

SIEMENS

WinCC/Connectivity Pack
Installation Notes **1**

WinCC/Connectivity Pack
Release Notes **2**

WinCC/Connectivity Pack
documentation **3**

SIMATIC HMI

WinCC V7.2 WinCC/Connectivity Pack

System Manual

Print of the Online Help

Legal information

Warning notice system

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

⚠ DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
⚠ WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
⚠ CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.

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

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

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

Trademarks

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

Disclaimer of Liability

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

Table of contents

1	WinCC/Connectivity Pack Installation Notes.....	7
1.1	Licensing.....	7
1.2	How to Install MS Message Queuing.....	8
1.3	Installation of the Connectivity Pack Server.....	10
1.4	Installation of the Connectivity Pack Client.....	12
2	WinCC/Connectivity Pack Release Notes.....	15
2.1	Important information on the Connectivity Pack.....	15
2.2	Service and Support.....	16
2.2.1	Warnings.....	16
2.2.2	Customer Support.....	18
2.2.3	Support Request.....	20
3	WinCC/Connectivity Pack documentation.....	23
3.1	WinCC/Connectivity Pack.....	23
3.2	Overview: WinCC/Connectivity Pack.....	24
3.3	Applications.....	28
3.3.1	Use Case 1: Local Access to WinCC RT Databases.....	28
3.3.2	Use Case 2: Remote Access to WinCC RT Databases.....	29
3.3.3	Use Case 3: Local Access to WinCC Archive Databases.....	30
3.3.4	Use Case 4: Remote Access to WinCC Archive Databases.....	31
3.3.5	Use Case 5: Local Access to WinCC User Archive.....	32
3.3.6	Use Case 6: Remote Access to WinCC User Archives.....	33
3.3.7	Use Case 7: Access Via the WinCC OLE DB Provider.....	34
3.3.8	Access Using OPC to WinCC Archives, Tags, and Messages.....	35
3.3.9	Transparent access to archived data.....	37
3.3.10	Functions of SQL Servers.....	38
3.4	Access Via the OLE DB Provider.....	40
3.4.1	Access to Archive Data Using OLE DB Provider.....	40
3.4.2	Bases of OLE DB.....	41
3.4.3	WinCC Archive Connector.....	42
3.4.4	Establishing the Connection to the Archive Database.....	46
3.4.5	Querying the Archive Data.....	48
3.4.5.1	Displaying Process Value Archives.....	48
3.4.5.2	Querying the Archive Data.....	49
3.4.5.3	Querying Process Value Archives.....	51
3.4.5.4	Querying Alarm Message Archives.....	57
3.4.5.5	Displaying Alarm Message Archives.....	59
3.4.5.6	Query for User Archives.....	61
3.4.5.7	Displaying User Archives.....	63
3.4.5.8	Configure Access via the Wizard "SQL Server Import/Export".....	64
3.4.5.9	Meeting prerequisites for using the Reporting Services.....	65

3.4.6	Analysis Functions for Messages and Process Values.....	67
3.4.6.1	Analysis Functions for Messages and Process Values.....	67
3.4.6.2	Display of Message Archives for Analysis Queries.....	70
3.5	Security Settings During Access to SQL Databases Using MS OLE DB.....	73
3.6	Access via OPC - Open Connectivity.....	74
3.6.1	OPC Channel.....	74
3.6.1.1	WinCC OPC Channel.....	74
3.6.1.2	OPC Item Manager.....	76
3.6.1.3	Overview of the Supported WinCC Data Types.....	79
3.6.1.4	WinCC OPC DA Client.....	80
3.6.1.5	WinCC OPC XML Client.....	96
3.6.1.6	WinCC OPC UA client.....	104
3.6.2	OPC - Open Connectivity.....	116
3.6.2.1	OPC - Open Connectivity.....	116
3.6.2.2	Functionality of OPC.....	116
3.6.2.3	OPC Specifications.....	116
3.6.2.4	Compatibility.....	117
3.6.2.5	Using OPC in WinCC.....	117
3.6.2.6	WinCC OPC XML DA Server.....	118
3.6.2.7	WinCC OPC DA server.....	122
3.6.2.8	WinCC OPC HDA server.....	141
3.6.2.9	WinCC OPC A&E Server.....	158
3.6.2.10	WinCC OPC UA Server.....	184
3.6.2.11	Commissioning.....	196
3.7	Examples for Access Using OLE DB Provider.....	203
3.7.1	Examples for Access Using OLE DB Provider.....	203
3.7.2	Example: Configuring the Access to Archive Data Using VB.....	203
3.7.3	Example: Configuring Access to Archive Data Using DataConnector Wizard.....	205
3.7.4	Examples: Analyzing Process Value Archives.....	211
3.7.4.1	Example: Analyzing Process Value Archives in WinCC Project.....	211
3.7.4.2	Example: Reading Process Value Archive With WinCC OLE DB Provider and Visual Basic 6.....	213
3.7.4.3	Example: Reading Process Value Archive With WinCC OLE DB Provider and Visual Basic.NET.....	216
3.7.4.4	Example: Comparing Measured Value Profiles in the WinCC Project.....	219
3.7.4.5	Example: Analyzing Process Value Archives with a VB Application.....	221
3.7.5	Examples: Analyzing Alarm Message Archives.....	223
3.7.5.1	Example: Analyzing Alarm Message Archives in the WinCC Project.....	223
3.7.5.2	Example: Reading Message Archive Data with the WinCC OLE DB Provider and Visual Basic 6.....	226
3.7.5.3	Example: Reading Message Archive Data With WinCC OLE DB Provider and Visual Basic.NET.....	229
3.7.5.4	Example: Analyzing Alarm Message Archives With a VB Application.....	232
3.8	Performance Data.....	236
3.9	Connectivity Station.....	238
3.9.1	Basics of the Connectivity Station.....	238
3.9.2	Functionality of the Connectivity Station.....	240
3.9.2.1	Use of OPC interface of the Connectivity Station.....	240
3.9.2.2	Use of OLE DB interface of the Connectivity Station.....	242
3.9.3	Configuring the Connectivity Station in the S7 project.....	243
3.9.4	Accessing WinCC data with the Connectivity Station.....	245

Index.....247

WinCC/Connectivity Pack Installation Notes

1.1 Licensing

Introduction

The WinCC / Connectivity Pack enables licensed access to online and archive data of WinCC.

The Connectivity Pack includes licenses for access using:

- WinCC OPC XML DA Server
- WinCC OPC-DA Server
- WinCC OPC HDA Server
- WinCC OPC A&E Server
- WinCC OPC UA Server

Starting from WinCC/Connectivity Pack V7.0, a WinCC Client Access License (WinCC/CAL) is no longer required.

Note

Access to WinCC User Archives using Microsoft OLE DB requires a Connectivity Pack license on the computer where the WinCC user archives are located.

Note

ASIA license

The licensed ASIA version is executable by switching to Unicode parallel to the European version. The supplied hardware key (dongle) checks for the following conditions:

- The runtime language of the user interface (GUI)
 - The languages in the text library
 - The operating system
-

1.2 How to Install MS Message Queuing

Introduction

WinCC implements the Message Queuing services from Microsoft. It is a component part of the operating system. MS Message Queuing is however not included in the standard Windows installation and must be installed separately if required.

The Windows installation CD is required to complete the installation.

Note

WinCC is enabled for operation within a domain or workgroup.

Note however that domain group policies and restrictions in the domains may prevent installation. In this case, remove the computer from the domain before installing Microsoft Message Queuing, Microsoft SQL Server 2008 and WinCC. Log on to the computer concerned locally with administrator rights. Carry out the installation. Following successful installation, the WinCC computer can be registered in the domain again. If the domain-group policies and domain restrictions do not impair the installation, the computer must not be removed from the domain during installation.

Note however that domain group policies and restrictions in the domain may also hinder operation. If these restrictions cannot be overcome, operate the WinCC computer in a work group.

If necessary, contact the domain administrator.

Procedure for Windows XP

1. In the operating system Start Menu, open "Settings > Control Panel > Software".
2. Click the "Add/Remove Windows Components" button on the left menu bar. The "Windows Components Wizard" opens.
3. Select the "Message Queuing" component. The "Details" button is activated.
4. Click "Details". The "Message Queuing" dialog opens.
5. Activate the "Common" subcomponent.
6. Deselect all other subcomponents and acknowledge with "OK".
7. When the "Disk" dialog opens insert the requested Windows Installations CD-ROM. Click on the "OK" button. MS Message Queuing will be installed.
8. Close the wizard using the "Finish" button.

Procedure for Windows 7

1. In the operating system Start Menu, open "Control Panel > Programs and Functions".
2. Click the "Enable/Disable Functions" button on the left menu bar. The "Windows Function" dialog opens.
3. Select the "Microsoft Message Queue (MSMQ) Server" component.

4. Activate the "Microsoft Message Queue (MSMQ) Server Core" component.
5. Deactivate the subsidiary components.
6. Confirm with "OK".

Procedure for Windows Server 2003

1. In the operating system Start Menu, open "Settings > Control Panel > Software".
2. Click the "Add/Remove Windows Components" button on the left menu bar. The "Windows Components Wizard" opens.
3. Select the "Application server" component and then click "Next". The "Application server" dialog box opens.
4. Select the "Message Queuing" component. The "Details" button is activated.
5. Click "Details". The "Message Queuing" dialog opens.
6. Activate the "Shared Components" subcomponent.
7. Deselect all other subcomponents and acknowledge with "OK".
8. When the "Disk" dialog opens insert the requested Windows Installations CD-ROM. Click on the "OK" button. MS Message Queuing will be installed.
9. Close the wizard using the "Finish" button.

Procedure for Windows Server 2008

1. Start the Server Manager.
2. Add the "Message Queue" feature.
3. Activate the "Message Queuing" option, and under it also the "Message Queuing Services" and "Message Queuing Server" options.

1.3 Installation of the Connectivity Pack Server

Introduction

The installation of the Connectivity Pack Server includes the following components:

- WinCC OLE DB Provider
- SQL Server 2008
- "Automation License Manager" for Management of WinCC Licenses
- WinCC Archive Connector
- WinCC DataConnector
- WinCC Basic Components
- Documentation
- Examples

Requirement

- i5/ 4GB RAM
- Operating system:
 - Windows XP Professional Service Pack 3 (max. 3 clients)
 - Windows 7 SP1 (max. 3 clients) 32-bit
 - Windows Server 2003 Standard Service Pack 2
 - Windows Server 2003 Standard R2 Service Pack 2
 - Windows Server 2008 Standard Service Pack 2 32-bit
 - Windows Server 2008 R2 Standard Service Pack 1 64-bit
- Microsoft Message Queuing must be installed.
- Internet Explorer as of V7.0
- For access to WinCC RT archives, WinCC V7.0 SP3 must be installed.

Note

To use more than three clients, you must install the server version. With the workstation version, you can use max. three clients.

Procedure

1. In order to configure a computer as Connectivity Pack Server, run the Connectivity Pack Server setup on the computer.
2. Select the "ConnectivityPack-Server" entry on the WinCC Product DVD in the "Program Packages" dialog.

Licensing

For operation of the Connectivity Pack Server, the license for the WinCC Connectivity Pack option is required.

Access rights

All the users of the WinCC/Connectivity Pack have to be included in the Windows user group "SIMATIC HMI". The user has to be a member of the user group "SIMATIC HMI" on the Connectivity Pack server for remote access of a Connectivity Pack client.

See also

Licensing (Page 7)

1.4 Installation of the Connectivity Pack Client

Introduction

The installation of the Connectivity Pack Client includes the following components:

- WinCC OLE DB Provider
- WinCC DataConnector
- SQL Connectivity Tools
- Documentation

Note

In order to install the SQL Connectivity Tools, you will need administrator rights on the computer.

Requirement

- Operating system:
 - Windows XP Professional Service Pack 3 (max. 3 clients)
 - Windows 7 SP1 (max. 3 clients) 32-bit
 - Windows Server 2003 Standard Service Pack 2
 - Windows Server 2003 Standard R2 Service Pack 2
 - Windows Server 2008 Standard Service Pack 2 32-bit
 - Windows Server 2008 R2 Standard Service Pack 1 64-bit
- Microsoft Message Queuing must be installed.
- Internet Explorer as of V7.0

Procedure

1. In order to configure a computer as Connectivity Pack Client, run the Connectivity Pack Client setup on the computer.
2. Select the "ConnectivityPack-Client" entry on the WinCC Product DVD in the "Program Packages" dialog.
3. If the client already has WinCC V7.0 SP3 installed, no additional installation of the Connectivity Pack Client is necessary.

Access rights

All the users of the WinCC/Connectivity Pack have to be included in the Windows user group "SIMATIC HMI". The user has to be a member of the user group "SIMATIC HMI" on the Connectivity Pack server for remote access of a Connectivity Pack client.

See also

Licensing (Page 7)

WinCC/Connectivity Pack Release Notes

2.1 Important information on the Connectivity Pack

Contents

These release notes contain important information.

The statements in these release notes take precedence over information provided in the manuals and in the online help.

Please read these release notes carefully as they contain useful information.

Limitation for use of WinCC OLEDB Provider

The "Import" function in Office Excel cannot be executed in WinCC V7.2 by means of the "WinCC OLEDB Provider" interface.

Updated demo project for Connectivity Pack

The WinCC demo project "OPConPack" in the directory "Samples\Connectivity Pack \DemoProject" on the WinCC DVD has been revised regarding the software interface. Some of the buttons and designations as well as illustrations in the examples referencing the demo project in the WinCC/Connectivity Pack documentation do not match the updated demo project. The functionality and operation of the demo project has not changed fundamentally.

Saving examples prior to uninstallation

When uninstalling the Connectivity Pack, the included examples are also uninstalled from the path "Installation Directory>\SAMPLES". If you want to save the examples, you need to copy the files from this path to a different directory.

2.2 Service and Support

2.2.1 Warnings

Safety notes


This manual contains information that must be observed to ensure your personal safety and to prevent property damage. Notices referring to your personal safety are highlighted in the manual by a safety alert symbol; notices referring to property damage only have no safety alert symbol. Depending on the hazard level, warnings are displayed in a descending order as follows:

 **DANGER**

means that there can be severe physical injury or even death if the corresponding safety measures are not followed.

 **WARNING**

means that there can be severe physical injury or even death if the corresponding safety measures are not followed.

 **CAUTION**

means that there can be slight physical injury if the corresponding safety measures are not followed.

NOTICE

means that there can be damage to property if the corresponding safety measures are not followed.

Note

means an undesirable result or state can occur if the corresponding instruction is not followed.

Note

is an important information about the product, the way to handle the product or the respective part of the documentation and we wish to especially bring this to your notice.


If multiple levels of hazards can occur, the warning is always displayed with the highest possible level. If a warning with a warning triangle is to be indicate physical injury, the same warning may also contain information about damage to property.

Qualified Personnel

The corresponding machine/ system may only be set up and operated with the help of this documentation. A device/system must only be commissioned and operated by qualified personnel. Qualified persons in the sense of safety instructions in this documentation stand for persons who are authorized to operate, earth and mark machines, system and electrical circuits according to safety standards.

Proper use

Please observe the following:

 WARNING
The machine may only be used for the application instances that have been described in the technical description and only in combination with third-party devices and components recommended and/or approved by Siemens. Smooth and safe operations demand proper transport, proper storage, installation and assembling as well as careful operations and maintenance.

Brands

All designations with the trademark symbol ® are registered trademarks of Siemens AG. Other designations in this documentation may be trademarks whose use by third parties for their own purposes can violate the rights of the owner.

Security information

Siemens offers IT security mechanisms for its automation and drive product portfolio in order to support the safe operation of the plant/machine. Our products are also continuously developed further with regard to IT security. We therefore recommend that you keep yourself informed about updates and upgrades for our products and always use the latest version of each product. You can find information on this at:

- <http://support.automation.siemens.com> (<http://support.automation.siemens.com>)

You can register for a product-specific newsletter here.

For the safe operation of a plant/machine, however, it is also necessary to integrate the automation components into an overall IT security concept for the entire plant/machine, which corresponds to the state-of-the-art IT technology. You can find information on this at:

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

Products used from other manufacturers should also be taken into account here.

Disclaimer of liability

We have checked the contents of the description to ensure that it matches with the hardware and the software it describes. Nevertheless, we cannot assume responsibility for any deviations that may arise. The details outlined in this description are checked regularly and the required corrections are done in the subsequent editions. Suggestions for improvement are welcomed.

2.2 Service and Support

The statements in the online documentation are more binding than the statements in the manuals and PDF files.

Please follow the Release Notes and Installation Notes. The information in these Release Notes and Installation Notes has priority over that in the manuals and online help with regard to legal validity.

Copyright © Siemens AG 2012

Änderungen vorbehalten / All rights reserved

It is prohibited to transfer, copy, evaluate or communicate this document in full or part unless the same has been explicitly approved. Violation of this rule can lead to claims for damage compensation. All rights reserved, especially for granting patents or for GM registration.

Siemens AG

Automation and Drives

SIMATIC Human Machine Interfaces

P.O. Box 4848

D-90327 Nuremberg, Germany

See also

<http://support.automation.siemens.com> (<http://support.automation.siemens.com>)

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

2.2.2 Customer Support

Customer Support and Technical Support

You can reach the SIMATIC hotlines at the times specified in the following table. The SIMATIC hotline employees speak German and English. The Authorization hotline offers French, Italian or Spanish customer support in addition to German and English.

Technical support

Nuremberg (GMT +1:00)

Service Hours Monday - Friday, 8:00 to 17:00 (CET/CEST)

Phone +49 (0)911 895 7222

Fax +49 (0)911 895 7223

E-mail <http://www.siemens.com/automation/support-request> (<http://www.siemens.com/automation/support-request>)

An overview of the Technical Support is available at the following URL:

- <http://support.automation.siemens.com/WW/view/en/16605032> (<http://support.automation.siemens.com/WW/view/en/16605032>)

Automation Value Card (AVC)

The Automation Value Card (AVC) provides extended Technical Support and is available 24 hours every day of the week. Information on the AVC can be found at the following URL:

- <http://support.automation.siemens.com/WW/view/en/21981898> (<http://support.automation.siemens.com/WW/view/en/21981898>)

SIMATIC Customer Online Support

Service and Support

An overview of the support offering for our products is available at the following URL:

- <http://www.siemens.com/automation/service&support> (<http://www.siemens.com/automation/service&support>)

In Product Support, for example, you will find downloads of firmware updates, service packs and useful utilities.

Online Help is available so that you can successfully use the Support offering. Open the Online Help by selecting the corresponding button on the Internet site or at the following URL:

- http://support.automation.siemens.com/WW/support/html_00/help/Online_Hilfe.htm (http://support.automation.siemens.com/WW/support/html_76/help/Online_Hilfe.htm)

WinCC FAQs

WinCC Online Support with information on FAQs (Frequently Asked Questions) may also be found at the following URL:

- <http://support.automation.siemens.com/WW/view/de/10805548/133000> (<http://support.automation.siemens.com/WW/view/en/10805583/133000>)

Searching in the Support database

The topic-related search in the Support database can be found under the following URL:

- <http://www.siemens.com/automation/csi/km> (http://www.siemens.de/automation/csi_en/km)

Technical Forum

The Technical Forum supports exchange with other SIMATIC users. It is available at the following URL:

- <http://www.siemens.com/automation/csi/forum> (http://www.siemens.de/automation/csi_en/forum)

Technical documentation for SIMATIC products

You can find a guide to the technical documentation provided for individual SIMATIC products and systems at the following URL:

2.2 Service and Support

- <http://www.siemens.com/simatic-tech-doku-portal> (<http://www.siemens.com/simatic-tech-doku-portal>)

Contact person database

To contact your local agent, search our contact database at the following URL:

- <http://www.automation.siemens.com/partner/index.asp> (<http://www.automation.siemens.com/partner/index.asp?lang=en>)

Product Information

SIMATIC WinCC

Go to the following URL for additional information about WinCC products:

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

SIMATIC Products

Go to the following URL for additional information about SIMATIC products:

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

See also

Internet: Support Request (<http://www.siemens.com/automation/support-request>)

Internet: Technical support (<http://support.automation.siemens.com/WW/view/en/16605032>)

Internet: Automation Validation Card (AVC) (<http://support.automation.siemens.com/WW/view/en/21981898>)

Internet: Service and Support (<http://www.siemens.com/automation/service&support>)

Internet: WinCC FAQs (<http://support.automation.siemens.com/WW/view/en/10805583/133000>)

Internet: Support Technical Forum (http://www.siemens.de/automation/csi_en/forum)

Internet: Support Search (http://www.siemens.de/automation/csi_en/km)

Internet: Support Online Help (http://support.automation.siemens.com/WW/support/html_76/help/Online_Hilfe.htm)

Internet: Technical documentation for SIMATIC products (<http://www.siemens.com/simatic-tech-doku-portal>)

Internet: Contact person database (<http://www.automation.siemens.com/partner/index.asp?lang=en>)

Internet: Information about WinCC (<http://www.siemens.com/wincc>)

Internet: SIMATIC Products (<http://www.siemens.com/simatic>)

2.2.3 Support Request

Dear customer

In order to provide you with fast and effective support, please complete the "Support Request" form online on the Internet. Describe the problem in as much detail as possible. We would appreciate if you would provide us with all project data, so that we can reproduce the error situation or shorten the turn-around time.

Before filling out the support request, check whether your configured quantity structure is within the range of tested quantity structures (see topic "Performance Data").

Support Request form

The Support Request form is available at the following URL:

- <http://www.siemens.com/automation/support-request> (<http://www.siemens.com/automation/support-request>)

When filling out the report, you will be guided through several steps, which will ask about all required information.

A detailed description of the Support Request can be found at the following URL:

- <http://support.automation.siemens.com/WW/view/en/16605654> (<http://support.automation.siemens.com/WW/view/en/16605654>)

Procedure

1. Open the "Support Request" form using the link on the Internet. Step 1 "Select product" is displayed:
2. Enter the project name in the "Product/Order number" box. Upper/lower case is not relevant. Search for parts of the product name or enter the full product name in the correct order. You can e. g. search for the following terms:
 - "WinCC Runtime"
 - "WinCC DataMonitor"
 - "wincc webnavigator"
 - "Connectivity"The found products are offered in the "Product selection" field.
3. Select the desired product and click on "Next" to switch to step 2 "Select use case".
4. Select a use case or describe your specific use case in the "Other use case" field.
5. Press "Next" to switch to step 3 "Our solutions". Suggested solutions and FAQs for the selected key words are listed. Once you have found a suggested solution for your problem, you can close the form in the browser. If you did not find any applicable suggested solutions, press "Next" to switch to step 4 "Describe problem".

2.2 Service and Support

6. Describe your problem as exactly as possible in the "Details" field.
Pay particular attention to the following questions and comments. Please also check the WinCC installation and configuration with regard to the following references.
If you have any idea what has caused the error, please let us know. No detail should be omitted, even if you consider it unimportant.
 - Was the configuration data created with older WinCC versions?
 - How can the error be reproduced?
 - Are other programs running simultaneously with WinCC?
 - Have you deactivated the screen saver, virus checker and power management function?
 - Search the computer for log files (WinCC\Diagnose*.log, drwatson.log, drwtsn32.log).
The log files are needed for error analysis. Thus, be sure to send the log files as well.
7. Use the "Search" button to upload your affected project and the log files (e. g. as a Zip file) to the Support Request.
Press "Next" to switch to step 5 "Provide contact information".
8. Enter your contact information.
Read the privacy notice and choose whether your personal data should be permanently saved.
Press "Next" to switch to step 6 "Summary & Send".
9. Press the "Print" button if you would like to print the support request.
You close the support request by clicking the "Send" button.
Your data will be transmitted to Customer Support and processed there.

Thank you for your cooperation. We hope that we can be of assistance in solving your problems.

Your WinCC Team

See also

Internet: Error Report (<http://www.siemens.com/automation/support-request>)

Internet: Overview of Support Request (<http://support.automation.siemens.com/WW/view/en/16605654>)

WinCC/Connectivity Pack documentation

3.1 WinCC/Connectivity Pack

Content

Through the WinCC Connectivity Pack, you receive licensed access to WinCC databases via OPC or WinCC OLE DB Provider.

This chapter will show you

- how to install the Connectivity Pack Server and Client;
- the OPC servers of WinCC;
- how to configure access to the alarm message archive;
- how to configure access to the process value archive.
- how to configure the Connectivity Station.

Target group of this documentation

This documentation was designed for developers with Visual Basic and SQL Server knowledge.

3.2 Overview: WinCC/Connectivity Pack

Introduction

Licensed access to online and archive data of WinCC is enabled with the WinCC / Connectivity Pack.

The WinCC OLE DB Provider makes access to the process value and alarm archives possible. Data that is stored, compressed in the database can be read as decompressed data. The WinCC OLE DB Provider also provides analysis functions such as Minimum, Maximum of archive tags for example.

OPC enables manufacturer-spanning communication in the automation branch via standardized interfaces. WinCC is expanded by OPC HDA 1.20 (Historical Data Access) and OPC A&E 1.10 (Alarm & Events). In addition WinCC also supports OPC DA in the versions 2.05a, 3.00 and OPC XML DA 1.00. As a result, WinCC operating as an OPC-Server can forward current process data to other OPC clients (e.g. Microsoft Excel).

The WinCC Connectivity Station also uses OPC to access data of different WinCC stations.

The Connectivity Pack includes:

- The WinCC OLE DB Provider for directly accessing process value and alarm archives in the SQL server database on the WinCC RT computer and on a long-term archive server.
- The tool "Archive Connector" for configuring the database access. With it, swapped out WinCC archive databases can be connected to or disconnected for the SQL server. In doing so, an overview of the individual database segments is generated. The Archive Connector can monitor folders and automatically connect copied in archives.
- WinCC DataConnector for configuration and access to the process value and alarm archives in process images.
- WinCC Connectivity Station
- License for Server OPC HDA 1.20 (Historical Data Access) for access to historical data in the WinCC archive system.
- License for Server OPC A&E 1.10 (Alarms & Events) for forwarding and acknowledging of messages.
- License for Server OPC XML DA 3.00 (OPC eXtensible Markup Language).
- The licenses for access to the WinCC archive databases through the WinCC OLE DB-Provider or WinCC User Archive through Microsoft OLE DB.

WinCC OLE DB Provider

The WinCC OLE DB Provider is available on the following systems:

- Connectivity Pack Client
- Connectivity Pack Server
- The WinCC Station
- Connectivity Station

Using WinCC OLE DB Provider, the Connectivity Pack Client has direct access to the WinCC archive data in the process value and message archives.

Access may take place under various configurations of the Connectivity Pack Client.

- A WinCC software like WinCC Basis, Web Navigator Server, DataMonitor Server or Connectivity Pack Server exists on the client computer.
The Connectivity Pack Client does not have to be installed explicitly. Licensing is provided through WinCC licenses.
- The client computer has no installation of WinCC software.
Then the Connectivity Pack Client needs to be installed on the client computer.

Simultaneous access to archive and Runtime databases

The Connectivity Pack provides the function "ArchiveMonitor". The function automatically merges the data from runtime and archive databases of the activated WinCC project into an SQL database "CC_ExternalBrowsing" and creates the "AMT" and "ARCHIVE" views in it. Since these views provide all the necessary information for the WinCC OLE DB Provider, the "CC_ExternalBrowsing" database can be used as a data source for the provider. On deactivating WinCC runtime, views additionally created in "CC_ExternalBrowsing" are deleted.

Since a long-term archive server does not contain any runtime databases, access to the archive databases using the "CC_ExternalBrowsing" database is not possible.

WinCC OLE DB Provider as a "Linked Server"

The WinCC OLE DB Provider can be registered in the SQL server in the list of "Linked Servers". This is independent of whether the database is local or remote.

Note

When configuring WinCC OLE DB Provider as a "Linked Server", the "WinCC OLE DB Provider for Archives" entry must be selected in the "Provider Name" field of the "Linked Server Properties" dialog. Activate the "AllowInProcess" checkbox in the "Provider Options" dialog.

You will find more detailed information in the "SQL Server Books Online" under "Configuring OLE DB Providers for Distributed Queries".

Example of a WinCC OLE DB Provider as a Linked Server with the server name "WinCC":

```
select min(realvalue) from openquery(WINCC,'Tag:R,1,'0000-00-00
00:01:00.000','0000-00-00 00:00:00.000')

select * from openquery(WINCC,'Tag:R,1,'0000-00-00
00:01:00.000','0000-00-00 00:00:00.000')
```

WinCC Archive Connector

The Connectivity Pack also includes the tool "Archive Connector" for the configuration of the database access. With it, swapped out WinCC archives can be reconnected to an SQL server.

3.2 Overview: WinCC/Connectivity Pack

The archive data is made available again via the WinCC OLE DB Provider. With the Archive Connector, the following functions are possible:

- Manual Connection: Locally swapped out WinCC archive databases are selected and connected to the local SQL server.
- Manual Disconnection: Connected databases are selected and disconnected from the SQL server.
- Automatic Connection: Local folders for swapped out WinCC archives are selected. All archives in the selected folders are automatically connected to the SQL server when copied in.

The Archive Connector may only be operated using a local SQL Server and a Connectivity Pack license.

Note

If you access message archives or swapped out archives via "CC_ExternalBrowsing", this access may take several minutes.

WinCC DataConnector

The DataConnector provides the following functions.

- Using the DataConnector Wizard, a process picture may be configured in Graphics Designer for an archive inquiry for message or process value archives.
- DataConnector Control will execute the archive inquiry in Runtime after opening the process picture and will display the data found.

Inquiries using relative or absolute time ranges are possible. The result of the inquiry may be shown in table format for messages, and in table or trend format for process values.

OPC

WinCC supplies historical data from the archive system to other applications via the WinCC OPC HDA server. An OPC HDA client - such as a reporting tool - can specify the beginning and the end of a time interval and specifically request the corresponding data. An OPC HDA client can also specifically request previously processed data on the WinCC OPC HDA server and actively affect data compression prior to data transfer.

With the WinCC OPC A&E server, a WinCC message is portrayed as an alarm. The alarm can only be forwarded with its accompanying process values to the production or management level of the company, where it is also acknowledged. Via filters, only selected data is transferred.

The WinCC OPC-XML server provides the OPC-XML client with the OPC process data as a web service. OPC-XML clients can access WinCC runtime data via any platforms as well as via both Intranet and Internet.

Access via OPC can only take place on computers on which WinCC Runtime is running.

Note

For access to WinCC archive databases using OPC HDA, process values with OPC XML and alarms with OPC A&E, a Connectivity Pack license is required on the computer with this data. An installation of Connectivity Pack Server or Client is not required. OPC DA is licensed with a valid RT license for WinCC.

WinCC Connectivity Station

The Connectivity Station allows you to access data of different WinCC stations such as WinCC server or WinCC / Central Archive Server (CAS). The Connectivity Station is configured in the S7 projects, which also manage these WinCC stations.

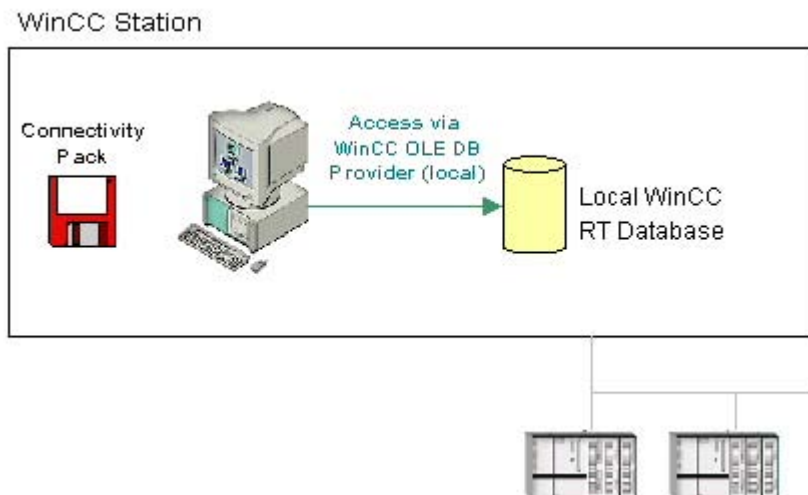
You will access the WinCC stations via an OPC client via the OPC-Server.

See also

[Access Using OPC to WinCC Archives, Tags, and Messages \(Page 35\)](#)

3.3 Applications

3.3.1 Use Case 1: Local Access to WinCC RT Databases



Principles

An application uses WinCC OLE DB Provider to access the local WinCC RT database. You may locally analyze the archive data and may, for example, calculate the standard deviation of a process value.

Software requirements

On the WinCC station, the following licenses need to be installed:

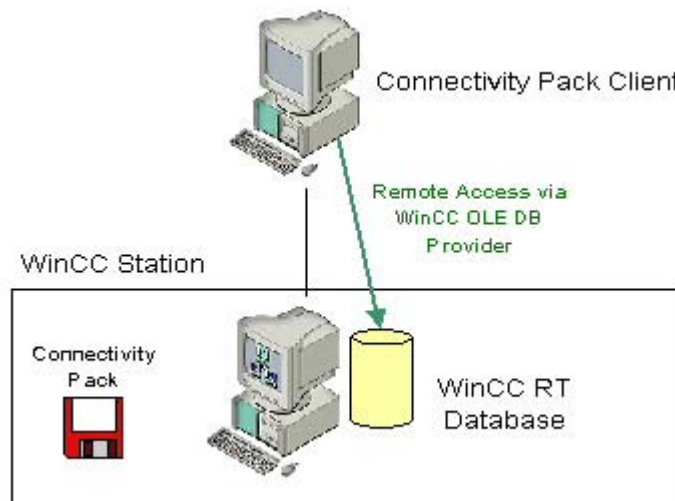
- A valid RT license for WinCC
- WinCC Option Connectivity Pack

See also

Examples for Access Using OLE DB Provider (Page 203)

Licensing (Page 7)

3.3.2 Use Case 2: Remote Access to WinCC RT Databases



Principles

The Connectivity Pack Client remotely accesses the WinCC RT database of a WinCC station. Via the WinCC OLE DB Provider, the Connectivity Pack Client reads the data of the process value and alarm message archives.

Since in this use case, the swapped-out WinCC archive is not accessed, the Archive Connector does not have to connect WinCC archives to an SQL server.

You may use the Connectivity Pack Client to display, analyze, or process the data, e.g. by exporting it to a CSV file.

Software requirements

On the WinCC station, the following licenses need to be installed:

- A valid RT license for WinCC
- WinCC Option Connectivity Pack

The access may take place under various configurations of the Connectivity Pack Client.

- A WinCC software like WinCC Basis, Web Navigator Server, DataMonitor Server or Connectivity Pack Server exists on the client computer.
The Connectivity Pack Client does not have to be installed explicitly. Licensing is provided through WinCC licenses.
- The client computer has no installation of WinCC software.
Then the Connectivity Pack Client needs to be installed on the client computer.

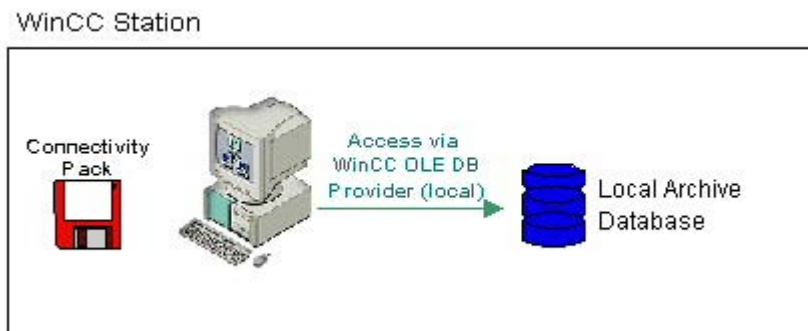
3.3 Applications

See also

Examples for Access Using OLE DB Provider (Page 203)

Licensing (Page 7)

3.3.3 Use Case 3: Local Access to WinCC Archive Databases



Principles

An application accesses the local archive database using WinCC OLE DB Provider. The older archive data are copied from the WinCC RT database to a separate directory on the same computer.

With the Archive Connector, the swapped out WinCC archives are reconnected to an SQL Server. The archives are then available for access using WinCC OLE DB Provider.

Local archive data may be displayed, searched or analyzed, e.g. to search for process errors or to optimize processes.

