
General IO tags Sys	tem constants Tex	xts		
General	Address datalla			
Local ID	Address details			
Special connection properties				
Address details		Local		Partner
OPC	End point:	OPC server [OPC Server]		Unknown
	Pack/slots			0
	RECKISIOU:			
	Connection res.	10	-	03
	(10.3).			
	ISAP:	10.11		03.01
		SIMATIC-ACC		SIMATIC-ACC
	Subnet ID:	1A43 - 0001		-

- 4. In the "General" tab under "OPC", enable the function "Maintain connection permanently".
- 5. Enable the following functions for alarms:
  - "Receive block and symbol-related alarms"
  - "Receive diagnostics alarms"
  - "Use own time stamp"



# 2.5.4 User program of the S7-1500 CPU

To generate a program alarm, it is necessary to call the "Program\_Alarm" instruction in the user program of the S7-1500 CPU. The "Get\_AlarmState" instruction is used to output the alarm state of a program alarm. There are 3 options:

- Incoming
- Outgoing
- Acknowledged

The following figure shows an overview of the user program in the S7-1500 CPU that is required to generate 2 program alarms:

- Program alarm with required acknowledgement and 2 associated values
- Program alarm for information purposes only

Figure 2-10



# FB "PrgAlarm" for calling the alarm blocks

Insert a function block (FB) to call the "Program\_Alarm" and "Get\_AlarmState" instructions.

- 1. In the project tree, navigate to the device folder of the S7-1500 CPU.
- 2. Open the "Program blocks" folder.
- 3. Double-click the "Add new block" command.



The dialog "Add new block" opens.

4. Make the following settings:

Α	dd new block	×
	Norma	
	Name:	
		Language: FBD
	-OB	Number:
	Organization block	
		Description:
	FB (	Function blocks are code blocks that store their values permanently in instance data blocks
	Function block	so that they remain available after the block has been executed.
	-FC	
	Function	
	DB	
	Data block	
		more
>	Additional information	tion ( 🍋 )
	Add new and open	OK Cancel

- Click on the "Function block" button.
- Enter the name of the FB, e. g. "PrgAlarm".
- Select the programming language, e. g. "FBD".
- Select the "Automatic" radio button for automatic number assignment. The number of the FB will be assigned by TIA Portal.
- Click "OK" to confirm the settings.

The inserted FB "PrgAlarm" is displayed in the project tree.



# Create PLC data type "typePrgAlarmVar"

Create a PLC data type, e. g. "typePrgAlarmVar", to define the parameters of the FB "PrgAlarm" and populate it with tags.

The following table shows the structure of the PLC data type "typePrgAlarmVar". Table 2-1

Тад	Data type	Description			
createAlarm	Bool	<ul> <li>The signal to be monitored.</li> <li>Positive signal edge: An incoming program alarm is generated</li> <li>Negative signal edge: An outgoing program alarm is generated</li> </ul>			
SD1Value	String	Associated value 1, for example a character string Up to 10 associated values can be assigned to a program alarm.			
SD2Value	Real	Associated value 2, for example a floating-point number Up to 10 associated values can be assigned to a program alarm.			
errPrgAlarm	Bool	Status parameter to detect an error in the processing of the "Program_Alarm" instruction.			
stateProgAlarm	Word	Status parameter to store the error information of the instruction "Program_Alarm" in case of an error.			
alarmState	Byte	Status of the message as a bit field:         Bit 0: S         - S=1: incoming         - S=0: outgoing         Bit 1: Ac (Status of the message)         - AC=1: Incoming alarm was acknowledged         Bit 2: AG (Status of the message)         - AG=1: Outgoing alarm was acknowledged         Bit 3: Oc (overflow)         - Oc=1: Overflow for incoming messages         Bit 4: OG (overflow)         - OG=1: Overflow for outgoing messages         Bit 5: Reserved         Bit 6: Reserved         Bit 7: V (status message information)         - V=0: Message information invalid         - V=1: Message information valid			
errGetAlarmState	Bool	Status parameter to detect an error when processing the "Get_AlarmState" instruction.			
stateGetAlarm	Word	Status parameter to store the error information of the instruction "Get AlarmState" in case of an error.			

#### Create tags for the parameters of FB "PrgAlarm"

Insert a data block (DB) and create tags to parameterize the FB "PrgAlarm".

- 1. In the project tree, navigate to the device folder of the S7-1500 CPU.
- 2. Open the "Program blocks" folder.
- 3. Double-click the "Add new block" command. The dialog "Add new block" opens.

▼ 🛅 PLC_1 [CPU 1513-1 PN]
Device configuration
🧏 Online & diagnostics
Software units
Program blocks
📑 Add new block
💶 Main [OB1]
🕨 🙀 Technology objects
External source files
🕨 🚂 PLC tags
PLC data types
-

4. Make the following settings.

Add new block		×
Name		
AlarmData N		
AI		
	Type:	
-OB	Language: DB	
Organization block	Number: 1	
	O Manual	
	Automatic	
FB	Description:	
Function block	Data blocks (DBs) save program data.	
FC		
Function		
Data block		
	more	
Additional informat	ion( 🍋 )	
🖌 Add new and open	OK Cancel	

- Click the "Data block" button.
- Enter the name of the DB, e. g. "AlarmData".
- Select the "Global DB" type.
- Select the "Automatic" radio button for automatic number assignment. The number of the global DB will be assigned by TIA Portal.
- Click "OK" to confirm the settings.

The inserted DB "AlarmData" is displayed in the project tree.

5. Double-click on the DB "AlarmData" in the project tree. The data block opens.

PLC_1 [CPU 1513-1 PN]
Device configuration
🛂 Online & diagnostics
Software units
🔻 ⋥ Program blocks
📑 Add new block
📲 Main [OB1]
📲 PrgAlarm [FB1]
🥃 AlarmData [DB1]
🥃 InstPrgAlarm [DB2] ( 🏹 )
🕨 🔙 System blocks
🕨 🏣 Technology objects
_

6. Double-click "<Add new>" to create tags.

	AlarmUata									
		Na	me		Data type	Start value	Retain	Accessible from HMI/OPC UA/Web API	Writable from HMI/OPC UA/Web API	
1		•	St	atic						
2		•	٠	prgAlarm1	"typePrgAlarmVar"					
з			•	createAlarm	Bool	false			<b>v</b>	
4			•	SD1Value	String	'Associated String-Value alarm1,'		<ul> <li>Image: A start of the start of</li></ul>	<b>v</b>	
5			•	SD2Value	Real	5.1		<ul> <li>Image: A start of the start of</li></ul>	<b>v</b>	
6			٠	errPrgAlarm	Bool	false		<b>V</b>	<b>V</b>	
7	-00		•	statePrgAlarm	Word	16#0		<b>V</b>	<b>V</b>	
8	-00		•	alarmState	Byte	16#0		<b>V</b>	<b>V</b>	
9			•	errGetAlarmState	Bool	false		<b>V</b>	<b>V</b>	
10			•	stateGetAlarmState	Word	16#0		<b>V</b>	<b>V</b>	
11		•	•	prgAlarm2	"typePrgAlarmVar"					
12	-00		•	createAlarm	Bool	false		<b>V</b>	<b>V</b>	
13	-00		•	SD1Value	String	'Associated String-Value alarm 2'		<b>V</b>	<b>V</b>	
14	-00		•	SD2Value	Real	6.2		<b>V</b>	<b>V</b>	
15			•	errPrgAlarm	Bool	false		<b>V</b>	<b>V</b>	
16			•	statePrgAlarm	Word	16#0		<b>V</b>	<b>V</b>	
17			•	alarmState	Byte	16#0		¥		
18	-00		•	errGetAlarmState	Bool	false		<b>V</b>	<b>V</b>	
19	-00		•	stateGetAlarmState	Word	16#0		<b>V</b>	<b>V</b>	
20		•		<add new=""></add>						
1										

7. Create the following tags to assign the parameters of the FB "PrgAlarm". The PLC data type "typePrgAlarmVar" is used as data type.

Tag	PLC data type	Description
prgAlarm1	typePrgAlarmVar	Tags for the parameterization of the program alarm with acknowledgement required and 2 associated values
prgAlarm2	typePrgAlarmVar	Tags for parameterization of the program alarm, for information purposes only, without associated values

- 8. Enable the following options for the tags that you created:
  - "Accessible from HMI/OPC UA/Web API"
  - "Writable from HMI/OPC UA/Web API"

	AlarmData								
		Nam	e	Data type	Start value	Retain	Accessible from HMI/OPC UA/Web API	Writable from HMI/OPC UA/Web API	
1	-	▼ S	static						
2	-	•	prgAlarm1	"typePrgAlarmVar"					
з	-00		createAlarm	Bool	false		× N		
4	-00		SD1Value	String	'Associated String-Value alarm1,'				
5	-00		SD2Value	Real	5.1				
6	-		errPrgAlarm	Bool	false				
7	-		statePrgAlarm	Word	16#0				
8	-		alarmState	Byte	16#0		<b>V</b>		
9			errGetAlarmState	Bool	false		<b>V</b>		
10			stateGetAlarmState	Word	16#0		<u></u>		
11	-00	•	prgAlarm2	"typePrgAlarmVar"					
12			createAlarm	Bool	false				
13			SD1Value	String	'Associated String-Value alarm 2'				
14			SD2Value	Real	6.2				
15	-		errPrgAlarm	Bool	false				
16	-		statePrgAlarm	Word	16#0				
17	-0		alarmState	Byte	16#0				
18	-00		errGetAlarmState	Bool	false				
19			stateGetAlarmState	Word	16#0				
20		•	<add new=""></add>						

- 9. In the project tree, right-click the DB "AlarmData". The context menu opens.
- 10. Select "Properties".
  - The Properties dialog box for the DB "AlarmData" will open.

▼ 1 PLC 1 [CPU 1513-1 PN]	
Device configuration	
V. Online & diagnostics	
Software units	
Program blocks	
Add new block	
- Cyclic interrupt [OB30]	
Main [OB1]	
PrgAlarm [FB1]	
AlarmData [DB1]	
InstPrgAlarm [DB2]	Open
Test [DB3]	¥ Cut Ctrl+X
System blocks	E Copy Ctrl+C
Technology objects	Paste Ctrl+V
External source files	Copy as text
PLC tags	N Dalata Dal
PLC data types	Pename F7
Watch and force tables	
🕨 🙀 Online backups	Compile
🕨 🔀 Traces	Download to device
OPC UA communication	Go online Ctrl+K
Device proxy data	Go omine Ctri+M
📴 Program info	Snapshot of the actual values
🖙 PLC supervisions & alarms	Load snapshots as actual values
PLC alarm text lists	Load start values as actual values
🕨 🛅 Local modules	Copy snapshots to start values
<ul> <li>PC station [SIMATIC PC station]</li> </ul>	💁 Quick compare 🔹 🕨
Device configuration	Search in project Ctrl+F
Details view	Generate source from blocks
	Cross references 511
	Cross-reference information Shift+E11
No	Call structure
Name Offset Dat	Assignment list
ty	
■ PrgAlarm2 ty	Switch programming language
	Know-how protection
	📕 Print 🕥 Ctrl+P
	Print preview
	Properties Alt+Enter

11. In the "General" tab under "Attributes", enable the function "Data block accessible from OPC UA".

AlarmData [DB1] General Texts General Information Time stamps Compilation Protection	Attributes
Attributes Download without reinitialization	Optimized block access      Optimized block access      Data block accessible from OPC UA      Data block accessible via Web server
	OK Cancel

### Call the instructions "Program\_Alarm" and "Get\_AlarmState"

Two program alarms are generated in FB "PrgAlarm":

- Program alarm with required acknowledgement and two associated values
- Program alarm for information purposes only, without associated values

Create two "InOut" parameters of the data type "typePrgAlarmVar" in the interface of the FB "PrgAlarm".