Software requirements

The WinCC station requires the following installations:

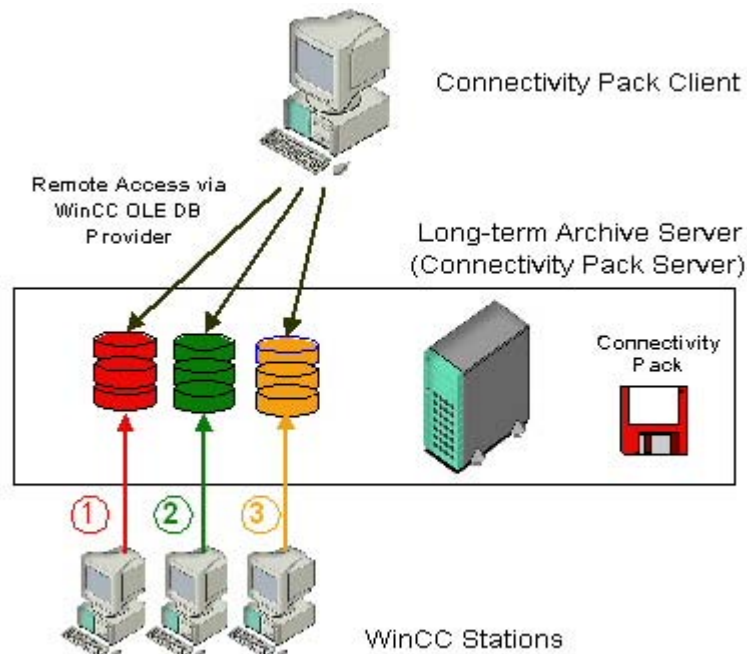
- WinCC Basic System
- A valid RT license for WinCC
- License for WinCC Option Connectivity Pack

See also

Examples for Access Using OLE DB Provider (Page 203)

Licensing (Page 7)

3.3.4 Use Case 4: Remote Access to WinCC Archive Databases



Principles

A long-term archive server is used to secure database files of process value and message archives, for example, in a monthly backup.

With the Archive Connector, the swapped out WinCC archives are reconnected to an SQL Server. The archives are then available for access using WinCC OLE DB Provider.

The Connectivity Pack Client accesses the archives via the WinCC OLE DB Provider. Using a VB application, for example, the archives may be analyzed, and process values of a specific day may be displayed.

Note

If you access message archives or swapped out archives via "CC_ExternalBrowsing", this access may take several minutes.

Software Requirements

The long-term archive server requires the following to be installed:

- Connectivity Pack Server
- License for WinCC Connectivity Pack

Access may take place under various configurations of the Connectivity Pack Client.

3.3 Applications

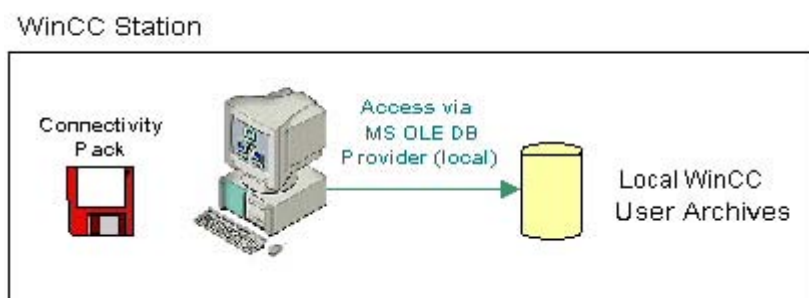
- A WinCC software like WinCC Basis, Web Navigator Server, DataMonitor Server or Connectivity Pack Server exists on the client computer. The Connectivity Pack Client does not have to be installed explicitly. Licensing is provided through WinCC licenses.
- The client computer has no installation of WinCC software. Then the Connectivity Pack Client needs to be installed on the client computer.

See also

Examples for Access Using OLE DB Provider (Page 203)

Licensing (Page 7)

3.3.5 Use Case 5: Local Access to WinCC User Archive



Principles

An application accesses the local archive WinCC user archives using the MS OLE DB Provider.

Using a VB application, for example, you may display, search, and write back modified values for local archive data.

Software requirements

The WinCC station requires the following installations:

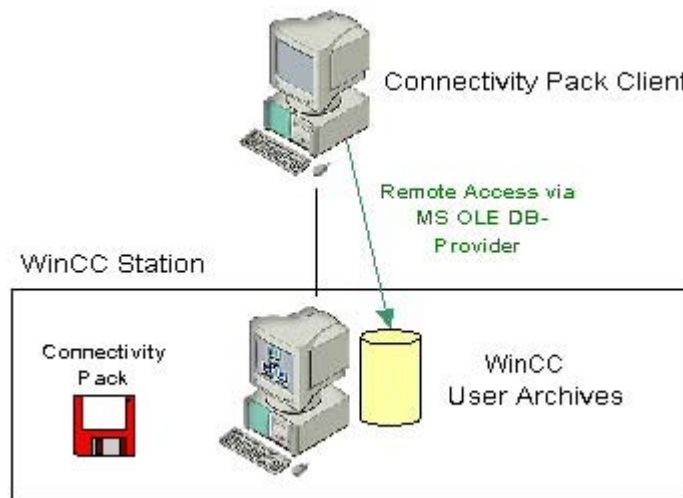
- WinCC Basic System
- A valid RT license for WinCC
- License for WinCC Option Connectivity Pack

See also

Examples for Access Using OLE DB Provider (Page 203)

Licensing (Page 7)

3.3.6 Use Case 6: Remote Access to WinCC User Archives



Principles

The Connectivity Pack Client accesses the WinCC user archives using the MS OLE DB Provider.

Using a VB application, for example, you may display, search, and write back modified values for archive data.

Software requirements

The WinCC server requires the following installations:

- WinCC Basic System
- A valid RT license for WinCC
- License for WinCC Connectivity Pack

Access may take place under various configurations of the Connectivity Pack Client.

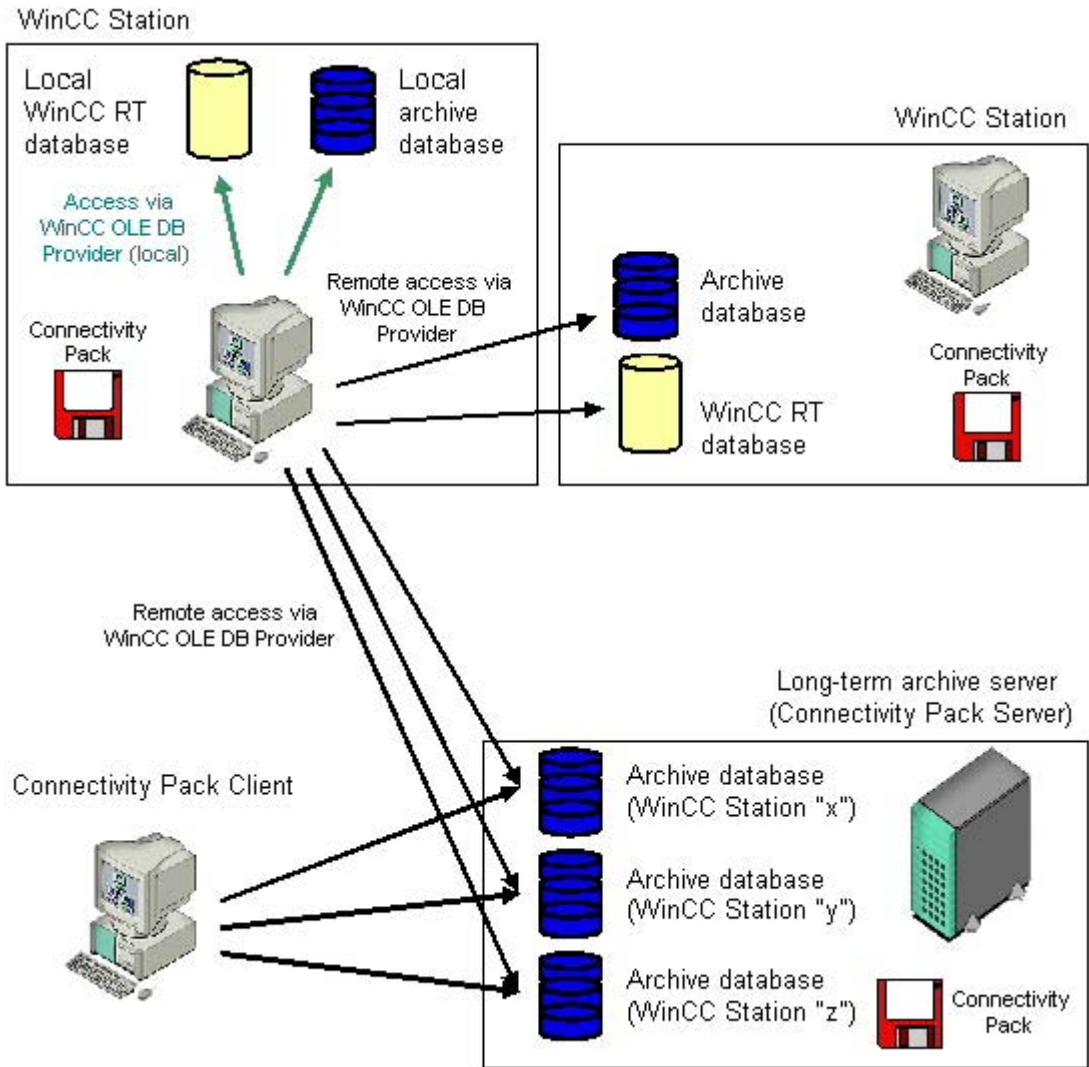
- A WinCC software like WinCC Basis, Web Navigator Server, DataMonitor Server or Connectivity Pack Server exists on the client computer. The Connectivity Pack Client does not have to be installed explicitly. Licensing is provided through WinCC licenses.
- The client computer has no installation of WinCC software.
Then the Connectivity Pack Client needs to be installed on the client computer.

See also

Examples for Access Using OLE DB Provider (Page 203)

Licensing (Page 7)

3.3.7 Use Case 7: Access Via the WinCC OLE DB Provider



Principles

WinCC OLE DB Provider may be used to access WinCC databases while employing the Wizard "SQL Server Import/Export".

The Wizard "SQL Server Import/Export" enables data to be extracted from different sources and their export into other formats, e.g. in Excel table. Databases are linked using OLE DB, and access to WinCC databases using WinCC OLE-DB Provider. You can save the inquiry of data in a DTSX-Package.

The DTSX-Packages can be bound in scripts, to obtain a time-controlled inquiry and transfer of data into the target format. Equally, tasks may be tied into packages, for example, in order to initiate a notification by mail following execution of the package.

Using WinCC computers, access to runtime and archive databases may be established locally or remotely. In the case of long-term archive servers, local or remote access is only possible to the archive databases since they have no runtime databases.

Software requirements

The WinCC station requires the following installations:

- WinCC Basic System
- A valid RT license for WinCC
- License for WinCC Option Connectivity Pack

For further information, refer to the chapter "Configure Access via the Wizard SQL Server Import/Export."

See also

Examples for Access Using OLE DB Provider (Page 203)

Licensing (Page 7)

Configure Access via the Wizard "SQL Server Import/Export" (Page 64)

3.3.8 Access Using OPC to WinCC Archives, Tags, and Messages

Introduction

OPC enables licensed access to online and archive data of WinCC. WinCC OPC-Servers provide WinCC data to the OPC client through the OPC software interface. As OPC client, any software can be implemented which is based on the respective OPC specification.

OPC DA

The WinCC OPC DA server makes the data from the WinCC project available to other applications. These applications may be running locally or on computers linked to the network environment. In this way WinCC tags can for example be exported to Microsoft Excel. The WinCC-OPC-DA server and its licensing are components of the WinCC base system.

OPC XML

Within a distributed system, WinCC clients have views of several WinCC servers. The WinCC OPC-XML server provides the OPC-XML client with the OPC process data as a web service. You can access the web service via the Internet using HTTP. The OPC XML client is no longer limited to the local network. In this way, OPC XML clients can access WinCC Runtime data via any platform as well as through an intranet or the Internet.

3.3 Applications

OPC HDA

Using the OPC HDA (Historical Data Access) server permits access to historical data of the WinCC archive system.

Installations without write access permit only reading and analyzing of WinCC archive data. Write access permits analyzing, adding, deleting, and updating of data.

An OPC HDA client may be used for analysis and evaluation of archive data and for process controlling of archives from different OPC HDA servers.

Note

OPC HDA does not permit access to message archives. Application permits access to process value archives only.

OPC A&E

The OPC A&E (Alarms & Events) server permits forwarding or acknowledging of WinCC messages.

An OPC A&E client, for example, may be used for analysis and joint archiving of alarms from different OPC A&E servers.

WinCC OPC-Servers in a Redundant System

In a redundant system, the WinCC servers monitor each other during runtime for early recognition of any server outage. The WinCC OPC-Servers make WinCC Runtime data available to the OPC client, using the OPC software interface. An OPC client with a simultaneous view of several WinCC-OPC-Servers can be used for centralized monitoring of various redundant systems.

As OPC client, any software can be implemented which is based on the respective OPC specification.

For additional information, please refer to chapter "OPC" - Open Connectivity.

Note

Error OPC_E_MAXEXCEEDED for archive access via OPC

If the OPC client requests more than 2,000 values during synchronous or asynchronous data reading, the request is rejected with the OPC_E_MAXEXCEEDED error message. This limit serves to limit the computer load and duration of the call.

This limit does not apply if the entire time range is read.

3.3.9 Transparent access to archived data

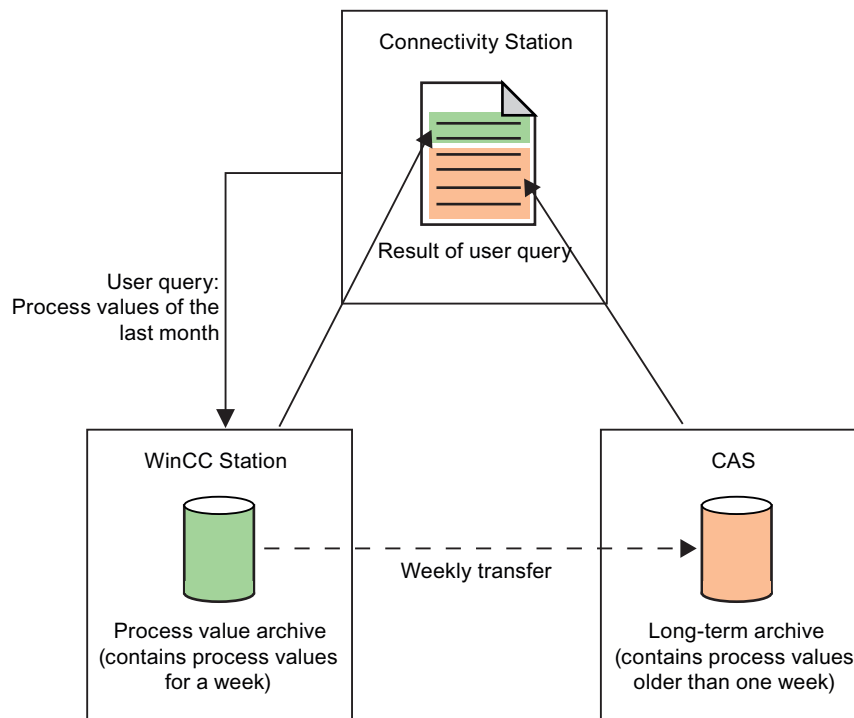
Introduction

The archiving of process values and messages is used to register, manage and archive process data from an industrial system. The registered process data are swapped out onto the central archive server "CAS" by the WinCC stations in regular intervals. The archived process data of a longer time period are therefore distributed to two archive databases.

The transparent access will ensure that the requested process data from the two archive databases are combined.

Operating principle

The following screen will show the principle of transparent access using an example of a user request for process values of the previous month:



The result of the user query is shown to the user as though the process values stem from a data source.

Note

A Multiclient can also be used for transparent access instead of a Connectivity Station.

3.3 Applications

Transparent access in redundant systems

With redundant systems, the transparent access functions by the same principle, but with the following difference: If a server fails during a user query, the user query will automatically be rerouted to the redundant partner server.

Transparent access with OPC

With OPC, you will have transparent access to all archive databases of the WinCC stations:

OPC-Server	Server name
OPC DA	WinCCConnectivity.OPCDAServer
OPC HDA	WinCCConnectivity.OPCHDAServer.1
OPC A&E	WinCCConnectivity.OPCAEServer.1

Transparent access via OLE DB-Provider

Using OLE DB-Provider you can access process value archives in a transparent manner. Use the following syntax for transparent access for database link:

Data Source

<SYMBOLIC COMPUTER NAME>::\WinCC

Catalog

Name of the WinCC project

3.3.10 Functions of SQL Servers

Introduction

In the following you find a short description of important functions already implemented in Microsoft SQL Servers.

Microsoft offers technical documentation on the SQL Server 2005 for download at:

<http://technet.microsoft.com/de-de/sqlserver/bb331762.aspx>

Functions

Wizard "SQL Server Import/Export"

With the "SQL Server Import/Export" Wizard you extract data which derive from different sources and which can transfer to one or more targets.

A description of use cases may be found in Chapters "Access Using WinCC OLE DB Provider" and "Configure Access via the Wizard "SQL Server Import/Export."

Jobs and Alerts

A job represents a series of operations executed in sequence by the SQL Server Agent. A job may consist of extensive functions, such as Transact SQL scripts, command line applications and ActiveX scripts. Jobs allow the execution of repetitive or time-controlled tasks. Through settings of displays, so-called "Alerts", a job may automatically inform the user of the execution status.

Backup

The "Backup" component of the SQL server provides important protection for critical data in SQL server databases.

This will prevent damage caused by memory media malfunctions, user errors or the permanent loss of a server.

Furthermore, the component can be useful for other application cases, such as the copying of databases between different servers or the creation of a copy of a database via backup and the subsequent restore on a different computer.

Replication

The "Replication" component enables copying, distributing, and modifying of data within the corporate level. Therefore, the SQL server contains several methods and options for the design of replication, implementation, monitoring, and administration, and therefore provides the required functionality for the distribution of data and maintenance of data consistency.

Database Maintenance Plans

After creating and supplementing objects and data and their use, a maintenance of a database may become necessary.

Therefore, it is important to create a backup of the database regularly or to create new indices to increase the performance. These items should be taken into consideration during creation of the database in order to minimize the effect on users, and to minimize the required time and resources for such maintenance.

You can use a wizard and the component "Database Maintenance Plans" you can create one or more maintenance schedules.

Linked Server

The Microsoft SQL Server allows creating a connection to OLE DB databases by using the "Linked Server". For example, implementation of a "Linked Server" offers the following advantages.

- Permits access to data sets from the OLE-DB databases as well as display in table format using Transact SQL instructions.
- Permits transmission of commands to OLE-DB data sources as well as display in table format of the subsequent data results using Transact SQL instructions.

A description of a use case on WinCC OLE DB Provider as "Linked Server" may be found in Chapter "WinCC / Connectivity Pack: Introduction".

See also

Overview: WinCC/Connectivity Pack (Page 24)

Configure Access via the Wizard "SQL Server Import/Export" (Page 64)

Use Case 7: Access Via the WinCC OLE DB Provider (Page 34)

3.4 Access Via the OLE DB Provider

3.4.1 Access to Archive Data Using OLE DB Provider

Introduction

Using OLE DB, you have the following options for accessing WinCC archive data and for displaying these using an external interface.

Access using WinCC OLE DB Provider

WinCC OLE DB provides access to all WinCC archive data.

Depending on the configuration, process data of WinCC are stored in compressed form. WinCC OLE DB Provider permits transparent access even to these data.

Use the "SQL Server Import / Export Wizard" to take advantage of standard SQL queries. You can save the unzipped files to an intermediate database using the wizard; you access the database with standard SQL queries.

Access with Microsoft OLE DB

Microsoft OLE DB provides access to all WinCC user archives.

Note

Microsoft OLE DB is only tested and released for access to WinCC User Archives but not to alarm and process value archives.

Use the WinCC OLE DB Provider to access message and process value archives.

Configuration Options

For access to databases with WinCC OLE DB, you may write your own applications. For the communication with the WinCC OLE DB Provider, applications - created with, for example, Visual Basic, VBScript or VBA - use the ADO DB.

Note

Special characters in tag names

Please note that programming languages such as Visual Basic, VBScript or VBA only allow the following characters in the tag names: "A...Z", "a...z", "0...9" and "_".

In WinCC if you use special characters such as "," or ";" in the tag names then the script will be aborted with an error message. In such a case use the "Tag-ID" to access a tag with special characters in the script name.

The procedure in principle

1. For access to archive data, the computer must have WinCC Basic, Connectivity Pack Server or Connectivity Pack Client installed.
2. For swapped out archives, establish the connection between the SQL database and the swapped out archives with the WinCC Archive Connector.

Note

WinCC RT archives in directory "<Project Directory> \ ArchiveManager" and the associated subdirectories must not be connected to or disconnected from the Archive Connector since their connection to the SQL server is managed by the WinCC Basic system.

3. Establish the connection to the database, for example by using MS Excel or your own application. Define the desired selection criteria and read the archive data.
4. The query result, for example, may be displayed in MS Excel or be exported as a csv file.

See also

Configure Access via the Wizard "SQL Server Import/Export" (Page 64)

Querying the Archive Data (Page 49)

Establishing the Connection to the Archive Database (Page 46)

WinCC Archive Connector (Page 42)

Bases of OLE DB (Page 41)

3.4.2 Bases of OLE DB

Introduction

Using the OLE DB interface and the associated database provider supplied by WinCC, you have access to process value and message archives.

OLE DB

OLE DB is an open standard for a fast access to different databases. It is irrelevant whether the database is relational or not.

The connection between the OLE DB level and the database is established through a database provider.

OLE DB interfaces and providers are offered from various manufacturers.

WinCC OLE DB Provider

Using WinCC OLE DB Provider, you may directly access WinCC archive data stored in the MS SQL server database. Depending on the configuration, process data of WinCC are stored in compressed form. WinCC OLE DB Provider permits transparent access even to these data.

Note

If WinCC closes a full archive and opens a new one, no data from the message and process value archives are read momentarily via the OLE DB Provider.

Microsoft OLE DB

Microsoft OLE DB only provides access to WinCC user archives.

Access to WinCC User Archives using Microsoft OLE DB requires a Connectivity Pack license on the computer where the WinCC user archives will be accessed. A WinCC Client Access License is required for remote access to the MS SQL Server database.

As protection from unauthorized access using MS OLE DB, the administrator of the databases can take appropriate actions. Additional information may be found in Chapter "Security Settings for Access to SQL Databases Using MS OLE DB".

Note

Microsoft OLE DB is only tested and released for access to WinCC User Archives but not to alarm and process value archives.

Use the WinCC OLE DB Provider to access message and process value archives.

See also

Security Settings During Access to SQL Databases Using MS OLE DB (Page 73)

Access to Archive Data Using OLE DB Provider (Page 40)

Licensing (Page 7)

3.4.3 WinCC Archive Connector

Introduction

The WinCC "Archive Connector" is used for configuring the access to the archive database. The tool is an integral part of WinCC DataMonitor and Connectivity Pack. With the Archive Connector, already swapped out WinCC archives can be reconnected to an SQL Server. DataMonitor client or WinCC OLE DB provider can then access the archives.

Functions of the WinCC Archive Connector:

- Manual Connection: Local databases may be selected and connected to the local SQL server.
- Manual Disconnection: Connected databases may be selected and disconnected from the SQL server.
- Automatic Connection: Local directories can be selected in which WinCC archives have been exported. All the archives are automatically linked to the SQL servers which were added to the selected directories from the moment change monitoring was activated.

The Archive Connector can only be operated on a local SQL server and a license for WinCC DataMonitor or WinCC Connectivity Pack.

Once the configuration has been completed, the Archive Connector may be terminated.

Note

WinCC RT archives in directory "<Project Directory> \ ArchiveManager" and the associated subdirectories must not be connected to or disconnected from the Archive Connector since their connection to the SQL server is managed by the WinCC Basic system.

The path for the swapped out WinCC archives is set in WinCC with the Archive Configurator, e.g. of Tag Logging, not with the WinCC Archive Connector.

If access is to be made to swapped archives which are on interchangeable media such as tape or MOD drives, pay attention that the connection to these archives on this medium is disconnected using the Archive Connector before changing the medium in the drive. After changing the medium, the user should check the Archive Connector whether or not the archives on the new medium are connected.

Configuration of the WinCC Archive Connector should be accessible to a limited circle of people only. Therefore, access to the Tool should be protected using Windows user authorization "Administrators" or other Windows protective measures, such as storage in a protected directory.

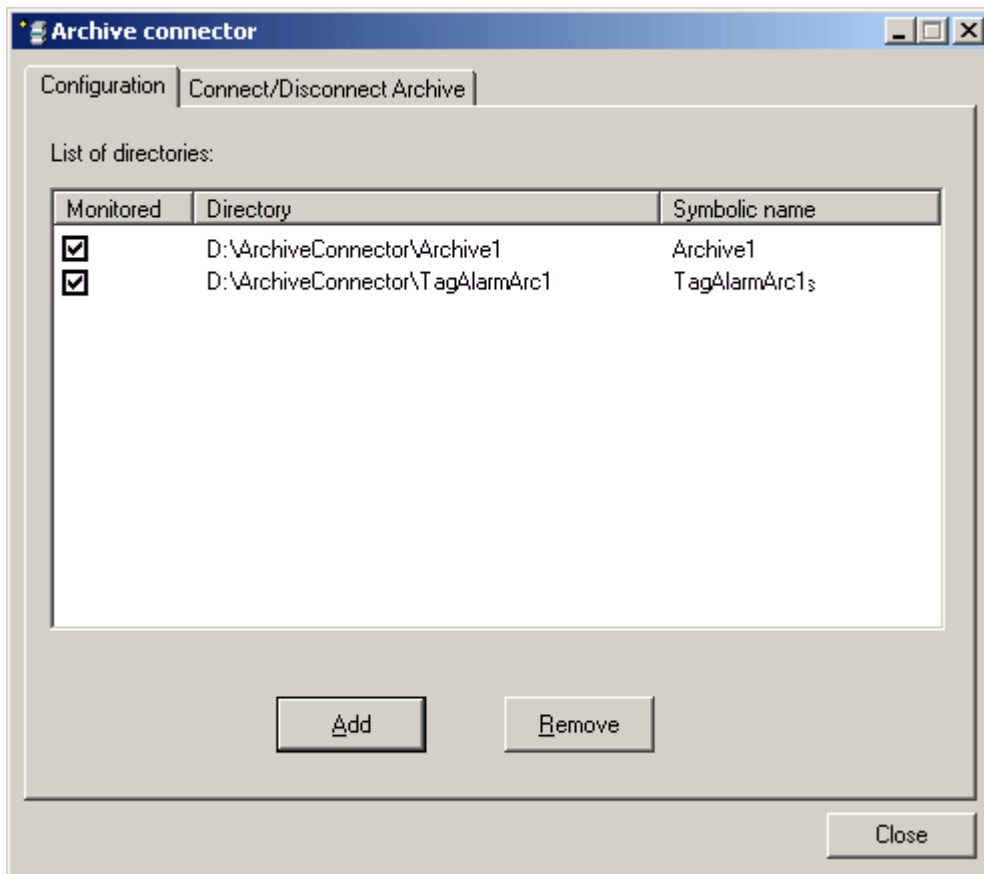
Note

Use the Archive Connector to access the linked archives using the Connectivity Pack or DataMonitor.

The following objects do not give any access to the linked archives using Archive Connector:

- WinCC Alarm Control
 - WinCC Online Trend Control
 - WinCC Online Table Control
 - WinCC Online Function Control
-

The "Configuration" Tab



In the "Configuration" tab, archiving folders are displayed and managed that are to be accessed through the Web or the WinCC OLE DB Provider.

Via buttons, archiving folders can be added or removed. For each archiving folder, a symbolic, unique name has to be assigned during the configuration.

DataMonitor client or the WinCC OLE DB-Provider use the symbolic name to access the archive.

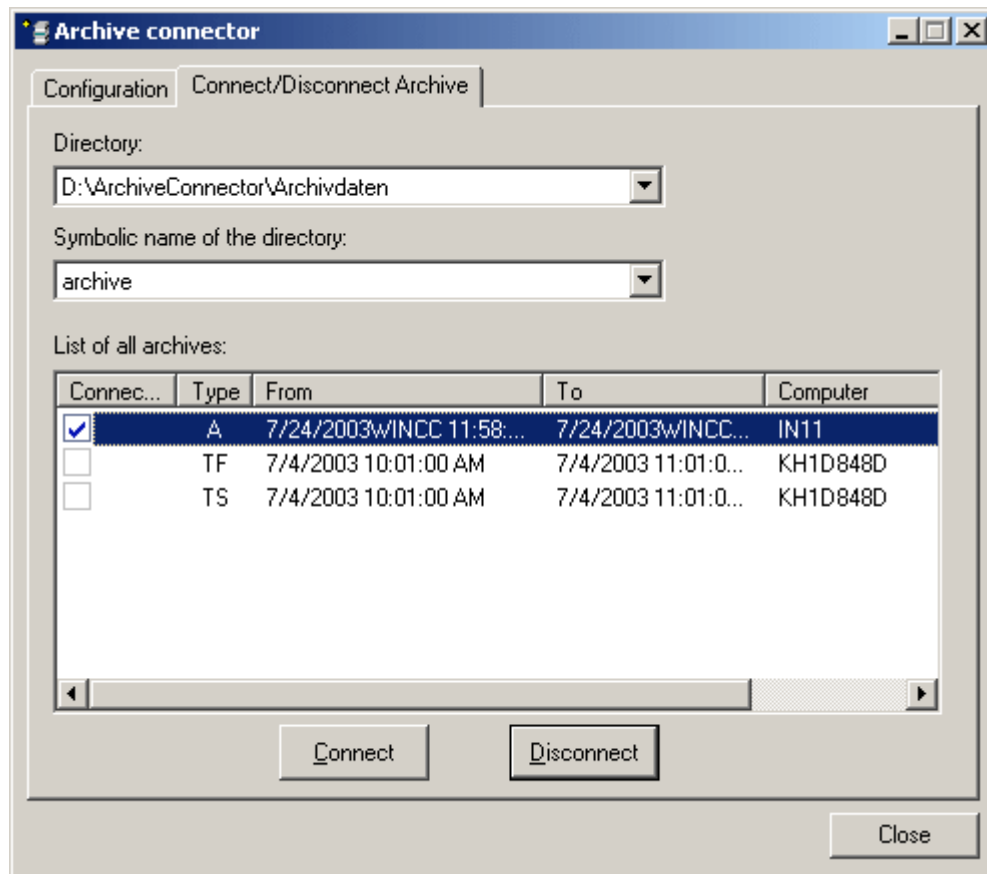
The name is also used for managing and connecting exported data from multiple computers or projects.

The symbolic names must only contain SQL-syntax-permissible characters.

By activating the corresponding checkbox, all archives added to the selected folder at the time of activation will automatically be connected to the SQL Server.

If you activate or deactivate monitoring, the changes will not be activated until you close the Archive Connector.

The "Connect/Disconnect Archive" Tab



The "Connect/Disconnect Archive" tab lists all archives existing in the archiving directories.

The connection status of each archive is displayed. The connection to the archives can be established or terminated via buttons.

The archive type is shown in the "Type" field:

- "A" = Alarm Logging;
- "TF" = Tag Logging (Fast);
- "TS" = Tag Logging (Slow).

3.4 Access Via the OLE DB Provider

The columns "From" and "To" provide information on the local time zone.

Note

The connection of multiple, swapped-out archives to the SQL server may take several seconds.

It is not possible to connect a database file with the same name twice.

The WinCC Archive Connector connects finalized and backed up (swapped-out) archives to the SQL server. Archives not finalized are not supported.

The user interface language of the Archive Connector is based on the settings of the regional and language options in Windows.

Note

Archives created with SQL Server 2000 can only be connected if you remove the write protection of the archive. Archives that are once linked can no longer be linked using the Archive Connector of the Connectivity Pack under SQL Server 2000.

In order to connect swapped out archives on CD or DVD, copy the archives to a media where you will be able to remove the write protection.

3.4.4 Establishing the Connection to the Archive Database

Introduction

For ActiveX data objects (ADO), the connection between the application and the archive database is established by the connection object. An important parameter here is the `ConnectionString`. The `ConnectionString` contains all necessary information for access to the database using OLE DB Provider.

Structure of the ConnectionString

```
"Provider = Name of the OLE DB Provider; Catalog=Database name;Data Source=Server name;"
```

Parameter	Description
Provider	Name of the OLE DB Provider: e.g. WinCCOLEDBProvider
Catalog	Names of the WinCC database With WinCC RT databases, you will use database names that end in "R." <Datenbankname_R>. The database "CC_ExternalBrowsing" can also be used. If you have connected swapped out WinCC archives to the SQL Server via the WinCC Archive Connector, use their symbolic name. Note Enter the WinCC project name for "Catalog" for transparent access; for e.g.: "Catalog=WinCC_Project_Name". Note If you access message archives or swapped out archives via "CC_ExternalBrowsing", this access may take several minutes.
Data Source	Server name Local: ".\WinCC" or "<Computer Name>\WinCC" Remote: "<Computer name>\WinCC" Note Enter the transparent access to the Central Archive Server and in case of redundant servers enter the following via the OLE DB-Provider for "Data Source": <Symbolic Computer Name>::WinCC. Note Use the archive tag name to directly access an archive tag on the central archive server CAS. The central archive server CAS returns the CAS-ID and not the archive tag ID as ID: <SYMBOLIC COMPUTER NAME>\<Achive_Var_Name>

Example Process Value and Message Archive:

In the following example, a connection object is created with subsequent opening of the connection to the WinCC database (process value and message archive).

```
Set conn = CreateObject("ADODB.Connection")
conn.open "Provider=WinCCOLEDBProvider.
1;Catalog=CC_OpenArch_03_05_27_14_11_46R;Data Source=.\WinCC"
```

Example User Archive:

In the following example, a connection object is created with subsequent opening of the connection to the WinCC user archive.

```
Set conn = CreateObject("ADODB.Connection")
```

3.4 Access Via the OLE DB Provider

```
conn.open "Provider=SQLOLEDB.1; Integrated Security=SSPI; Persist  
Security Info=false; Initial Catalog=CC_OpenArch_03_05_27_14_11_46R;  
Data Source=.\WinCC"
```

Note

In order to improve performance during local access, enter "<Computer Name>WinCC" as the data source instead of ".WinCC".

See also

Example: Configuring Access to Archive Data Using DataConnector Wizard (Page 205)

Example: Configuring the Access to Archive Data Using VB (Page 203)

Query for User Archives (Page 61)

Querying Alarm Message Archives (Page 57)

Querying Process Value Archives (Page 51)

3.4.5 Querying the Archive Data

3.4.5.1 Displaying Process Value Archives

Introduction

The query result is returned as the Recordset. In this chapter, the structure of Recordset for process value archives is described.

Recordset Structure

Field name	Type	Comments
ValueID	Integer 4 Bytes or Integer 8 Bytes	Unique identification of value. The length depends on the type of query.
TimeStamp	DateTime	Time Stamp
RealValue	Real 8 Bytes	Tag value
Quality	Integer 4 Bytes	QualityCode of value (e.g. "good" or "bad").
Flags	Integer 4 Bytes	Internal Control Parameter

See also

Querying the Archive Data (Page 49)
Establishing the Connection to the Archive Database (Page 46)
Access to Archive Data Using OLE DB Provider (Page 40)
Bases of OLE DB (Page 41)

3.4.5.2 Querying the Archive Data

Introduction

The queries are forwarded to the database by the command object. An important parameter, aside from "ConnectionString", is CommandText. The CommandText transmits the query. The result is returned as the Recordset.

Note

Time range for archive inquiries for message and process values

If the query for message or process value archives specifies a time range for which no messages or other values exist within the archives, no information message or other status display occurs. If this status is to be displayed, error handling must be implemented by the user.

A simple version of this error handling routine is described in the sample script under the topic "Example: Reading message archive data via the WinCC OLE DB Provider".

In the following examples, a command object each is generated and the query transmitted as CommandText.

In the following structure examples, CommandText also includes the ConnectionString whose structure is described under "Establishing Connection to Archive Database".

Structure of CommandText

Process Value Archives:

```
Set oRs = CreateObject("ADODB.Recordset")
Set oCom = CreateObject("ADODB.Command")
oCom.CommandType = 1
Set oCom.ActiveConnection = conn
oCom.CommandText = "TAG:R, 'PVArchive\Tag1', '0000-00-00
00:10:00.000', '0000-00-00 00:00:00.000'"
```

Alarm Message Archives:

```
Set oRs = CreateObject("ADODB.Recordset")
Set oCom = CreateObject("ADODB.Command")
```

3.4 Access Via the OLE DB Provider

```
oCom.CommandType = 1
Set oCom.ActiveConnection = conn
oCom.CommandText = "ALARMVIEW>Select * FROM AlgViewEnu"
```

User archives

```
Set oRs = CreateObject("ADODB.Recordset")
Set oCom = CreateObject("ADODB.Command")
oCom.CommandType = 1
Set oCom.ActiveConnection = conn
oCom.CommandText = "SELECT * FROM UA#Test"
```

Specifying the RecordSet location

To specify the location of RecordSet for query of the archive data, you need to set the value "3" for the "CursorLocation" property, for example, "conn.CursorLocation = 3". The RecordSet is created on the client.

See also

- Example: Reading Process Value Archive With WinCC OLE DB Provider and Visual Basic 6 (Page 213)
- Displaying User Archives (Page 63)
- Displaying Alarm Message Archives (Page 59)
- Displaying Process Value Archives (Page 48)
- Query for User Archives (Page 61)
- Querying Alarm Message Archives (Page 57)
- Querying Process Value Archives (Page 51)
- Establishing the Connection to the Archive Database (Page 46)
- WinCC Archive Connector (Page 42)
- Bases of OLE DB (Page 41)
- Examples for Access Using OLE DB Provider (Page 203)

3.4.5.3 Querying Process Value Archives

Principle

With the following query, a process value archive can be accessed. The data can be selected using filter criteria. The queries are forwarded to the database by the command object.

Note

The length of the ValueID can be different.

- For databases processed on a central archive server (CAS), the ValueID is 8 Bytes long and includes a server ID in the HI-DWORD area as well as the ValueID assigned by the respective server in the LO-DWORD area.
- For all other databases, the ValueID is 4 Bytes long and includes only the unique ValueID assigned by the WinCC server.

The 4-Bytes request via TAG:R is still available for compatibility. The 4-Byte ValueID returned is no longer unique in case of CAS databases.

Queries for process value archives are limited to a maximum of 20 tags, each with a maximum of 128 characters per tag.

Syntax

Note that the query may not contain any spaces.

Request of ValueIDs 8 Bytes long:

```
TAG_LLVID:R,<ValueID or  
ValueName>,<TimeBegin>,<TimeEnd>[,<SQL_clause>][,<TimeStep>]
```

Request of ValueIDs 4 Bytes long:

```
TAG:R,<ValueID or ValueName>,<TimeBegin>,<TimeEnd>[,<SQL_clause>]  
[,<TimeStep>]
```

Parameter

Parameter	Description																								
ValueID	Value ID from the database table Multiple names are possible, for e.g. "TAG:R,(ValueID_1;ValueID_2;ValueID_x),<TimeBegin>,<TimeEnd>"																								
ValueName	ValueName in the format 'ArchiveName\Value_Name'. The parameter <ValueName> must be enclosed in single quotes. Multiple names are possible, for e.g. "TAG:R,('ValueName_1';'ValueName_2';'ValueName_x'), <TimeBegin>,<TimeEnd>" Note Please note that programming languages such as Visual Basic, VBScript or VBA only allow the following characters in the tag names: "A...Z", "a...z", "0...9" and "_". In WinCC if you use special characters such as "," or ";" in the tag names then the script will be aborted with an error message. In such a case use the "Tag-ID" to access a tag with special characters in the script name.																								
TimeBegin	Start time in the format 'YYYY-MM-DD hh:mm:ss.msc' While using <TimeStep> you must specify <TimeBegin> as absolute time. A relative statement or "0000-00-00 00:00:00.000" are not permitted.																								
TimeEnd	End time in the format 'YYYY-MM-DD hh:mm:ss.msc'																								
SQL_Clause	Filter criterion in SQL syntax: [WHERE search_condition] [ORDER BY {order_expression [ASC DESC] }] "ORDER BY" criterion can only be used with the given sort sequence "{order_expression [ASC DESC] }". Example: The following query returns all values of the tags "ValueName_1" and "ValueName_2" which are below 50 or above 100. "TAG:R,('ValueName_1';'ValueName_2'),<TimeBegin>,<TimeEnd>, 'WHERE RealValue > 100 OR RealValue < 50'"																								
TimeStep	Values in the stated time interval are summarized, beginning with the starting time <TimeBegin> Format: 'TIMESTEP=x,y' x = Interval in seconds y = Aggregation type, defines the interval result The following values are possible for aggregation type: <table border="1"> <thead> <tr> <th>Without interpolation</th> <th>With interpolation</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1 (FIRST)</td> <td>257 (FIRST_INTERPOLATED)</td> <td>First value</td> </tr> <tr> <td>2 (LAST)</td> <td>258 (LAST_INTERPOLATED)</td> <td>Last value</td> </tr> <tr> <td>3 (MIN)</td> <td>259 (MIN_INTERPOLATED)</td> <td>Minimum value</td> </tr> <tr> <td>4 (MAX)</td> <td>260 (MAX_INTERPOLATED)</td> <td>Maximum value</td> </tr> <tr> <td>5 (AVG)</td> <td>261 (AVG_INTERPOLATED)</td> <td>Median value</td> </tr> <tr> <td>6 (SUM)</td> <td>262 (SUM_INTERPOLATED)</td> <td>Sum</td> </tr> <tr> <td>7 (COUNT)</td> <td>263 (COUNT_INTERPOLATED)</td> <td>Number of values</td> </tr> </tbody> </table> <p>Without interpolation means: If no values are present in the interval, no interval result will be returned. With interpolation means: If no values are present in the interval, the value will be derived by linear interpolation from the results of the neighboring intervals that are not empty. No extrapolation is done. Example: For TIMESTEP=60.257 for each interval of 60 seconds, the first value of this interval or - if there are no values in this interval - the linear, interpolated value from the first values of the neighboring intervals will be returned. "TAG:R,1,'2004-07-09 09:03:00.000','0000-00-00 00:10:00.000','TIMESTEP=60.257'"</p>	Without interpolation	With interpolation	Description	1 (FIRST)	257 (FIRST_INTERPOLATED)	First value	2 (LAST)	258 (LAST_INTERPOLATED)	Last value	3 (MIN)	259 (MIN_INTERPOLATED)	Minimum value	4 (MAX)	260 (MAX_INTERPOLATED)	Maximum value	5 (AVG)	261 (AVG_INTERPOLATED)	Median value	6 (SUM)	262 (SUM_INTERPOLATED)	Sum	7 (COUNT)	263 (COUNT_INTERPOLATED)	Number of values
Without interpolation	With interpolation	Description																							
1 (FIRST)	257 (FIRST_INTERPOLATED)	First value																							
2 (LAST)	258 (LAST_INTERPOLATED)	Last value																							
3 (MIN)	259 (MIN_INTERPOLATED)	Minimum value																							
4 (MAX)	260 (MAX_INTERPOLATED)	Maximum value																							
5 (AVG)	261 (AVG_INTERPOLATED)	Median value																							
6 (SUM)	262 (SUM_INTERPOLATED)	Sum																							
7 (COUNT)	263 (COUNT_INTERPOLATED)	Number of values																							

Note

<TimeBegin> and <TimeEnd> must never both be "ZERO" = "0000-00-00 00:00:00.000".

In order to improve performance, use the parameter "ValueID" instead of "ValueName" during the query. The "ValueID" may be determined from the table "Archives".

Some applications cannot process the time in steps of 1 ms with process values which can lead to inaccuracies.

In the "Example: chapter you will find an example in the "SplitDateTimeAndMs" VB script to remove the milliseconds from the time stamp of process values. Reading Process Value Archive Using WinCC OLE DB Provider". The script is also implemented in the demo project "OpConPack".

Selection of an Absolute Time Interval

Reading from start time <TimeBegin> until the end time <TimeEnd> .

Example A1:

Reads the values of the ValueID 1 from start time 9:03 hours to end time 9:10 hours.

```
"TAG:R,1,'2004-07-09 09:03:00.000','2004-07-09 09:10:00.000'"
```

Selection of a Relative Time Interval

Reads from beginning of recording:

```
<TimeBegin> = '0000-00-00 00:00:00.000'
```

Reads until end of recording:

```
<TimeEnd> = '0000-00-00 00:00:00.000'
```

<TimeBegin> and <TimeEnd> should both not be "ZERO" = '0000-00-00 00:00:00.000'.

Note

Enter a relative period you want to query in a linked archive database using the following format:

- 0000-00-DD hh:mm:ss.msc

If you indicate the time frame in months, the content can be faulty, because a month can have 28 to 31 days.

Example B1:

Reads the absolute time from "TimeBegin" to end of recording, i.e. the last archived value.

```
<TimeBegin> = '2003-02-02 12:00:00.000', <TimeEnd> = '0000-00-00  
00:00:00.000'
```

3.4 Access Via the OLE DB Provider

Example B2:

Reads the absolute time from "TimeBegin" for the next 10 seconds.

```
<TimeBegin> = '2003-02-02 12:00:00.000', <TimeEnd> = '0000-00-00  
00:00:10.000'
```

Example B3:

Reads 10 seconds backward from the absolute time from "TimeEnd".

```
<TimeBegin> = '0000-00-00 00:00:10.000', <TimeEnd> = '2003-02-02  
12:00:00.000'
```

Example B4:

Reads the values of the last hour starting from the time of the last archived value for multiple valueIDs (1;3;5;6).

```
"TAG:R, (1;3;5;6), '0000-00-00 01:00:00.000', '0000-00-00  
00:00:00.000'"
```

Example B5:

Reads the values of the last five minutes starting from the time of the last archived value for "TAG_2" tag from the "ArTags" archive.

```
"TAG:R, 'ArTags\TAG_2', '0000-00-00 00:05:00.000', '0000-00-00  
00:00:00.000'"
```

The following diagrams shows a possible result of this example. The query was implemented using the Connectivity Pack Demo Project.

DateTime	Ms	RealValue	Quality
13.08.2003 07:17:56	150	3,5293	801000
13.08.2003 07:17:57	150	3,5293	801000
13.08.2003 07:17:58	150	3,4009	801000
13.08.2003 07:17:59	150	3,4009	801000
13.08.2003 07:18:00	150	3,2748	801000
13.08.2003 07:18:01	150	3,2748	801000
13.08.2003 07:18:02	150	3,1509	801000
13.08.2003 07:18:03	150	3,1509	801000
13.08.2003 07:18:04	150	3,0292	801000
13.08.2003 07:18:05	150	3,0292	801000

Multiple Return Values to a Query Using a Filter on Tag Value

Example C1:

The following query also uses the <SQL_Clause> parameter and returns all tag values that have the ValueID "3" and "6" and are below 50 or above 100.

```
"TAG:R, (3;6), <TimeBegin>, <TimeEnd>, 'WHERE RealValue > 100 OR RealValue < 50'"
```

Query with parameter <TimeStep>

Example C2:

The following query uses the <TimeStep> parameter and returns all values of ValueID "1" - starting from start time "TimeBegin" till 5 minutes later in intervals of "60" seconds with the aggregation type "5" = "Average value without Interpolation".

```
"TAG:R, 1, '2004-10-13 17:00:00.000', '0000-00-00 00:05:00.000', 'TIMESTEP=60.5'"
```

The following diagram shows the query result. The left table displays the archive data which were archived in an archiving cycle of 30 seconds. The right table displays the query result. It determines the average between two archive values at "0" seconds and "30" seconds, displayed with the first time stamp of the averaging interval, i.e. second "0".

TIMESTEP = 60,5

ValueID	Datetime	RealValue	Quality
1	2004-10-13 17:00:00.000	3.0	801000
1	2004-10-13 17:00:30.000	4.0	801000
1	2004-10-13 17:01:00.000	2.0	801000
1	2004-10-13 17:01:30.000	4.0	801000
1	2004-10-13 17:02:00.000	4.0	801000
1	2004-10-13 17:02:30.000	1.0	801000
1	2004-10-13 17:03:00.000	3.0	801000
1	2004-10-13 17:03:30.000	3.0	801000
1	2004-10-13 17:04:00.000	1.0	801000
1	2004-10-13 17:04:30.000	0.0	801000
1	2004-10-13 17:05:00.000	3.0	801000



ValueID	Datetime	RealValue	Quality
1	2004-10-13 17:00:00.000	3.5	801000
1	2004-10-13 17:01:00.000	3.0	801000
1	2004-10-13 17:02:00.000	2.5	801000
1	2004-10-13 17:03:00.000	3.0	801000
1	2004-10-13 17:04:00.000	0.5	801000
1	2004-10-13 17:05:00.000	3.0	801000

Example C3:

The following query uses the <TimeStep> parameter and returns all values of ValueID "1" and "2" - starting from start time "TimeBegin" till 2 minutes later in intervals of "15" seconds with the aggregation type "261" = "Average value with linear Interpolation".

```
"TAG:R, (1;2), '2004-10-13 17:00:00.000', '0000-00-00 00:02:00.000', 'TIMESTEP=15.261'"
```

The following diagram shows the query result. The left table displays the archive data which were archived in an archiving cycle of 30 seconds. The right table displays the query result. The archive values at "0" and "30" seconds are displayed in the query result unchanged with their time stamp. For second "15," the linear, interpolated value is formed of archive values at seconds "0" and "30". For the "45" second, the linear, interpolated value is taken from the archive values of "30" second of the same minute and the "0" second of the next minute.

TIMESTEP = 15, 261

ValueID	Datetime	RealValue	Quality
1	2004-10-13 17:00:00.000	3,0	801000
2	2004-10-13 17:00:00.000	12,0	801000
1	2004-10-13 17:00:30.000	4,0	801000
2	2004-10-13 17:00:30.000	14,0	801000
1	2004-10-13 17:01:00.000	2,0	801000
2	2004-10-13 17:01:00.000	16,0	801000
1	2004-10-13 17:01:30.000	4,0	801000
2	2004-10-13 17:01:30.000	17,0	801000
1	2004-10-13 17:02:00.000	4,0	801000
2	2004-10-13 17:02:00.000	14,0	801000
1	2004-10-13 17:02:30.000	1,0	801000
2	2004-10-13 17:02:30.000	13,0	801000
1	2004-10-13 17:03:00.000	3,0	801000
2	2004-10-13 17:03:00.000	13,0	801000



ValueID	Datetime	RealValue	Quality
1	2004-10-13 17:00:00.000	3,0	801000
1	2004-10-13 17:00:15.000	3,5	801000
1	2004-10-13 17:00:30.000	4,0	801000
1	2004-10-13 17:00:45.000	3,0	801000
1	2004-10-13 17:01:00.000	2,0	801000
1	2004-10-13 17:01:15.000	3,0	801000
1	2004-10-13 17:01:30.000	4,0	801000
1	2004-10-13 17:01:45.000	4,0	801000
1	2004-10-13 17:02:00.000	4,0	801000
2	2004-10-13 17:00:00.000	12,0	801000
2	2004-10-13 17:00:15.000	13,0	801000
2	2004-10-13 17:00:30.000	14,0	801000
2	2004-10-13 17:00:45.000	15,0	801000
2	2004-10-13 17:01:00.000	16,0	801000
2	2004-10-13 17:01:15.000	16,5	801000
2	2004-10-13 17:01:30.000	17,0	801000
2	2004-10-13 17:01:45.000	15,5	801000
2	2004-10-13 17:02:00.000	14,0	801000

See also

Example: Reading Process Value Archive With WinCC OLE DB Provider and Visual Basic 6 (Page 213)

Displaying Process Value Archives (Page 48)

3.4.5.4 Querying Alarm Message Archives

Introduction

With the following query, the message archive can be accessed. The data can be selected using filter criteria. The queries are forwarded to the database by the command object.

You will find information about status of messages in the WinCC Information System under "Working with WinCC > ANSI-C Function for Creation of Functions and Actions > ANSI-C Function descriptions > Appendix > Structure Definitions > Structure Definition MSG_RTDATA_STRUCT".

When querying message archives, the result is summarized by archive, but without sorting the queried archive segments. The filter condition needs to be extended accordingly if the segments are to be sorted, e.g., for the chronological sorting "ORDER BY DateTime ASC, MS ASC".

Syntax

ALARMVIEW:SELECT * FROM <ViewName>[WHERE <Condition>...., optional]

Parameter

Parameter	Description
ViewName	<p>Name of the database table. The table has to be specified in the desired language. The "ViewName" for the five European language is e.g.:</p> <p>ALGVIEWDEU: German message archive data ALGVIEWENU: English message archive data ALGVIEWESP: Spanish message archive data ALGVIEWFRA: French message archive data ALGVIEWITA: Italian message archive data</p> <p>The "ViewName" for the Asian language is e.g.:</p> <p>ALGVIEWCHS: Chinese (simplified) message archive data ALGVIEWCHT: Chinese (traditional) message archive data ALGVIEWJPN: Japanese message archive data ALGVIEWKOR: Korean message archive data</p> <p>Note</p> <p>The languages that are installed in the WinCC base system or that are configured in the WinCC Text Library are supported. Information concerning the possible query-languages or the respective "ViewName" can be found in the SQL-Server in the linked alarm archives under "Views". All languages that are supported in the corresponding archive are shown with their IDs e.g. "GENVIEWENU" here.</p>
Condition	<p>Filter criterion, e.g.:</p> <p>DateTime>'2003-06-01' AND DateTime<'2003-07-01' DateTime>'2003-06-01 17:30:00' MsgNr = 5 MsgNr in (4, 5) State = 2</p> <p>With DateTime, only absolute time indications can be used.</p>

Example 1:

Reads all entries of message number 5 that were recorded after July 5, 2003.

```
"ALARMVIEW:SELECT * FROM ALGVIEWENU WHERE MsgNr = 5 AND
DateTime>'2003-07-05'"
```

Example 2:

Reads all messages with a time stamp between July 3, 2003 and July 5, 2003.

```
"ALARMVIEW:SELECT * FROM ALGVIEWENU WHERE DateTime>'2003-07-03' AND
DateTime<'2003-07-05'"
```

The following picture shows a possible result of this example. The query was implemented using the Connectivity Pack Demo Project.

Database Alarms			
DSN	CC_OpConPac_03_07_30_15_59_32R	Enter	
Server		Count	4204
		Sum	287411
F:All	F:MsgNr=5	Avg	68,36608
F:State=2	F:'Date1'< D<'Date2'	Std	216,5581
		Execute	Csv + Hitlist
WHERE DateTime>'2003-07-03' AND DateTime <'2003-07-05'			
DateTime	MsgNr	State	Typename
08.07.2003 15:21:37	2	1	Alarm
08.07.2003 15:21:59	1	1	Alarm
08.07.2003 15:22:21	1	2	Alarm
08.07.2003 15:22:21	2	2	Alarm
08.07.2003 15:22:21	3	1	Warnung
08.07.2003 15:22:43	1	16	Alarm
08.07.2003 15:22:43	1	1	Alarm
08.07.2003 15:23:05	2	16	Alarm
08.07.2003 15:23:05	2	1	Alarm
08.07.2003 15:23:05	1	2	Alarm

See also

Displaying Alarm Message Archives (Page 59)

Example: Reading Message Archive Data with the WinCC OLE DB Provider and Visual Basic 6 (Page 226)

3.4.5.5 Displaying Alarm Message Archives

Introduction

The query result is returned as the Recordset. In this chapter, the structure of the Recordset for alarm log archives is described.

You will find information about status of messages in the WinCC Information System under "Working with WinCC > ANSI-C Function for Creation of Functions and Actions > ANSI-C Function descriptions > Appendix > Structure Definitions > Structure Definition MSG_RTDATA_STRUCT".

Recordset Structure

Location	Field name	Type	Comments
1	MsgNo	Integer 4 Bytes	Message number
2	State	Small Integer 2 Bytes	Alarm Log Status
3	DateTime	DateTime 8 Bytes	Time stamp of the message (date/time without milliseconds)

3.4 Access Via the OLE DB Provider

Location	Field name	Type	Comments
4	Ms	Small Integer 2 Bytes	Time stamp of the message (milliseconds)
5	Instance	VarChar (255)	Instance Name of the Alarm Log
6	Flags1	Integer 4 Bytes	(only for internal use)
7	PValueUsed	Integer 4 Bytes	Process Values used
8 to 17	PValue1 to PValue10	Real 8 Bytes	Numerical Process Value 1 to 10
18 to 27	PText1 to PText10	VarChar (255)	Process Value Text 1 to 10
28	ComputerName	VarChar (255)	Name of computer
29	Application	VarChar (255)	Application Name
30	Comment	VarChar (255)	Comments
31	UserName	VarChar (255)	User name
32	Counter	Integer 4 Bytes	Running Alarm Message Counter
33	TimeDiff	Integer 4 Bytes	Time difference to "Came in" status
34	ClassName	VarChar (255)	Name of the message class
35	Typename	VarChar (255)	Name of the message type
36	Class	Small Integer 2 Bytes	Message class ID
37	Type	Small Integer 2 Bytes	Message type ID
38 to 47	Text1 to Text10	VarChar (255)	Message Text 1 to 10
48	AG_NR	Small Integer 2 Bytes	Number of the PLC
49	CPU_NR	Small Integer 2 Bytes	Number of the CPU
50	CrComeFore	Integer 4 Bytes	Foreground Color for the "Came in" Status
51	CrComeBack	Integer 4 Bytes	Background Color for the "Came in" Status
52	CrGoFore	Integer 4 Bytes	Foreground Color for the "Went out" Status
53	CrGoBack	Integer 4 Bytes	Background Color for the "Went out" Status
54	CrAckFore	Integer 4 Bytes	Foreground Color for the "Acknowledged" Status
55	CrAckBack	Integer 4 Bytes	Background Color for the "Acknowledged" Status
56	LocalID	Integer 4 Bytes	Location of the Alarm
57	Priority	Integer 4 Bytes	Priority
58	AP_type	Integer 4 Bytes	Loop in Alarm
59	AP_name	VarChar (255)	Loop-in-Alarm Function Name
60	AP_PAR	VarChar (255)	Loop-in-Alarm Screen
61	InfoText	VarChar (255)	Infotext
62	TxtCame	VarChar (255)	Text came in
63	TxtWent	VarChar (255)	Text went out
64	TxtCameNWent	VarChar (255)	Text came in and went out
65	TxtAck	VarChar (255)	Text acknowledged
66	AlarmTag	Integer 4 Bytes	Message tag

Location	Field name	Type	Comments
67	AckType	Small Integer 2 Bytes	Acknowledgment Type
68	Params	Integer 4 Bytes	Parameter
69	Servename	VarChar (255)	Servename

See also

Querying the Archive Data (Page 49)

Establishing the Connection to the Archive Database (Page 46)

Access to Archive Data Using OLE DB Provider (Page 40)

Bases of OLE DB (Page 41)

3.4.5.6 Query for User Archives

Introduction

With the following query, you may use MS OLE DB Provider to access WinCC user archives. Access may be read or write enabled in order to analyze the saved data and to modify and save same.

The data can be selected using filter criteria. The queries are forwarded to the database by the command object.

Note

Consider the following when accessing WinCC user archives via the MS OLE DB Provider:

- Ensure that the write access is not enabled simultaneously via the MS OLE DB Provider and WinCC. This prevents inconsistencies in the archives.
 - Changes via MS OLE DB Provider will not be displayed in WinCC Runtime until the user archive table controls are selected by a picture change. The current data of the user archives are read again.
 - User archives changed via MS OLE DB Provider are not synchronized in a redundant system.
 - Note that WinCC updates can cause changes in the database scheme. The scheme can also be changed by the installation of hot fixes and service packs. In this case, you must adapt the read and write access accordingly.
-

Syntax

Reading of Values

```
SELECT * FROM UA#<ArchiveName>[WHERE <Condition>....., optional]
```

3.4 Access Via the OLE DB Provider

Writing of Values

```
UPDATE UA#<ArchiveName> SET UA#<ArchiveName>.<Column_n> = <Value>
[WHERE <Condition>...., optional]
```

Inserting a Data Set

```
INSERT INTO UA#<ArchiveName> (ID,<Column_1>,<Column_2>,<Column_n>)
VALUES (<ID_Value>, Value_1,Value_2,Value_n)
```

Deleting a Data Set

```
DELETE FROM UA#<ArchiveName> WHERE ID = <ID_Number>
```

Parameter

Parameter	Description
ArchiveName	Name of the user archive.
Condition	Filter criterion e.g.: LastAccess>'2004-06-01' AND LastAccess<'2004-07-01' DateTime>'2004-06-01 17:30:00' ID = 5 ID > 3

Example 1:
Reads all data in the user archive "Test".

```
SELECT * FROM UA#Test
```

Example 2:
Reads all data in the user archive "Test" that were changed between June 1, 2004 and July 1, 2004.

```
SELECT * FROM UA#Test WHERE LastAccess>'2004-06-01' AND
LastAccess<'2004-07-01'
```

Example 3:
Enters the value 'New_String' in the field F_STRING of the ID 3.

```
UPDATE UA#TEST SET F_STRING = 'New_String' WHERE ID = 3
```

Example 4:
Inserts a data set with the ID 100.

```
INSERT INTO UA#Test (ID,F_Integer,F_Float,F_Double,F_String) VALUES
(100.10, '10.0', 'AAAA')
```

Example 5:
Deletes the data set with the ID 100.

```
DELETE FROM UA#Test WHERE ID = 100
```

See also

Displaying User Archives (Page 63)

3.4.5.7 Displaying User Archives

Introduction

Each user archive consists of data fields with editable properties. Each data field has properties such as name, alias name, type, lengths, value etc. The representation of the data fields and properties in the Editor User Archives is done in lines and columns. Therefore, we are talking of rows instead of data fields and of columns instead of properties.

In the following, the user archive "Test" is described as a structure example. This user archive is included in the Connectivity Pack Demo Project "OPConPack" in directory "\\Samples\Connectivity Pack\DemoProject."

Structure of User Archive "Test"

Field Name	Type	Comment
ID	Integer	Unique identification of Value.
F_Integer	Integer	Example for Value
F_Float	Float	Example for Value
F_Double	Double	Example for Value
F_String	String	Sample character sequence

See also

Querying the Archive Data (Page 49)

Establishing the Connection to the Archive Database (Page 46)

Access to Archive Data Using OLE DB Provider (Page 40)

Bases of OLE DB (Page 41)

3.4.5.8 Configure Access via the Wizard "SQL Server Import/Export"

Introduction

WinCC OLE DB Provider may be used to access WinCC databases while employing the Wizard "SQL Server Import/Export. You can save the unzipped files to an intermediate database using the wizard; you access the database with standard SQL queries.

- Using WinCC computers, access to runtime and archive databases may be established locally or remotely.
- In the case of long-term archive servers, local or remote access is only possible to the archive databases since they have no runtime databases.

Procedure

1. Start the "SQL Server Management Studio" and select the desired database.
2. In the shortcut menu of the database select "Tasks > Export Date...". The SQL Server Import/Export-Wizard opens.
3. Configure the data source.
Click "Next". In the field Data source, select the entry WinCC OLE DB-Provider for Archives". Click the button "Properties...". The "Data Link Properties" dialog box opens.
4. Configure the correct Provider settings.
In the field "Data Source" enter the following text as data source: ".\WinCC"The entry for "Location" remains empty.
Under "Enter the initial catalog to use" either enter the desired Runtime database or the symbolic name, which was configured in "Archive Connector Tool". The correct spelling of the name may be found in "SQL Server Management Studio" in the "Databases" directory. Alternatively you can also enter the database "CC_ExternalBrowsing" for Runtime data and Archive data.
Click the "Advanced" tab. For the Property "Connect timeout" select the desired time in seconds. In the property "Access permissions" only select the box "ReadWrite".
Close the dialog by activating the "OK" button.

Note

In order to improve performance during local access, enter " <Computer Name>\WinCC" in the field "Data Source" instead of ".\WinCC".

5. Configure the data source.
Click "Next". In the field "Destination", select the entry SQL Native Client" for example. The server name can be any SQL Server instance. The database name which you enter in the field "Database", can be any self-created target database.

Note

Leave the "Database" field empty. No target tables are then created.

6. Configure the query conditions.
Click "Next". Select "Write a query to specify the data to transfer". Click "Next". Enter the desired query conditions. With the query "Tag:R,1,'0000-00-00 00:10:00.000','0000-00-00 00:00:00.000" of the ValueID "1", for example, the values of the last ten minutes of the archiving are read. Additional information on the syntax may be found in Chapter "Query for Process Value Archives".
7. End the Wizard and export the data.
Click "Next" and on the last page of the Wizard click on "Finish". The Wizard executes the data export to the target database. If the data export was successful, the comprised data in the target database are saved in the newly created table "dbo.Query". You can change the table name. If you do not change the table name, data will be overwritten with a new export. New tables with names "Query1", "Query2" etc. are created by the wizard.

See also

Use Case 7: Access Via the WinCC OLE DB Provider (Page 34)

3.4.5.9 Meeting prerequisites for using the Reporting Services

Introduction

You can use the reporting services of the SQL server 2005 with WinCC. This makes it possible to provide reports created with Microsoft Visual Studio with archive data on the network.

Requirements

The use of the reporting services with WinCC requires the following other software prerequisites.

- Internet Information Services
- Workstation Components of the MS SQL Server 2005, including the Business Intelligence Development Studio
- Reporting Services of the MS SQL Server 2005

Note

Take the installation steps in precisely the indicated order.

Installing Internet Information Services

1. Select "Settings > Control Panel > Software".
2. On the left, click "Add/Remove Windows components".
3. Activate the "Internet Information Services (IIS)" checkbox in the "Windows Components Wizard" dialog.
Activate the "Details" for this under "Application Server" in Windows 2003.

Installing Business Intelligence Development Studio

You install the Business Intelligence Development Studio as another component of the MS SQL Server 2005.

1. Select "Settings > Control Panel > Software".
The "Change or remove program" button is active.
2. Select "Microsoft SQL Server 2005" and click on "Change".
3. Select the option "Workstation Components" in the "Microsoft SQL Server 2005 Maintenance" and click on "Next".
The Microsoft SQL Server Installation Wizard is opened.
4. Run the Wizard:
 - Select "Change Installed Components".
 - Open the "Client Components" branch.
 - Use the mouse to activate the hard drive symbol "Will be installed on local hard drive" for the Business Intelligence Development Studio.
 - Leave the other settings unchanged.

The Business Intelligence Development Studio is installed.

Installing Reporting Services of the MS SQL Server 2005

You install the Reporting Services of the MS SQL Server 2005 from the WinCC DVD or from its position in the file system.

1. Select "Start > Run" and enter the following:
`\\<wincc-dvd-pfad>\instdata\SQL\servers\setup.exe SKUUPGRADE=1`
The Microsoft SQL Server 2005 Setup is executed. Follow the on-screen instructions.
2. Activate the "Reporting Services" checkbox in the "Components to Install" dialog. Services" and click on "Next".
3. Click on "Installed Instances" in the "Instance Name" dialog.
4. Activate the entry "SQL Server (WinCC) and continue in the "Installed instances" dialog.
5. Configure the reporting services according to your requirements in the "Service Account" dialog.
The settings made here apply globally for the reporting services.
6. Close the project.

Installing the Service Pack

After installing the reporting services, you must reinstall Service Pack 2 for the SQL Server 2005.

1. Select "Start > Run" and enter the following:
`\\<wincc-dvd-pfad>\instdata\SQL\ServicePack\SQLServer2005SP2\setup.exe`
2. Follow the instructions and do not make any changes in the setup menu.

Configuring computer administration

The Internet Information Services are configured in the computer administration.

1. Right-click on "Workstation" in the Windows Explorer and select the entry "Administration" in the pop-up menu.
The computer administration is opened.
2. Select the "Properties" entry in the "Application Pool" pop-up menu under "Internet Information Services Manager".
3. Select the "Configurable" option on the "Identity" tab and enter the user name and your password in the >Domains or computer name>\<User> form.
4. Select the "Properties" entry in the "Web Sites" pop-up menu under "Internet Information Services Manager".
5. Select "Edit" on the "Directory Security" tab under "Authentication and Access Control" and enter the user name and your password in the >Domains or computer name>\<User> form.

Note

We recommend restarting the computer after completing the installation.

Result

This makes the prerequisites for using the reporting services. You can now create reports and provide them on the internet.

3.4.6 Analysis Functions for Messages and Process Values

3.4.6.1 Analysis Functions for Messages and Process Values

Introduction

Using WinCC / Connectivity Pack, different analysis functions are available for query of archived messages and process values. The analysis is triggered by a query with parameters for different aggregate functions. Calculation of the aggregate function is performed on the Connectivity Pack server, and only the result is transferred to the client.

Additional information on CommandText and ConnectionString which are used in the following examples may be found under "Establishing Connection to Archive Database" and "Querying Archive Data".

Analysis Functions for Messages

The analysis query for message archives returns a specific recordset which contains configuration and runtime data for each message as well as results of the aggregate functions.

The returned recordset for analysis queries of message archives is not identical to the recordset of normal queries of message archives. Additional information may be found in Chapter "Display of Message Archives for Analysis Queries".

For each message, the following aggregate functions are calculated. The column descriptions of the result list are placed in parenthesis.

- Sum of message frequency ("FreqOfAlarm")
- Cumulative duration from "Message Came In" until "Message Went Out" ("CumDurationComeGo")
- Average duration from "Message Came In" until "Message Went Out" ("AvDurationComeGo")
- Cumulative duration from "Message Came In" until initial acknowledgment ("CumDurationComeAckn1")
- Average duration from "Message Came In" until initial acknowledgment ("AvDurationComeAckn1")
- Cumulative duration from "Message Came In" until second acknowledgment ("CumDurationComeAckn2")
- Average duration from "Message Came In" until second acknowledgment ("AvDurationComeAckn2")
- Cumulative duration from "Message Came In" until "Message Came In" ("CumDurationComeCome")
- Average duration from "Message Came In" until "Message Came In" ("AvDurationComeCome")

Syntax

For the calculation of aggregate functions for messages, the following command is issued to WinCC OLE DB Provider.

```
"AlarmHitView: SELECT * FROM <ViewName>[WHERE <Condition>]"
```

Here :

<ViewName> = Name of the database table in the desired language, for e.g. ALGVIEWMENU for English.

[WHERE <Condition>] = optional filter criterion as WHERE condition in the SQL syntax.

Additional information on the syntax may be found in Chapter "Query for Message Archives".

Example

The example provides results of the aggregate functions for all messages for the time range between 7/15/2004 12:00 o'clock and 12:15 o'clock from the "ALGVIEWENU" database.

ConnectionString:

```
"Provider=WinCCOLEDBProvider.  
1;Catalog=CC_OpenArch_03_05_27_14_11_46R;Data Source=.\WinCC"
```

CommandText:

```
"AlarmHitView: SELECT * FROM ALGVIEWENU WHERE DateTime>'2004-07-15  
12:00:00' AND DateTime<'2004-07-15 12:15:00'"
```

Analysis Functions for Process Values

The analysis of process values returns the result of an aggregate function. Only one aggregate function can be calculated in a query.

The following aggregate functions are available for process values.

- MIN (minimum)
- MAX (maximum)
- AVG (average)
- SUM (sum of all values)
- COUNT (count of process values)
- COUNTER (number of entries with value "1", e.g., query of binary tags)
- STDEV (statistical standard deviation)
- VAR (statistical variance)

Syntax

For the calculation of aggregate functions for process values, a query is issued to the MS SQL OLE DB Provider and the procedure "cp_TagStatistic" from database "SQL Server Master" is executed.

Note

The analysis functions for process values in transparent access function only with Connectivity Station on a client with own project.

The following parameters are transferred to the "cp_TagStatistic" procedure.

```
cp_TagStatistic @P1,@P2,@P3[,@P4]
```

Where:

"@P1" = database name (e.g. WinCC Runtime database or symbolic name for the directory with the swapped out archives). During transparent access, instead of the database name use the WinCC project name.

"@P2" = WinCC OLE DB-Provider String for process values.

"@P3" = desired aggregate function.

"@P4" = <Symbolic computer name>:\WinCC (required only during transparent access).

Additional information on the syntax of parameters "@P1" and "@P2" may be found in Chapter "Query for Process Value Archives".

Note

Analysis functions for process values with Asian archive tag names

If you use archive tag names with Asian character sets to calculate an analysis function, the request for Unicode character sets has to be adapted.

Add the prefix "N" in front of both parameters.

Example: cp_TagStatistic N'TestDB',N'TAG:R,17,"2004-05-17 12:00:00","2004-05-17 13:00:00",'AVG'

3.4 Access Via the OLE DB Provider

Example

This query will return the average of process values in the time range between 5/17/2004 12:00 and 13:00 for ValueID "17" from database "TestDB".

ConnectionString:

```
"Provider=SQLOLEDB.1;Integrated Security=SSPI;Persist Security Info=False;Initial Catalog=master ;Data Source=.\WinCC"
```

CommandText:

```
"cp_TagStatistic 'TestDB','TAG:R,17','2004-05-17 12:00:00','2004-05-17 13:00:00','','AVG'"
```

Example of transparent access

This query delivers the average process value in the time range between 14.09.2006 10:00 hrs and 11:00 hrs for the ValueID "7" from the "WinCCProj".