-	ala	rm	1	
-	ala	rm2	2	
	Prg	Alá	arm	
		Na	me	Data type
1	-00	•	Input	
2		•	<hinzufügen></hinzufügen>	
3	-00	٠	Output	
4		•	<hinzufügen></hinzufügen>	
5	-00	٠	InOut	
6	-00	•	alarm1	"typePrgAlarmVar"
7		•	alarm2	"typePrgAlarmVar"

#### Generate program alarm with required acknowledgement and two associated values

 Call the "ProgramAlarm" instruction in the FB "PrgAlarm". The "Call options" dialog opens automatically to create the instance DB of the "Program\_Alarm" instruction.

**Note** You will find the "ProgramAlarm" instruction in the "Instructions" task card in the "Extended instructions" palette under "Alarming".

- 2. Click the "Multi instance" button.
- 3. Enter the name of the multi-instance, e. g. "instProgramAlarm1".
- 4. Click "OK" to confirm the settings.



- 5. Interconnect the parameters of the instance "#instProgramAlarm1" with the tags of the "InOut" parameter "alarm1".
  - SIG: #alarm1.createAlarm (triggers an alarm on a positive edge)
  - SD\_1: #alarm1.SD1Value (alarm accompanying value 1)
  - SD\_2: #alarm1.SD2Value (alarm accompanying value 2)
  - Error: #alarm1.errPrgAlarm
  - Status: #alarm1.statePrgAlarm



- 6. To output the alarm state of the program alarm, call the "Get\_AlarmState" instruction.
- **Note** You will find the "Get\_AlarmState" instruction in the "Instructions" task card in the "Extended instructions" palette under "Alarming".
  - 7. At the "Alarm" input parameter, specify the instance DB "#instProgramAlarm1" of the triggering program alarm.
  - 8. Connect the output parameters of the "Get\_AlarmState" instruction with the tags of the "InOut" parameter "alarm1".
    - AlarmState: #alarm1.alarmState
    - Error: #alarm1.errGetAlarmState
    - State: #alarm1.stateGetAlarmState



- Select the instruction "Program\_Alarm". The properties of the program alarm are displayed in the Inspector window.
- 10. Configure the following settings in the "Alarm" tab under "Basic settings":
  - "Alarm class": "Acknowledgement", i. e. this program alarm requires an acknowledgement.

# Note The "Acknowledgment" function will be activated automatically.

- "Priority": 2
- "Alarm text"

Program_Alarm [FB700]		Sector Properties	🗓 Info 👔 🗓 Diagnostics
General Configura	ation Alarm		
Basic settings Advanced settings	Basic settings		
Additional alarm texts			
Alarm attributes	Alarm class	Acknowledgement	
		Acknowledgment	
		Information only	
	Priority	2*	
	Alarm text	Message from PLC: " <keyword: 20s@" Associate value 2: "@2%</keyword: 	<mark>CpuName&gt;</mark> " Associate value 1: "@1% 3.1f@"
		<b>A</b> I	

11. Set the "Display class", e. g. 1, in the "Alarm" tab under "Advanced settings".

Program_Alarm [FB700]				Rise Properties
General Configura	ation	Alarm		
Basic settings Advanced settings	Adva	anced settin	ngs	
Additional alarm texts Alarm attributes		Display Gro	class 1 up ID 0 Report	)

12. Enter any informational text and additional texts for the program alarm in the "Alarm" tab under "Additional alarm texts".

PrgAlarm [FB1]				🖳 Properties 🚺 Info 🔒
General Configu	ration	Alarm		
General     Configu       Basic settings     Advanced settings       Additional alarm texts     Adarm attributes	Addi	Alarm tional alarn Additional 1 Additional 1 Additional 1 Additional 1 Additional 1 Additional 1 Additional 1 Additional 1	n texts o text text 1 text 2 text 3 text 4 text 5 text 6 text 7 text 8	SAdditional information text from alarm 1 Additional message text from alarm 1 Additional message text from alarm 1 Al
		Additional	text 9	

**Note** To insert a dynamic tag in the message text, right-click in the "Message text" field. Select "Insert keyword..." and specify the appropriate keyword. In this example, the name of the PLC that triggers the program alarm is displayed.

It is also possible to enter dynamic keywords in the additional message texts.

You can include the associated values in the alarm text in the following format:

@<Associated value number>%<Format specification>@

Example:

- "@1%3.1f@" for the formatting of the associated value SD\_1 (real number with 3 digits and 1 decimal place) in the alarm text.
- "@2%20s@" for the formatting of the associated value SD\_2 (string tag) in the alarm text.

# Generate a program alarm for informational purposes only, without any accompanying values

 Call the "ProgramAlarm" instruction in the FB "PrgAlarm". The "Call options" dialog opens automatically to create the instance DB of the "Program\_Alarm" instruction.



- 2. Click the "Multi instance" button.
- 3. Enter the name of the multi-instance, e. g. "instProgramAlarm2".
- 4. Click "OK" to confirm the settings.

- 5. Interconnect the parameters of the instance "#instProgramAlarm2" with the tags of the "InOut" parameter "alarm2".
  - SIG: #alarm2.createAlarm (triggers an alarm on a positive edge)
  - Error: #alarm2.errPrgAlarm
  - Status: #alarm2.statePrgAlarm



- 6. Select the instruction "Program\_Alarm".
- The properties of the program alarm are displayed in the Inspector window.
- 7. Configure the following settings in the "Alarm" tab under "Basic settings":
  - "Alarm class": "No Acknowledgement", i. e. this program alarm does not require an acknowledgement

Note The "Acknowledgment" function is automatically disabled.

- Enable the function "Information only".
- "Priority": 3
- "Alarm text":

Program_Alarm [FB700]		Properties 🚺 Info 🚺 🗓 Diagnostics
General Configuration	on Ala	arm
Basic settings	Basic set	tings
Additional alarm texts		
Alarm attributes		Alarm class No Acknowledgement
4		Acknowledgment
		Information only
	3	Priority 3*
		Alarm text Information message from PLC: " <keyword: cpuname="">" without acknowledgement</keyword:>
H		AI

8. In the "Alarm" tab under "Advanced settings", set the display class, e. g. 2.

Program_Ala	rm [FB700]					🔍 Properties
General	Configuratio	on	Alarm			
Basic settings Advanced set Additional ala Alarm attribut	s ttings arm texts tes	Adva	anced settir Display Gro	class [ oup ID [	2 0 Report	

9. Enter any informational text and additional texts for the program alarm in the "Alarm" tab under "Additional alarm texts".

Program_Alarm [F	B700]		🖳 Properties 🚺 Info
General Cor	figuration	Alarm	
Basic settings Advanced settings	Add	litional alarm text	S
Additional alarm te	xts	Info tout	This is an additional information text
Alarmateributes		inio text	This is an additional information text
		Additional text 1	additional information text
		Additional text 2	
		Additional text 3	
		Additional text 4	
		Additional text 5	
		Additional text 6	
	-	Additional text 7	
		Additional text 8	
		Additional text 9	

**Note** For program alarms that are only used for information purposes, it is not necessary to output the message state with the "Get\_AlarmState" instruction.

If a program alarm is generated without accompanying values, it is not necessary to assign the input parameters "SD\_1" to "SD\_2".

To insert a dynamic tag in the message text, right-click in the "Message text" field. Select "Insert keyword..." and specify the appropriate keyword. In this example, the name of the PLC that triggers the program alarm is displayed.

It is also possible to enter dynamic keywords in the additional message texts.

#### Parameterization of FB "PrgAlarm"

Call the FB "PrgAlarm" in the user program of the S7-1500 CPU, for example in OB 1. The following figure shows the call of the FB "PrgAlarm" in OB 1.

Figure 2-11



The following table shows the parameters of the FB "PrgAlarm".

Table 2-2

Parameter	Declaration	Data type	Description
alarm1	InOut	typePrgAlarmVar	Detailed information about the data type "typePrgAlarmVar" can be found in <u>Table 2-1</u> .
alarm2	InOut	typePrgAlarmVar	Detailed information about the data type "typePrgAlarmVar" can be found in <u>Table 2-1</u> .

## 2.5.5 Declaring S7 symbols to the OPC server

- 1. Open the "Device view" of the PC station.
- 2. Select the OPC server. The properties of the OPC server are displayed in the Inspector window.
- 3. In the "General" tab, navigate to "S7 > OPC symbols".
- To access configured symbolic S7 tags in the OPC server, enable the option "Configured" and click the "Configuring" button. The "Symbol Configuration" dialog opens.

OPC server [OPC Server]	
General IO tags Sys	tem constants Texts
General	OPC symbols
DP	
DP master class 2	
FDL	O None
▼ S7	○ All
OPC symbols	Configured
OPC alarms	
OPC program alarms ma	Configuring
ISO/TCP	🗌 Field elements visible during runtime 🛛 🚺
SNMP	

- 5. Select the S7 tags to make the following settings:
  - Visibility:

You can enable or disable visibility for the selected S7 tags.

If the selected S7 tags need to be visible in the OPC server, it is necessary to enable the "Visible" option. This is necessary so that the OPC client can access the S7 tags.

- Note The "Visible" option is enabled by default.
  - Access permissions: Set the access permission that the OPC server has to the selected S7 tags.
- **Note** The "ReadWrite" access permission is pre-set by default, i. e. the OPC server has read and write access to the S7 tags.
  - Access to historical data: You can enable or disable access to historical data for the selected S7 tags. In this example, the "Enable access to historical data" function is enabled for the associated values of the program alarm with required acknowledgement.

# Note The function "Enable access to historical data" is disabled by default.

🕶 🗋 OpcUa	Name	Data type	Address	Visible	Connection	Access	EU Lo
▼ 1 ■ PLC_1	createAlarm	Bool		True	S7 connecti	ReadWrite	0
PLC tags	SD1Value	String[254]		True	S7 connecti	ReadWrite	0
🕶 🋅 Program blocks	SD2Value	Real		True	S7 connecti	ReadWrite	0
👻 📄 Alarm Data	errrrgAlarm	8001		irue	57 connecti	Keadwrite	U
📶 prgAlarm1	statePrgAlar	Word		True	S7 connecti	ReadWrite	0
че рідліатті 2	alarmState	Byte		True	S7 connecti	ReadWrite	0
📄 InstPrgAlarm	errGetAlarm	Bool		True	S7 connecti	ReadWrite	0
📄 InstBlock	stateGetAlar	Word		True	S7 connecti	ReadWrite	0
			Visible	Access right:	ReadWrite		
Elements with active branch							
Elements with active branch	, <b>(</b> )			C			
Elements with active branch	8			Connection:	S7 connec	tion 💌	
Elements with active branch Symbols: Enabled historical data:	8 2		ow limit:	Connection:	S7 connec High limit:	tion	
Elements with active branch Symbols: Enabled historical data:	8 2		ow limit:	Connection:	S7 connec High limit: 0.00000000000	tion	
Elements with active branch Symbols: Enabled historical data: CSV Import / Export	8 1		ow limit:	Connection:	S7 connec High limit: 0.00000000000	tion	
Elements with active branch Symbols: Enabled historical data: CSV Import / Export Import file	8 2 Export file		ow limit: 0.000000000 Enable acc	Connection:	S7 connec High limit: 0.00000000000	tion 💌	
Elements with active branch Symbols: Enabled historical data: CSV Import / Export Import file Access path	8 2 Export file		ow limit: .0000000000	Connection:	S7 connec High limit: 0.00000000000 I data	tion	

6. Click "OK" to apply the settings.

# 2.6 Configuring the "Station Configuration Editor"

This chapter demonstrates how to configure the "Station Configuration Editor".