ConnectionString:

```
"Provider=SQLOLEDB.1;Integrated Security=SSPI;Persist Security Info=False;Initial Catalog=master ;Data Source=.\WinCC"
```

CommandText:

```
"cp_TagStatistic 'WinCCProj','TAG:R,7','2006-09-14 10:00:00','2006-09-14 11:00:00','','AVG','Symb_WinCCProj::\WinCC'"
```

See also

[Querying the Archive Data \(Page 49\)](#)

[Establishing the Connection to the Archive Database \(Page 46\)](#)

[Display of Message Archives for Analysis Queries \(Page 70\)](#)

[Use of OLE DB interface of the Connectivity Station \(Page 242\)](#)

3.4.6.2 Display of Message Archives for Analysis Queries

Introduction

The analysis query for message archives returns a specific recordset which contains configuration and runtime data for each message as well as results of the aggregate functions. This Recordset is not identical to the Recordset of normal queries of message archives.

Recordset Structure for Analysis of Message Archives

Upon query of message archives using the analysis function "AlarmHitView", the result is returned as recordset with the following structure.

Location	Field name	Type	Comments
1	MsgNo	Integer 4 Bytes	Message number
2	State	Small Integer 2 Bytes	Alarm Log Status
3	DateTime	DateTime 8 Bytes	Time stamp of the message (date/time without milliseconds)
4	Ms	Small Integer 2 Bytes	Time stamp of the message (milliseconds)
5	Instance	VarChar (255)	Instance Name of the Alarm Log
6	Flags1	Integer 4 Bytes	(only for internal use)
7	Counter	Integer 4 Bytes	Running Alarm Message Counter
8	TimeDiff	Integer 4 Bytes	Time difference to "Came in" status
9	ClassName	VarChar (255)	Name of the message class.
10	Typename	VarChar (255)	Name of the message type.
11	Class	Small Integer 2 Bytes	Message class ID
12	Type	Small Integer 2 Bytes	Message type ID
13 to 22	Text1 to Text10	VarChar (255)	Message Text 1 to 10
23	AG_NR	Small Integer 2 Bytes	Number of the PLC
24	CPU_NR	Small Integer 2 Bytes	Number of the CPU
25	CrComeFore	Integer 4 Bytes	Foreground Color for the "Came in" Status
26	CrComeBack	Integer 4 Bytes	Background Color for the "Came in" Status
27	CrGoFore	Integer 4 Bytes	Foreground Color for the "Went out" Status
28	CrGoBack	Integer 4 Bytes	Background Color for the "Went out" Status
29	CrAckFore	Integer 4 Bytes	Foreground Color for the "Acknowledged" Status
30	CrAckBack	Integer 4 Bytes	Background Color for the "Acknowledged" Status
31	Priority	Integer 4 Bytes	Priority
32	AP_type	Integer 4 Bytes	Loop in Alarm
33	AP_name	VarChar (255)	Loop-in-Alarm Function Name
34	AP_PAR	VarChar (255)	Loop-in-Alarm Screen
35	InfoText	VarChar (255)	Infotext
36	TxtCame	VarChar (255)	Text came in
37	TxtWent	VarChar (255)	Text went out
38	TxtCameNWent	VarChar (255)	Text came in and went out
39	TxtAck	VarChar (255)	Text acknowledged
40	AckType	Small Integer 2 Bytes	Acknowledgment Type

3.4 Access Via the OLE DB Provider

Location	Field name	Type	Comments
41	FreqOfAlarm	Integer 4 Bytes	Sum of message frequency
42	CumDurationComeGo	Integer 4 Bytes	Cumulative duration from "Message Came In" until "Message Went Out"
43	AvDurationComeGo	Real 8 Bytes	Average duration from "Message Came In" until "Message Went Out"
44	CumDurationComeAckn1	Integer 4 Bytes	Cumulative duration from "Message Came In" until initial acknowledgment
45	AvDurationComeAckn1	Real 8 Bytes	Average duration from "Message Came In" until initial acknowledgment
46	CumDurationComeAckn2	Integer 4 Bytes	Cumulative duration from "Message Came In" until second acknowledgment
47	AvDurationComeAckn2	Real 8 Bytes	Average duration from "Message Came In" until second acknowledgment
48	CumDurationComeCome	Integer 4 Bytes	Cumulative duration from "Message Came In" until "Message Came In"
49	AvDurationComeCome	Real 8 Bytes	Average duration from "Message Came In" until "Message Came In"

See also

Analysis Functions for Messages and Process Values (Page 67)

3.5 Security Settings During Access to SQL Databases Using MS OLE DB

Introduction

Using MS OLE DB, users may access SQL databases, such as WinCC User Archives, and may modify same. It is therefore possible for unauthorized users to do so. As protection from unauthorized access, the administrator must take suitable measures.

Principle

One option for access protection is to create a user or user group on the SQL server for access to SQL databases. This user or user group will then be assigned certain authorizations for access to SQL databases.

This may use local or global Windows user groups on the SQL server to organize such access authorizations in SQL.

Alternatively, Windows users can be transferred to the SQL server - either directly as a Windows user or as individually defined SQL users.

Part of the security structure of an SQL server are the so-called "Server Roles". This organizes users into groups for administrative purposes, similar to Windows. "Server Roles" are used to assign server-wide security settings to a login or if there are no corresponding Windows user groups.

Microsoft offers technical documentation on the SQL Server 2005 for download at:

<http://technet.microsoft.com/de-de/sqlserver/bb331762.aspx>

See also

Bases of OLE DB (Page 41)

3.6 Access via OPC - Open Connectivity

3.6.1 OPC Channel

3.6.1.1 WinCC OPC Channel

Introduction

WinCC can be used as both an OPC server and as an OPC client. The OPC channel is the OPC client application of WinCC.

The OPC communication driver can be used as OPC DA client, OPC XML client, and OPC UA client.

The following OPC components are installed automatically:

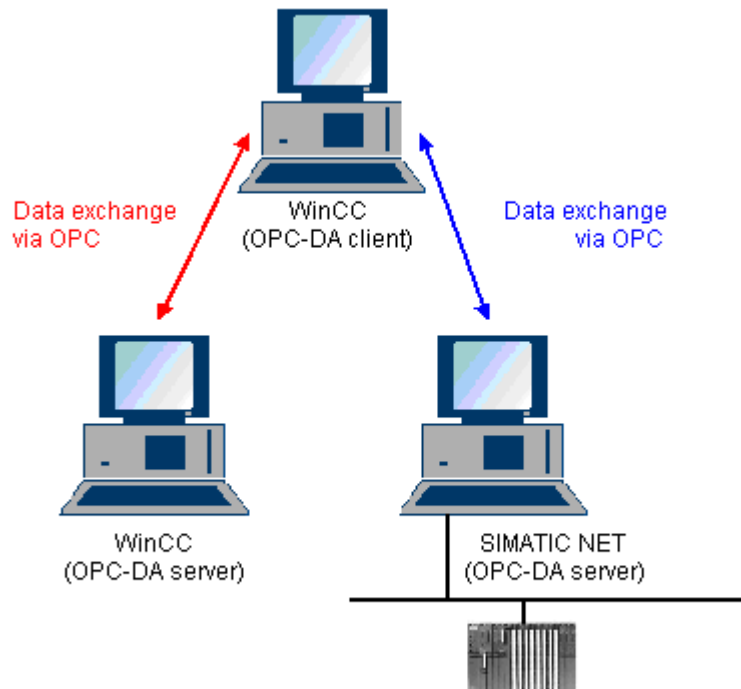
- OPC communication driver
- OPC Item Manager

Possible Applications

WinCC as an OPC DA client

If WinCC is used as an OPC DA client, the OPC channel must be added to the WinCC project. A connection for data exchange is created in the WinCC project of the WinCC OPC DA client; this is used to handle access to the WinCC tags of the OPC DA server.

To simplify the process, the OPC Item Manager is used. A WinCC OPC DA client can access multiple OPC DA servers. This requires that a connection be created for each OPC server. In this way, the WinCC OPC DA client can be used as a central operation and monitoring station.



Note

The WinCC OPC channel establishes connections only to OPC servers which have the status "OPC_STATUS_RUNNING".

Note

"OPC" channel

Unicode is not supported for connection names. Make sure that you name all connections in the project in the same language. Open the Control Panel of your computer to set the code page of this language for use in programs that do not support Unicode.

3.6.1.2 OPC Item Manager

Introduction

A connection and a WinCC tag are configured in the WinCC project of the WinCC OPC client to enable access to tags of an OPC server. The OPC Item Manager simplifies this process for you. The OPC Item Manager is automatically installed with WinCC.

Note

"OPC" channel

Unicode is not supported for connection names. Make sure that you name all connections in the project in the same language. Open the Control Panel of your computer to set the code page of this language for use in programs that do not support Unicode.

Requirements

The following requirements must be met in order to use the OPC Item Manager for configuration:

- The OPC server is an OPC DA server, an OPC XML server, or an OPC UA server
- A tag is already configured on the OPC server.
- If WinCC is to be used as the OPC server the WinCC project of the WinCC OPC server must be enabled. If this is not the case, the OPC Item Manager cannot access the WinCC OPC server.
- It must be possible to access the computer of the OPC servers via the IP address or HTTP.
- The OPC server must support the browser functionality. If that is not the case, access to the tag of the OPC server must be configured manually.

Note

If you change language in the WinCC Explorer while the OPC Item Manager is open, no tags are displayed when you click the "Browse Server" button. Exit the OPC Item Manager before changing language.

Tasks of the OPC Item Manager

The OPC Item Manager assumes the following tasks:

- Select OPC server
- Creating a connection
- Tag selection
- Adding a tag

Selecting the OPC server

OPC DA server

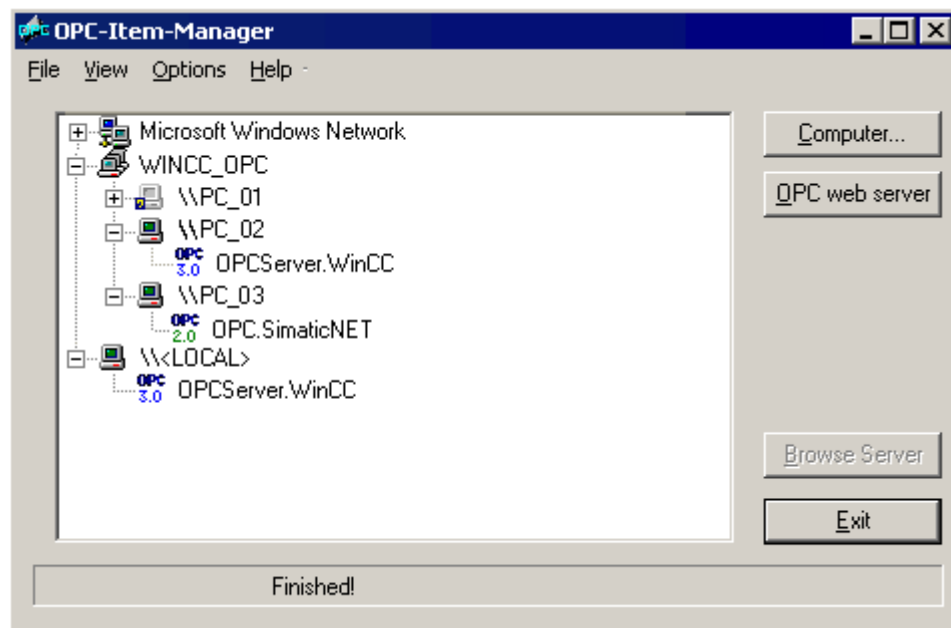
The OPC Item Manager can be used to determine the name of the OPC DA server in the network. These OPC DA servers can run on the same computer or on different computers in the connected network environment. For further details, refer to "WinCC OPC DA client".





OPC XML Server

The OPC Item Manager cannot be used to determine the name the OPC XML server. The OPC XML server can be added using the "OPC Web Server" button. For further details, refer to "WinCC OPC XML client".



OPC UA Server

The OPC Item Manager cannot be used to determine the name the OPC UA server. The OPC UA server can be added using the "OPC UA Server" button. For further details, refer to "WinCC OPC UA client".



Icons of the OPC Item Manager	Description
	A networked computer has not yet been searched for installed OPC DA servers.
	The computer was not found in the network or the computer could not be accessed.
	A networked computer has been searched for installed OPC DA servers.
	A networked computer contains the OPC DA server designated with the OPC symbol. The number indicates which OPC DA specification of the WinCC OPC DA client is used.
\\<LOCAL>	Refers to the computer running the OPC Item Manager.

3.6 Access via OPC - Open Connectivity

Icons of the OPC Item Manager	Description
 http://	Name of the OPC XML server. The OPC XML server can be added using the "OPC Web Server" button.
 opc.tcp://	Name of the OPC UA server. The OPC UA server can be added using the "OPC UA Server" button.

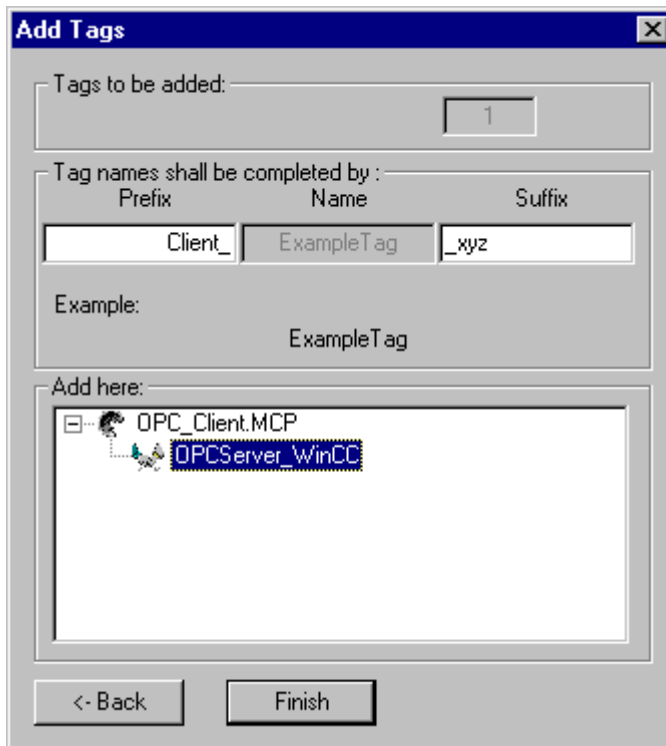
Creating a connection

The OPC Item Manager configures all required settings when creating a connection. If a connection to the OPC server has already been created, this function is not available.

Tag selection

You may use the tag selection dialog to select one or more tags on the OPC server which the WinCC OPC client is to access. Filter criteria can be used to limit the choices in the tag selection dialog.

Adding a tag



The names of the WinCC tags that access the tags of the OPC server can be set in the "Add Tags" dialog.

The WinCC tag name consists of the "prefix", "name" and "suffix". The "Name" field is preconfigured with the "ExampleTag" text. "ExampleTag" stands for the WinCC tag name of the WinCC OPC server.

You can assign a prefix or suffix to distinguish the WinCC tag name on the WinCC OPC client from the WinCC tag name on the WinCC OPC server. When configuring project monitoring, a prefix or suffix must be assigned.

The tag name may be assigned only once in a given WinCC project.

Example

The WinCC tag name on the WinCC OPC DA server is called "OPC_Server_Tag". The "Client_" value is entered in the prefix field and "_xyz" in the suffix field. In the WinCC project of the WinCC OPC DA client, the WinCC tag "Client_OPC_Server_Tag_xyz" is created.

If the tag name on the OPC server contains special characters, they are replaced by an underscore ("_"), because not all special characters occurring in tag names are supported by the OPC Item Manager.

Click "Finish" to add the WinCC tags to the WinCC project of the WinCC OPC DA client. The OPC Item Manager automatically sets the data type, the name and the address parameters for the WinCC tag.

See also

How to Access a WinCC Tag with the OPC Item Manager (Page 97)

How to Access a WinCC Tag with the OPC Item Manager (Page 82)

3.6.1.3 Overview of the Supported WinCC Data Types

The list below shows the data types that are supported by the WinCC OPC DA client and WinCC OPC DA server:

- Binary tags
- Signed 8-bit value
- Unsigned 8-bit value
- Signed 16-bit value
- Unsigned 16-bit value
- Signed 32-bit value
- Unsigned 32-bit value
- Floating-point number 32-bit IEEE 754
- Floating-point number 64-bit IEEE 754
- Text tag, 8-bit character set
- Text tag, 16-bit character set
- Raw data type

3.6 Access via OPC - Open Connectivity

- Structure types
- Text reference

Note

For structure types, only the structure elements are supported, not the structure itself. However, the structure can be configured later. For more information, refer to the topic "Using structures on the WinCC OPC DA client."

If a text tag is created with the OPC Item Manager, it is assigned a length of 160 characters. This length can be changed to any length.

See also

How to Use Structures on the WinCC OPC DA Client (Page 89)

3.6.1.4 WinCC OPC DA Client

Functionality of the WinCC OPC DA Client

Introduction

The OPC channel does not require a separate communication module. The OPC channel is an application which employs the OPC software interface to use an OPC DA server to access process data.

If WinCC is to be used as an OPC DA client, the OPC channel must be added to the WinCC project.

If a communication is established to a WinCC OPC DA server, the values of the WinCC tags are exchanged. To do this, a connection is set up in the WinCC project of the WinCC OPC DA client; it is used to handle access to the WinCC OPC DA server.

For the WinCC OPC DA client to access multiple OPC DA servers, a connection for each of the OPC DA servers must be set up in the WinCC project. For more information about troubleshooting channels and tags, refer to "Troubleshooting".

Note

The WinCC OPC channel establishes connections only to OPC servers which have the status "OPC_STATUS_RUNNING".

Note

"OPC" channel

Unicode is not supported for connection names. Make sure that you name all connections in the project in the same language. Open the Control Panel of your computer to set the code page of this language for use in programs that do not support Unicode.

Connection Monitoring

Three mechanisms are integrated for connection monitoring in the WinCC OPC-DA client. It is thus possible to take the best possible measures in the event of a network error or malfunction of an OPC DA server.

1. If the processing period for a DCOM activation exceeds warning value of 5 seconds, the tag is assigned the value "Addressing Error". If the processing period exceeds the cancellation value of 10 seconds, the connection to the OPC DA server is interrupted. This is displayed in the "Connection Status" dialog of the WinCC Explorers.

The OPC DA specification 3.00 is provided with the "Keep-Alive" feature. If the OPC DA server supports the OPC DA specifications 3.00, this feature is used. The feature causes the OPC DA server to automatically trigger cyclic updating (call OnDataChange) even if the tag values have not changed. If this regular updating is disabled, the WinCC OPC DA client terminates the connection.

The same behavior applies in the case of an OPC DA server which supports the OPC DA specifications 2.05a. In order to check the connection to the OPC DA server, the WinCC OPC DA client requests the status cyclically every 10 seconds. If this regular updating is disabled, the WinCC OPC DA client terminates the connection.

Generally, the WinCC OPC DA client terminates the connection to the OPC DA server when the connection is not capable of functioning. The WinCC OPC DA client attempts to re-establish the connection again, automatically, every 10 seconds.

See also

How to Use Structures on the WinCC OPC DA Client (Page 89)

Accessing a WinCC Tag without the OPC Item Manager (Page 87)

Configuring Access with the OPC Item Manager (Page 83)

Overview of the Supported WinCC Data Types (Page 79)

OPC Item Manager (Page 76)

OPC Specifications (Page 116)

Compatibility (Page 117)

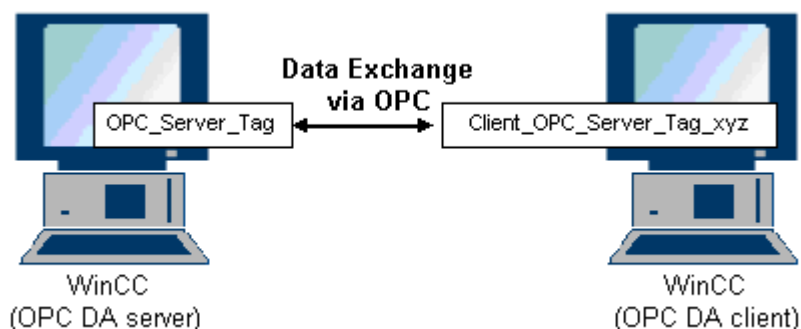
Functionality of the WinCC OPC DA Server (Page 122)

How to Access a WinCC Tag with the OPC Item Manager

How to Access a WinCC Tag with the OPC Item Manager

Introduction

When an OPC connection is made between WinCC and WinCC, data exchange occurs using WinCC tags. The WinCC OPC DA client uses an OPC connection to read the WinCC tag "OPC_Server_Tag" on the WinCC OPC DA server. To simplify the process, the OPC Item Manager is used.



Requirements

- Two computers with WinCC projects.
- Both computers must be accessible via their IP addresses.

Configuration Steps

The following configurations are required in the WinCC project of the WinCC OPC DA client:

See also

- Configuring Access with the OPC Item Manager (Page 83)
- Configuring the OPC Channel on the WinCC OPC DA Client (Page 82)
- Configuring Access with the OPC Item Manager (Page 98)
- Example of WinCC to WinCC Connection (Page 125)

Configuring the OPC Channel on the WinCC OPC DA Client

Introduction

To use OPC for data exchange, the OPC channel must be set up in the WinCC project.

Procedure

1. Click the "Tag Management" icon in the navigation window of the WinCC Explorer on the WinCC OPC DA client.
2. Select "Add New Driver" from the "Tag Management" shortcut menu. The "Add New Driver" dialog is opened.
3. Select the "OPC.chn" driver and click the "Open" button. The channel is created and the communication driver is displayed in the tag management.

See also

Configuring Access with the OPC Item Manager (Page 83)

Configuring Access with the OPC Item Manager

Introduction

This section explains how to use the OPC Item Manager to configure access to the WinCC tag "OPC_Server_Tag" of the WinCC OPC DA server.

Requirements

- Configure an internal tag named "OPC_Server_Tag" of the data type "signed 16-bit value" in the WinCC project of the WinCC OPC DA server.
- Enable the WinCC project of the WinCC OPC DA server.
- Add the "OPC" channel to the WinCC project of the WinCC OPC DA client.

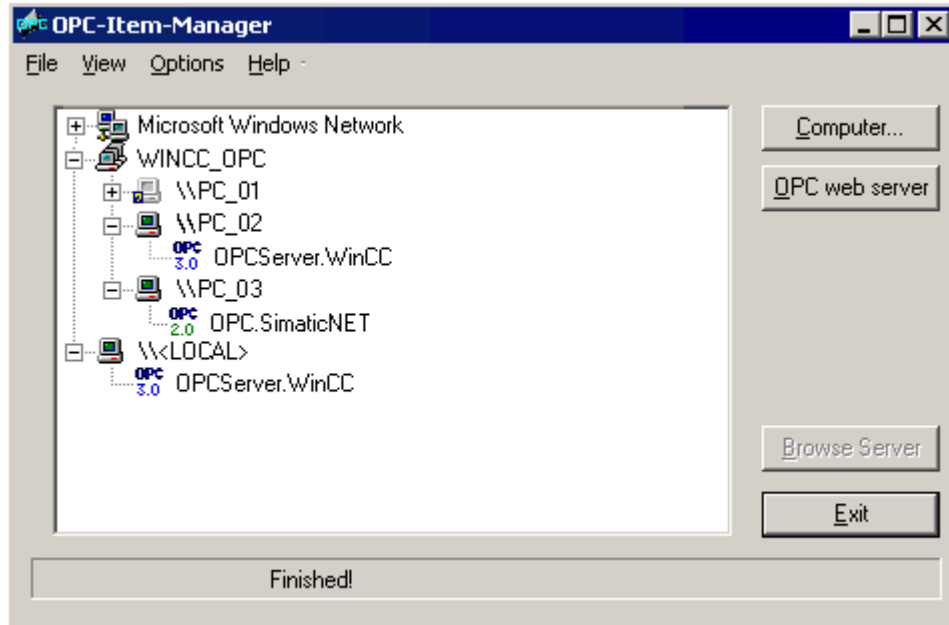
Note

"OPC" channel

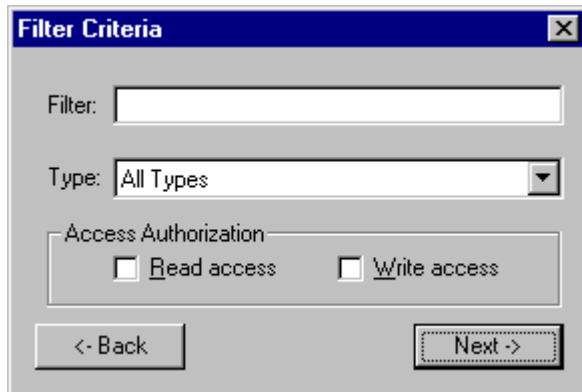
Unicode is not supported for connection names. Make sure that you name all connections in the project in the same language. Open the Control Panel of your computer to set the code page of this language for use in programs that do not support Unicode.

Procedure

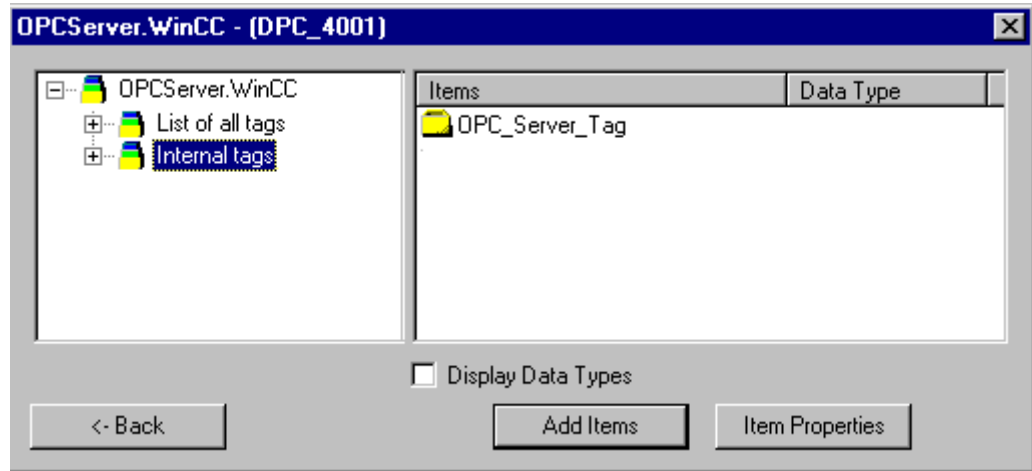
1. In the shortcut menu of the channel unit "OPC Groups(OPCHN Unit#1)" on the WinCC OPC DA client, select "System Parameters". The "OPC Item Manager" opens.



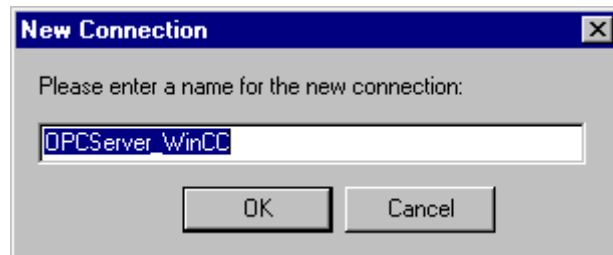
2. Choose the name of the computer to be used as the WinCC OPC DA server from the selection dialog.
Select "OPCServer.WinCC" from the list displayed.
3. Click the "Browse Server" button.
The "Filter criteria" dialog is opened.



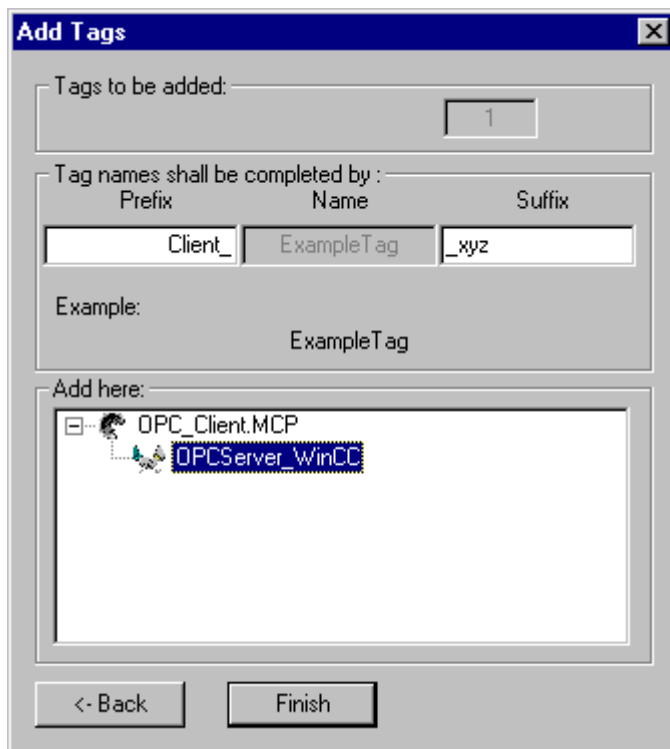
- Click "Next".
The "OPCServer.WinCC ..." dialog is opened.



- Select the WinCC tag "OPC_Server_Tag".
Click the "Add Items" button.
- If a connection to the WinCC OPC DA server already exists, continue with step 6.
If a connection has not been created, a message will be displayed.
Click on the "Yes" button. The "New Connection" dialog is opened.



7. Enter "OPCServer_WinCC" as the name of the connection. Click "OK".
The "Add Tags" dialog opens.



8. Enter the text "Client_" in the prefix field and the text "_xyz" in the suffix field.
9. Select connection "OPCServer_WinCC".
Click "Finish".
10. Click the "Back" button in the "OPCServer.WinCC ..." dialog.
Click "Exit" to close the OPC Item Manager.

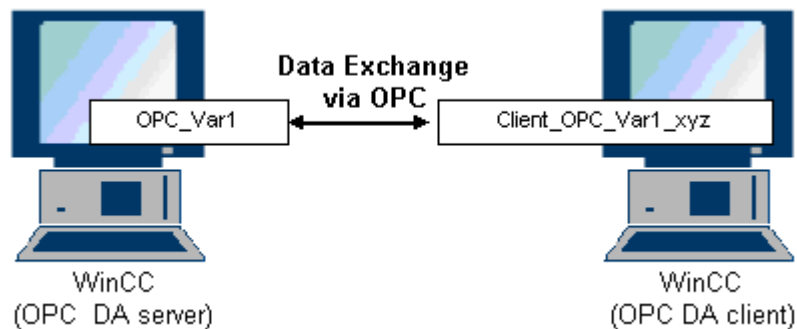
See also

Configuring the OPC Channel on the WinCC OPC DA Client (Page 82)

Accessing a WinCC Tag without the OPC Item Manager

Introduction

OPC servers that do not support browser functionality require access to be configured manually. Configuration of WinCC tags on the WinCC OPC DA client is shown using an example of a WinCC-WinCC OPC connection.



Note

To access a WinCC tag without the OPC Item Manager, the ItemID must be set manually. When addressing WinCC tags, the symbolic computer name (server prefix) can also be specified. The ItemID has the following syntax: Server prefix::WinCC tag. If the WinCC tag of the local WinCC project is addressed, the server prefix is omitted.

The following configurations are required in the WinCC project of the WinCC OPC DA client:

1. Selection of the "OPC_Var1" WinCC tag to be accessed.
2. Creation of a connection.
3. Configuration of the "Client_OPC_Var1_xyz" WinCC tag that accesses the WinCC tag of the WinCC OPC DA server.

Requirements

- Two computers with WinCC projects.
- Both computers must be accessible via their IP addresses.
- Configure an internal tag named "OPC_Var1" with data type "signed 16-bit value" in the WinCC project of the WinCC OPC DA server.
- Enable the WinCC project of the WinCC OPC DA server.
- Add the OPC channel to the WinCC project of the WinCC OPC DA client.

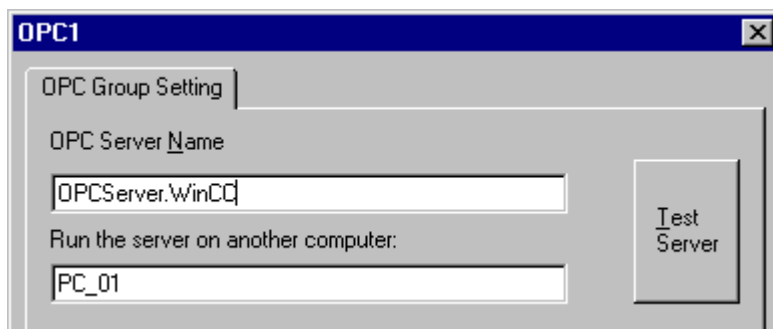
Note

"OPC" channel

Unicode is not supported for connection names. Make sure that you name all connections in the project in the same language. Open the Control Panel of your computer to set the code page of this language for use in programs that do not support Unicode.

Procedure

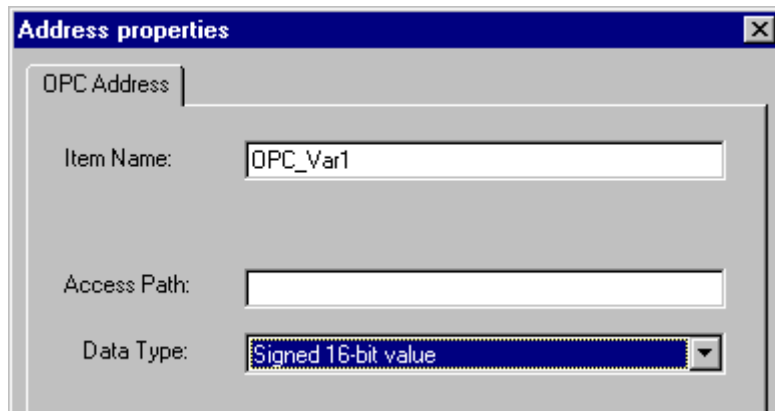
1. Select "New Connection" from the shortcut menu of the channel unit "OPC Groups(OPCHN Unit#1)" on the WinCC OPC DA client. The "Connection Properties" dialog is opened. Enter a name for the connection in the corresponding field.
2. Click the "Properties" button. A dialog with the connection name in its title is displayed.



For connections to WinCC V 6, the entry in the "OPC Server Name" field must be "OPCServer.WinCC".

3. Enter the name of the computer to be used as the OPC DA server in the "Start Server on this Computer" field. Click "Test Server", to check the connection to the WinCC OPC DA server.
4. Select "New Tag" from the shortcut menu of the connection. The "Tag Properties" dialog opens.
5. Enter the name "Client_OPC_Var1_xyz" in the "Tag" field. Set the data type to "signed 16-bit".

- In the "Tag Properties" dialog, click the "Select" button. The "Address Properties" dialog opens.



Enter the name of the WinCC tag of the WinCC OPC DA server in the "Item Name" field. Leave the entry in the "Access Path" field unchanged. Set the data type to "signed 16-bit".

- Click "OK" to close all open dialogs.

Using Structures on a WinCC OPC DA Client

How to Use Structures on the WinCC OPC DA Client

Introduction

Structures are used to organize tags and tag types that form a logical unit. This allows them to be referenced using a single logical name.

Structures are not supported by the OPC DA specification. As a result, structures cannot be set up using the OPC Item Manager, only the individual tags in a structure. If you wish to use structures on the WinCC OPC DA client nonetheless, the data structure must be configured subsequently in the WinCC project of the WinCC OPC DA client in order to supply it with the relevant item names of the server tags.

Requirements

- Two computers with WinCC projects.
- Both computers must be accessible via their IP addresses.