You have the following options for configuring the "Station Configuration Editor":

- Manual configuration (see chapter <u>2.6.1</u>)
- Configure in TIA Portal (see chapter 2.6.2)
- XDB export: Export XDB from TIA Portal (see chapter 2.6.3)

# 2.6.1 Manual configuration

**Note** Insert the components in the same order as in the component image that you created in TIA Portal in the PC station "Device view". If the configuration differs, the configuration data that you download from TIA Portal to the PC station will not be adopted correctly.

When configuring for the first time it is necessary to enter the station name.

- 1. Double-click the corresponding icon on your desktop to start the "Station Configuration Editor".
- 2. Click the "Station Name" button. The "Station name" dialog will open.

Station Configuration Editor - [OFFLINE]							×	
Components Diagnostics Configuration Info								
S	Station:	PC		Mode:	RUN	_P		
	Index	Name	Туре	LED	Status	Run/Stop	Conn	^
	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10							
	11							
	12							
	13							
	14							
	15							
	16							
	17							·
١	New dia	gnostic entry arrived!						
Add Edit Delete Flash LED								
Station Name Disable Station								in
			)					
	OK						He	lp 🛛

- Enter the station name, e. g. "PC station". It is imperative that the name in the "Station Configuration Editor" matches the name that you assigned when configuring the PC station with TIA Portal.
- 4. Click "OK" to confirm the settings.

Station name		×
PC station		
	Cancel Hel	p

#### 5. Click the "Add" button. The "Add Component" dialog box opens.

	 DD			DUN			
tation:	PL		Mode:	RUN	_P		
Index	Name	Туре	LED	Status	Run/Stop	Conn	^
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
15							~
Jew dia	anostic entru arrive	d					
1011 0.0	gnoodo ondy anno	- <b>-</b> -					
	Add	5 <u> </u>		elete	F	Flash LED	
Stat	tion Name	Import Station			Dis	able Statio	on

- 6. Configure the following settings to add the "OPC server" user application.
  - "Type": "OPC Server"
  - "Index": 1

Add Component	×
Type: OPC Server	×
Index: 1	
Name: OPC Server	
Parameter assig.:	<b>v</b>
	Properties
OK	Cancel Help

- 7. Make the following settings to add the "IE General" component.
  - "Type": "IE General"
  - "Index": 2
  - "Parameter assig.": Select the network adapter via which the PC station is connected to communicates with the S7 CPU.

Add Component	×
Type: IE General	•
Index: 2	
Name: IE General	
Parameter assig.: Intel(R) 1210 Gigabit Network Connection.ISO.1,Intel(R) 1210 Giga	oit 💌
Properties	
OK Cancel Help	)

## Result

The added components and the station name will be displayed in the "Station Configuration Editor":

- Station: "PC station"
- Index 1: "OPC server"
- Index 2: "IE General"
- Index 125: "Stationmanager"
   "Stationmanager" will be automatically added at this index by the system.

Figure	2-12
--------	------

Station Configuration Editor - [ONLINE]						×	
Componen	ts Diagnostics	Configuration Info					
Station:	PC station		Mode:	RUI	N_P		
Index	Name	Тире	LED	Status	Bun/Stop	Conn	
1	0PC Server	OPC Server		185			
2	IE General	IE General			Ö		
3				0.000			
4							
5							
6							
7							
8							
9							
10							
11							
12							_
13							
14							
32	B			To cell			_
125	🧾 Stationmana	ger Stationmana		<b>X</b>			
1							
New diad	nostic entry arrive	:d!					
	Add	Edit	D	elete		Flash LED	
Station Name Imp		Import Station			Dis	sable Stati	on
OK						He	əlp

The following status icons for the components show that the configuration data are not yet loaded:

Table 2-3

Status icon	Meaning
	<ul> <li>The component is present in the current configuration of the PC station.</li> <li>The component has a configuration that is derived from a default parameter set. The default parameter set allows a component to be accessible via network without further configuration immediately after its installation. Make sure that the default parameter set you use has parameters that match the other network parameter settings.</li> </ul>
<b>X</b>	• The component exists in the current configuration of the PC station, but it was not created in the project engineering. Depending on the intended application, you still might have to configure the component in TIA Portal and load the configuration.

After you have manually configured the "Station Configuration Editor", load the configuration into the PC station (see chapter 2.7.1)

# 2.6.2 Configure in TIA Portal

- 1. Right-click on the device folder of the PC station. The context menu opens.
- 2. Select "Configure PC station online". The "Configure" dialog will open.



- 3. Select the network adapter via which the PC station communicates with the S7 CPU, then click "Update".
- 4. Click "Configure" to transfer the configuration of the PC station to the Station Configuration Editor.

The message "Transfer completed successfully" will appear once the transfer has completed successfully.

5. Click "Close" to finish the dialog.

Configure	×
Local network	
network adapter	-
Update	
Available computers:	
myComuter	
_	
Use configured target computer	
Target computer:	
computer name	
Configure Displaying	
Message:	
Transfer completed successfully.	
G Class	
Close	

#### Result

In the "Station Configuration Editor", the components and the station name are created according to the configuration in TIA Portal:

- Station: "PC station"
- Index 1: "OPC server"
- Index 2: "IE General"
- Index 125: "Stationmanager"
   "Stationmanager" will be automatically added at this index by the system.

#### Figure 2-13

Station Configuration Editor - [ONLINE]						>	
Componen	ts Diagnostics Co	nfiguration Info					
Station:	PC station		Mode:	RUN	LP		
	, 	-		-	-	-	
Index	Name	lype	LED	Status	Run/Stop	Conn	
1	OPC Server	OPC Server		2	<u>v</u>		
2	IE General	IE General					
3							
4							
6							
7							
8							
9							
10							
11							
12							
13							
14							
32	_			_	_		
125	📗 Stationmanager	Stationmana		X	Ø		
New diag	nostic entry arrived!						
Add Edit Delete Flash LED							
Station Name Import Station Disable S				sable Stati	on		
OK						Не	elp

The following status symbols for components show that the configuration is not yet loaded: Table 2-4

Status icon	Meaning
	<ul> <li>The component is present in the current configuration of the PC station.</li> <li>The component has a configuration that is derived from a default parameter set. The default parameter set allows a component to be accessible via network without further configuration immediately after its installation. Make sure that the default parameter set you use has parameters that match the other network parameter settings.</li> </ul>
	• The component exists in the current configuration of the PC station, but it was not created in the project engineering. Depending on the intended application, you still might have to configure the component in TIA Portal and load the configuration.

After you have configured the "Station Configuration Editor" in TIA Portal, load the configuration into the PC station (see chapter 2.7.1).

# 2.6.3 XDB export: Exporting XDB from TIA Portal

- 1. Open the "Device view" of the PC station.
- 2. Select the PC station.
  - The Inspector window displays the properties of the PC station.
- 3. In the "General" tab, navigate to "XDB configuration".
- 4. Enable the following functions:
  - "S7RTM is installed (for example SIMATIC NET PC software)"
  - "Generate XDB file"
- 5. Click on the "Browse" button to set the path where the XDB file will be stored.



- 6. Select the PC station in the project tree.
- 7. Click on the "Compile" button in the function bar.



#### Result

The XDB configuration file will be generated and saved in the directory that you set when configuring the PC station.

Once the XDB configuration file has been exported, it is necessary to import it into the "Station Configuration Editor" (see chapter 2.7.2.2).

# 2.7 Loading the configuration

This chapter demonstrates how to load the configuration into the PC station and the S7 CPU.

# 2.7.1 Load configuration into S7 CPU

# Requirements

- Engineering PC and S7 CPU are in the same subnet.
- You set the same IP address and subnet mask for the S7 CPU as you did in the hardware configuration (see chapter <u>2.2.2</u>).

#### Compile

Figure 2-14

9	
Vî₀	Siemens - D:\Projekte\OpcUa\OpcUa
Pr	oject Edit View Insert Online Options Tools Window Help
	출 🎦 🔚 Save project 🔒 🐰 🗎 🖆 🗙 🥱 ± (주 ± 🖥 🗓 🔢 🌆 💋 Go online
	Project tree
	Devices
	CpcUa
at	🗳 Add new device
5	📅 Devices & networks
	▶ 🚰 PLC_1 [CPU 1513-1 PN]
	C station [SIMATIC PC station]
	Ungrouped devices
	🕨 📷 Security settings
	Cross-device functions

- 1. Select the S7 CPU in the project tree.
- 2. Click on the "Compile" button in the function bar.

# Downloading

- 1. Select the S7 CPU in the project tree.
- Click on the "Download to device" button in the function bar. The "Extended download to device" or "Load preview" dialog opens automatically.

Ji Siemens - D:\Projekte\OpcUa\OpcUa							
Pr	oject Edit View Insert Online Options Tools Window Help						
	- 🚰 🔚 Save project 📑 🐰 🧾 🗊 🗙 🏷 生 (半生) 🖥 🛄 🔓 🚆 縁 💋 Go online						
	Project tree						
	Devices						
	🔻 🛅 OpcUa						
Ħ	🗳 Add new device						
Υ.	🚠 Devices & networks						
	▶ 📺 PLC_1 [CPU 1513-1 PN]						
	C station [SIMATIC PC stat]						
	Ingrouped devices						
	🕨 🚟 Security settings						
	Research Stress - Device functions						
	🕨 🙀 Common data						

- **Note** The "Extended download to device" dialog is only opened automatically if the access path from the PG/PC to the S7 CPU must be reset.
  - 3. In the "Extended download to device" dialog, make the following settings to access the S7 CPU via TCP/IP:
    - "Type of the PG/PC interface": PN/IE
    - "PG/PC interface": PG/PC network adapter
    - "Connection to interface/subnet": Subnet of the S7 CPU, e. g. PN/IE\_1
  - 4. Select the "Show all compatible devices" option.
  - 5. Click the "Start search" button.
  - 6. Select the S7 CPU as the target device.
  - Click "Load". The "Load preview" dialog window opens.

	Configured access node	es of "PLC_1"			
	Device	Device type	Slot Inte	rface type Address	Subnet
	PLC_1	CPU 1513-1 PN	1 X1 PN/I	E 172.16.43.35	PN/IE_1
		upe of the PG/PC inter	are: PN	ne.	],
	Conne	PG/PC inter ection to interface/sub	face: Www.vm onet: PN/IE_	nxnet3 Ethernet Adapter _1	
	Select target device:	1st gate	way:	Show all compatibl	e devices
	Device	Device type	Interface type	Address	Target device
4	testrackphilplc1	CPU 1518F-4 PN/	PN/IE	172.16.20.2	testrackphilplc1
	TestRackPhilPlc2	CPU 1517TF-3 PN	PN/IE	172.16.20.3	TestRackPhilPlc2
a i	PLC 1	CPU 1513F-1 PN	PN/IE	172.16.43.13	PLC 1
<u>e</u>	PLC_1	CPU 1513-1 PN	PN/IE	172.16.43.35	PLC_1
	Lukas_1500	CPU 1511-1 PN	PN/6	172.16.62.12	Lukas_1500
Flash LED	CPU-IpCom	CPU 1516-3 PN/DP	PN/I	172.16.66.15	I-IpCom
	publisher_plc.profinet	\$7-1500	PN/I	172.16.68.10	
				٩	<u>S</u> tart searc
				Display only error	r messages
ne status informa	ation:				
ne status informa Found accessibl	e device scalancexb208				
ne status informa Found accessibl Scan completed	ation: e device scalancexb208 . 8 compatible devices of 32 a	ccessible devices for	und.		
ne status informa Found accessibl Scan completed Retrieving device	ation: e device scalancexb208 . 8 compatible devices of 32 a e information	ccessible devices for	und.		

8. Click the "Load" button to start the load process. The "Load results" dialog opens.


9. Click the "Finish" button.

Load res	sults			×
<b>?</b> s	itatus a	and actions after downloa	ding to device	
Status	1	Target	Message	Action
tî	0	▼ PLC_1	Downloading to device completed without error.	Load 'PLC_1'
	0	Start modules	Start modules after downloading to device.	Start module
				_
				_
<			III 9 Finish	Load Cancel

### Result

The download sequence is complete.

### 2.7.2 Load configuration into PC station

For production operation, in addition to the component configuration, you need to configure the communication links and, if necessary, the symbols of tags.

You have the following options for loading the configuration into the PC station:

- Loading via TIA Portal in online mode (see chapter <u>2.7.2.1</u>)
- XDB import: Import XDB in the "Station Configuration Editor" (see 2.7.2.2)

### 2.7.2.1 Loading via TIA Portal in online mode

Online operation enables direct loading of the configuration into the network-connected PC station, or into the local PC station if that PC station is also used as an engineering PC.

**Note** Loading via the TIA Portal in online mode only leads to successful installation of the communication services on your PC station if the component arrangement in the configuration is identical to the arrangement in the configuration data on the PC station.

### Requirements

- Engineering PC and PC station are in the same subnet
- You set the same IP address and subnet mask for the PC station network adapter as you did in the hardware configuration (see chapter <u>2.2.1</u>).

### Compile



- 1. Select the PC station in the project tree.
- 2. Click on the "Compile" button in the function bar.

### Downloading

1. Open the "Device view" of the PC station.



- 2. Right-click the PC station. The context menu opens.
- Select the "Download to device > Hardware configuration" command. The "Extended download to device" or "Load preview" dialog will open.

Note The "Extended download to device" dialog only opens if the access path to the PC station must be reset.

- 4. In the "Extended download to device" dialog, make the following settings:
  - "Type of the PG/PC interface": PN/IE
  - "PG/PC interface": Network adapter of the PC station
  - "Connection to interface/subnet": Subnet of the PC station, e. g. PN/IE\_1
- 5. Select the option "Show devices with the same addresses".
- 6. Click the "Start search" button.
- 7. Select the Station Manager as target device.
- 8. Click "Load". The "Load preview" dialog window opens.

	Device	Device type	Slot	Interface type	Address	Subnet
<u> </u>	IE general	IE general	2 X1	PN/IE	172.16.43.99	PN/IE_1
	<b>9</b>	Type of the PG/PC in PG/PC in Connection to interface	nterface: nterface: /subnet:	PN/IE W vmxnet3 Ethe PN/IE_1	rnet Adapter	
	Select target dev	1st (	gateway:	[	Show devices with t	
				L	Show devices with a	ne sume addresses
	Device	Device type	Interfa	ce tvpe Ado	Iress	Target device
	Device IE general	Device type IE general	Interfa PN/IE	ce type Add	Iress 2.16.43.99	Target device Stationmanage
Flash LED	Device IE general	Device type IE general	Interfa PN/IE PN/IE	ce type Ado 172 Acc	Irress 2.16.43.99 ess address	Target device Stationmanage
Flash LED	Device IE general	Device type IE general	Interfa PN/IE PN/IE	ce type Ado 172 Acc	Display only error	Target device Stationmanage
Flash LED	Device IE general	Device type IE general	found.	ce type Ado	Display only error	Target device Stationmanage
Flash LED	ion: 1 compatible devices information	Device type IE general	found.	ce type Ado 172 Acc	Display only error	Target device Stationmanage

9. Click the "Load" button to start the load process.



### Result

The configuration of the PC station was loaded successfully.

### Figure 2-16

Station	Confi	guration Editor - [(	ONLINE]					×
Compo	nents	Diagnostics Confi	guration Info					
Statio	n:	PC station		Mode:	RUN	LP		
Inde	x N	lame	Туре	LED	Status	Run/Stop	Conn	<u>^</u>
1		OPC server	OPC Server			0	P	
2		E general	IE General			0		
3								
4								
5	;							
6	;							
7								-
8								-
9	0							-
1	1							-
1	2							-
1	2							-
1	4							
1	5							
	125 📗	Stationmanager	Stationmana			0		
		-			-			×
								_
1								
	۵r	на – [	Edit	D	Telete		Flash I ED	
			L. (1)(		01010		10011 22.0	
9	Station	Name Imp	port Station			Dis	able Statio	n
0	К						He	lp

- The components are in "RUN" mode. This is shown with the vicon in the "Run/Stop" column.
- The following status icon for the component shows that the configuration data have been loaded successfully.

Status icon	Meaning
	• The component is present and configured in the current configuration of the PC station.
	The component is ready for operation!

The configured S7 connection is loaded. This is shown with the icon in the "Conn" column.

## 2.7.2.2 XDB import: Import XDB in the "Station Configuration Editor"

- 1. Open the "Station Configuration Editor".
- 2. Click on the "Import Station" button to load the configuration into the PC station.

tion Co omponer	nfiguration Edito	r - [OFFLINE] Configuration Info					
Station:	PC		Mode:	RUN	_P		
Index	Name	Туре	LED	Status	Run/Stop	Conn	^
1							
2							
3							
4							
5							
6							
7							
8							-1
9							
10							
10							
12							
14							
14							
16							
17							4
New diag	gnostic entry arrived Add	ا! Edit Import Station ر		elete	Dis	Flash LED	on
		(	<u>)</u>			H	elp

### Result

The configuration of the PC station was loaded successfully.

### Figure 2-17

Station Configuration Editor - [ONLINE]							
Compone	nts Diagnostics Cor	nfiguration Info					
Station:	PC station		Mode:	RUN	I_P		
Index	Name	Туре	LED	Status	Run/Stop	Conn	
1	OPC server	OPC Server			0	Image: A start and a start	
2	🌃 IE general	IE General			0		
3							
4							
5							
6							
7							
8							- 1
9							- 1
10							- 1
12							-
12							-
14							-
15							
12	5 📔 Stationmanager	Stationmana		2			
							~
							1
	Add	Edit		) elete		Flash LED	
C to	tion Name	mont Station	1		Die	abla Stativ	
518		nport station				sable statit	
OK	OK Help						

- The station has the same name as in the component image that you generated in TIA Portal in the "Device view" for the PC station.
- The components are in "RUN" mode. This is shown with the victor in the "Run/Stop" column.
- The following status icon for the component shows that the configuration data have been loaded successfully.

Status icon	Meaning
	• The component is present and configured in the current configuration of the PC station.
	The component is ready for operation!

• The configured S7 connection is loaded. This is shown with the 🛱 icon in the "Conn" column.

## 2.8 Operation

You need an OPC client to access the following objects of the S7OPT OPC UA Server:

- OPC UA event and alarm types
- Process values of archived S7 tags.

In this example we will use UA Expert as an OPC client.

### Establish a connection from UA Expert to S7OPT OPC UA Server

- 1. Start UA Expert via the Windows start menu "Unified Automation > UaExpert".
- 2. In the "Project" window under "Project", right-click "Servers". The context menu opens.
- 3. Click "Add".

The "Add Server" dialog opens.

📰 Unified Automation UaExpert - The OPC Unified Architectu

File	View	Server	Documen	t Setti	ngs H	lelp
	Ø	BF	] 🔘	• =	- (),	$\varkappa \leqslant$
Project						₽×
× Ø •	Proje	ect ervers Oocument Data A		÷	Add	

4. Under "Custom Discovery", double-click on "<Double click to Add Server>". The "Enter URL" dialog opens.

Add Server ? ×						
Configuration Name						
Discovery Advanced						
Endpoint Filter: No Filter		•				
🔍 Local						
<ul> <li>Society</li> <li>Cocal Network</li> </ul>						
> 1 Microsoft Terminal Services						
> 👳 Microsoft Windows Network						
> 👳 Web Client Network						
✓						
Souther State of the Add Reverse Discovery >						
✓ See Custom Discoverv						
📌 < Double click to Add Server >						
S Recently Used						

5. Enter the URL of the S7OPT OPC UA server. URL: opc.tcp://<PC name>:55105

Note Port 55105 is preset in the "Communication settings". The port can be changed.

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



7. Under "Custom Discovery > [URL of the S7OPT OPC UA server] > OPC.SimaticNET.S7 (opc.tcp)", click one of the visible S7 connections.

Mdd Server	?	×
Configuration Name OPC.SimaticNET.S7OPT		
Discovery Advanced		
Endpoint Filter: No Filter		•
<ul> <li>Q Local</li> <li>✓ Solution Local Network</li> </ul>		
Microsoft Terminal Services     Microsoft Windows Network		
Web Client Network     Web Client Network     Reverse Discovery		
<ul> <li>Custom Discovery</li> <li>Custom Discovery</li> <li>Custom Discovery</li> </ul>		
<ul> <li>✓ Q opc.tcp:// :55105</li> <li>✓ Q OPC.SimaticNET.S7OPT (opc.tcp)</li> </ul>		
Basic128Rsa15 - Sign & Encrypt (uatcp-uasc-uabinary) Basic256Sha256 - Sign & Encrypt (uatcp-uasc-uabinary)	0	0
S Recently Used		J

- A user authentication with Windows login and password will be needed to establish the S7 connection.
- 9. Click "OK" to apply the settings.

	Authentication	Settings	
		3	
	Username	admin	Store
	Password	•••••	
	Certificate		
	Private Key		
⊘ ⊘	Connect Automa	ically	OK Cancel

- **Note** It is possible to log in anonymously if you enabled the option "Allow anonymous logins to the OPC UA server" in the "Communication Settings".
  - In the "Project" window under "Project > Servers", right-click the entry "OPC.SimaticNET.S7OPT". The context menu opens.
  - 11. Click "Connect" in order to establish the connection to the SIMATIC NET S7OPT OPC UA server.

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### Note

If only secured connections are allowed, it is necessary to accept the certificate of the OPC client "UA Expert" in the "Communication settings" (see Figure 2-7).

### Access the S7 tags in the S7 CPU via symbol names

 In the "Address Space" window, navigate to "Root > Objects > SYM". A symbol table with the existing S7 tags will be displayed.

Add	Address Space					
9	No Highligh	nt				
	Root					
~	🚞 Objec	ts				
	> 🛅 S70PT:					
	> 🗎 S7					
	🗸 🚞 SI	(M:				
	× (	S71500ET200MP station_1				
	~	DLC_1				
		🗸 🚞 AlarmData				
		🗸 🚞 prgAlarm1				
		> 🍩 SD1Value				
		> 🍩 SD2Value				
		> 🍩 alarmState				
		> 🍩 createAlarm				
		> 🍩 errGetAlarmState				
		> 🍩 errPrgAlarm				
		> 🍩 stateGetAlarmState				
		> 🍩 statePrgAlarm				
		✓ i prgAlarm2				
		> 🍩 SD1Value				
		> 🍩 SD2Value				
		> 🍩 alarmState				
		> 🍩 createAlarm				
		> 🍩 errGetAlarmState				
		> 🗐 errPrgAlarm				
		> 🔘 stateGetAlarmState				
		> 🔘 statePrgAlarm				
		> 💷 Clock_0.5Hz				
		> 🔲 Clock_0.625Hz				

- 2. Drag and drop to add the following S7 tags from the object "prgAlarm1" to the "Data Access View" of UA Expert.
  - SD1Value
  - SD2Value
  - alarmState
  - createAlarm
- Drag and drop to add the S7 tag "createAlarm" from the object "prgAlarm2" to the "Data Access View" of UA Expert.