Configuration steps

The following configuration steps are necessary to use structures on the WinCC OPC DA client:

- Configuring structures and structure tags on the WinCC OPC DA server
- Using structures on the WinCC OPC DA client in the WinCC project

See also

How to Configure Structures on the WinCC OPC DA Client (Page 91)

Configuring Structures and Structure Tags on the WinCC OPC DA Server (Page 90)

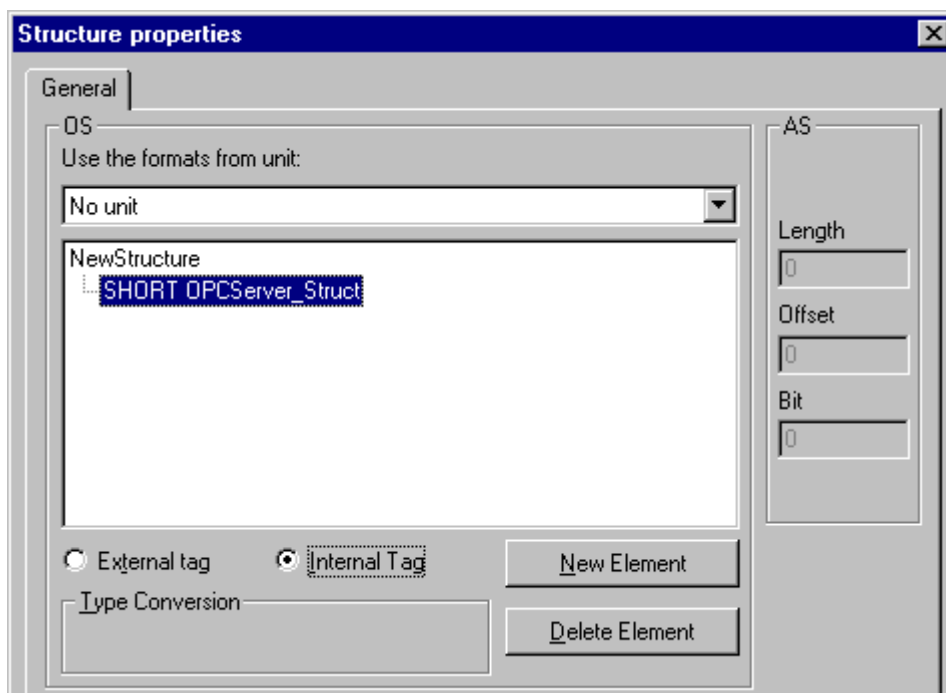
Configuring Structures and Structure Tags on the WinCC OPC DA Server

Introduction

In this section a structure and a structure tag is created in the WinCC project of the OPC DA server. This configuration is required for the OPC DA client to access the structure tag.

Procedure

1. Select "New Structure Type" from the structure types shortcut menu on the WinCC OPC DA server. The "Structure Properties" dialog is displayed.
2. Click "New Element" and create the internal tag "OPCServer_Struct" of data type SHORT.



Click "OK" to close the dialog.

3. In the navigation window, click the plus sign in front of the icon for tag management. Select "New Tag" from the internal tag shortcut menu. Create a WinCC tag named "Var" with this structure type.
4. The data frame of the WinCC Explorer shows the single tag "Var" and the structure tag "Var.OPCServer_Struct".
5. Activate the WinCC project.

See also

How to Configure Structures on the WinCC OPC DA Client (Page 91)

How to Configure Structures on the WinCC OPC DA Client

Introduction

Structures are not supported by the OPC DA specification. As a result, structures cannot be set up using the OPC Item Manager. In this section, the structure already present in the WinCC project of the WinCC OPC DA server is configured for the WinCC project of the WinCC OPC DA client. A WinCC tag that accesses the existing structure tag on the WinCC OPC DA server is configured on the WinCC OPC DA client.

Requirements

- Create a structure and a structure tag named "Var.OPCServer_Struct" in the WinCC project of the WinCC OPC DA server.
- Enable the WinCC project of the WinCC OPC DA server.
- Add the OPC channel to the WinCC project of the WinCC OPC DA client.

Note

"OPC" channel

Unicode is not supported for connection names. Make sure that you name all connections in the project in the same language. Open the Control Panel of your computer to set the code page of this language for use in programs that do not support Unicode.

Procedure

1. Select "New Structure Type" from the structure types shortcut menu on the WinCC OPC DA client. The "Structure Properties" dialog is displayed.
2. Click the "New Element" button and set up an external tag. Name the element exactly as it is in the WinCC project of the OPC-DA server. Click "OK" to close the "Structure Properties" dialog.
3. If a connection to the OPC DA server already exists, continue with step 6. If no connection has been created, select "New Connection" from the shortcut menu of the channel unit "OPC". The "Connection Properties" dialog is opened. Enter a name for the connection in the corresponding field.
4. Click the "Properties" button. A dialog with the connection name in its title is displayed. For connections to WinCC V 6, the entry in the field "OPC Server Name" must be "OPCServer.WinCC".
5. Enter the name of the computer to be used as the WinCC OPC DA server in the field "Start Server on this Computer". Click "Test Server", to check the connection to the WinCC OPC DA server. Click "OK" to close the dialog.

3.6 Access via OPC - Open Connectivity

6. Select "New Tag" from the shortcut menu of the connection. The "Tag Properties" dialog opens. Select the newly created structure type as the data type.
7. In the "Tag Properties" dialog, click the "Select" button. The "Address properties" dialog opens.
In the "Item Name" field, enter the name "Var.OPCServer_Struct" for the structure tag of the WinCC OPC DA server. Leave the entry in the "Access Path" field unchanged.
8. Click "OK" to close all open dialogs.

See also

Configuring the OPC Channel on the WinCC OPC DA Client (Page 82)

Configuring Structures and Structure Tags on the WinCC OPC DA Server (Page 90)

Error Handling in the Event of Disturbed OPC DA Communication

Error Handling in the Event of Disturbed OPC Communication

Introduction

The procedure for communication testing is independent of how WinCC is used.

WinCC Used as the OPC DA Server

Use the channel diagnostics on the WinCC OPC DA client to determine whether a connection to the OPC DA server can be established. For more information regarding channel problem analysis, refer to "Troubleshooting".

WinCC Used as the OPC DA Client

Use the channel diagnostics on the WinCC OPC DA client to determine whether a connection to the OPC DA server can be established. For more information regarding channel problem analysis, refer to "Troubleshooting".

See also

WinCC is used as the OPC DA client, and the connection is not established. (Page 96)

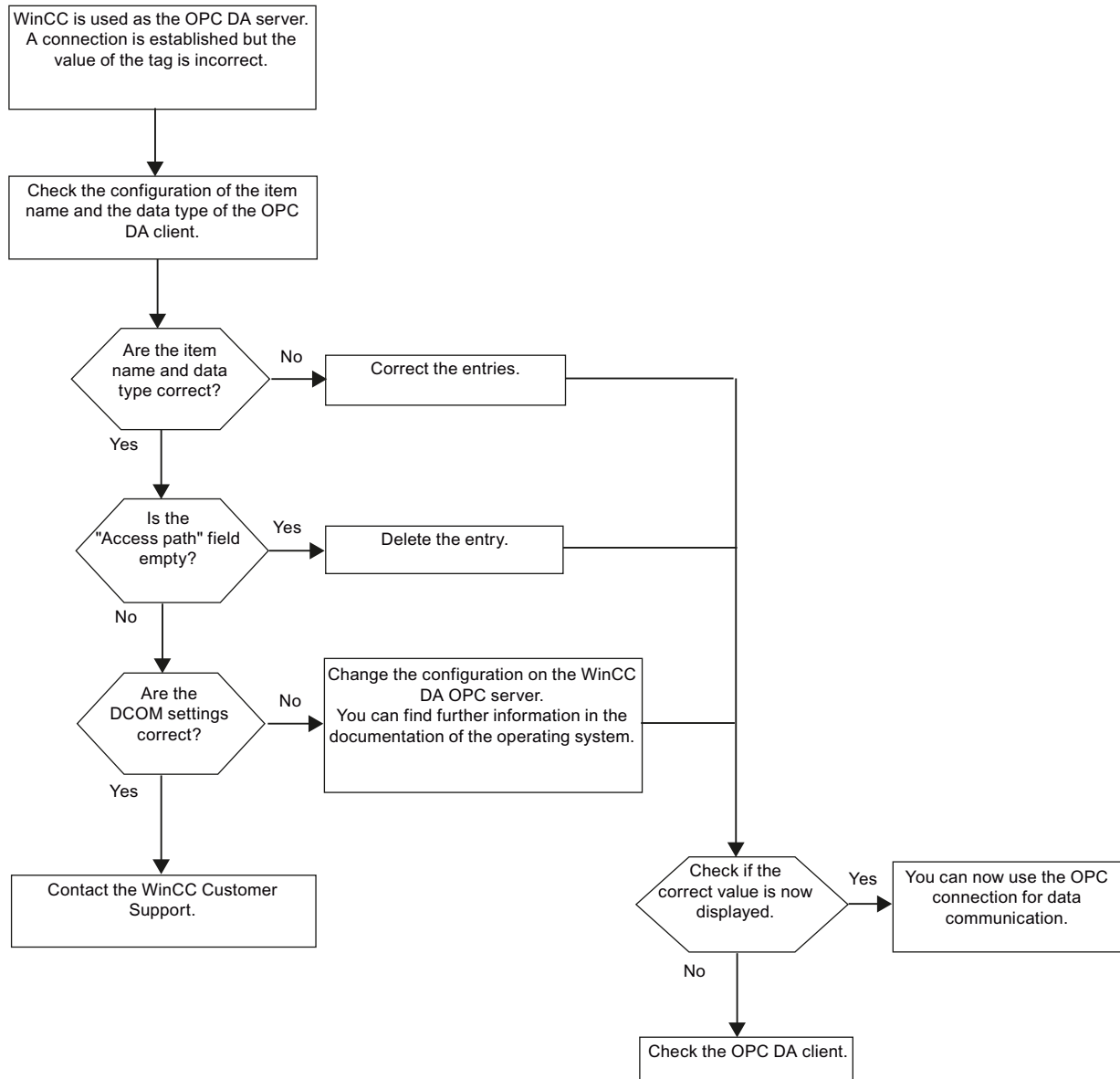
WinCC is used as the OPC DA client, and the connection is established. (Page 95)

WinCC is used as the OPC DA server, and the connection is not established. (Page 94)

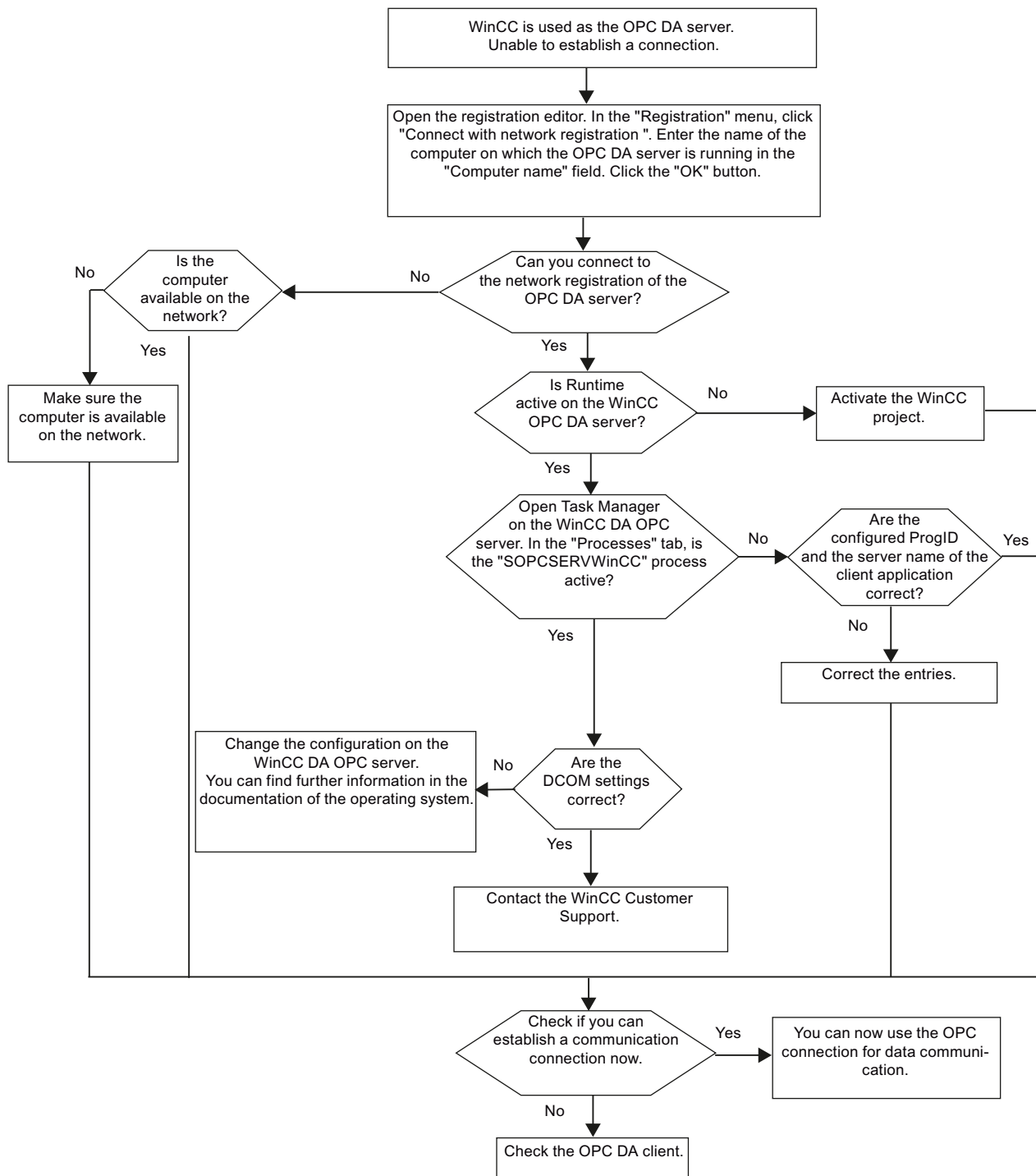
WinCC is used as the OPC DA server, and the connection is established successfully. (Page 93)

WinCC as OPC DA Server

WinCC is used as the OPC DA server, and the connection is established successfully.

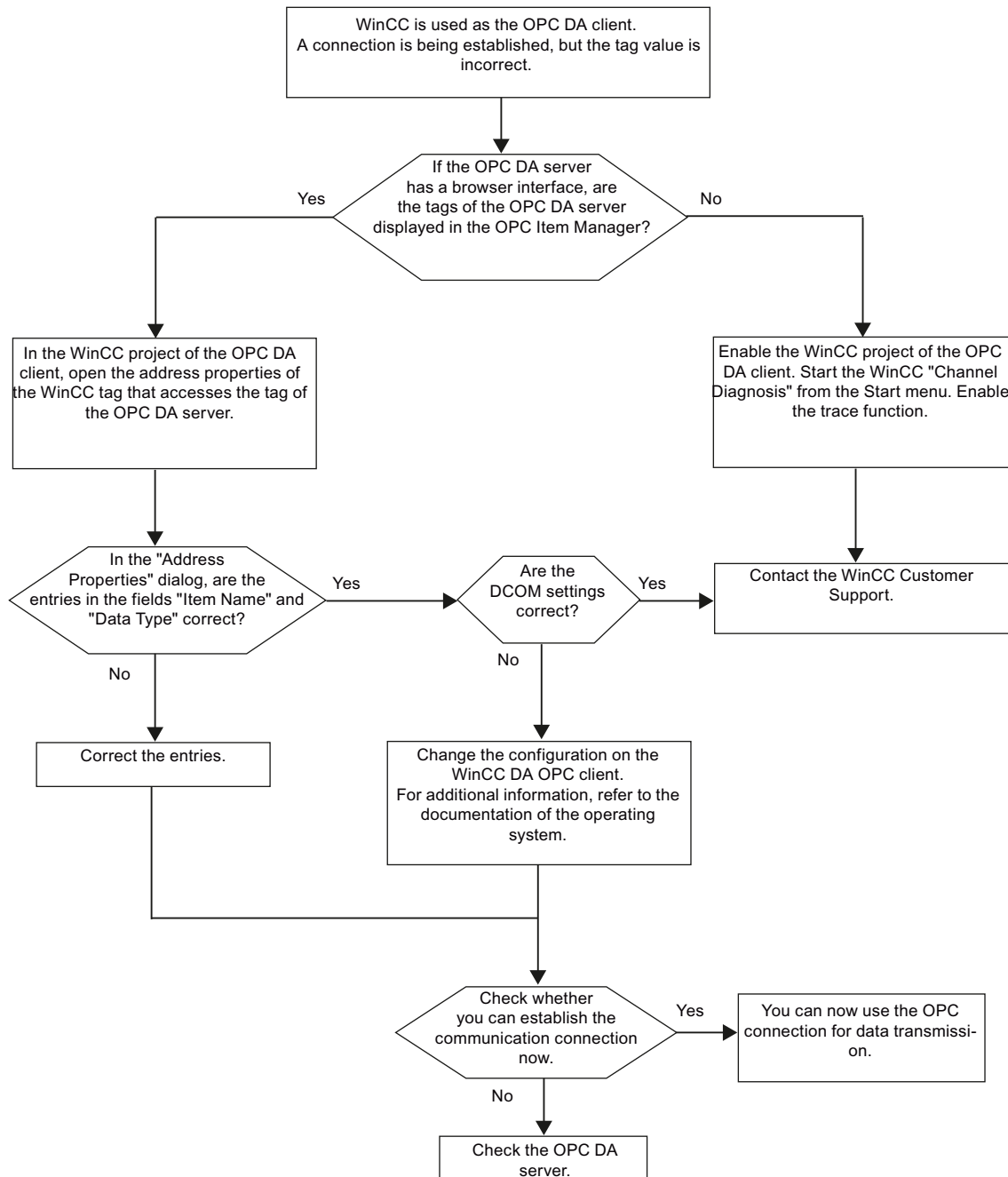


WinCC is used as the OPC DA server, and the connection is not established.

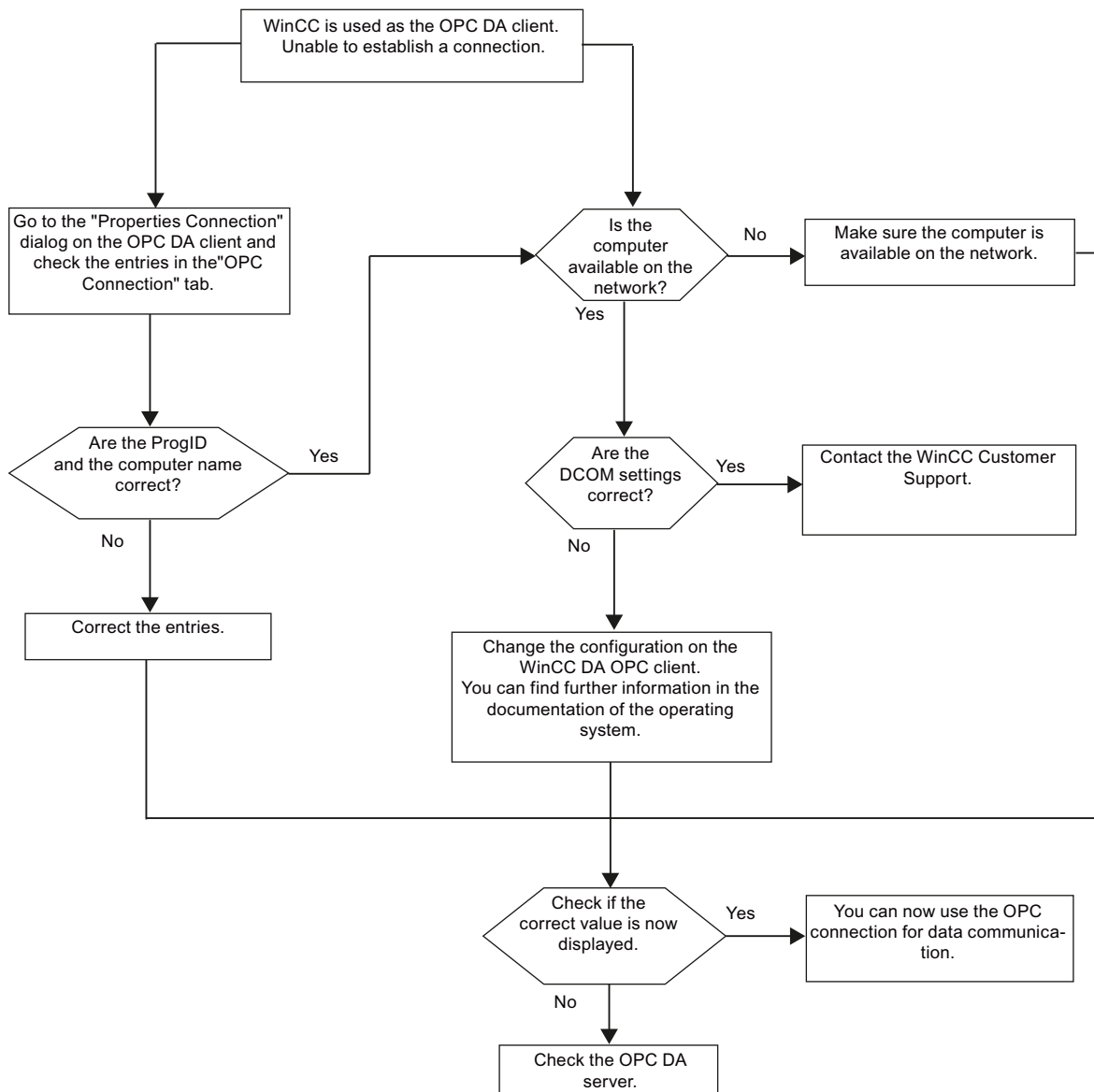


WinCC as OPC DA Client

WinCC is used as the OPC DA client, and the connection is established.



WinCC is used as the OPC DA client, and the connection is not established.



3.6.1.5 WinCC OPC XML Client

Functionality of the WinCC OPC XML Client

Introduction

The OPC channel does not require a separate communication module. The OPC communication driver can be implemented as the OPC XML client.

In order to use WinCC as the WinCC OPC XML client, the OPC channel must be added to the WinCC project.

The WinCC OPC XML client provides the OPC XML server with the OPC process data as a web page. Access can be made to the web page via the Internet / Intranet using HTTP. When a WinCC OPC XML client requests data, the web service is automatically started by the web server.

In order that the WinCC OPC XML client can access several OPC XML servers, a connection must be made to each OPC XML server in the WinCC project.

If a communication is established to a WinCC OPC XML server, the values of the WinCC tags are exchanged. A connection is set up in the WinCC project of the WinCC OPC XML client via which access to the WinCC OPC XML server can be processed. The connection monitoring is not activated in the case of a WinCC OPC XML client.

Note

The WinCC OPC channel establishes connections only to OPC servers which have the status "OPC_STATUS_RUNNING".

Note

"OPC" channel

Unicode is not supported for connection names. Make sure that you name all connections in the project in the same language. Open the Control Panel of your computer to set the code page of this language for use in programs that do not support Unicode.

See also

Overview of the Supported WinCC Data Types (Page 79)

OPC Item Manager (Page 76)

OPC Specifications (Page 116)

Functionality of WinCC OPC XML DA server (Page 118)

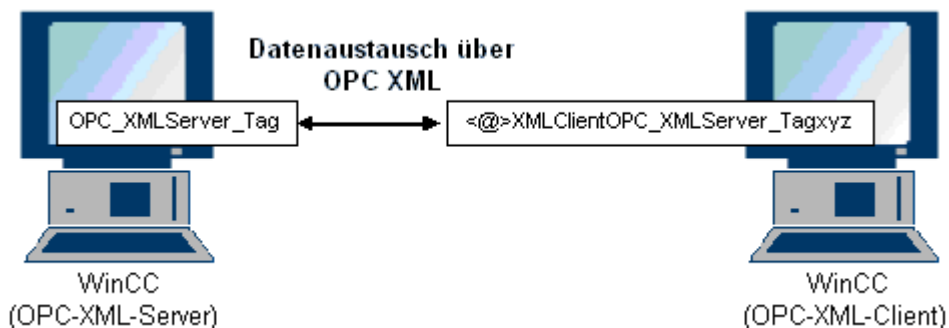
How to Access a WinCC Tag with the OPC Item Manager

How to Access a WinCC Tag with the OPC Item Manager

Introduction

When an OPC connection is made between WinCC and WinCC, the data is exchanged by means of WinCC tags. The WinCC OPC DA client uses an OPC connection to read the WinCC

tag "OPC_Server_Tag" on the WinCC OPC XML server. To simplify the process, the OPC Item Manager is used.



Requirements

- Two computers with WinCC projects.
- It must be possible to access both computers using HTTP.

Configuration Steps

The following configurations are required in the WinCC project of the WinCC OPC XML client:

See also

Configuring the OPC Channel on the WinCC OPC DA Client (Page 82)

Configuring Access with the OPC Item Manager (Page 98)

Configuring Access with the OPC Item Manager

Introduction

This section explains how to use the OPC Item Manager to configure access to the "OPC_XMLServer_Tag" WinCC tag of the WinCC OPC XML server.

Requirements

- Configure an internal tag named "OPC_XMLServer_Tag" of data type "signed 16-bit value" in the WinCC project of the WinCC OPC XML server.
- Activate the WinCC project of the WinCC OPC XML server.
- The OPC channel must be added to the WinCC project of the WinCC OPC XML client.

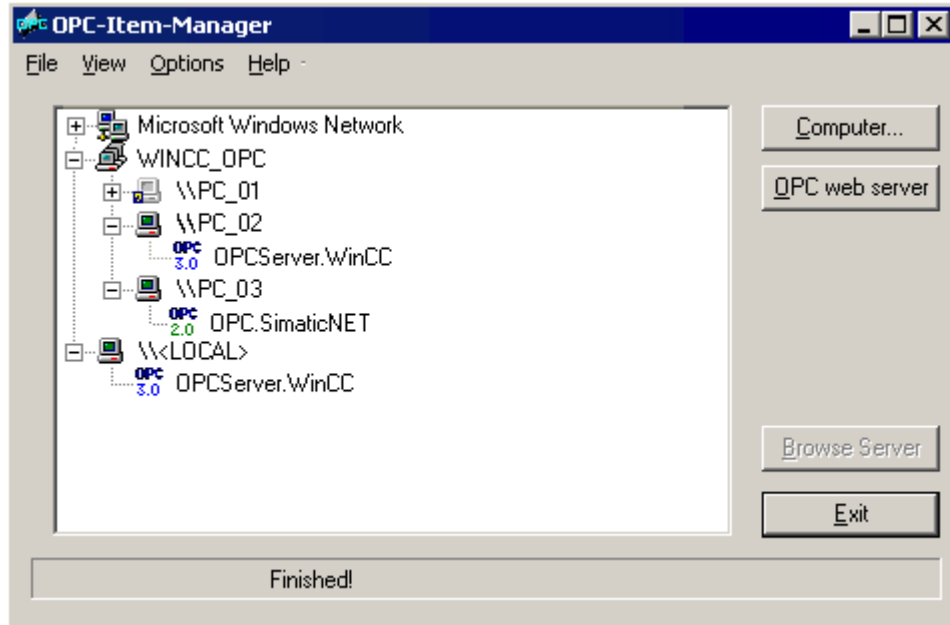
Note

"OPC" channel

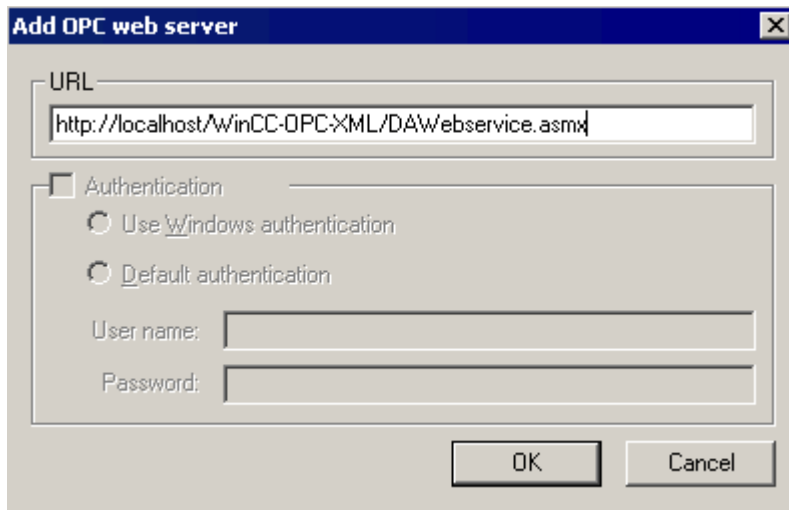
Unicode is not supported for connection names. Make sure that you name all connections in the project in the same language. Open the Control Panel of your computer to set the code page of this language for use in programs that do not support Unicode.

Procedure

1. Select "System Parameters" from the shortcut menu of the channel unit "OPC Groups(OPCHN Unit#1)" on the WinCC OPC XML client. The "OPC Item Manager" opens.

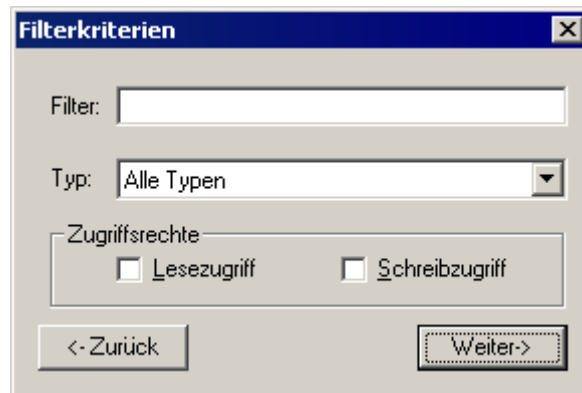


2. Click the "OPC Web Server" button. The "Add OPC Web Server" dialog is opened. Enter the URL of the WinCC OPC XML server in the "URL" field in following format: <http://<xxx>/WinCC-OPC-XML/DAWebservice.asmx>. Replace xxx with either the IP address or the computer name on which the OPC XML web service is running.

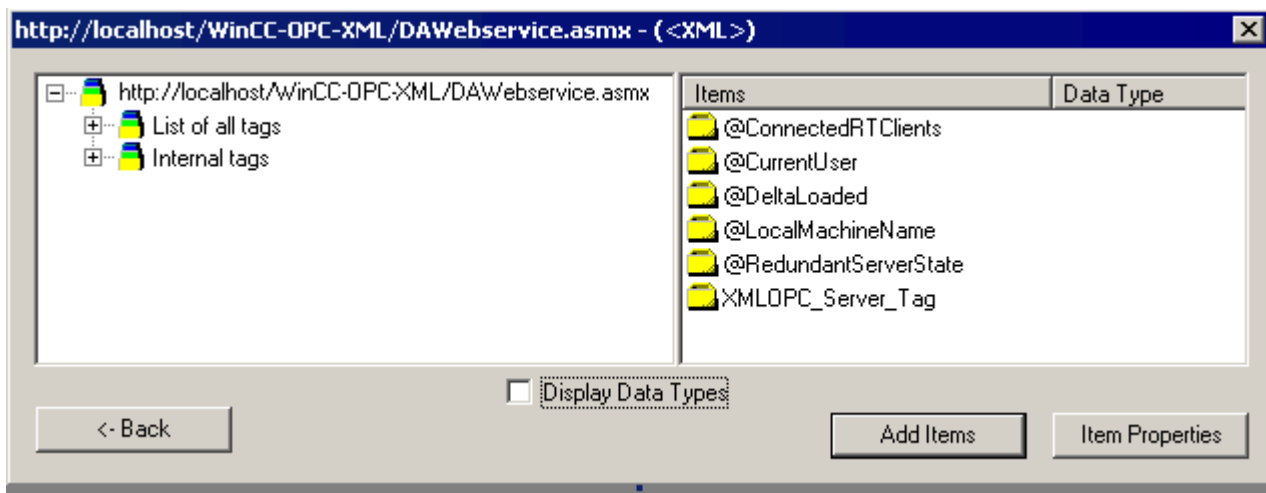


Click "OK" to close the dialog.

- A list appears from which to select "WinCC-OPC-XML/DAWebservice.asmx>". Click the "Browse Server" button. The "Filter criteria" dialog is opened.



- Click the "Next->" button in the "Filter Criteria" dialog. The "http:// ..." dialog is opened.

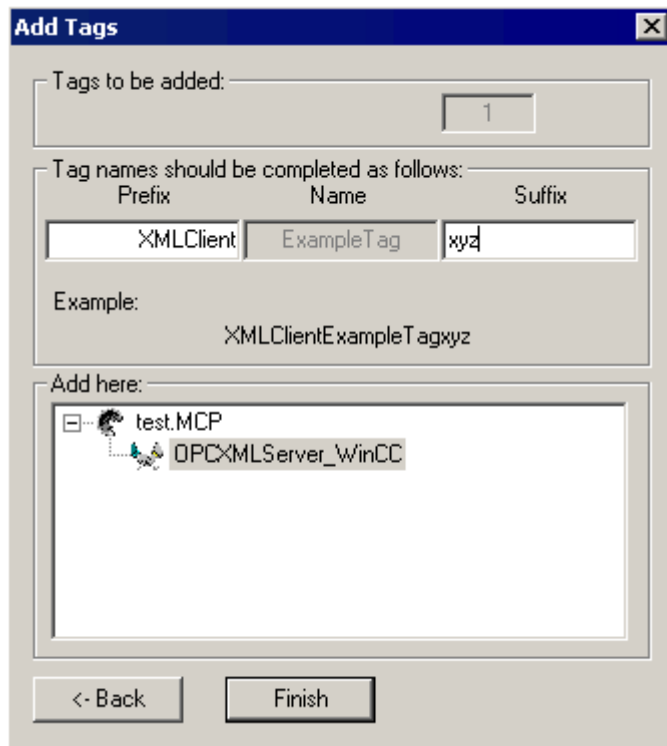


- In the "http:// ..." dialog, select the WinCC tag "XMLOPC_Server_Tag". Click the "Add Items" button.
- If a connection to the WinCC OPC XML server already exists, continue with step 7. If no connection has been configured, a corresponding message is output. Click "Yes". The "New Connection" dialog is opened.



Enter the name "OPCXMLServer_WinCC" for the connection. Click "OK".

- The "Add Tags" dialog opens.
Enter the string "XMLClient_" in the prefix field, and "_xyz" in the suffix field. Select the "OPCXMLServer_WinCC" connection. Click "Finish".



- In the "http:// ..." dialog, click "<- Back". Click "Exit" to close the OPC Item Manager.

See also

Configuring the OPC Channel on the WinCC OPC DA Client (Page 82)

Accessing a WinCC Tag without the OPC Item Manager

Introduction

OPC servers that do not support browser functionality require access to be configured manually. Configuration of WinCC tags on the WinCC OPC XML client is shown using an example of a WinCC - WinCC OPC connection.

Note

To access a WinCC tag without the OPC Item Manager, the ItemID must be set manually. When addressing WinCC tags, the symbolic computer name (server prefix) can also be specified. The ItemID has the following syntax: server_prefix::<@>WinCC tag. If the WinCC tag of the local WinCC project is addressed, the ItemID has the following syntax: <@>WinCC tag.

Configuration Steps

The following configurations are required in the WinCC project of the WinCC OPC XML client:

1. Creation of a connection.
2. Configuring the "XMLClient_OPC_Var1_xyz" WinCC tag on the WinCC OPC XML client which accesses the WinCC tag of the WinCC OPC DA server.

Requirements

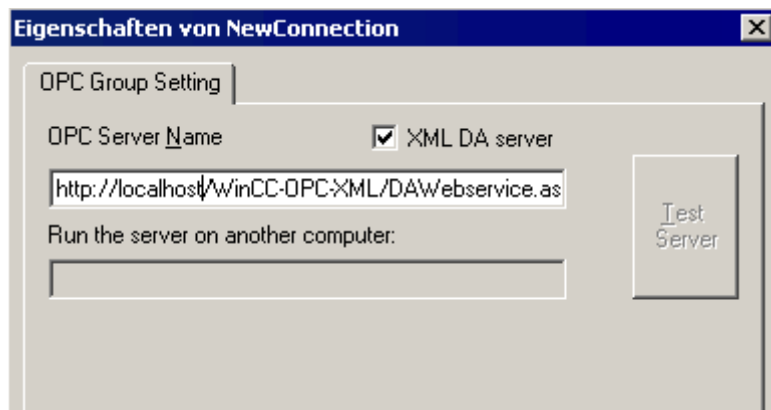
- Two computers with WinCC projects.
- It must be possible to access the computers using HTTP.
- Configure an internal tag named "XML OPC_Server_Tag" with data type "signed 16-bit value" in the WinCC project of the WinCC OPC XML server.
- Enable the WinCC project of the WinCC OPC XML server.
- The OPC channel must be added to the WinCC project of the WinCC OPC XML client.

Note

When configuring external tags in the OPC channel, the preset values from WinCC in the type conversion field of the "Tag Properties" dialog must not be altered. The data type of the tag in the process is set in the data type field of the "Address Properties" dialog.