	Dutu	Access view	LVEIT VIEW	rv .						
	#	Serve	er	Node Id	Display Name	Value	Datatype	ce Timest	ver Timesta	Statuscode
	1	OPC.SimaticN	IET.S7OPT	NS6 String S7	createAlarm	false	Boolean	12:33:0	12:33:05.722	Good
	2	OPC.SimaticN	IET.S7OPT	NS6 String S7	SD1Value	Associated String-Value alarm1	String	12:19:2	12:19:24.164	Good
	3	OPC.SimaticN	IET.S7OPT	NS6 String S7	SD2Value	5.1	Float	12:19:2	12:19:27.976	Good
	4	OPC.SimaticN	IET.S7OPT	NS6 String S7	alarmState	134	Byte	12:33:0	12:33:05.722	Good
	5	OPC.SimaticN	IET.S7OPT	NS6 String S7	createAlarm	false	Boolean	12:37:5	12:37:56.524	Good
- 1										

### Set up the "Event View"

The "Event View" is used to display the events reported by the S7OPT OPC UA server. Event messages requiring acknowledgement can be acknowledged in the "Event View".

1. Click on "Add" in the "Document" menu. The "Add Document" dialog opens.

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File	View	Server	Doc	ument	Settings	Help
	Ø			Add		
Project	·		X	Remov	re	
✓ 11	Proie	ct		Hide /	unhide all d	lock widgets

- 2. Select the document type "Event View".
- 3. Click the "Add" button.

The "Event View" will be added to UA Expert.

Add Document	?	×	
Document Type:			
Event View		1	2
Description:			Ì
This document type can be used to subscribe to evo of the UA server. It supports the selection of even acknowledge and confirm alarms. It also supports the historical event data for a given time period.	vents and a t fields and reading of	larms I can	
License Type: Runtime License			
There are no functional limitations.			
	_		
Add	Cano	:el	

 Drag & drop the server from the "Address Space" window into the "Configuration" area of the "Event View".

The server responds with two initialization events.



### Display attributes of the program alarm via the S7OPT event type "S7OPTOffNormalAlarmType"

To display the configured attributes of the program alarm via the S7OPT event type "S7OPTOffNormalAlarmType", make the following settings:

- In the "Configuration" section of the "Event View", navigate to the node "Condition Type > AcknowledgeableConditionType > AlarmConditonType > DiscreteAlarmType > OffNormalAlarmType > S7OPTOffNormalAlarmType".
- 2. Select the following attributes:
  - "S7OPTAddData1 > Datavalue" (associated value SD\_1)
  - "S7OPTAddData2 > Datavalue" (associated value SD\_2)
  - "S7OPTAddText1" (additional text 1)
  - "S7OPTDisplayClass" (display class of the alarm)
  - "S7OPTInfoText" (additional info text)

Figure 2-18		
Data Access View	Event View	
Carfornation		
Configuration		
Server/Object		
	🗌 🚕 Firstl	nGroup
×	🔳 🐒 Discre	eteAlarmType
	🗸 🔳 🐒 Of	ffNormalAlarmType
	L 4	NormalState
	> 🗆 🖠	SystemOffNormalAlarmType
	🗸 🔳 💈	🕻 S7OPTOffNormalAlarmType
		_ 🖉 S7OPTAlarmId
		STOPTAddDataCount
	~ -	S70PTAddData1
		✓ ✓ Datavalue
	× •	S/OPTAddData2
	> L	
	> [	$\exists \overset{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}}{\overset{\bullet}{\overset{\bullet}}{\bullet$
	> [	□ ♣ S70PTAddData10
		☐
		STOPTAddText2
		♀ S7OPTAddText3
		] 🔷 S7OPTAddText4
		] 🔗 S7OPTAddText5
		S70PTAddText6
		S70PTAddText7
	Ļ	_ ♥ S7OPTAddText8
		_ ♥ STOPT Time
		STOPTCommercian
		STOPTAlarmClass
		🛛 🔗 S7OPTInfoText
		STOPTStationPlcName
		] 🔗 S7OPTDBName
	> 🔳 🐒	S70PTSysOffNormalAlarmType

### Result

When a program alarm is triggered, the selected attributes will be displayed in the "Details" section.

Figure 2-19

De	tails							
Na	ime	Value						
~	ConditionId	Nodeld						
	NamespaceIndex	3						
	IdentifierType	String						
	Identifier	7 connection.alarm53						
	2:S7OPTAddData1/2:Datavalue	Associated String-Value alarm1						
	2:S7OPTAddData2/2:Datavalue	5.1						
	2:S7OPTAddText1	"en", "Additional message text from alarm 1"						
	2:S7OPTDisplayClass	1						
	2:S7OPTInfoText	"en", "Additional information text from alarm 1"						
	AckedState/Id	False						
	ActiveState	"en", "Active"						
	ActiveState/Id	True						
~	Branchld	Nodeld						
	NamespaceIndex	0						
	IdentifierType	Numeric						
	Identifier	0						
	ConditionName	instProgramAlarm1						
	EventId	len=16, 0x2f5f82f4f91f7e40aac16b97de7c130c						
~	EventType	Nodeld						
	NamespaceIndex	2						
	IdentifierType	Numeric						
	Identifier	43						
	Message	"en", "Message from PLC: "PLC_1" Associate value 1: "Associated String-Value alarm1" Associate value 2: "5.1""						
	Retain	True						
	Severity	125						
	SourceName	S71500/ET200MP station_1\PLC_1\InstPrgAlarm						
	Time	15:02:01.537						

### Enable a program alarm with required acknowledgement in the PLC

- 1. Open the "Data Access View".
- 2. In the "Value" column, double-click on the tag "createAlarm" of the object "prgAlarm1".

Data	Access View								
#	Server	Node Id	Display Name	Value	2	Datatype	ce Timest	ver Timesta	Statuscode
1	OPC.SimaticNET.S7OPT	NS6 String S7	createAlarm	false		Boolean	12:19:2	12:19:20.664	Good
2	OPC.SimaticNET.S7OPT	NS6 String S7	SD1Value	Associated biring	value alamm	String	12:19:2	12:19:24.164	Good
3	OPC.SimaticNET.S7OPT	NS6 String S7	SD2Value	5.1		Float	12:19:2	12:19:27.976	Good
4	OPC.SimaticNET.S7OPT	NS6 String S7	alarmState	134		Byte	12:19:3	12:19:31.757	Good

3. Set the tag "createAlarm" of the "prgAlarm1" object to the value "true".

Data	Access View	Event Vie	W							
#	Serv	er	Node Id	Display Name	e Value		Datatype	e Times	r Times	Statuscode
1	OPC.Simatic	IET.S7OPT	NS6 Strin	createAlarm			Boolean	11:20:	11:20:	Good
2	OPC.Simatic	IET.S7OPT	NS6 Strin	SD1Value	Asso _ Qring-Value alarm1,	+6.6	String	12:33:	12:33:	Good
3	OPC.Simatic	IET.S7OPT	NS6 Strin	SD2Value	6.6 (		Float	12:33:	12:33:	Good
4	OPC.Simatic	IET.S7OPT	NS6 Strin	alarmState	134		Byte	11:20:	11:20:	Good

### Result

- The value of the "createAlarm" tag of the object "prgAlarm1" changes to "true".
- The value of the "alarmState" tag of the object "prgAlarm1" changes from "134" to "133".
- The values "Good" appear in the "Statuscode" column.

Data	Access View	Event View	N							
#	Serve	er	Node Id Display Name		Value	Datatype	ce Timest	ver Timesta	Statuscode	
1	OPC.SimaticN	IET.S7OPT	NS6 String S7	createAlarm	true	Boolean	12:23:5	12:23:52.153	Good	
2	OPC.SimaticN	IET.S7OPT	NS6 String S7	SD1Value	Associated String-Value alarm1	String	12:19:2	12:19:24.164	Good	
3	OPC.SimaticN	IET.S7OPT	NS6 String S7	SD2Value	5.1	Float	12:19:2	12:19:27.976	Good	
4	OPC.SimaticN	IET.S7OPT	NS6 String S7	alarmState	133	Byte	12:23:5	12:23:52.153	Good	

• With a rising edge in the tag "createAlarm", a program alarm is activated in the PLC and sent to the S7OPT OPC UA server.

### Receive program alarm with required acknowledgement in the "Event View"

1. Open the "Event View".

The program alarm (with required acknowledgement) of S7OPT event type "S7OPTOffNormalAlarmType" with the status "Active" and "acknowledgement required (alarmState = 133)" will appear in the "Events" and "Alarms" tabs.

	Events		Alarms	Event H	History					
\$	¢ 9									
A	. (	С	Time	Severity	Server/Object		SourceName N	Tessage Event1	уре	Active
			12:	<b>50</b> 0	OPC.SimaticN	ET.S7OPT / Server	Server	Refrest	StartEventType	
			12:	5 <mark>0</mark> 0	OPC.SimaticN	ET.S7OPT / Server	Server	Refres	EndEventType	
4	Δ		12:	125	OPC.SimaticN	ET.S7OPT / Server	S71500/ET200M N	lessage from PLC: "PLC_1" Associate value 1: "Associated String-Value alarm1" Associate value 2: "5.1" S7OPT	OffNormalAlarmType	Active
	Event	ts	Alarm	s Even	it History					
1	∽ A₂ C₂ ℝ									
	4	С	Tim	2	Severity	Server/Object	SourceName	Message	ConditionName	Active
	Δ		12:27	12.787	125	OPC.SimaticNET.	S71500/ET200M	P Message from PLC: "PLC_1" Associate value 1: "Associated String-Value alarm1" Associate value 2: "5.1"	instProgramAlarm1	Active

 Select the program alarm with required acknowledgement S7OPT event type "S7OPTOffNormalAlarmType" in the "Events" or "Alarms" tab. The configured attributes of the program alarm appear in the "Details" section.

	cuns .	
Na	ime	Value
×	ConditionId	Nodeld
	NamespaceIndex	3
	IdentifierType	String
	Identifier	\$7 connection.alarm53
	2:S7OPTAddData1/2:Datavalue	Associated String-Value alarm1
	2:S7OPTAddData2/2:Datavalue	5.1
	2:S7OPTAddText1	"en", "Additional message text from alarm 1"
	2:S7OPTDisplayClass	1
	2:S7OPTInfoText	"en", "Additional information text from alarm 1"
	AckedState/Id	False
	ActiveState	"en", "Active"
	ActiveState/Id	True
~	Branchld	Nodeld
	NamespaceIndex	0
	IdentifierType	Numeric
	Identifier	0
	ConditionName	instProgramAlarm1
	EventId	len=16, 0x2f5f82f4f91f7e40aac16b97de7c130c
~	EventType	Nodeld
	NamespaceIndex	2
	IdentifierType	Numeric
	Identifier	43
	Message	"en", "Message from PLC: "PLC_1" Associate value 1: "Associated String-Value alarm1" Associate value 2: "5.1""
	Retain	True
	Severity	125
	SourceName	S71500/ET200MP station_1\PLC_1\InstPrgAlarm
	Time	15:02:01.537

3. In the "Alarms" tab, click the "Acknowledge All" icon.

In the tabs "Events" and "Alarms", the program alarm with required acknowledgement and of S7OPT event type "S7OPTOffNormalAlarmType" will appear with the state "Active" and "acknowledged (alarmState = 135)".

Events	Alarm	ns Event H	listory				
× 9							
A C	Time	e Severity	Server/Object	SourceName	Message Even	ntType	Active
	12:	eshStartEventType					
	12:	eshEndEventType					
Δ	12:	. 125	OPC.SimaticNET.S7OPT / Serve	S71500/ET200M	Message from PLC: "PLC_1" Associate value 1: "Associated String-Value alarm1" Associate value 2: "5.1" S70	PTOffNormalAlarmType	Active
1	12.	125	OPC Simplic NET STOPT / Serve	S71500/ET200M	Message from PLC: "PLC 1" Associate value 1: "Associated String-Value alarm1" Associate value 2: "5.1" S70	PTOffNormalAlarmType	Active
V	16		or claimaderer stor 17 serve				Active
Events	Alarn	ms Event	History			,,	Active
Events	Alarn C	ms Event	History Severity Server/Object	SourceName	Message	ConditionName	Active

4. Open the "Data Access View" and check whether the "alarmState" tag of the object "prgAlarm1" has the value "135".

Data	Access View	Event Viev	N							
#	Serve	er	Node Id	Display Name	Value	Datatype	ce Timest	ver Timesta	Statuscode	
1	OPC.SimaticN	IET.S7OPT	NS6 String S7	createAlarm	true	Boolean	12:28:0	12:28:09.344	Good	
2	OPC.SimaticN	IET.S7OPT	NS6 String S7	SD1Value	Associated String-Value alarm1	String	12:19:2	12:19:24.164	Good	
3	OPC.SimaticN	IET.S7OPT	NS6 String S7	SD2Value	5.1	Float	12:19:2	12:19:27.976	Good	
4	OPC.SimaticN	IET.S7OPT	NS6 String S7	alarmState	135	Byte	12:31:0	12:31:06.934	Good	

5. In the "Value" column, double-click on the tag "createAlarm" of the object "prgAlarm1".

Data	Access View	Event Viev	N								
#	Serve	er	Node Id	Display Name		Value	5	Datatype	ce Timest	ver Timesta	Statuscode
1	OPC.SimaticN	IET.S7OPT	NS6 String S7	createAlarm	true			Boolean	12:28:0	12:28:09.344	Good
2	OPC.SimaticN	IET.S7OPT	NS6 String S7	SD1Value	Associated	Sening v	anac ananimi	String	12:19:2	12:19:24.164	Good
3	OPC.SimaticN	IET.S7OPT	NS6 String S7	SD2Value	5.1			Float	12:19:2	12:19:27.976	Good
4	OPC.SimaticN	IET.S7OPT	NS6 String S7	alarmState	135			Byte	12:31:0	12:31:06.934	Good

6. Reset the tag "createAlarm" of the "prgAlarm1" object to the value "false".

Data	Access View	Event View	N							
#	Serv	er	Node Id	Display Name	Value		Datatype	e Times	r Times	Statuscode
1	OPC.Simatic	NET.S7OPT	NS6 Strin	createAlarm			Boolean	10:34:	10:34:	Good
2	OPC.Simatic	NET.S7OPT	NS6 Strin	SD1Value	AssQring-Value alarm1,	+4.2	String	11:20:	11:20:	Good
3	OPC.Simatic	VET.S7OPT	NS6 Strin	SD2Value	4.2		Float	11:20:	11:20:	Good
4	OPC.Simatic	VET.S7OPT	NS6 Strin	alarmState	135		Byte	11:19:	11:19:	Good

### Result

- In the "Data Access View", the value of the tag "createAlarm" of the object "prgAlarm1" changes to "false".
- In the "Data Access View", the value of the tag "alarmState" of the object "prgAlarm1" changes from "135" to "134".

Data	Data Access View											
#	Server	Node Id	Display Name	Value	Datatype	ce Timest	ver Timesta	Statuscode				
1	OPC.SimaticNET.S7OPT	NS6 String S7	createAlarm	false	Boolean	12:19:2	12:19:20.664	Good				
2	OPC.SimaticNET.S7OPT	NS6 String S7	SD1Value	Associated String-Value alarm1	String	12:19:2	12:19:24.164	Good				
3	OPC.SimaticNET.S7OPT	NS6 String S7	SD2Value	5.1	Float	12:19:2	12:19:27.976	Good				
4	OPC.SimaticNET.S7OPT	NS6 String S7	alarmState	134	Byte	12:19:3	12:19:31.757	Good				

• UA Expert has received a new alarm state change for this object. In the "Event View", the alarm has changed to the state "Inactive" and "acknowledged (alarmState = 134)".

E١	ents	Alarms	Event	History				
×	9							
Α	С	Time	Severity	Server/Object	SourceName	Message	EventType	Active
			500	OPC.SimaticNET.S7OPT / Server	Server		RefreshStartEventType	
		12:	<b>50</b> 0	OPC.SimaticNET.S7OPT / Server	Server		RefreshEndEventType	
Δ		12:	125	OPC.SimaticNET.S7OPT / Server	S71500/ET200M	Message from PLC: "PLC_1" Associate value 1: "Associated String-Value alarm1" Associate value 2: "5.1"	S70PTOffNormalAlarmType	e Active
$\checkmark$		12:	125	OPC.SimaticNET.S7OPT / Server	S71500/ET200M	Message from PLC: "PLC_1" Associate value 1: "Associated String-Value alarm1" Associate value 2: "5.1"	S70PTOffNormalAlarmType	e Active
1		12:	125	OPC.SimaticNET.S7OPT / Server	S71500/ET200M	Message from PLC: "PLC_1" Associate value 1: "Associated String-Value alarm1" Associate value 2: "5.1"	S70PTOffNormalAlarmType	e Inactive

### Enable information-only program alarm in the PLC

- 1. Open the "Data Access View".
- 2. In the "Value" column, double-click on the "createAlarm" tag of the object "prgAlarm2".

Data	Access View	Event Vie	N						
#	Serv	er	Node Id	Display Name	Value	Datatype	ce Timest	ver Timesta	Statuscode
1	OPC.Simatic	VET.S7OPT	NS6 String S7	createAlarm	false	Boolean	12:33:0	12:33:05.722	Good
2	OPC.Simatic	VET.S7OPT	NS6 String S7	SD1Value	Associated String-Value alarm1	String	12:19:2	12:19:24.164	Good
3	OPC.Simatic	VET.S7OPT	NS6 String S7	SD2Value	5.1	Float	12:19:2	12:19:27.976	Good
4	OPC.Simatic	VET.S7OPT	NS6 String S7	alarmState	104	Byte	12:33:0	12:33:05.722	Good
5	OPC.Simatic	VET.S7OPT	NS6 String S7	createAlarm	false	Boolean	12:37:5	12:37:56.524	Good

3. In the Data Access View, set the tag "createAlarm" of the object "prgAlarm2" to the value "true".

Data	Access View	Event View	v							
#	Serv	er	Node Id	Display Name	Value		Datatype	e Times	r Times	Statuscode
1	OPC.Simatic	NET.S7OPT	NS6 Strin	createAlarm	false		Boolean	11:20:	11:20:	Good
2	OPC.Simatic	VET.S7OPT	NS6 Strin	SD1Value	Associated String-Value alarm1,	+1	String	12:02:	12:02:	Good
3	OPC.Simatic	VET.S7OPT	NS6 Strin	SD2Value	15.4		Float	12:02:	12:02:	Good
4	OPC.Simatic	VET.S7OPT	NS6 Strin	alarmState	134		Byte	11:20:	11:20:	Good
5	OPC.Simatic	VET.S7OPT	NS6 Strin	createAlarm			Boolean	10:34:	10:34:	Good

### Result

- The value of the "createAlarm" tag of the object "prgAlarm2" changes to "true".
- The values "Good" appear in the "Statuscode" column.

Data	Access View	Event Viev	V						
#	Serve	er	Node Id	Display Name	Value	Datatype	ce Timest	ver Timesta	Statuscode
1	OPC.SimaticN	ET.S7OPT	NS6 String S7	createAlarm	false	Boolean	15:20:4	15:20:46.331	Good
2	OPC.SimaticN	IET.S7OPT	NS6 String S7	SD1Value	Associated String-Value alarm1	String	12:19:2	12:19:24.164	Good
3	OPC.SimaticN	IET.S7OPT	NS6 String S7	SD2Value	5.1	Float	12:19:2	12:19:27.976	Good
4	OPC.SimaticN	IET.S7OPT	NS6 String S7	alarmState	134	Byte	15:20:4	15:20:46.331	Good
5	OPC.SimaticN	IET.S7OPT	NS6 String S7	createAlarm	true	Boolean	15:33:1	15:33:12.607	Good

• With a rising edge of the tag "createAlarm" a program alarm is activated in the PLC and sent to the S7OPT OPC UA server.

### Receive information-only program alarm in the "Event View"

1. Open the "Event View".

In the "Events" tab, the information-only program alarm will be shown by the S7OPT event type "S7OPTInfoReportEventType".

E١	ents Alarms Event History											
×	9											
Α	С	Time	Severity	Server/Object	SourceName	Message	EventType	Active				
		12:	<b>50</b> 0	OPC.SimaticNET.S7OPT / Server	Server		RefreshStartEventType					
		12:	<b>50</b> 0	OPC.SimaticNET.S7OPT / Server	Server		RefreshEndEventType					
		12:	188	OPC.SimaticNET.S7OPT / Server	\$71500/ET200M	Information message from PLC: "PLC_1" without acknowledgement	S7OPTInfoReportEventType					

- 2. Open the "Data Access View".
- 3. In the "Value" column, double-click on the "createAlarm" tag of the object "prgAlarm2".

Data	Access View	Event View	v						
#	Serv	er	Node Id	Display Name	Value	Datatype	ce Timest	ver Timesta	Statuscode
1	OPC.Simatic	NET.S7OPT	NS6 String S7	createAlarm	false	Boolean	15:20:4	15:20:46.331	Good
2	OPC.Simatic	VET.S7OPT	NS6 String S7	SD1Value	Associated String-Value alarm1	String	12:19:2	12:19:24.164	Good
3	OPC.Simatic	VET.S7OPT	NS6 String S7	SD2Value	5.1	Float	12:19:2	12:19:27.976	Good
4	OPC.Simatic	VET.S7OPT	NS6 String S7	alarmState	124	Byte	15:20:4	15:20:46.331	Good
5	OPC.Simatic	NET.S7OPT	NS6 String S7	createAlarm	true	Boolean	15:33:1	15:33:12.607	Good

4. Reset the tag "createAlarm" of the object "prgAlarm2" to the value "false".

Data	Data Access View Event Vie		v							
#	Serv	er	Node Id	Display Name	Value		Datatype	:e Times	r Times	Statuscode
1	OPC.Simatic	IET.S7OPT	NS6 Strin	createAlarm	false		Boolean	12:42:	12:42:	Good
2	OPC.Simatic	JET.S7OPT	NS6 Strin	SD1Value	Associated String-Value alarm1,	+1	String	12:42:	12:42:	Good
3	OPC.Simatic	IET.S7OPT	NS6 Strin	SD2Value	16.4		Float	12:42:	12:42:	Good
4	OPC.Simatic	IET.S7OPT	NS6 Strin	alarmState	134		Byte	12:42:	12:42:	Good
5	OPC.Simatic	JET.S7OPT	NS6 Strin	createAlarm			Boolean	12:42:	12:42:	Good

### Result

 In the "Data Access View", the value of the tag "createAlarm" of the object "prgAlarm2" changes to "false".

Data	Access View	Event View	N						
#	Serv	er	Node Id	Display Name	Value	Datatype	ce Timest	ver Timesta	Statuscode
1	OPC.Simatic	VET.S7OPT	NS6 String S7	createAlarm	false	Boolean	12:33:0	12:33:05.722	Good
2	OPC.Simatic	VET.S7OPT	NS6 String S7	SD1Value	Associated String-Value alarm1	String	12:19:2	12:19:24.164	Good
3	OPC.Simatic	VET.S7OPT	NS6 String S7	SD2Value	5.1	Float	12:19:2	12:19:27.976	Good
4	OPC.Simatic	VET.S7OPT	NS6 String S7	alarmState	134	Byte	12:33:0	12:33:05.722	Good
5	OPC.Simatic	NET.S7OPT	NS6 String S7	createAlarm	false	Boolean	12:37:5	12:37:56.524	Good

• No more program alarm will be generated for the S7OPT event type "S7OPTInfoReportEventType".