Procedure

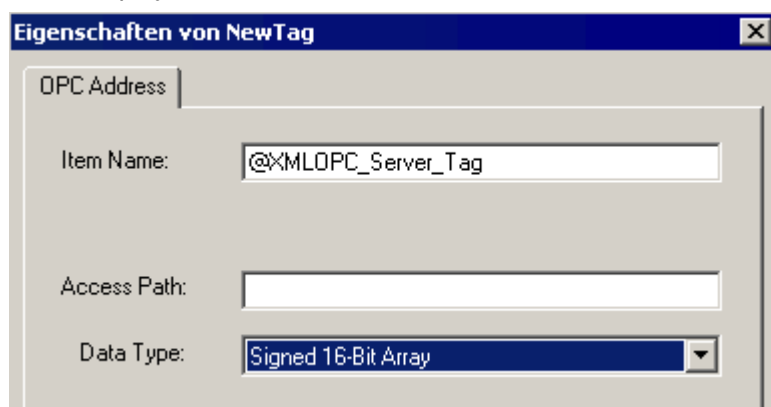
1. Select "New Connection" from the shortcut menu of the channel unit "OPC Groups(OPCHN Unit#1)" on the WinCC OPC XML client. The "Connection Properties" dialog is opened. Enter a name for the connection in the corresponding field.
2. Click the "Properties" button. A dialog with the connection name in its title is displayed.



Select the "XML DA Server" check box. In the case of a connection to the WinCC OPC XML server, the "OPC Server Name" field must contain the URL of the WinCC OPC XML server. The URL has the following syntax: "http://<xxx>/WinCC-OPC-XML/DAWebservice.asmx". Replace xxx with either the IP address or the computer name on which the OPC-XML web service is running.

3.6 Access via OPC - Open Connectivity

3. Select "New Tag" from the shortcut menu of the connection. The "Tag Properties" dialog is opened.
4. Enter the name "XMLClient_OPC_Var1_xyz" in the "Tag" field. Set the data type to "signed 16-bit".
5. In the "Tag Properties" dialog, click the "Select" button. A dialog with the tag name in its title is displayed.



Enter the symbol "<@>" and the name of the WinCC tag of the WinCC OPC XML server in the "Item Name" field. Leave the entry in the "Access Path" field unchanged. Set the data type to "signed 16-bit".

6. Click "OK" to close all open dialogs.

3.6.1.6 WinCC OPC UA client

Functionality of the WinCC OPC UA client

Introduction

The WinCC OPC UA client enables data access to any OPC UA server in accordance with the OPC Unified Architecture specification. OPC Unified Architecture (OPC UA) also provides additional mechanisms such as authentication and encryption for secure communication between participating partners.

To use WinCC as WinCC OPC UA client, add the OPC communication driver (OPC channel) to the WinCC project. A separate communication module is not required.

To enable access to the OPC process data of different OPC UA servers, configure a connection to each server in the WinCC project. Use the WinCC OPC Item Manager to configure the connections.

Note

Connection monitoring is not activated if the OPC channel is used as OPC UA client.

Connections are only established to servers which signal the status "RUNNING".

Accessing a tag using the OPC Item Manager

Accessing an OPC tag using the OPC Item Manager

Introduction

If there is an OPC link from WinCC to an OPC UA server, OPC UA server data is mapped to a WinCC tag. In this process, the WinCC OPC UA client uses a secure connection to access the "OPC_UAServer_Tag" of the WinCC OPC UA server. Use OPC Item Manager for your configuration.

Note

You can only access servers that offer browse support during the configuration.

Distinguish between client and server certificates when configuring. Secure communication is only possible when client and server recognize each other's certificates.

Certificates are linked to the respective computers. After having moved, copied, or duplicated the WinCC project to a different computer, repeat this procedure so that each computer can verify the other's certificates.

Requirements

- Client computers with a WinCC project.
- Both computers must be accessible via TCP connection.
- The Firewall allows two-way communication with the UA server.

Configuration Steps

Complete the following configuration tasks in the WinCC project of the WinCC OPC UA client:

- Configuration of the OPC channel on the WinCC OPC UA client.
- Setup of a valid server certificate.
- Configuration of access with the OPC Item Manager.

How to set up a server certificate

Introduction

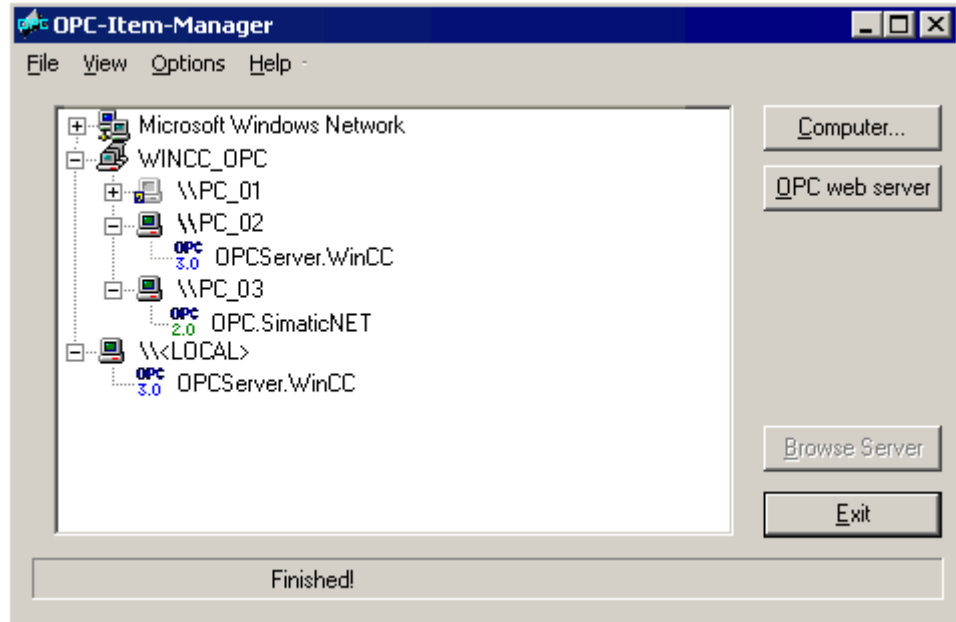
This section explains how to set up an OPC UA server certificate for the WinCC OPC UA client.

Requirements

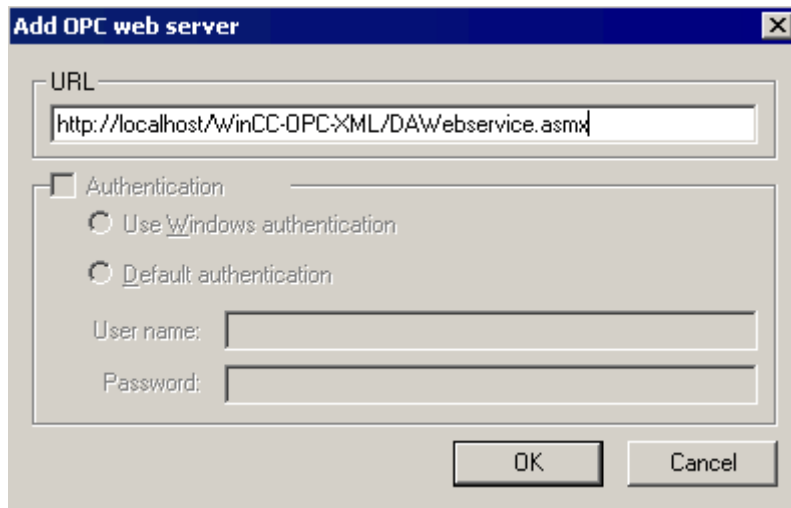
- The OPC UA server is activated.
- The Firewall allows two-way communication with the UA server.
- The "OPC" channel has been added to the WinCC project of the WinCC OPC UA client.

Procedure

1. On the WinCC OPC UA client, select the "System parameters" command from the shortcut menu of the "OPC Groups(OPCHN Unit#1)" channel unit. The "OPC Item Manager" opens.



2. Click "OPC UA server". The "Add OPC UA server" dialog opens. Enter the URL of the WinCC OPC UA server in the "Server URL" field in the following format:
<opc.tcp://OPC UA server address>
Make the required security settings. If necessary, enter authentication data.



Close the dialog with "OK".

3. Select the "<opc.tcp://OPC UA server address>" entry from the list displayed.
4. Click "Browse Server".
An error dialog opens.
5. Close the error dialog.

3.6 Access via OPC - Open Connectivity

6. Open Windows Explorer and change to the "OPC" folder in the WinCC installation path.
7. Open the "PKI/CA/" folder.
The "rejected" folder containing the rejected server certificate has been added.
8. Move the server certificate from the "rejected" folder to the "certs" folder.
The server certificate has been validated. It is now possible to activate a secure connection to the OPC UA server.

How to configure access to a tag using the OPC Item Manager

Introduction

This section explains how to use OPC Item Manager to configure access to the "OPC_UAServer_Tag" WinCC tag of the WinCC OPC UA server.

Note

You can only access servers that offer browse support during the configuration.

Requirements

- The OPC UA server is activated.
- The Firewall allows two-way communication with the UA server.
- The server certificate has been set up.
- The "OPC" channel has been added to the WinCC project of the WinCC OPC UA client.

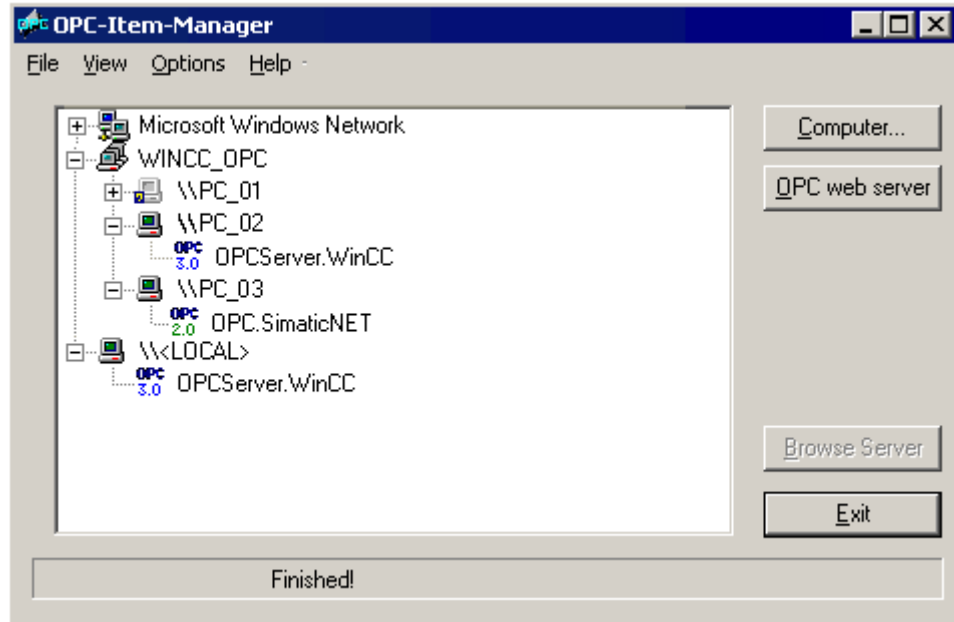
Note

"OPC" channel

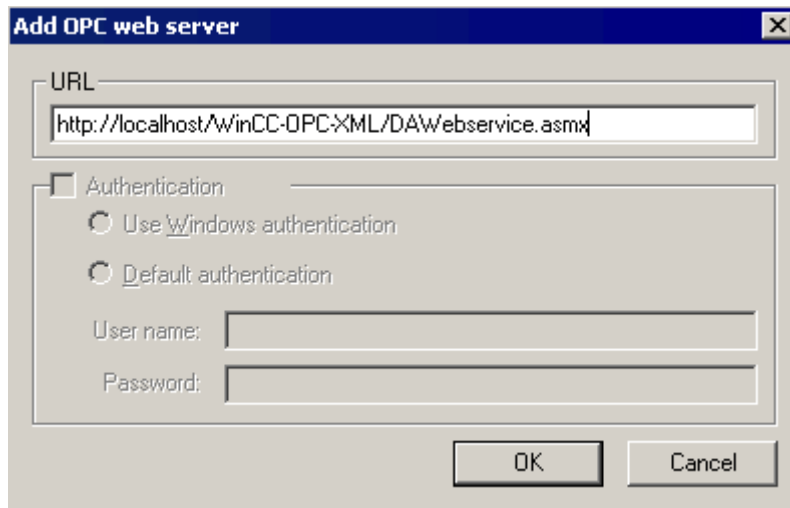
Unicode is not supported for connection names. Make sure that you name all connections in the project in the same language. Open the Control Panel of your computer to set the code page of this language for use in programs that do not support Unicode.

Procedure

1. On the WinCC OPC UA client, select "System parameters" from the shortcut menu of the channel unit "OPC Groups(OPCHN Unit#1)". The "OPC Item Manager" opens.

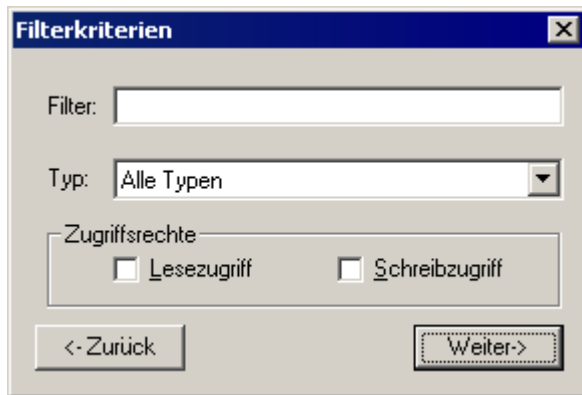


2. Click "OPC UA server". The "Add OPC UA server" dialog opens. Enter the URL of the WinCC OPC UA server in the "Server URL" field in the following format:
<opc.tcp://OPC UA server address>
Make the required security settings. If necessary, enter authentication data.

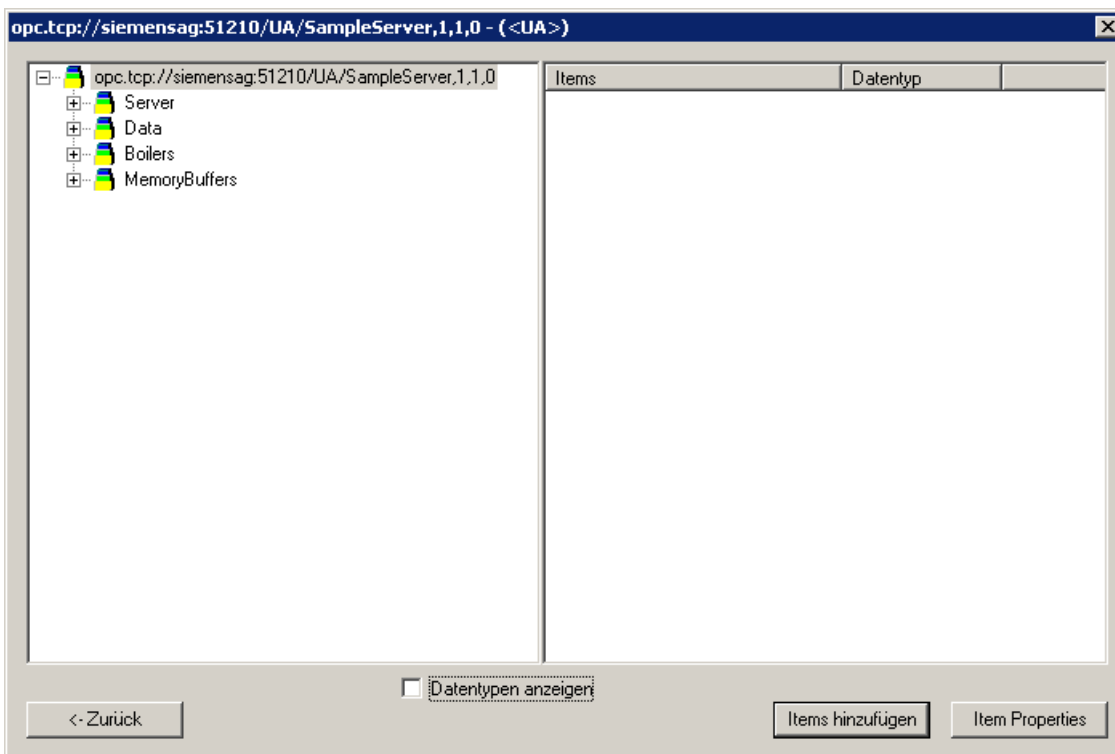


Click "OK" to close the dialog.

3. Select the "<opc.tcp://OPC UA server address>" entry from the list displayed. Click "Browse Server". The "Filter criteria" dialog is opened.



4. Click "Next". The "opc.tcp:// ..." dialog opens.



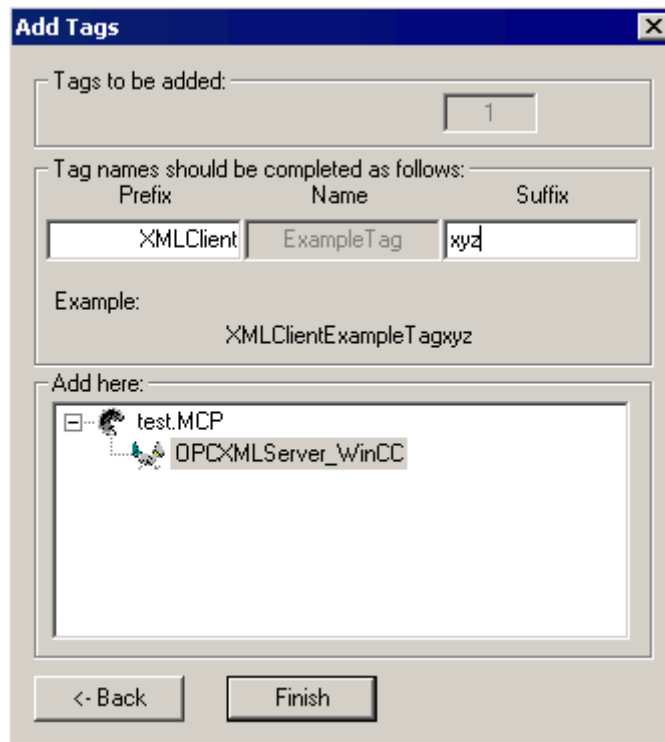
5. Select the tag to be mapped in the "opc.tcp:// ..." dialog, e.g. "OPC_UA_Server_Tag". Click "Add items".

6. Continue with step 7 if you have already set up a connection to the WinCC OPC UA server. A message will be output if this connection is not available. Click "Yes". The "New Connection" dialog is opened.



Enter the connection name "OPCUAServer". Click "OK".

7. The "Add Tags" dialog opens. Enter the "UAClient_" string in the "Prefix" field and the "xyz" string in the "Suffix" field. Select the "OPCUAServer" connection. Click "Finish".



8. Click "Back" in the "opc.tcp:// ..." dialog. Click "Exit" in the "OPC Item Manager" dialog to close the OPC Item Manager.

Error handling in event of disturbed communication

Introduction

The procedure for communication testing is independent of how WinCC is used.

WinCC used as OPC UA server

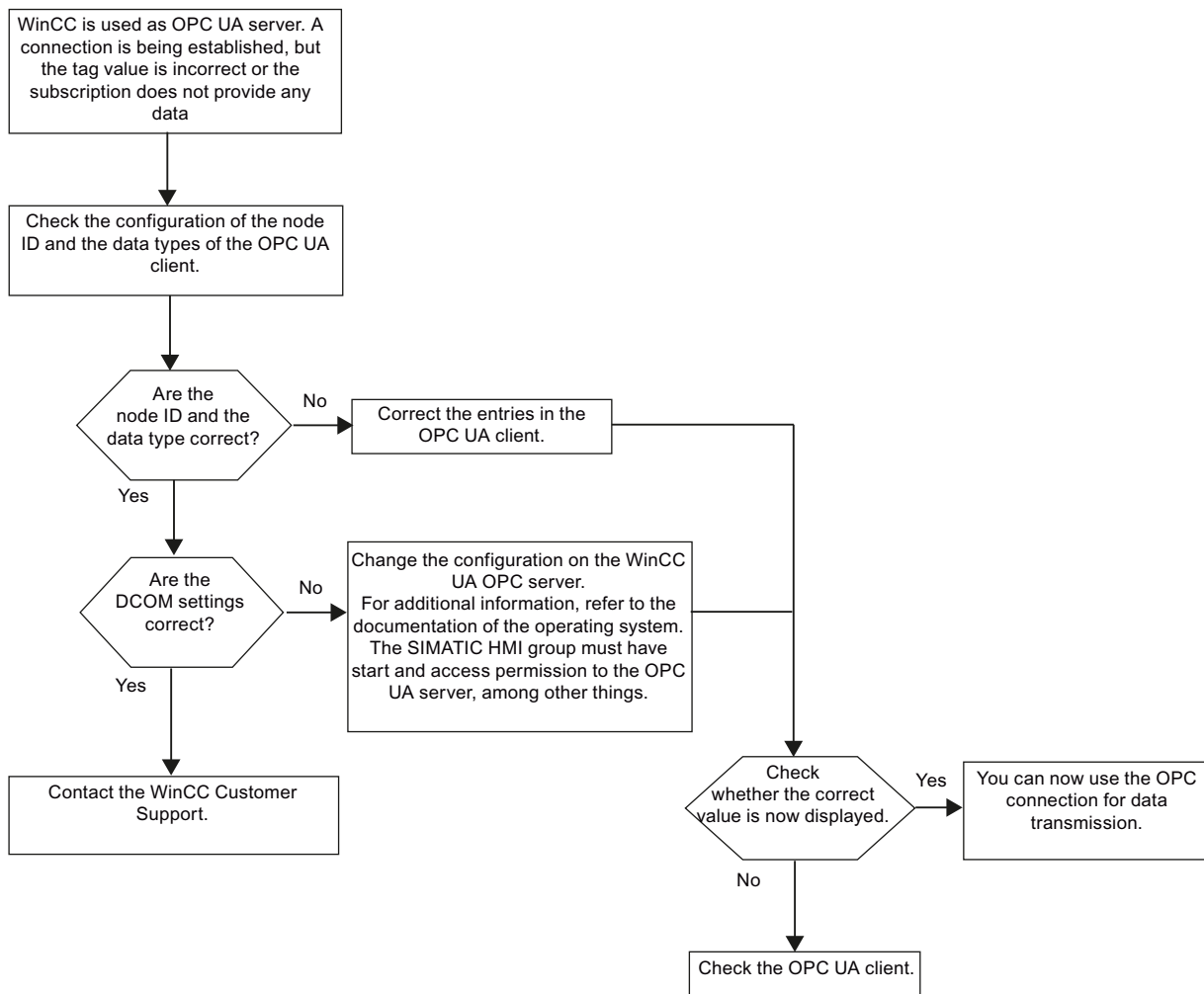
First, run the channel diagnostics on the WinCC OPC UA client to check whether it is possible to set up a connection to the OPC UA server. For more information regarding channel problem analysis, refer to "Troubleshooting".

WinCC used as OPC UA client

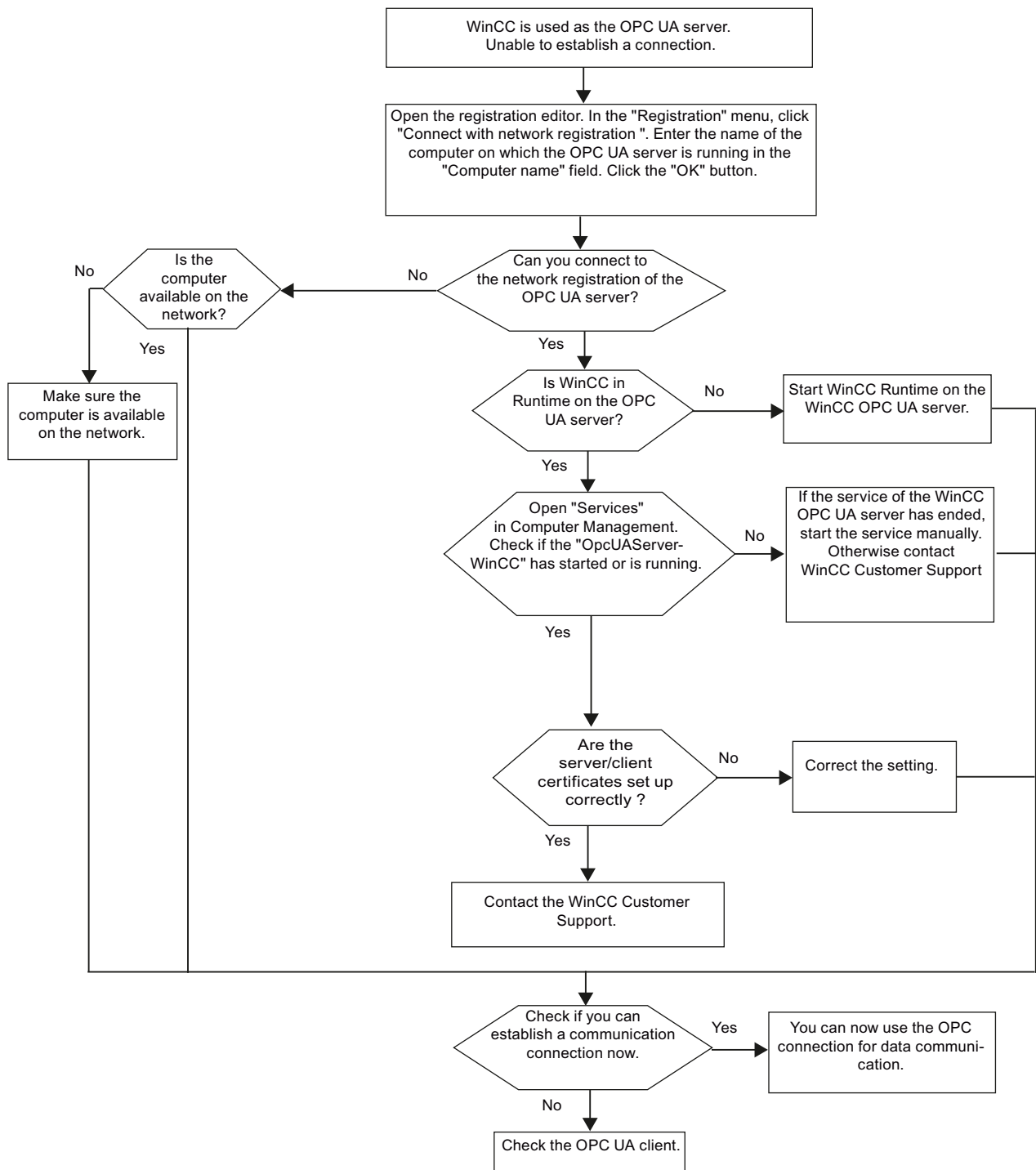
First, run the channel diagnostics on the WinCC OPC UA client to check whether it is possible to set up a connection to the OPC UA server. For more information regarding channel problem analysis, refer to "Troubleshooting".

WinCC as OPC UA server

WinCC is used as OPC UA server, and the connection is set up.

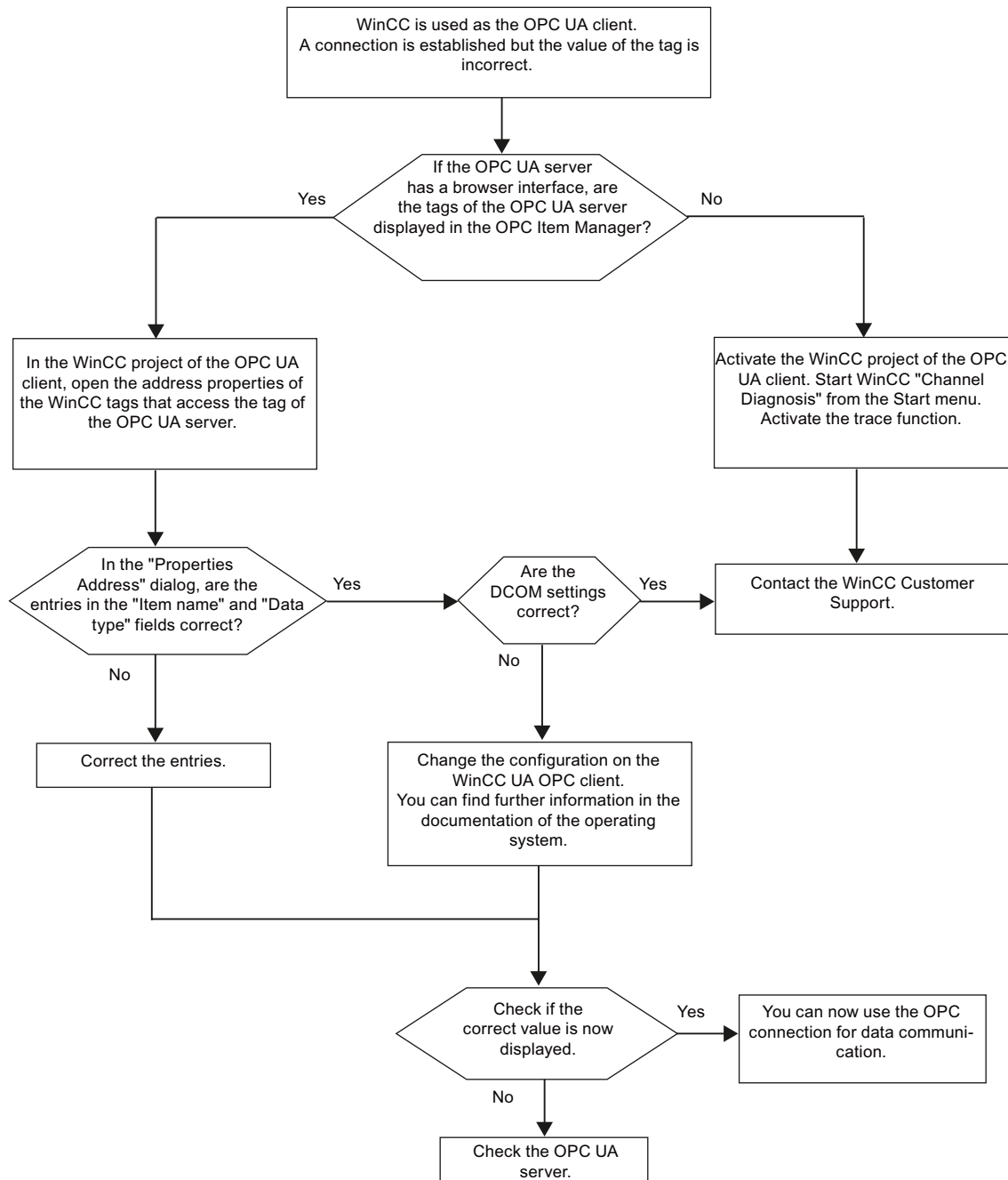


WinCC is used as the OPC UA server, and the connection is not set up.

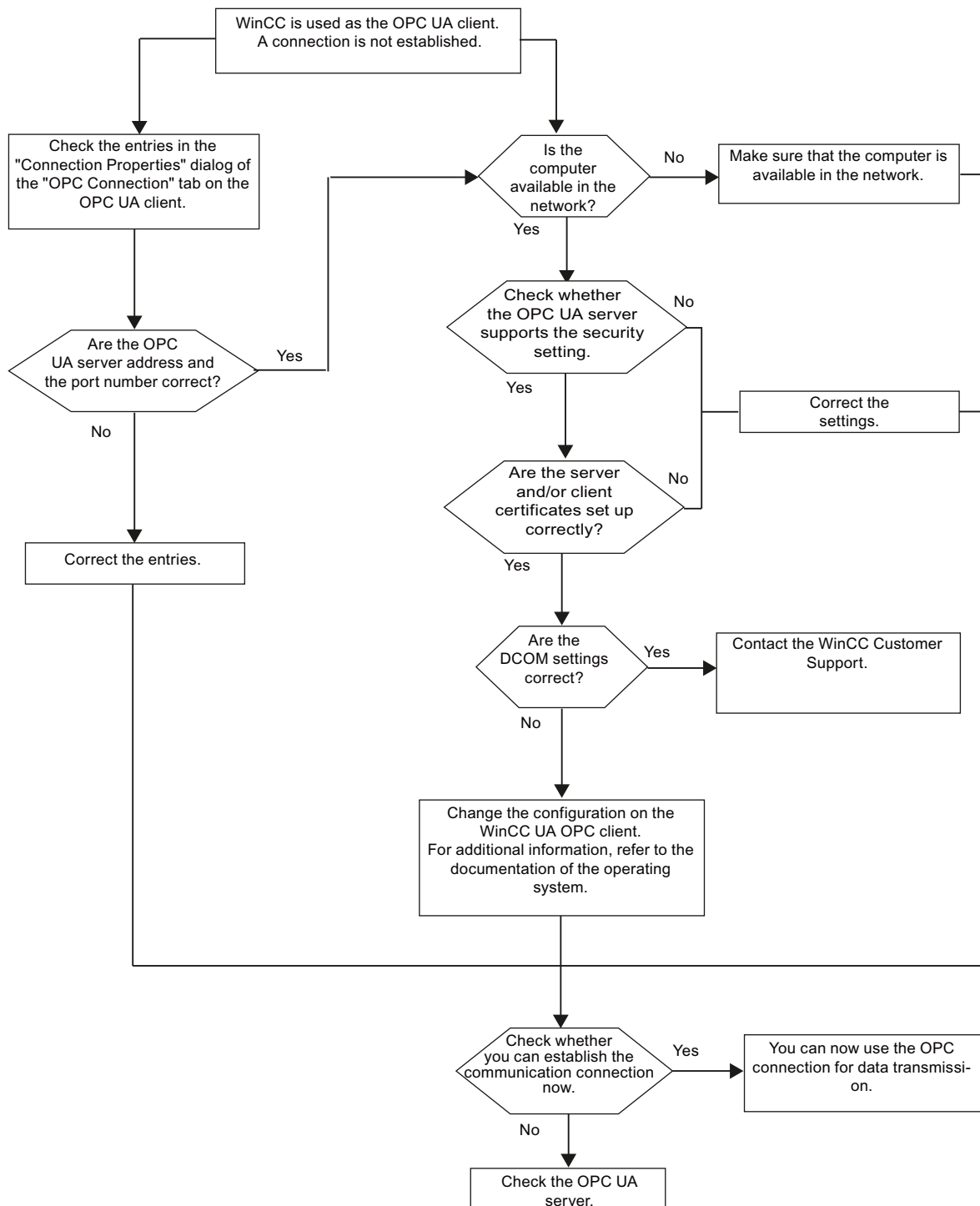


WinCC as OPC UA client

WinCC is used as the OPC UA client, and the connection is set up.



WinCC is used as OPC UA client, and the connection is not set up.



3.6.2 OPC - Open Connectivity

3.6.2.1 OPC - Open Connectivity

Contents

The OPC standard software interface allows devices and applications from various manufacturers to be combined with one another in a uniform manner.

WinCC can be used as an OPC server or an OPC client. The "OPC" channel represents the OPC client application of WinCC.

This chapter describes

- the OPC servers of WinCC
- how to use OPC in WinCC
- how to set up various OPC DA links
- how to configure the access to the WinCC message system
- how the WinCC message system appears on the OPC A&E
- how to set up access to the WinCC archive system

3.6.2.2 Functionality of OPC

OPC is a standardized manufacturer-independent software interface for data exchange in automation engineering.

OPC interfaces allow the standard linking of devices and applications from different manufacturers.

OPC is based on the Windows COM (Component Object Model) and DCOM (Distributed Component Object Model) technologies.

OPC XML DA provides an additional software interface that is based on the XML, SOAP and HTTP Internet standards.

OPC UA (Unified Architecture) is the successor technology to OPC. OPC UA is platform-independent and supports different protocols as communication medium.

3.6.2.3 OPC Specifications

OPC specifies the interfaces for access to the following objects in WinCC:

- Process values (OPC Data Access 2.05a, 3.0; OPC XML Data Access 1.01; OPC UA 1.01)
- Archived process values (OPC Historical Data Access 1.20; OPC UA 1.01)
- Chronological messages (OPC Historical Alarms and Events v1.10)
- Messages (OPC Alarms and Events 1.10)

For more information about individual OPC specifications, refer to the OPC Foundation (<http://www.opcfoundation.org>) Web site.

3.6.2.4 Compatibility

Support of these specifications is regularly monitored by the "Compliance Test Tool" (CTT) of the OPC Foundation. Interoperability with OPC products of other manufacturers is guaranteed by participation in "OPC Interoperability Workshops".

The test results submitted are published on the OPC Foundation Web site. To view the results, enter the search term "OPC Self-Certified Products".

See also

www.opcfoundation.org (<http://www.opcfoundation.org>)

3.6.2.5 Using OPC in WinCC

Introduction

In WinCC V7.2 or higher, servers are available for the following OPC interfaces:

- OPC Data Access / OPC XML Data Access: Access to the WinCC body of data
- OPC Historical Data Access: Access to the WinCC archive system
- OPC Alarms&Events: Access to the WinCC message system
- OPC Unified Architecture: Access to the WinCC body of data and archive system

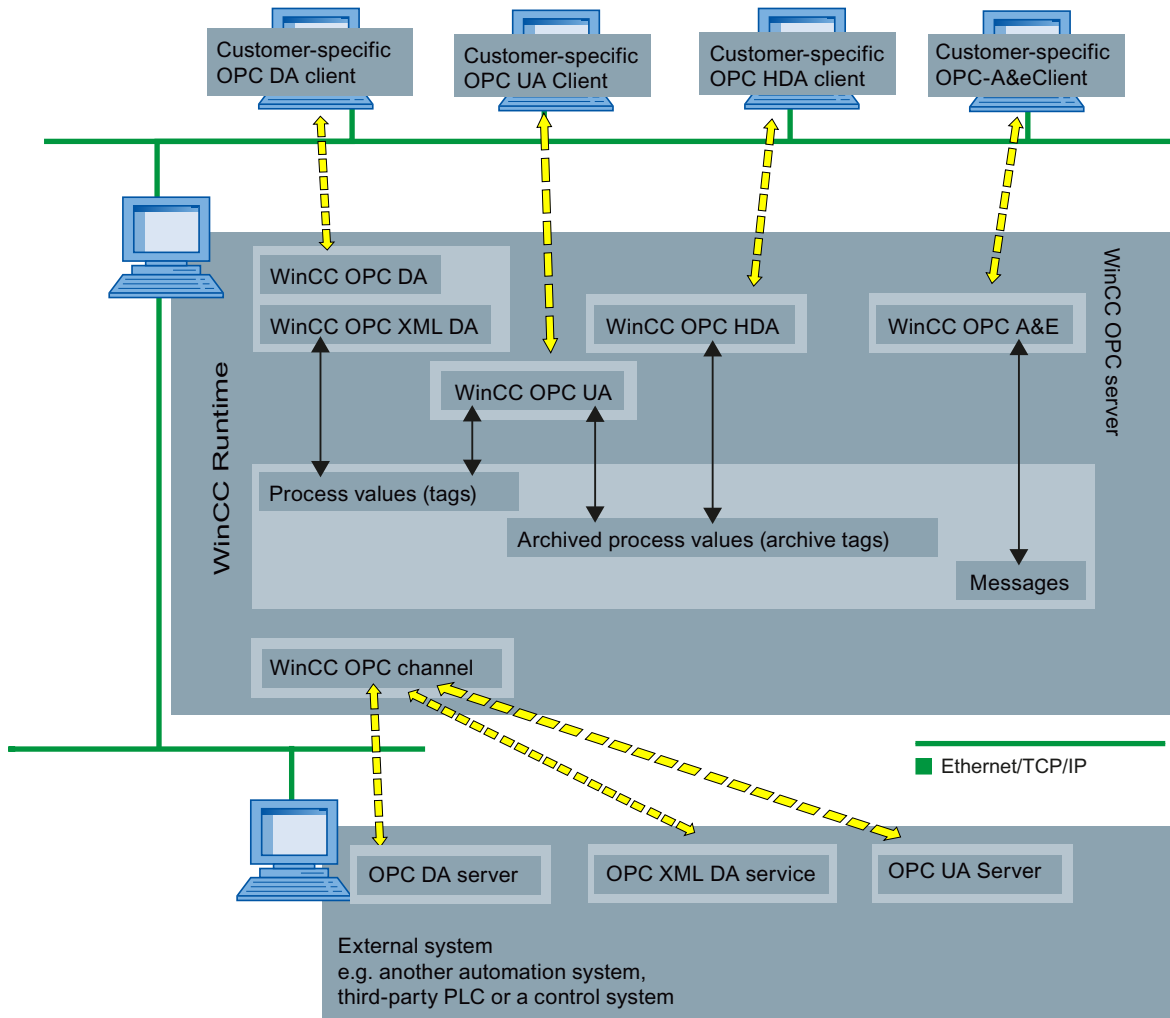
WinCC contains an OPC channel by default. The OPC channel can access the relevant OPC servers as client via OPC DA , OPC XML DA or OPC UA.

Licensing

OPC server	Licensing
WinCC OPC UA Server	A valid RT license for WinCC
WinCC OPC XML DA Server	A valid RT license for WinCC
WinCC OPC DA server	WinCC Option Connectivity Pack
WinCC OPC HDA server	
WinCC OPC A&E Server	

WinCC OPC communications concept

The following shows the WinCC OPC communication concept:



3.6.2.6 WinCC OPC XML DA Server

Functionality of WinCC OPC XML DA server

Introduction

The OPC XML DA server from WinCC is realized as a web service of the Microsoft Internet Information Server (IIS).

The WinCC OPC XML DA server provides the OPC XML client with the OPC process data as a web page. The web page can be accessed via the Internet using HTTP. The address of the WinCC OPC XML DA Server is: `<http://<xxx>/WinCC-OPC-XML/DAWebservice.aspx>`

The WinCC OPC XML DA server is not visible in WinCC. When an OPC XML client requests data, the Web service is automatically started by the Web server.

To establish successful OPC communication, the following must be observed:

- The WinCC project of the WinCC OPC XML DA server must be activated.
- The computer of the WinCC OPC XML DA server must be capable of being accessed via HTTP.

Licensing

In order to operate the WinCC OPC XML DA server, the following licenses must be installed on each WinCC computer implemented as an OPC XML server:

- A valid RT license for WinCC
- WinCC Option Connectivity Pack

Special features of tags of "String" type

If you use tags of "string" type that logically stand for floating point values, there can be problems when OPC clients want to write and read.

Description

An OPC client writes to a string tag and does not enter the new value in the form of a string but as float, double or decimal.

Problem

The comma that indicated the decimal value (in German) can be lost. This will result in a wrong value.

This also affects the read access to string tags if the read value is requested in the float, double or decimal format.

Remedy

Only use the respective floating point tags for the floating point values. Access string tags only in string format.

See also

Functionality of the WinCC OPC XML Client (Page 96)

Overview of the Supported WinCC Data Types (Page 79)

www.opcfoundation.org (<http://www.opcfoundation.org>)

Installation

Installation

Introduction

OPC XML enables access to the process tags via the Internet. In order to operate OPC XML, a number of additional software components must be installed.

Note

It is essential to observe the sequence of installation steps as described here. Otherwise, there might be problems during installation.

Installing WinCC-OPC-XML-Server under Windows 2000 and Windows XP

1. Installation of the Internet Information Server (IIS)
2. Installation of the ASP.NET under Windows Server 2003
3. Installation Microsoft .NET-Framework V2.0
4. Installation of the WinCC OPC XML Server Using WinCC Setup

Installing the Internet Information Service (IIS)

Introduction

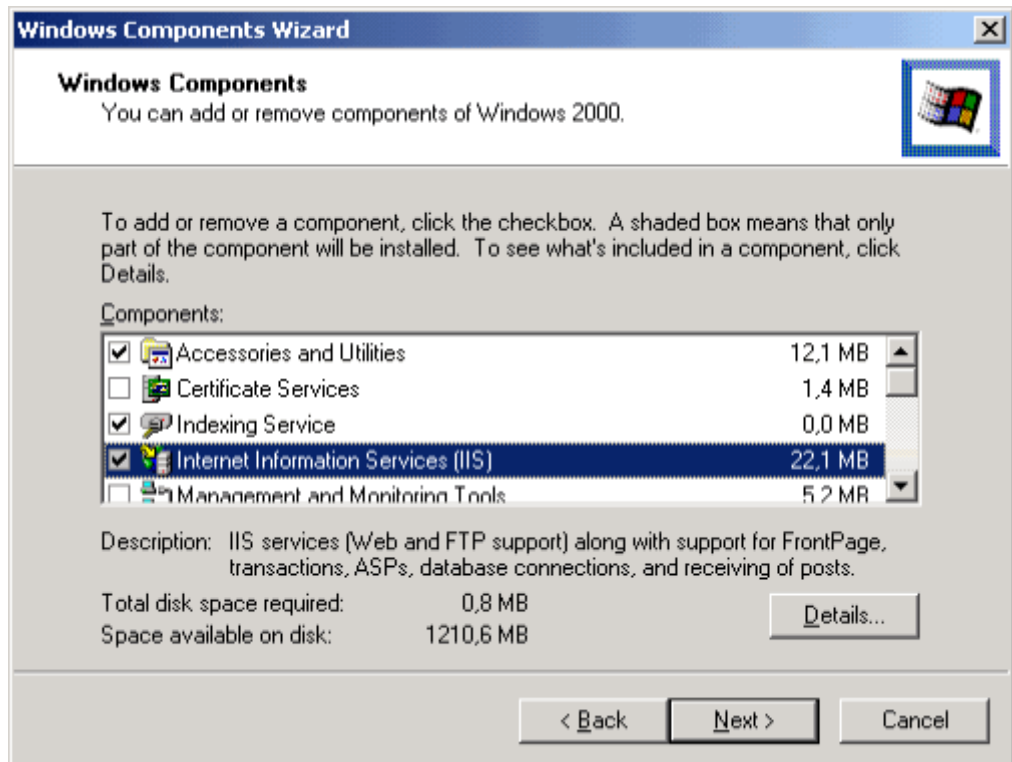
The Internet Information Service (IIS) must be installed prior to the installation of WinCC OPC XML Server in Windows 2000 Professional, Windows 2000 Server, Windows 2003 Server or Windows XP.

Note

To install the Internet Information Service in Windows, you must have the necessary write access rights to the registry database. To do this, you must have administrator rights.

Procedure

1. Open the "Add or Remove Programs" dialog and click "Add or Remove Windows Components". The following dialog is opened.
2. Select the check box preceding the "Internet Information Service (IIS)" item in the selection box. On Windows 2003 servers, IIS is accessible at "Windows Components" > "Application Server" > "Internet Information Service". You must also install the ASP.NET under Windows Server 2003



3. Click "Next". The required data is transferred and the necessary configuration is completed by Windows.
4. Close the Assistant by clicking "Finish".

Installing Microsoft .NET Framework

Microsoft .NET Framework is the software required for the use of .NET applications. It is also required to operate the OPC XML web service.

Approximately 80 MB of memory space is required on the hard disk for the installation.

Microsoft .NET Framework 2.0 is available from the following sources:

- Download from <http://msdn.microsoft.com/downloads>.
- Microsoft Windows 2003 Server CD

Install the software as instructed by Microsoft.

Installing WinCC OPC XML DA Server

Requirement

- Internet Information Server (IIS)
- Installation of the ASP.NET under Windows Server 2003
- Microsoft .NET Framework 2.0

Installation

The WinCC OPC XML DA server can be selected during the installation of WinCC. For more information, refer to the WinCC Information System in chapter "Installation Notes" > "Installing WinCC".

The following settings must be made during the installation:

- Create virtual directory "WinCC-OPC-XML".
- Define the access rights for the directory.

See also

How to Test the Installation (Page 200)

Defining the Security Settings with IIS (Page 198)

3.6.2.7 WinCC OPC DA server

Functionality of the WinCC OPC DA Server

Introduction

The WinCC OPC DA Server supports OPC Data Access specifications 2.05a and 3.00. This has been confirmed by the compliance test. The WinCC OPC DA Server of WinCC V6.0 SP2 or higher supports the OPC Data Access 3.00 specification.

The WinCC OPC DA server is a DCOM application. This interface is used by the WinCC OPC DA server to make the required information about WinCC tag available to the WinCC client.

The WinCC OPC DA server is active, if the WinCC OPC DA client is accessing it via a connection. To establish successful OPC communication, the following must be observed:

- The WinCC project of the WinCC OPC DA server must be enabled.
- The computer on which the WinCC OPC DA server runs must be accessible via its IP address.

Installation

The WinCC OPC DA server can be selected during the installation of WinCC. After installation, the WinCC OPC DA server is immediately usable without any further configuration.

The WinCC OPC DA server can be implemented on a WinCC server or a WinCC client.

Configuration tip

In your WinCC project you can summarize for structuring purposes tags in tag groups. The tags should not have the same name as the group.

Note

If the Internet options on a computer are set to automatically detect settings under "Connections -> LAN Settings", access to OPC DA via the web service will take significantly longer.

See also

Compatibility (Page 117)

Querying the OPC DA Server Name (Page 124)

Using Multiple OPC DA Servers (Page 123)

Example of WinCC to WinCC Connection (Page 125)

Example of WinCC - SIMATIC NET FMS OPC Server Connection (Page 129)

Example of a WinCC - SIMATIC NET S7 OPC Server Connection (Page 132)

Example of the WinCC - Microsoft Excel Connection (Page 137)

Overview of the Supported WinCC Data Types (Page 79)

www.opcfoundation.org (<http://www.opcfoundation.org>)

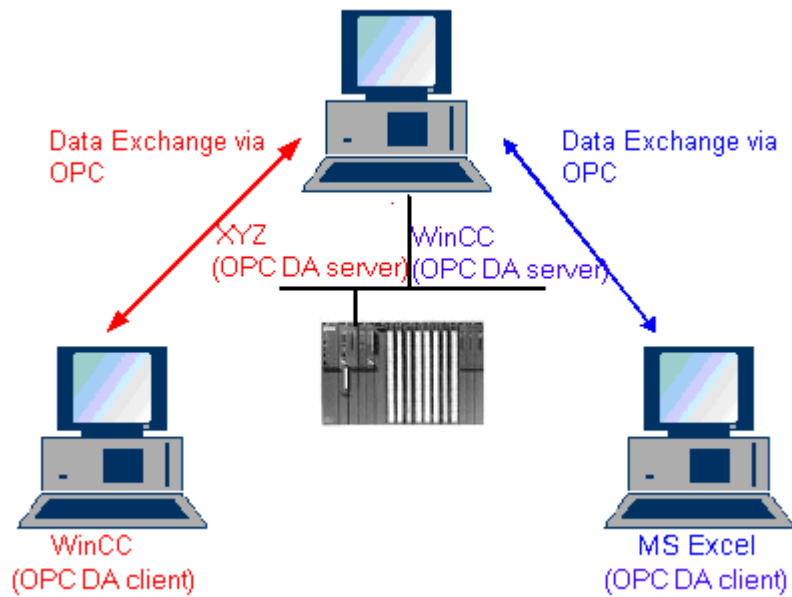
Using Multiple OPC DA Servers

Introduction

More than one OPC DA server may be installed on a computer, and any number may work in parallel.

In this way, the OPC DA server of WinCC and the OPC DA server of another (third-party) provider may be operated independently of one another on the same computer.

The WinCC OPC DA client can access the process data of the automation device via the OPC server of the third-party provider. The OPC DA client of Microsoft Excel can use the WinCC OPC DA server to access the WinCC data.



There are a number of OPC DA servers available from various manufacturers. Each of these OPC DA servers has a unique name (ProgID) for identification. OPC DA clients must use this name to address the OPC server.

The OPC Item Manager can be used to query the name of the OPC DA server. The OPC DA server of WinCC V 7 is named: "OPCServer.WinCC".

See also

Querying the OPC DA Server Name (Page 124)

Querying the OPC DA Server Name

Introduction

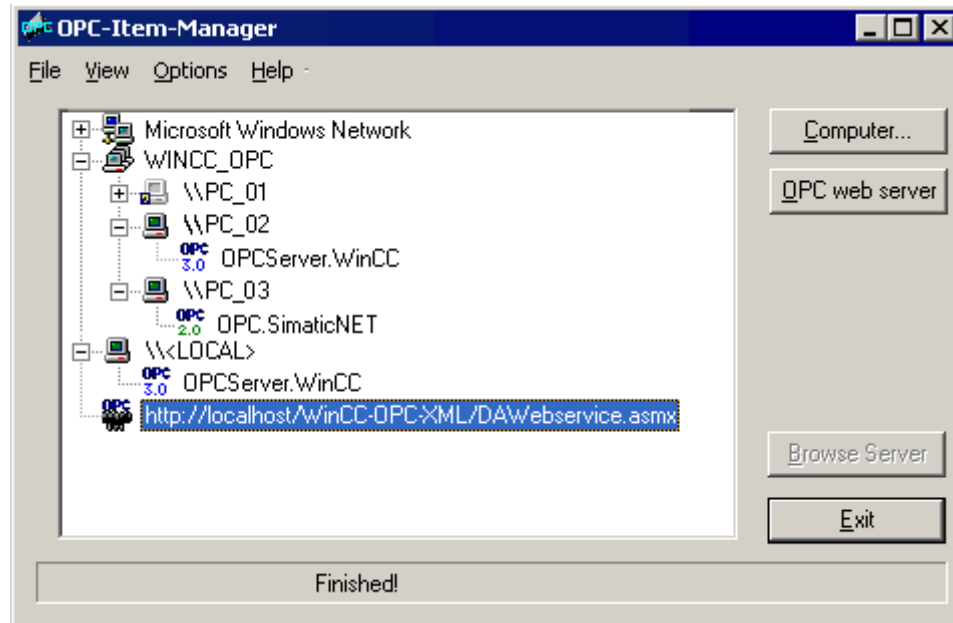
Multiple OPC DA servers can be installed on a single computer. The OPC Item Manager displays the names of the OPC DA servers available to the workstation in a selection window. These OPC DA servers can be run on the same computer or on computers in the network environment.

Requirement

Add the "OPC" channel to the WinCC project of the WinCC OPC DA client.

Procedure

1. In the shortcut menu of the channel unit "OPC Groups(OPCHN Unit#1)" on the WinCC OPC DA client, select "System Parameters". The "OPC Item Manager" is opened.
2. In the navigation window of the OPC Item Manager, select the name of the computer you wish to access.
3. The OPC Item Manager displays the names of the OPC DA servers that available to your computer in a selection window.



See also

OPC Item Manager (Page 76)

Examples of OPC DA Connections

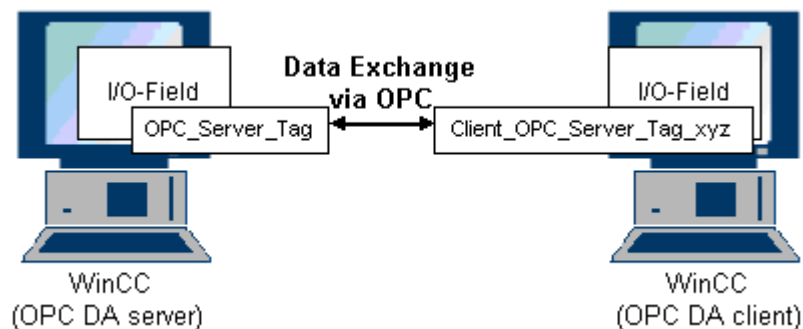
WinCC - WinCC Connection

Example of WinCC to WinCC Connection

Introduction

When establishing a WinCC - WinCC connection, data are exchanged between the WinCC OPC DA server and client by means of the "OPC_Server_Tag" WinCC tag. The "Client_OPC_Server_Tag_xyz" WinCC tag on the client reads the "OPC_Server_Tag" WinCC tag on the server. If the value of the "OPC_Server_Tag" tag on the WinCC OPC server changes, the value of the "Client_OPC_Server_Tag_xyz" WinCC tag on the WinCC OPC DA client also changes. Changes on the client are also reflect on the server.

Tag values are displayed in I/O fields on both computers.



Requirements

- Two computers with WinCC projects.
- Both computers must be accessible via their IP addresses.

Configuration Procedure

The following configurations are required to establish a WinCC - WinCC connection:

1. Configuring a WinCC Project on a WinCC OPC DA Server
2. Configuring a WinCC Project on a WinCC OPC DA Client

See also

[How to Configure a WinCC Project on a WinCC OPC DA Server \(Page 126\)](#)

[Configuring the WinCC Project on the WinCC OPC DA Client \(Page 127\)](#)

How to Configure a WinCC Project on a WinCC OPC DA Server

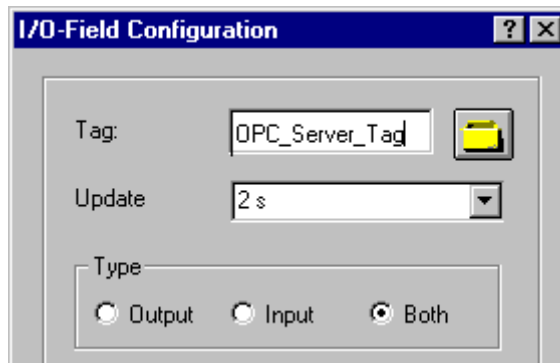
Introduction

In this section, a WinCC tag is created in the WinCC project of the WinCC OPC DA server and displayed in an I/O field.

Procedure

1. Select "New Tag" from the shortcut menu of the "Internal Tags" icon on the WinCC OPC DA server. Create a new tag called "OPC_Server_Tag" of the "signed 16-bit value" type.
2. Launch the Graphics Designer and open a new picture.

3. Add an I/O field to the picture. Select the "I/O field" object from the object list under "Smart Objects". The "I/O Field Configuration" dialog is opened.



4. Enter the name "OPC_Server_Tag" in the "Tag" field.
5. Set the update to "2s" and the field type to "I/O field".
6. Click "OK" to close the dialog and save the picture.
7. Enable the WinCC project by clicking the "Activate" button in the Graphics Designer.

See also

Configuring the WinCC Project on the WinCC OPC DA Client (Page 127)

Configuring the WinCC Project on the WinCC OPC DA Client

Introduction

In this section, a WinCC tag is created on the WinCC OPC DA client, in order to read a WinCC tag on the WinCC OPC DA server. The tag value is displayed in an I/O field.

Requirements

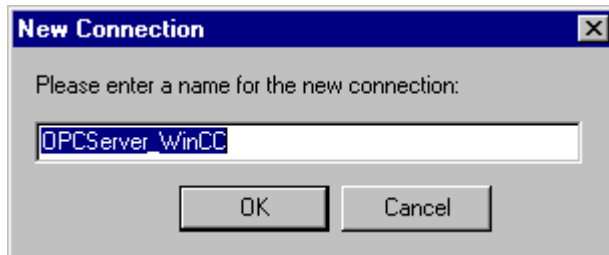
- Add the "OPC" channel to the WinCC project of the WinCC OPC DA client.
- Configure an internal tag named "OPC_Server_Tag" of the data type "signed 16-bit value" in the WinCC project of the WinCC OPC DA server.
- Enable the WinCC project of the WinCC OPC DA server.

Procedure

1. In the shortcut menu of the channel unit "OPC Groups(OPCHN Unit#1)" on the WinCC OPC DA client, select "System Parameters". The OPC Item Manager is opened.
2. Choose the name of the computer to be used as the OPC DA server from the selection dialog. Select "OPCServer.WinCC" from the list. Click the "Browse Server" button. The "Filter Criteria" dialog is opened.

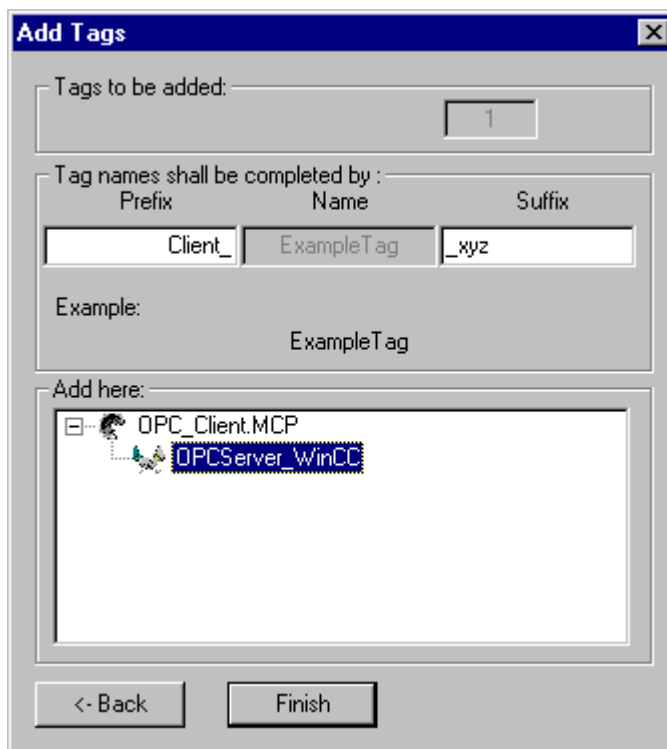
3.6 Access via OPC - Open Connectivity

3. Click the "Next->" button in the "Filter Criteria" dialog. Select the "OPC_Server_Tag" tag in the "OPCServer.WinCC ..." dialog. Click the "Add Items" button.
4. If a connection to the OPC DA server already exists, continue with step 5. If no connection has been configured, a corresponding message is displayed. Click "Yes". The "New Connection" dialog is displayed.



Enter "OPCServer_WinCC" as the name of the connection. Click "OK".

5. The "Add Tags" dialog is displayed. Enter "Client_" in the prefix field and "_xyz" in the suffix field. Select connection "OPCServer_WinCC". Click "Finish".



6. Click the "<- Back" button in the "OPCServer.WinCC ..." dialog. In the "OPC Item Manager", click "Exit" to close the OPC Item Manager.
7. Launch the Graphics Designer and open a new picture. Add an I/O field to the picture. Select the "I/O field" object from the object list under "Smart Objects". The "I/O Field Configuration" dialog is opened.

8. Enter the name "Client_OPC_Server_Tag_xyz" in the "Tag" field. Set the update to "2 s". Set the field type to "I/O field". Close the dialog and save the picture. Enable the WinCC project by clicking the "Activate" button in the Graphics Designer.
9. The value of the configured tags is displayed in the I/O field on both the WinCC OPC DA server and the client. Enter a new value in the I/O field on the WinCC OPC DA server. The new value is displayed in the I/O field on the WinCC OPC DA client.

See also

How to Configure a WinCC Project on a WinCC OPC DA Server (Page 126)

Configuring the OPC Channel on the WinCC OPC DA Client (Page 82)

WinCC - SIMATIC NET FMS OPC Server Connection

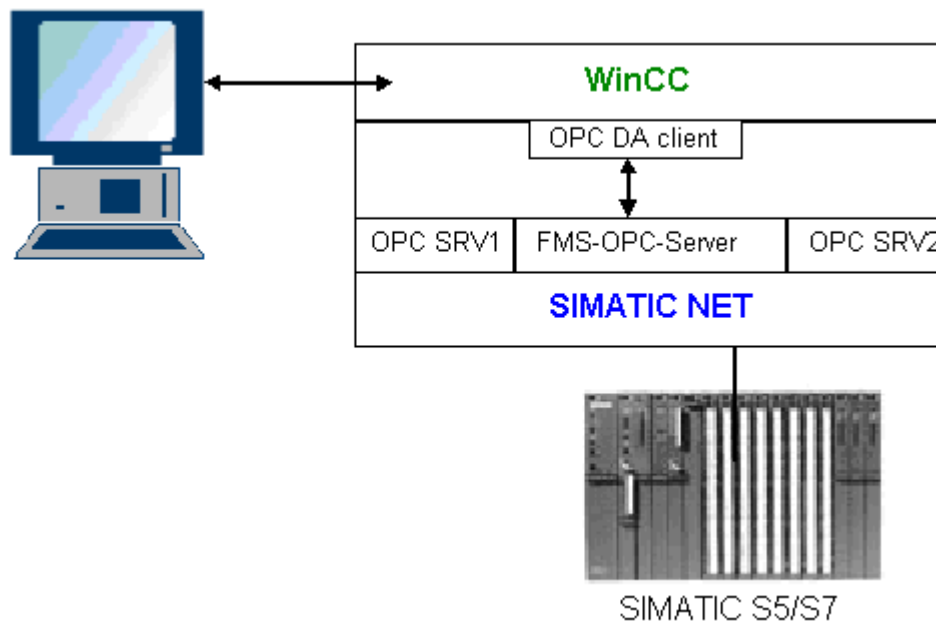
Example of WinCC - SIMATIC NET FMS OPC Server Connection

Introduction

During the installation of SIMATIC NET, you can select the OPC server to be installed. In the following example, a connection between WinCC and SIMATIC NET FMS OPC server is configured. Data from the automation device is made available to WinCC through the SIMATIC NET FMS OPC server.

In this example, WinCC is used as the WinCC OPC DA client. The OPC Item Manager displays the indexes of the object list configured for the automation device.

The current value of the tag is displayed in an I/O field. As soon as the value of the tags on the SIMATIC NET FMS OPC server changes, the new value is reflected on the process picture on the WinCC OPC DA client. Conversely, a value entered in the I/O field is sent to the automation device.



Requirements

- A computer with WinCC, SIMATIC NET software.
- A configured SIMATIC NET FMS OPC server. For additional information regarding the setup of SIMATIC NET S7 OPC servers refer to the SIMATIC NET documentation.

Configuration steps

The following configuration is required in the WinCC project of the WinCC OPC DA client:

1. Configuring a WinCC - SIMATIC NET FMS OPC server connection

Communication Manual

The communication manual contains additional information and extensive examples for the channel configuration. This manual is available for download on the Internet:

- <http://support.automation.siemens.com/>

Search by order number:

- A5E00391327

How to Configure the WinCC - SIMATIC NET FMS OPC Server Connection

Introduction

In this section, a WinCC tag that accesses an FMS index is configured in the WinCC project of the WinCC OPC DA client. The tag value is displayed in an I/O field.

Requirement

- Add the "OPC" channel to the WinCC project of the WinCC OPC DA client.

Procedure

1. In the shortcut menu of the channel unit "OPC Groups(OPCHN Unit#1)" on the WinCC OPC DA client, select "System Parameters". The OPC Item Manager is opened.
2. Choose the name of the computer to be used as the OPC DA server from the selection dialog. Select "OPC.SIMATICNet" from the list. Click the "Browse Server" button. The "Filter Criteria" dialog is opened.
3. Click the "Next->" button in the "Filter Criteria" dialog. The "OPC.SIMATICNet.." dialog is opened. All FMS indexes configured are displayed in a selection list. Select an index. Click the "Add Items" button.
4. If a connection to the SIMATIC NET FMS OPC server already exists, continue with step 5. If no connection has been configured, a corresponding message is displayed. Click "Yes". The "New Connection" dialog is displayed.



Enter "OPC_SlimaticNET" as the name of the connection. Click "OK".

5. The "Add Tags" dialog is opened. Enter "Client_" in the prefix field and "_xyz" in the suffix field. Select the connection "OPC_SimaticNET". Click "Finish".
6. Click the "<- Back" button in the "OPC.SIMATICNet .." dialog. In the "OPC Item Manager", click "Exit" to close the OPC Item Manager.
7. Launch the Graphics Designer and open a new picture. Add an I/O field to the picture. Select the "I/O field" object from the object list under "Smart Objects". The "I/O Field Configuration" dialog is opened.
8. Enter the name of the tags in the "Tag" field. Set the update to "2s". Set the field type to "I/O field".

3.6 Access via OPC - Open Connectivity

- 9. Click "OK" to close the dialog and save the picture. Enable the WinCC project by clicking the "Activate" button in the Graphics Designer.
- 10. The current value of the FMS index is shown in the I/O field. The value is updated every two seconds. Enter a value in the I/O field. The changed value is passed to the automation device.

See also

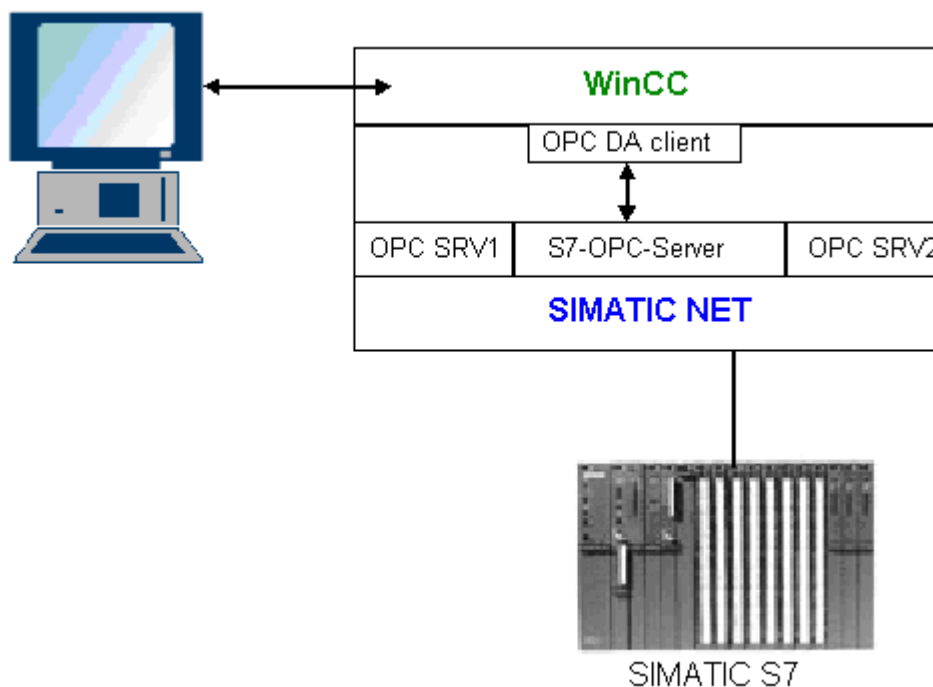
Configuring the OPC Channel on the WinCC OPC DA Client (Page 82)

WinCC - SIMATIC NET S7-OPC Server Connection

Example of a WinCC - SIMATIC NET S7 OPC Server Connection

During the installation of SIMATIC NET, you can select the OPC server to be installed. In the following example, a WinCC - SIMATIC NET S7 OPC server is configured. Data from the automation device is made available to the WinCC client via the SIMATIC NET S7 OPC server.

The current value of the tag is displayed in an I/O field on the WinCC OPC client. As soon as the value of the tags on the SIMATIC NET S7 OPC server changes, the changed value is shown on the process picture. Conversely, a value entered in the I/O field is sent to the automation device.



Requirements

- A computer with WinCC, SIMATIC NET software.
- A configured SIMATIC NET S7 OPC Server. For additional information regarding the setup of SIMATIC NET S7 OPC servers refer to the SIMATIC NET documentation.

Configuration steps

The following configurations are required to establish a WinCC - SIMATIC NET S7 OPC server connection:

1. Adding Tags to a SIMATIC NET S7 OPC Server
2. Configuring Access to the Tags on a SIMATIC NET S7 OPC Server

Communication Manual

The communication manual contains additional information and extensive examples for the channel configuration. This manual is available for download on the Internet:

- <http://support.automation.siemens.com/>

Search by order number:

- A5E00391327

Adding Tags to the SIMATIC NET S7 OPC Server

Introduction

In order for the OPC Item Manager to display the tags, they must be added to the address space of the SIMATIC NET S7 OPC server. The "OPC Scout" program is used for the configuration. OPC Scout is set up by the SIMATIC NET installer. For this example, the marker word "0" in the automation device is addressed.

Table of Parameters Used

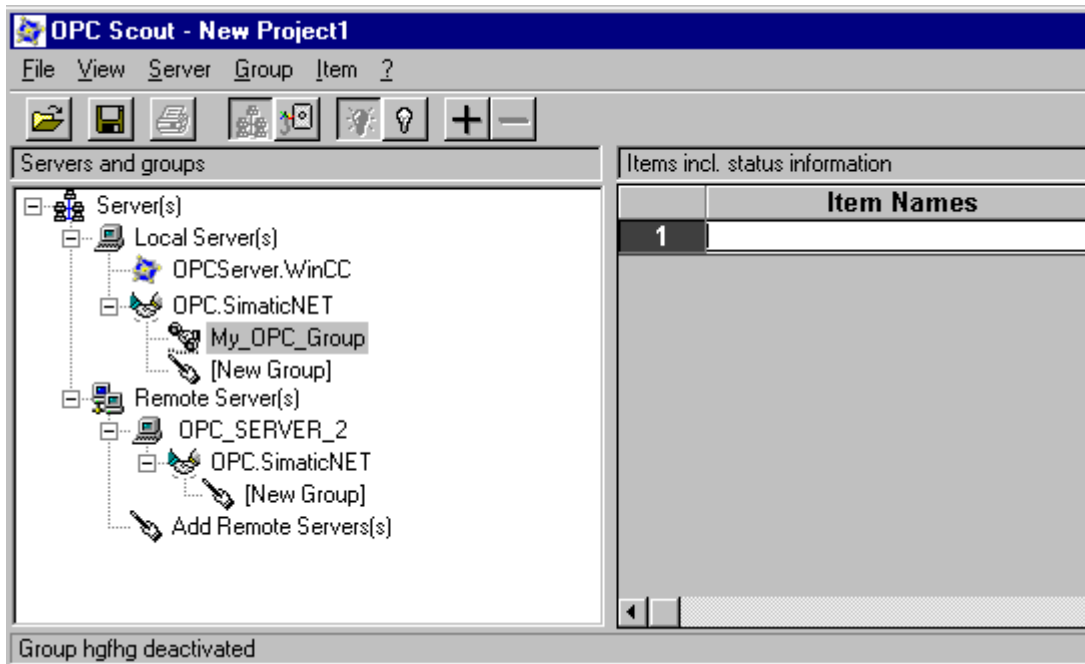
Parameter	Value
Data type	W
Range byte	0
No. values	1
Item alias	MW0

Requirements

- Configure an S7 connection in the SIMATIC NET software. For more information, refer to the SIMATIC NET documentation.