### Set up the "History Trend View"

The "History Trend View" is used to graphically display the process values of the S7 tags archived by the S7OPT OPC UA server.

In this example, the following S7 tags are stored in the archive:

- "SD1Value" from the data structure "prgAlarm1" (associated value 1)
- "SD2Value" from the data structure "prgAlarm1" (associated value 2)

The timestamp and the quality characteristic of the S7 tags are stored together with the process value.

With the "History Trend View", it is possible to have read access to the values of the S7 tags stored in the archive.

1. Click on "Add" in the "Document" menu. The "Add Document" dialog opens.

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Fi	le	View	Sen	/er	Doc	ument	Settings	Help
* * * *	n	Ø	P	P		Add		)
: Pro	iect				R	Remov	e 🕚	
~	m	Proie	ct			Hide /	unhide all d	lock widgets
	-				_			

- 2. Select the document type "History Trend View".
- Click the "Add" button. The "History Trend View" will be added in UA Expert.



- 4. Drag and drop to add the following S7 tags of the object "prgAlarm1" from the "Address Space" window to the "Configuration" section of the "History Trend View".
  - SD1Value
  - SD2Value



### Display process values of archived S7 tags in the "History Trend View"

The following options are available for read access to the S7 tags stored in the archive:

- Single Update: The displayed range is defined by the time of start and end.
- Cyclic Update: The time range to be displayed is specified directly as the duration and the data is retrieved at an adjustable interval.

### Cyclic Update

- 1. Enable the "Cyclic Update" function.
- 2. Enter the time span and update interval, for example:
  - "Timespan": 1 min The values that have been stored within 1 minute up to the current time are displayed.
  - "Update Interval": 10s
     The display of the values is updated every 10s.
- 3. Click the "Start" button to start the cyclic update.

Data Access View Configuration	Event View	History Trend View					6
Server	DisplayName	Node Id	Color	Single Update		Ocyclic Update	_
OPC.SimaticNE	createAlarm	NS6 String S715	blue	Start Time:		Timespan:	
OPC.SimaticNE	createAlarm	NS6 String S715	cyan	10.03.21 08:00:00.000	) ~	00:01:00	<b>•</b>
				End Time:		Update Interval:	
				10.03.21 20:00:00.000	) ~	00:00:10	\$
				Get Start	Time Update		Start

The values of the S7 tag "SD2Value" of the data type "Real" are displayed graphically in the "History Data" section of the "Numeric Values" tab.



Figure 2-20

The values of the S7 tag "SD1Value" of the data type "String" are displayed in tabular form in the "History data" section.

Figure 2-21

History Data					
Numeric Values	NS6 String S71500ET200MP station_:	1.PLC_1.AlarmData.prgAlarm1.SD2Value		NS6 String S71500ET200MP station_1.PLC_1.AlarmData.prgAlarm1.SD1Value	
Source Timestamp	Server Timestamp	Value		Status	^
2021-03-10 15:51:00.04	5 2021-03-10 15:51:00.045	Associated String-Value alarm1,	+3.8	Good (0x0000000)	
2021-03-10 15:50:59.04	5 2021-03-10 15:50:59.045	Associated String-Value alarm1,	+3.6	Good (0x0000000)	
2021-03-10 15:50:58.04	5 2021-03-10 15:50:58.045	Associated String-Value alarm1,	+3.4	Good (0x0000000)	
2021-03-10 15:50:57.04	5 2021-03-10 15:50:57.045	Associated String-Value alarm1,	+3.2	Good (0x0000000)	
2021-03-10 15:50:56.06	1 2021-03-10 15:50:56.061	Associated String-Value alarm1,	+3.0	Good (0x0000000)	
2021-03-10 15:50:55.04	5 2021-03-10 15:50:55.045	Associated String-Value alarm1,	+2.8	Good (0x0000000)	
2021-03-10 15:50:54.04	5 2021-03-10 15:50:54.045	Associated String-Value alarm1,	+2.6	Good (0x0000000)	
2021-03-10 15:50:53.05	0 2021-03-10 15:50:53.050	Associated String-Value alarm1,	+2.4	Good (0x0000000)	
2021-03-10 15:50:52.05	6 2021-03-10 15:50:52.056	Associated String-Value alarm1,	+2.2	Good (0x0000000)	
2021-03-10 15:50:51.05	6 2021-03-10 15:50:51.056	Associated String-Value alarm1,	+2.0	Good (0x0000000)	
2021-03-10 15:50:50.05	6 2021-03-10 15:50:50.056	Associated String-Value alarm1,	+1.8	Good (0x0000000)	
2021-03-10 15:50:49.05	6 2021-03-10 15:50:49.056	Associated String-Value alarm1,	+1.6	Good (0x0000000)	
2021-03-10 15:50:48.05	6 2021-03-10 15:50:48.056	Associated String-Value alarm1,	+1.4	Good (0x0000000)	
2021-03-10 15:50:47.05	6 2021-03-10 15:50:47.056	Associated String-Value alarm1,	+1.2	Good (0x0000000)	
2021-03-10 15:50:46.05	6 2021-03-10 15:50:46.056	Associated String-Value alarm1,	+1.0	Good (0x0000000)	
2021-03-10 15:50:45.05	6 2021-03-10 15:50:45.056	Associated String-Value alarm1,	+0.8	Good (0x0000000)	
2021-03-10 15:50:44.05	6 2021-03-10 15:50:44.056	Associated String-Value alarm1,	+0.6	Good (0x0000000)	
2021-03-10 15:50:43.05	6 2021-03-10 15:50:43.056	Associated String-Value alarm1,	+0.4	Good (0x0000000)	
2021-03-10 15:50:42.05	6 2021-03-10 15:50:42.056	Associated String-Value alarm1,	+0.2	Good (0x0000000)	
2021-03-10 15:50:41.05	6 2021-03-10 15:50:41.056	Associated String-Value alarm1,	+20.0	Good (0x0000000)	
2021-03-10 15:50:40.05	6 2021-03-10 15:50:40.056	Associated String-Value alarm1,	+ 19.8	Good (0x0000000)	
2021-03-10 15:50:39.05	6 2021-03-10 15:50:39.056	Associated String-Value alarm1,	+19.6	Good (0x0000000)	
2021-03-10 15:50:38.05	6 2021-03-10 15:50:38.056	Associated String-Value alarm1,	+ 19.4	Good (0x0000000)	
2021-03-10 15:50:37.05	6 2021-03-10 15:50:37.056	Associated String-Value alarm1,	+ 19.2	Good (0x0000000)	
2021-03-10 15:50:36.05	6 2021-03-10 15:50:36.056	Associated String-Value alarm1,	+ 19.0	Good (0x0000000)	
2021-03-10 15:50:35.05	6 2021-03-10 15:50:35.056	Associated String-Value alarm1,	+18.8	Good (0x0000000)	
2021-03-10 15:50:34.05	6 2021-03-10 15:50:34.056	Associated String-Value alarm1,	+18.6	Good (0x00000000)	
2021-03-10 15:50:33.04	1 2021-03-10 15:50:33.041	Associated String-Value alarm1,	+18.4	Good (0x0000000)	

### 4. Click the "Stop" button to stop the cyclic update.

erver	DisplayName	Node Id	Color	Single Update	Ocyclic Update	
PC.SimaticNET.S70PT	createAlarm	NS6 String S715	blue	Start Time:	Timespan:	
PC.SimaticNET.S7OPT	createAlarm	NS6 String S715	cyan	10.03.21 15:11:24.439	00:01:00	
				End Time:	Update Interval:	
				10.03.21 15:16:00.000	00:00:10	
				Get Start Time Update		Stop

### Single Update

- 1. Enable the "Single Update" function.
- 2. Click the "Get Start Time" button. The possible start time will be found and entered in the "Start Time" field.
- 3. Optional: Adjust the start time in the "Start Time" field.
- 4. Enter the end time in the "End Time" field.
- 5. Click the "Update" button.

Data Anna Your Data N	Lister Tree	d 16a			6
Data Access view Event vi	ew History Iren	u view			
Server	DisplayName	Node Id	Color	Single Update	
OPC.SimaticNET.S7OPT OPC.SimaticNET.S7OPT	createAlarm createAlarm	NS6 String S715 NS6 String S715	<b>blue</b> cyan	Start Time:	* *
				End Time: 10.03.21 15:51:00.000	<u>*</u>
				2 Get Start Time Update 6	Start

2 Engineering

The values stored in the specified period are displayed.

The values of the S7 tag "SD2Value" of the data type "Real" are displayed graphically in the "History Data" section of the "Numeric Values" tab.



The values of the S7 tag "SD1Value" of the data type "String" are displayed in tabular form in the "History data" section.

Figure 2-23

Thistory Data					
Numeric Values	S6 String S71500ET200MP station_1.	PLC_1.AlarmData.prgAlarm1.SD2Value		NS6 String S71500ET200MP station_1.PLC_1.AlarmData.prgAlarm1.SD1Value	
Source Timestamp	Server Timestamp	Value		Status	^
2021-03-10 15:51:00.045	2021-03-10 15:51:00.045	Associated String-Value alarm1,	+3.8	Good (0x0000000)	
2021-03-10 15:50:59.045	2021-03-10 15:50:59.045	Associated String-Value alarm1,	+3.6	Good (0x0000000)	
2021-03-10 15:50:58.045	2021-03-10 15:50:58.045	Associated String-Value alarm1,	+3.4	Good (0x0000000)	
2021-03-10 15:50:57.045	2021-03-10 15:50:57.045	Associated String-Value alarm1,	+3.2	Good (0x0000000)	
2021-03-10 15:50:56.061	2021-03-10 15:50:56.061	Associated String-Value alarm1,	+3.0	Good (0x0000000)	
2021-03-10 15:50:55.045	2021-03-10 15:50:55.045	Associated String-Value alarm1,	+2.8	Good (0x0000000)	
2021-03-10 15:50:54.045	2021-03-10 15:50:54.045	Associated String-Value alarm1,	+2.6	Good (0x0000000)	
2021-03-10 15:50:53.050	2021-03-10 15:50:53.050	Associated String-Value alarm1,	+2.4	Good (0x0000000)	
2021-03-10 15:50:52.056	2021-03-10 15:50:52.056	Associated String-Value alarm1,	+2.2	Good (0x0000000)	
2021-03-10 15:50:51.056	2021-03-10 15:50:51.056	Associated String-Value alarm1,	+2.0	Good (0x0000000)	
2021-03-10 15:50:50.056	2021-03-10 15:50:50.056	Associated String-Value alarm1,	+1.8	Good (0x0000000)	
2021-03-10 15:50:49.056	2021-03-10 15:50:49.056	Associated String-Value alarm1,	+1.6	Good (0x0000000)	
2021-03-10 15:50:48.056	2021-03-10 15:50:48.056	Associated String-Value alarm1,	+1.4	Good (0x0000000)	
2021-03-10 15:50:47.056	2021-03-10 15:50:47.056	Associated String-Value alarm1,	+1.2	Good (0x0000000)	
2021-03-10 15:50:46.056	2021-03-10 15:50:46.056	Associated String-Value alarm1,	+1.0	Good (0x0000000)	
2021-03-10 15:50:45.056	2021-03-10 15:50:45.056	Associated String-Value alarm1,	+0.8	Good (0x0000000)	
2021-03-10 15:50:44.056	2021-03-10 15:50:44.056	Associated String-Value alarm1,	+0.6	Good (0x0000000)	
2021-03-10 15:50:43.056	2021-03-10 15:50:43.056	Associated String-Value alarm1,	+0.4	Good (0x0000000)	
2021-03-10 15:50:42.056	2021-03-10 15:50:42.056	Associated String-Value alarm1,	+0.2	Good (0x0000000)	
2021-03-10 15:50:41.056	2021-03-10 15:50:41.056	Associated String-Value alarm1,	+20.0	Good (0x0000000)	
2021-03-10 15:50:40.056	2021-03-10 15:50:40.056	Associated String-Value alarm1,	+19.8	Good (0x0000000)	
2021-03-10 15:50:39.056	2021-03-10 15:50:39.056	Associated String-Value alarm1,	+19.6	Good (0x0000000)	
2021-03-10 15:50:38.056	2021-03-10 15:50:38.056	Associated String-Value alarm1,	+19.4	Good (0x0000000)	
2021-03-10 15:50:37.056	2021-03-10 15:50:37.056	Associated String-Value alarm1,	+19.2	Good (0x0000000)	
2021-03-10 15:50:36.056	2021-03-10 15:50:36.056	Associated String-Value alarm1,	+19.0	Good (0x0000000)	
2021-03-10 15:50:35.056	2021-03-10 15:50:35.056	Associated String-Value alarm1,	+18.8	Good (0x0000000)	
2021-03-10 15:50:34.056	2021-03-10 15:50:34.056	Associated String-Value alarm1,	+18.6	Good (0x0000000)	
2021-03-10 15:50:33.041	2021-03-10 15:50:33.041	Associated String-Value alarm1,	+18.4	Good (0x0000000)	

### **Useful information** 3

#### 3.1 S70PT event types

#### 3.1.1 **Overview**

The SIMATIC NET S7OPT OPC UA server supports the following OPC UA event and alarm types:

- Statepath alarm Alarms for the S7 connection status
- Consistency alarm Alarm for an inconsistent alarm configuration
- Program alarms At a signal change, the "Program\_Alarm" alarm block will generate a program alarm with or without required acknowledgement and with up to ten associated values.
- System messages System messages are triggered independently by the PLC and cannot be configured or changed by the user.

The following system messages are available:

- System diagnostics alarms: The scope of the system diagnostics is derived from the relevant hardware configurations. Conditions such as device failure, block error, peripheral access error, channel error, parameterization error, external auxiliary power failure, and hardware configuration changes (such as unplugging and plugging in of modules) are reported.
- Overload messages: Special system diagnostic messages for resource bottlenecks
- Security messages: Reporting of access violations in case of, e. g. incorrect password entry
- Note The S7OPT OPC UA server only supports program alarms to the S7-1500.

### 3.1.2 Statepath alarm

This S7OPT event type maps the inverse state of an S7 connection ("Inactive" if S7 connection is established ("UP"); and "Active" if S7 connection is not established ("DOWN" or "RECOVERY")).

The status is only determined on the PC side and can, therefore, be reported even if there is no physical connection to the PLC.

In the "Active" state, no further program alarms can be received.

### **Display name**

"S7OPTStatepathAlarmType"

### 3.1.3 Consistency alarm

This S7OPT event type has no acknowledgement requirement. It indicates inconsistent alarm configuration between a PLC and the PC station. Such inconsistent program alarms are not reported to the OPC client. In this case, the condition instance "consistency" is set to "Active" once for this PLC. It is recommended to update the alarm configuration first on the PLC and then on the PC station.

### **Display name**

"S7OPTConsistencyAlarmType"

### 3.1.4 Program alarms

### **Display name**

 "S7OPTOffNormalAlarmType": This S7OPT event type displays the configured program alarms with or without required acknowledgement and with up to ten associated values. The program alarms of this type have a state or condition. These can assume the status "incoming" or "outgoing".

 "S7OPTInfoReportEventType": This S7OPT event type displays the configured information-only program alarms with up to ten associated values. To do this, the checkbox in the "Information only" column in the TIA Portal alarms editor must be enabled.

### 3.1.5 System messages

### **Display name**

• "S7OPTSysOffNormalAlarmType"

This S7OPT event type displays the system messages with or without acknowledgement obligation with an associated value. The contents of this associated value are the 20 bytes of diagnostic data. The system messages of this type have a state or condition. These can assume the status "incoming" or "outgoing". To accomplish this, the checkbox in the "Acknowledgement" column for the module's alarm settings in TIA Portal must be enabled.

 "S7OPTSysInfoReportEventType" This S7OPT event type displays the system messages, which are for information purposes only, with an associated value. The contents of this associated value are the 20 bytes of diagnostic data.

### Receive system messages in the OPC client

System messages are automatically displayed in UA Expert in the Event View when they are incoming or outgoing. No user program is required in the S7 CPU.

### Figure 3-1

I	Even	ts							
	Eve	nts	Alarms Event His	tory					
	×	9	È						
	Α	С	Time	Severity	Server/Object	SourceName	Message	EventType	Active
							CPU status message: CPU not in RUN Current CPU operating mode: STOP		
	~		10:23:46.219	1	OPC.SimaticNET.S7OPT / Server	S71500/ET200M	PLC_1 / PLC_1	S7OPTSysOffNormalAlarmType	e Active
							CPU info: Communication initiated request: STOP Pending startup inhibit(s): - No startup inhibit set		
			10:23:46.230	1	OPC.SimaticNET.S7OPT / Server	S71500/ET200M	CPU changes from RUN to STOP mode	S7OPTSysInfoReportEventType	
							PLC_1 / PLC_1		

## 3.2 Access to historical data of S7 Tags

### **Historical data**

Historical data services enable storage and read access to the S7 tags of automation devices stored in an archive. The timestamp and the quality characteristic of the S7 tags are stored together with the process value.

### Enable historical data

Archiving can only be activated for symbolic data tags via the "Symbol Editor" of the SIMATIC PC station in TIA Portal.

### Options for OPC UA clients to access historical data

OPC UA clients, such as UA Expert from Unified Automation, can access the process values of archived S7 tags using the "HistoryRead" function. The archive consists of a maximum of 360 files. Each file stores the data of the symbols configured for the archive. Each file covers a period of 1 hour. Beginning at system startup, the maximum number of 360 files is reached after a little more than two weeks. When new archive files are created, the oldest files are successively deleted in the order in which they were first created.

### Maximum storage of S7 tags

A maximum of 1000 S7 tags can be archived by the S7OPT OPC UA server.

### Data types

The following table shows an overview of the data types that the S7OPT OPC UA server can archive. Table 3-1

Type identifier	S7 data type	OPC UA data type	Description
b	BYTE	Byte	8 Bit (bit string)
	USINT	Byte	8 Bit (unsigned)
с	CHAR	SByte	8 Bit (character)
	SINT	SByte	8 Bit (signed)
WC	WCHAR	UInt16	16 Bit (character, UTF-8)
w	WORD	UInt16	16 Bit (bit string)
	UINT	UInt16	16 Bit (unsigned)
dw	DWORD	UInt32	32 Bit (Bitstring)
	UDINT	UInt32	32 Bit (unsigned)
lw	LWORD	UInt64	64 Bit (Bitstring) only available for S7-1500
	ULINT	UInt64	64 Bit (unsigned) only available for S7-1500
I	INT	Int16	16 Bit (signed)
di	DINT	Int32	32 Bit (signed)
li	LINT	Int64	64 Bit (signed) only available for S7-1500
R	REAL	Float	Floating point (4 bytes) IEEE 754
lr	LREAL	Double	Floating point (8 bytes) IEEE 754
dt	DATE_TIME	DateTime	Date and time Value range as of 01.01.1990; only available for S7-1500
ldt	LDT	DateTime	Date and time accurate to nanoseconds, Value range as of 01.01.1990; only available for S7-1500 The OPC UA server rounds the time by representing it as DateTime. This limits the resolution to 100 nanoseconds.
dtl	DTL	DateTime	Date and time accurate to nanoseconds, Value range 01.01.1970–31.12.2553; only available for S7-1500 The OPC UA server rounds the time by representing it as DateTime. This limits the resolution to 100 nanoseconds. The individual components of the S7 data type "DTL" are not archived.
date	DATE	DateTime	Date and time (8 bytes) (where the time is always 00:00:00); value range starting at 01.01.1990. Image of the CPU data type "DATE" (unsigned, 16 bit).
t	TIME	Int32	Signed time value in milliseconds
lt	LTIME	Int64	Signed time value in nanoseconds; only available for S7-1500
tod	TOD	UInt32	Time of day, 0–86399999 ms from midnight

Type identifier	S7 data type	OPC UA data type	Description
Itod	LTOD	UInt64	Time of day, 0–86399999999999 ns from midnight;
			only available for S7-1500
s5tbcd	S5TIME	Ulnt16	Mapping of the CPU data type "S5TIME" to Ulnt 16 (unsigned, 16 bit) with restricted value range, 09990000 ms; only available for S7-1500
x <bit address=""></bit>	BOOL	Boolean	Bit (bool) In addition to the byte offset in the range, the <bit address=""> must also be specified in the respective byte. Value range 0–7</bit>
s <string length=""></string>	STRING	String (UTF-8)	The <string for="" length="" reserved="" the<br="">STRING&gt; must be specified. Value range 1–254 When writing, it is also possible to write shorter STRING, whereby the transmitted data length is always the reserved string length in bytes plus 2 bytes. The bytes that are not required are filled with the value 0. The reading and writing of STRING and STRING arrays is internally mapped to the reading and writing of byte arrays. The STRING must be initialized on the S7 with valid values.</string>
ws <string length=""></string>	WSTRING	String (UTF-8)	The <string length=""> reserved for the WSTRING must be specified in WCHAR. Value range 1–16382. When writing, shorter WSTRING can also be written, although the transmitted data length is always the reserved <string length=""> in WCHAR plus 4 bytes. The bytes that are not required are filled with the value 0. The reading and writing of WSTRING and WSTRING arrays is internally mapped to the reading and writing of byte arrays. The WSTRING must be initialized on the S7 with valid values.</string></string>

Furthermore, arrays of these elementary S7OPT data types are also supported for archiving. Each array or data tag counts as an archivable S7 tag. The configured number of archived S7 tags can be determined in the TIA Portal "Symbol Editor" at the time of configuration.

User-specific data types (UDT), structures, timers, and counters cannot be archived by the S7OPT OPC UA server.

**Note** The configured S7 connections, which are necessary for monitoring archived S7 tags, are established after the PC and the S7OPT OPC UA server start up. This ensures seamless archiving of process values from the S7 tags.

# 4 Appendix

## 4.1 Service and support

### **Industry Online Support**

Do you have any questions or need assistance?

Siemens Industry Online Support offers round the clock access to our entire service and support know-how and portfolio.

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- Spare parts services
- Repair services
- On-site and maintenance services
- Retrofitting and modernization services
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You can find detailed information on our range of services in the service catalog web page:

support.industry.siemens.com/cs/sc

### Industry Online Support app

You will receive optimum support wherever you are with the "Siemens Industry Online Support" app. The app is available for iOS and Android:

support.industry.siemens.com/cs/ww/en/sc/2067

## 4.2 Industry Mall



The Siemens Industry Mall is the platform on which the entire siemens Industry product portfolio is accessible. From the selection of products to the order and the delivery tracking, the Industry Mall enables the complete purchasing processing – directly and independently of time and location: mall.industry.siemens.com

## 4.3 Links and literature

Table 4-1

No.	Subject
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to the article page of the application example https://support.industry.siemens.com/cs/ww/en/view/67295801
/3/	SIMATIC NET: PC software Industrial Communication with PG/PC Volume 2 - Interfaces https://support.industry.siemens.com/cs/ww/en/view/77378184
\4\	SIMATIC NET: PC Software Industrial Communication with PG/PC Volume 1 – Fundamentals https://support.industry.siemens.com/cs/ww/en/view/77376110
\5\	SIMATIC NET: PC software Commissioning PC Stations - Manual and Quick Start https://support.industry.siemens.com/cs/ww/en/view/77377601

## 4.4 Change documentation

Table 4-2

Version	Date	Change
V1.0	07/2021	First version