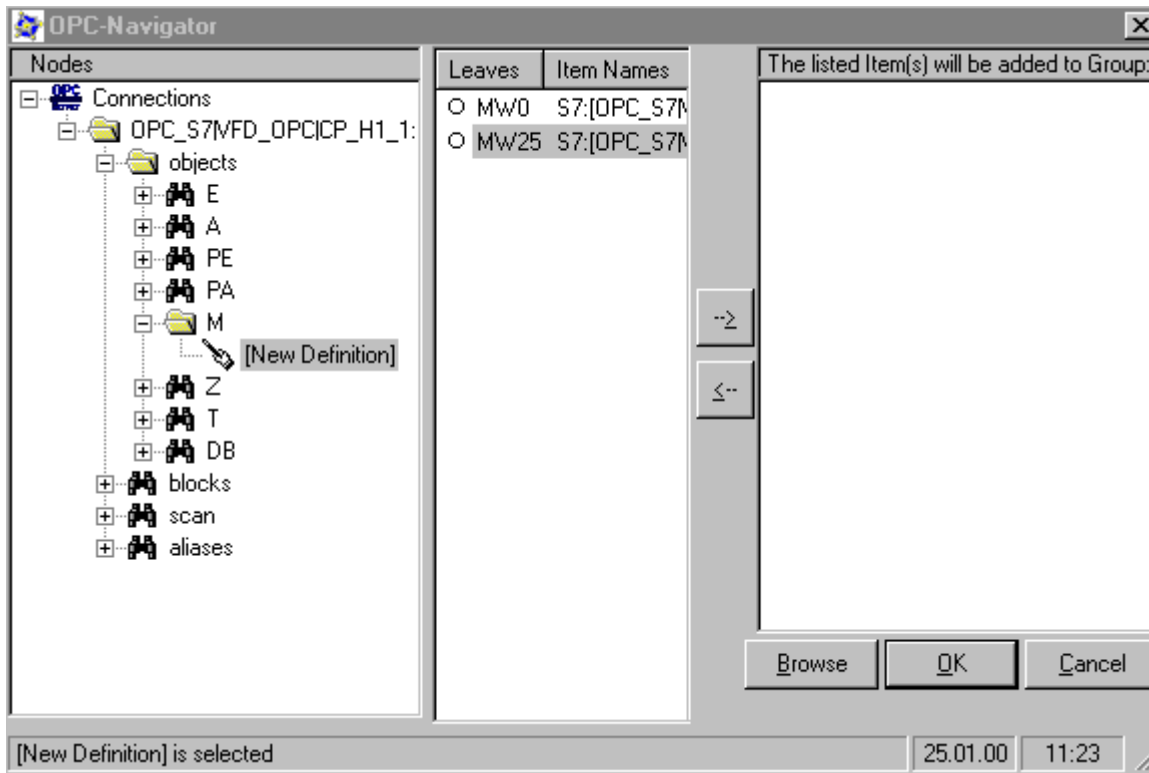
Procedure

1. Open the "OPC Scout" via Start → "Programs" → "SimaticNet" → "OPCServer" → "OPCScout".

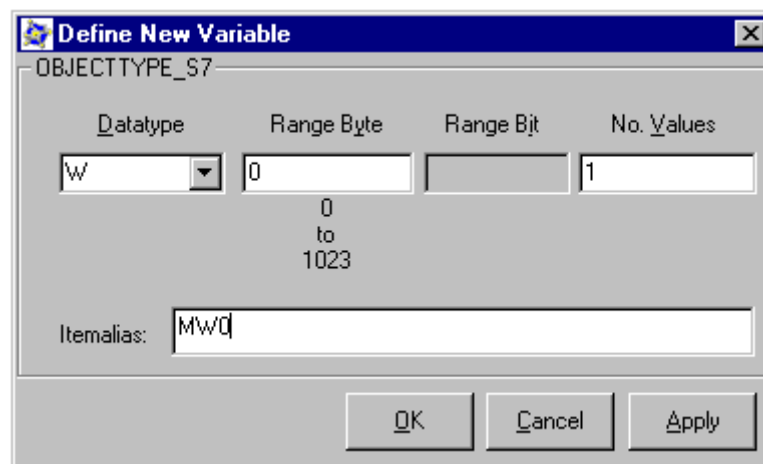


2. Select "OPC.SimaticNet" under "Local Server(s)". If the SIMATIC S7 OPC server is not run on the same computer, select "Add Remote Server(s)" in the "Server(s)" shortcut menu. Enter the name of the computer used as the OPC server in the "Add Remote Server(s)" dialog, then click "OK" to close the dialog.
3. Select "Connect" in the "OPC.SimaticNet" shortcut menu. The "Add Group" dialog is displayed. Enter a name for the group. Click "OK" to close the dialog.

4. Select "Add Item" from the shortcut menu of the added group. The "OPC Navigator" is opened.



5. Select "M" (marker) under "Objects" in the "OPC Navigator". Double-click "(New Definition)" to open the "Define New Tag" dialog.
6. Enter the parameters from the table in the "Define New Tag" dialog.



Click "OK" to close the "Define New Tag" dialog.

7. Mark the tag "MW0" in the "Leaves" area of the OPC Navigator. Click the "-->" button. Click "OK" in the OPC Navigator.

See also

Configuring Access to the Tags of the SIMATIC NET S7 OPC Server (Page 136)

Configuring Access to the Tags of the SIMATIC NET S7 OPC Server

Introduction

In this section, a WinCC tag is configured in the WinCC project of the WinCC OPC DA client. This tag accesses the tag "MW0" in the address space of the SIMATIC NET S7 OPC server. The tag value is displayed in an I/O field.

Requirements

- Create the tag "MW0" using the OPC Scout.
- Add the "OPC" channel to the WinCC project of the WinCC OPC DA client.

Procedure

1. Select "System Parameters" in the shortcut menu of "OPC Groups(OPCHN Unit#1)". The OPC Item Manager is opened.
2. Choose the name of the computer to be used as the OPC server from the selection dialog. Select "OPC.SIMATICNet" from the list. Click the "Browse Server" button. The "Filter Criteria" dialog is opened.
3. Click the "Next->" button in the "Filter Criteria" dialog. The "OPC.SIMATICNet.." dialog is opened. Select the "MW0" tag. Click the "Add Items" button.
4. If a connection to the SIMATIC NET FMS OPC server already exists, continue with step 5. If no connection has been configured, a corresponding message is displayed. Click "Yes". The "New Connection" dialog is displayed.



Enter "OPC_SlimaticNET" as the name of the connection. Click "OK".

5. The "Add Tags" dialog is opened. Enter "Client_" in the prefix field and "_xyz" in the suffix field. Select the connection "OPC_SimaticNET". Click "Finish".
6. Click the "<- Back" button in the "OPC.SIMATICNet .." dialog. In the "OPC Item Manager", click "Exit" to close the OPC Item Manager.

7. Start Graphics Designer and open a picture. Add an I/O field to the picture. Select the "I/O field" object from the object list under "Smart Objects". The "I/O Field Configuration" dialog is opened.
8. Enter the name "Client_MW0_xyz" in the "Tag" field. Set the update to "2s". Set the field type to "I/O field".
9. Close the dialog and save the picture. Enable the WinCC project by clicking the "Activate" button in the Graphics Designer.
10. The I/O field on the WinCC OPC DA client displays the current value of the S7 tags. The value is updated every two seconds. Enter a value in the I/O field. The changed value is passed to the automation device.

See also

Adding Tags to the SIMATIC NET S7 OPC Server (Page 133)

Configuring the OPC Channel on the WinCC OPC DA Client (Page 82)

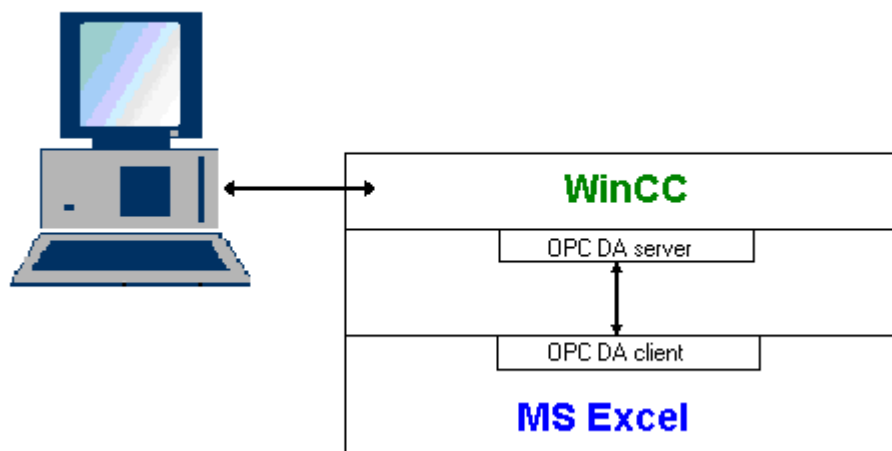
WinCC - Microsoft Excel Connection

Example of the WinCC - Microsoft Excel Connection

Introduction

In this example, an OPC DA client is created in Microsoft Excel using the Visual Basic Editor. The OPC DA client reads a WinCC tag in the WinCC project of the WinCC OPC DA server and writes the value into a cell. If a new value is entered in the cell, the value is passed to the WinCC OPC DA server.

A computer on which both WinCC and Microsoft Excel are installed is used for the connection.



Configuration steps

The following configurations must be made in Microsoft Excel:

1. Creating an OPC DA client in Visual Basic Editor of Microsoft Excel
2. Configuring access to a WinCC tag in Microsoft Excel

See also

How to Configure the Access to a WinCC Tag in Microsoft Excel (Page 140)

Creating an OPC DA Client in Microsoft Excel (Page 138)

Creating an OPC DA Client in Microsoft Excel

Introduction

To use Microsoft Excel as an OPC DA client, a special script must be created in the Visual Basic Editor of Microsoft Excel.

Requirements

Basic knowledge of Visual Basic Editor in Microsoft Excel.

Procedure

1. Open Microsoft Excel with a new workbook.
2. In the "Tools" menu of the Visual Basic Editor, → click "Macro". The Visual Basic Editor for Microsoft Excel is opened.
3. In the "Tools" menu of the Visual Basic Editor, select "References...". The "References - VBAProject" dialog is displayed. Locate entry "Siemens OPC DAAutomation 2.0" in the list of available references. Select the corresponding check box. Click "OK".
4. Copy the script shown below. This script is only available in the online help.
5. Open a new code window by double-clicking "Sheet1" in the project window of the Visual Basic Editor.
6. Paste the script into the code window.
7. Select "Save" from the "File" menu. Select "Close and Return to Microsoft Excel" from the "File" menu.

Example Script

```
Option Explicit  
Option Base 1
```

```

Const ServerName = "OPCServer.WinCC"

Dim WithEvents MyOPCServer As OpcServer
Dim WithEvents MyOPCGroup As OPCGroup
Dim MyOPCGroupColl As OPCGroups
Dim MyOPCItemColl As OPCItems
Dim MyOPCItems As OPCItems
Dim MyOPCItem As OPCItem

Dim ClientHandles(1) As Long
Dim ServerHandles() As Long
Dim Values(1) As Variant
Dim Errors() As Long
Dim ItemIDs(1) As String
Dim GroupName As String
Dim NodeName As String

'-----
' Sub StartClient()
' Purpose: Connect to OPC_server, create group and add item
'-----
Sub StartClient()
  ' On Error GoTo ErrorHandler
  '----- We freely can choose a ClientHandle and GroupName
  ClientHandles(1) = 1
  GroupName = "MyGroup"
  '----- Get the ItemID from cell "A1"
  NodeName = Range("A1").Value
  ItemIDs(1) = Range("A2").Value
  '----- Get an instance of the OPC-Server
  Set MyOPCServer = New OpcServer
  MyOPCServer.Connect ServerName, NodeName

  Set MyOPCGroupColl = MyOPCServer.OPCGroups
  '----- Set the default active state for adding groups
  MyOPCGroupColl.DefaultGroupIsActive = True
  '----- Add our group to the Collection
  Set MyOPCGroup = MyOPCGroupColl.Add(GroupName)

  Set MyOPCItemColl = MyOPCGroup.OPCItems
  '----- Add one item, ServerHandles are returned
  MyOPCItemColl.AddItem 1, ItemIDs, ClientHandles, ServerHandles, Errors
  '----- A group that is subscribed receives asynchronous notifications
  MyOPCGroup.IsSubscribed = True
  Exit Sub

ErrorHandler:
  MsgBox "Error: " & Err.Description, vbCritical, "ERROR"
End Sub

'-----
' Sub StopClient()
' Purpose: Release the objects and disconnect from the server
'-----
Sub StopClient()
  '----- Release the Group and Server objects
  MyOPCGroupColl.RemoveAll

```

3.6 Access via OPC - Open Connectivity

```
'----- Disconnect from the server and clean up
MyOPCServer.Disconnect
Set MyOPCItemColl = Nothing
Set MyOPCGroup = Nothing
Set MyOPCGroupColl = Nothing
Set MyOPCServer = Nothing
End Sub

'-----
' Sub MyOPCGroup_DataChange()
' Purpose: This event is fired when a value, quality or timestamp in our Group has changed
'-----
'----- If OPC-DA Automation 2.1 is installed, use:
Private Sub MyOPCGroup_DataChange(ByVal TransactionID As Long, ByVal NumItems As Long,
ClientHandles() As Long, ItemValues() As Variant, Qualities() As Long, TimeStamps() As
Date)
'----- Set the spreadsheet cell values to the values read
Range("B2").Value = CStr(ItemValues(1))
Range("C2").Value = Hex(Qualities(1))
Range("D2").Value = CStr(TimeStamps(1))
End Sub

'-----
' Sub worksheet_change()
' Purpose: This event is fired when our worksheet changes, so we can write a new value
'-----
Private Sub worksheet_change(ByVal Selection As Range)
'----- Only if cell "B3" changes, write this value
If Selection <> Range("B3") Then Exit Sub
Values(1) = Selection.Cells.Value
'----- Write the new value in synchronous mode
MyOPCGroup.SyncWrite 1, ServerHandles, Values, Errors
End Sub
```

See also

[How to Configure a WinCC Project on a WinCC OPC DA Server \(Page 126\)](#)

How to Configure the Access to a WinCC Tag in Microsoft Excel

Introduction

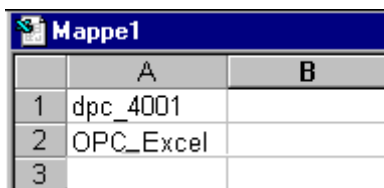
The Excel OPC DA client reads a WinCC tag of the WinCC OPC DA server and writes the value of the tag into a cell. In the WinCC project of the WinCC OPC DA server, the value of the tag is displayed in an I/O field. If the tag value in a cell is changed, this alters the value in the I/O field of the WinCC OPC DA server.

Requirements

- Configure an internal tag named "OPC_Excel" with data type "signed 16-bit value" in the WinCC project of the WinCC OPC DA server.
- Write the value of the "OPC_Excel" tag to an I/O field on the WinCC project of the WinCC OPC DA server.
- Enable the WinCC project of the WinCC OPC DA server.

Procedure

1. In Microsoft Excel, enter the name of the computer used as the OPC server in cell A1. In cell A2, enter the tag name "OPC_Excel".



	A	B
1	dpc_4001	
2	OPC_Excel	
3		

2. In the "Tools" menu in Excel, select "Macro" → "Macros". The "Macro" dialog is opened. Select the entry "Sheet1.StartClient" from the list of macros. Click "Run" to start the OPC client.
3. The value of the tag is written into cell B2, the quality code into C2 and the timestamp into D2.
4. Enter a new value in cell B3. The changed value is displayed in the I/O field on the WinCC OPC server.
5. In the "Tools" menu in Excel, select "Macro" → "Macros". The "Macro" dialog is opened. Select the entry "Sheet1.StopClient" from the list of macros. Click "Run" to stop the OPC client.

3.6.2.8 WinCC OPC HDA server

Functionality of the WinCC OPC HDA server

Introduction

The WinCC OPC HDA server is a DCOM application making data needed from the archive system available to the OPC HDA client. Access the data using Item Handles. Read or write access is enabled. The data can also be analyzed.

The WinCC OPC HDA server supports the OPC Historical Data Access 1.20 specification. This has been confirmed by the compliance test.

The following chapter explains the design of the data structure, as well as the attributes, aggregates and functions supported by the WinCC OPC HDA server. This is not a detailed description, but rather a summary of the most important information. For more information, refer to the "OPC Historical Data Access 1.20" specification.

Installation

The WinCC OPC HDA server can be selected during the installation of WinCC. It is possible to select whether access is made to the WinCC archive system with or without write function . After installation, the WinCC OPC DA server is immediately available for use without any additional configuration.

In the case of installation without write access, the data in the WinCC archive system can only be read and analyzed. In the case of write access, data in the WinCC archive system can be analyzed, added, deleted and updated.

The WinCC OPC HDA server can be implemented on a WinCC server or a WinCC client.

Licensing

In order to operate the WinCC OPC HDA server, the following licenses must be installed on each WinCC computer implemented as an OPC HDA server:

- A valid RT license for WinCC
- WinCC Option Connectivity Pack

OPC HDA Client

All OPC HDA clients that conform to the OPC Historical Data Access 1.20 specification can access the WinCC OPC HDA server. You can also create the OPC HDA client yourself. By creating proprietary OPC HDA clients, most user-specific requirements can be met.

Examples of how an OPC HDA client can be used include:

- Analysis and evaluation of archived data
- Statistical process control of archives from different OPC HDA servers

To request for historical values using OPC HDA client, you need to take care of the following during configuration:

- Select a query cycle in such a way that the client can receive the requested data before the next query is sent. Too short cycles can lead to high time delays while receiving data.
- CPU load of the WinCC server depends on the number of tags per query.

Write access to cyclic archive with configured swapping out

In runtime, the data is modified in the cyclic archives on the WinCC server.

Changes are accepted into the swapped-out archive only when the data is changed almost immediately after being created.

If the concerned archive segment of the circulation archive has already been swapped out, then the change is not done subsequently in the swapped-out archive. Even the modified data is deleted when you delete the archive segment on the WinCC server.

See also

Compatibility (Page 117)
 Quality codes (Page 148)
 Data Structure of a WinCC OPC HDA Server (Page 143)
 www.opcfoundation.org (<http://www.opcfoundation.org>)

Data Structure of a WinCC OPC HDA Server**Data Structure of a WinCC OPC HDA Server****Introduction**

The data on the WinCC OPC HDA server are structured. The available data structures are listed below. This is not a detailed description, but rather a summary of the most important information. For more information, refer to the "OPC Historical Data Access 1.20" specification.

Data structure

	Description
Attributes	Provide additional quality characteristics for the raw data. Attributes include data type, specifications re. archiving, etc. For more information, see the overview of supported attributes.
Assemblies	Summarize raw data of a specified time interval. Aggregates include average value, minimum, maximum, etc. For more information, see overview of supported aggregates.
StartTime/ EndTime	Set the beginning and end point for the time interval.
Bounding values	Values recorded at the beginning and end. If no bounding values are available, the values closest to these times are used as bounding values.
Raw data	Data from the WinCC archive system of a particular time interval. These data include a time stamp and quality rating.
Item handle	Unique assignment to a WinCC archive tag.
ItemID	Unique identifier of the WinCC archive tag. The ItemID can be used to get an item handle.

See also

www.opcfoundation.org (<http://www.opcfoundation.org>)
 Overview of the supported functions (Page 145)
 Time Format of a WinCC OPC HDA Server (Page 146)
 Overview of the supported attributes (Page 144)
 Overview of the supported assemblies (Page 144)

Overview of the supported attributes

Introduction

The following table contains the attributes supported by the WinCC OPC HDA server. For more information, refer to the "OPC Historical Data Access 1.20" specification.

Attributes

Attribute	Attribute ID	Description
ItemID	OPCHDA_ITEMID	Indicates the WinCC archive tag to be accessed.
Item data type	OPCHDA_DATA_TYPE	Indicates the data type of the WinCC archive tag.
Description	OPCHDA_DESCRIPTION	Returns a description of the WinCC archive tag. The description is defined in the WinCC Tag Logging.
Engineering units	OPCHDA_ENG_UNITS	Sets the display of measurement units. The labeling is defined in the WinCC Tag Logging.

See also

www.opcfoundation.org (<http://www.opcfoundation.org>)

Data Structure of a WinCC OPC HDA Server (Page 143)

Overview of the supported assemblies

Introduction

The following table lists the aggregates supported by the WinCC OPC HDA server. For more information, refer to the "OPC Historical Data Access 1.20" specification.

Assemblies

Assembly	Description
OPCHDA_COUNT	Returns the raw data count for the specified time interval.
OPCHDA_START	Returns the initial value of the raw data at the beginning of the time interval.
OPCHDA_END	Returns the final value of the raw data at the end of the time interval.
OPCHDA_AVERAGE	Returns the average value of the raw data for the specified time interval.
OPCHDA_TIMEAVERAGE	Returns the time-weighted average of the raw data for the specified time interval.
OPCHDA_TOTAL	Returns the sum total value for the specified time interval.
OPCHDA_STDEV	Returns the standard deviation of the raw data for the specified time interval.

Assembly	Description
OPCHDA_MINIMUMACTUALTIME	Returns the minimum value of the raw data and its time stamp for the specified time interval.
OPCHDA_MINIMUM	Returns the minimum value of the raw data for the specified interval.
OPCHDA_MAXIMUMACTUALTIME	Returns the maximum value of the raw data and its time stamp for the specified time interval.
OPCHDA_MAXIMUM	Returns the maximum value of the raw data for the specified interval.
OPCHDA_DELTA	Returns the difference between the first and last value in the raw data for the specified time interval.
OPCHDA_REGSLOPE	Returns the slope of the regression line of the raw data for the specified time interval.
OPCHDA_REGCONST	Returns the regression value of the raw data at the starting point.
OPCHDA_REGDEV	Returns the standard deviation of the regression of the raw data in the specified time interval.
OPCHDA_VARIANCE	Returns the variance of the raw data for the specified time interval.
OPCHDA_RANGE	Returns the difference between OPCHDA_MAXIMUM and OPCHDA_MINIMUM of the raw data for the specified time interval.
OPCHDA_DURATIONGOOD	Returns the period of time in which the quality of the raw data was good. The period is indicated in seconds.
OPCHDA_DURATIONBAD	Returns the period of time in which the quality of the raw data was bad. The period is indicated in seconds.
OPCHDA_PERCENTGOOD	Returns the percentage of the raw data of good quality.
OPCHDA_PERCENTBAD	Returns the percentage of the raw data of bad quality.
OPCHDA_WORSTQUALITY	Returns the worst quality of the raw data for the specified time interval.

See also

www.opcfoundation.org (<http://www.opcfoundation.org>)

Data Structure of a WinCC OPC HDA Server (Page 143)

Functionality of the WinCC OPC HDA server (Page 141)

Overview of the supported functions

Introduction

The following tables list the functions supported by the WinCC OPC HDA server. These functions can be used by the OPC HDA client for data exchange. For more information, refer to the "OPC Historical Data Access 1.20" specification.

Read

Function	Description
ReadRaw	Returns the raw data, its quality and time stamp for the specified time interval.
ReadProcessed	Returns the calculated value, the quality of the value and the time stamp for the specified time interval. The calculated value is determined by the selected aggregate.
ReadAtTime	Returns the raw data, its quality and time stamp for a particular time interval. If no value is available, the value for this point is interpolated.
ReadAttribute	Returns the item attributes and time stamp for the specified time interval.

See also

www.opcfoundation.org (<http://www.opcfoundation.org>)

Functionality of the WinCC OPC HDA server (Page 141)

Time Format of a WinCC OPC HDA Server

Introduction

The time interval is specified on the WinCC OPC HDA server by setting the starting and ending times. The specified time interval determines the observation period for the historical data. When specifying the times, certain formats must be maintained.

The following options are available for the specification of times:

- Absolute based on UTC
- Relative to the local time of the server

Absolute Value According to UTC

By default, the WinCC OPC HDA server uses the coordinated world time (UTC) as its time base. This time corresponds to the Greenwich Mean Time (Central European Time minus an hour).

Time format

YYYY/MM/DD hh:mm:ss.msmsms

Parameters

YYYY = year

MM = month

DD = day

hh = hours

mm = minutes

ss = seconds

ms = milliseconds

Input example

2002/06/10 09:27:30.000

Specification of Time Relative to Local Time

For this option, the time is entered relative to the local time of the server. The local time zone is set on the computer's "Date/Time" control panel.

Time format

keyword +/-offset1 +/-offset(n)

The offset is the deviation from the local time of the server.

Keywords

NOW = current local time on the server

SECOND = current second

MINUTE = current minute

HOUR = current hour

DAY = current day

WEEK = current week

MONTH = current month

YEAR = current year

Offset

+/-S = deviation in seconds

+/-M = deviation in minutes

+/-H = deviation in hours

+/-D = deviation in days

+/-W = deviation in weeks

+/-MO = deviation in months

+/-Y = deviation in years

Example:

DAY - 1D = previous day

DAY-1D + 7H30 = previous day at 7:30

MO-1D+5H = last day of the previous month at 5:00.

NOW-1H15M = one hour and 15 minutes ago

YEAR+3MO= April of this year

See also

www.opcfoundation.org (<http://www.opcfoundation.org>)

Functionality of the WinCC OPC HDA server (Page 141)

Quality codes

Introduction

Quality codes are used to evaluate the status and quality of the raw data. The quality codes for OPC are described under "6.8 OPC Quality flags" of the "Data Access Custom Interface Standard Version 3.00" specifications.

Quality Codes of the WinCC OPC HDA Server

Code	OPC	Description	Quality
0x00040000	OPCHDA_RAW	Indicates the quality of raw data transmission.	GOOD BAD UNCERTAIN
0x00080000	OPCHDA_CALCULATED	Indicates the quality of calculated data transmission.	GOOD BAD UNCERTAIN
0x00100000	OPCHDA_NOBOUND	No bounding values were found at the starting or ending point.	BAD
0x00200000	OPCHDA_NODATA	No raw data were found for the specified time interval.	BAD
0x00400000	OPCHDA_DATALOST	The raw data in the selected interval were not completely archived.	BAD

See also



www.opcfoundation.org (<http://www.opcfoundation.org>)

Supported Write-Accesses

Introduction





The following table shows the write accesses supported by the WinCC OPC HDA server.

Table element:


	Description
Cyclic archive	The process values to be archived are stored in a cyclic archive. The cyclic archive consists of a configurable number of data buffers. The size and a period of time (e.g. in days) for the data buffer are defined. If all data buffers are full, the process data in the first data buffer is overwritten.
Cyclic archive after swapping	In order to protect process data in the data buffers from being overwritten process, it can be swapped (exported).
	Supported by WinCC.
	Not supported by WinCC.

Write Accesses



Adding process values later

Cyclic archive	Cyclic archive after swapping	Supported by WinCC	Description
Yes	No		When the time period is contained in the cyclic archive, a process value can be added later.
Yes	Yes		The data buffer of the corresponding time period is swapped to an archive backup. Process values cannot be added later to an archive backup.
No	No		The cyclic archive is not available. The process value cannot be stored.
No	Yes		The cyclic archive is not available. The process value cannot be stored.





Adding process values in Runtime

Cyclic archive	Cyclic archive after swapping	Supported by WinCC	Description
Yes	No		The process value is added in the data buffer currently valid for the cyclic archive.





Inserting future process values

Cyclic archive	Cyclic archive after swapping	Supported by WinCC	Description
YES	No		During write access, no values can be added in the future.
No	No		With write access, no values can be added in the future.

Deleting process values

Cyclic archive	Cyclic archive after swapping	Supported by WinCC	Description
Yes	No		When the time period is contained in the cyclic archive, a process value can be deleted.
Yes	Yes		The data buffer of the corresponding time period is swapped to an archive backup. Process values can be deleted from an archive backup.
No	No		The cyclic archive is not available. The process value cannot be stored.
No	Yes		The cyclic archive is not available. The process value cannot be stored.

Editing process values

Cyclic archive	Cyclic archive after swapping	Supported by WinCC	Description
Yes	No		When the time period is contained in the cyclic archive, a process value can be edited.
Yes	Yes		The data buffer of the corresponding time period is swapped to an archive backup. Process values cannot be edited in an archive backup.
No	No		The cyclic archive is not available. The process value cannot be stored.
No	Yes		The cyclic archive is not available. The process value cannot be stored.

Example of an OPC HDA Connection

Example of an OPC HDA Connection

Introduction

In the example below, a connection between WinCC and the OPC HDA client is configured. Data from the WinCC archive system are made available via the WinCC OPC HDA server. The OPC HDA client accesses the data via item handles. To simplify the configuration process, the OPC HDA browser is used.

The OPC HDA client from the OPC Foundation is used. All OPC HDA clients conforming to the OPC Historical Data Access 1.20 specification can access the WinCC OPC HDA server.

Requirements

- Create an internal tag named "OPC_HDA" with data type "unsigned 16-bit value" in the WinCC project of the WinCC OPC HDA server.
- Create a process value archive called "HDA_ProcessValueArchive" in the WinCC archive system.
- Create an WinCC archive tag called "OPC_HDA_Tag" in the "HDA_ProcessValueArchive" process value archive. Link the WinCC archive tag to the internal tag "OPC_HDA".
- In the Runtime list, launch Tag Logging Runtime and disable Graphics Runtime.
- Launch the WinCC project of the WinCC OPC HDA server.

Configuration steps

The following configurations are required to connect WinCC to the OPC HDA client:

1. Configuring access to a WinCC archive tag using the HDA server browser
2. Reading values from the WinCC archive tags

See also

[How to Configure Access to a WinCC Archive Tag Using the HDA Server Browser \(Page 153\)](#)

[HDA server browser \(Page 151\)](#)

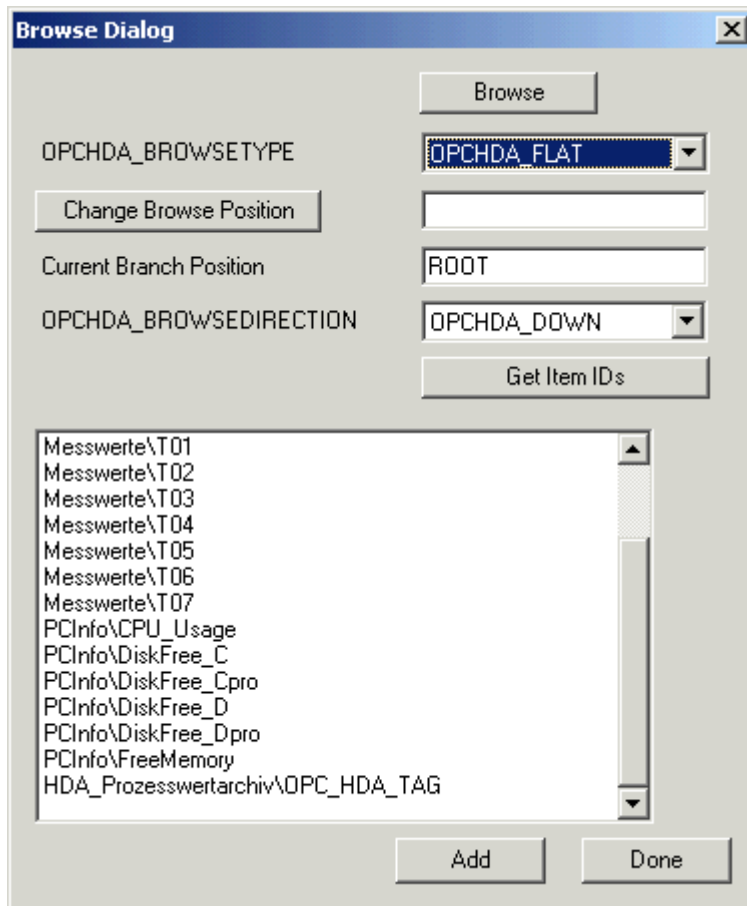
[Reading Values of WinCC Archive Tags \(Page 154\)](#)

HDA server browser

Introduction

The OPC HDA client accesses the tag values via item handles. For ease of configuration, the WinCC OPC HDA server supports the browser functionality. The OPC HDA client can use the

HDA server browser to search the address space of the WinCC OPC HDA server. The data are listed hierarchically by process value archive.



Note

Access to a WinCC archive tag without the HDA server browser requires manual configuration of the item ID.

When addressing WinCC archive tags, the computer name (server prefix) is included in the path. The ItemID has the following syntax: Server-prefix::process_value_archive WinCC_archive_tag.

See also

www.opcfoundation.org (<http://www.opcfoundation.org>)

How to Configure Access to a WinCC Archive Tag Using the HDA Server Browser (Page 153)

How to Configure Access to a WinCC Archive Tag Using the HDA Server Browser

Introduction

In this section, the OPC HDA client is used to access a WinCC archive tag. The OPC HDA client from the OPC Foundation is used. The HDA server browser is used to configure access.

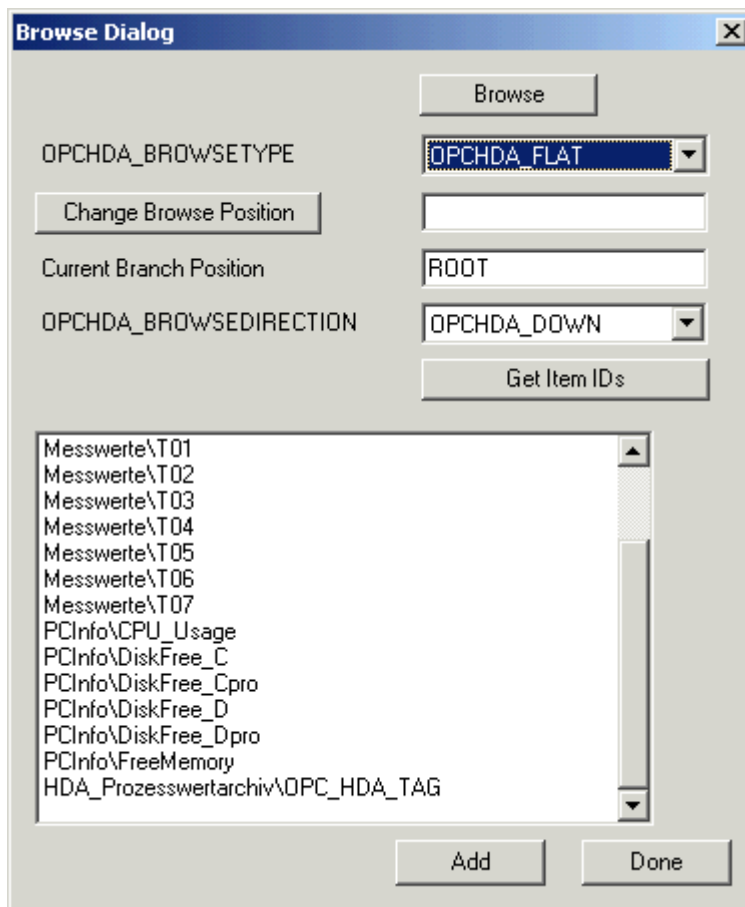
Note

The OPC HDA client described here is the demo client from the OPC Foundation. The source code for it is found on the Internet at <http://www.opcfoundation.org>.

Procedure

1. Copy the " SampleClientHDA.exe " file to a directory of your choice. This application is only available in the online help.
2. Double-click the "SampleClientHDA.exe" file. The HDA client program is started.
3. In the "Server Name" area, select entry "OPCServerHDA.WinCC.1". Click "Connect". Confirm the next dialog.

- Click "Browse" in the HDA client. The "Browse Dialog" dialog is opened. Select "OPCHDA_FLAT" in the "OPCHDA_BROWSETYPE" field.



- In the selection window, select entry "HDA_ProcessValueArchive_HDA_TAG". Click "Add" and then "Done" to close the dialog.

For more information, refer to <http://www.opcfoundation.org>.

See also

Reading Values of WinCC Archive Tags (Page 154)

www.opcfoundation.org (<http://www.opcfoundation.org>)

Reading Values of WinCC Archive Tags

Introduction

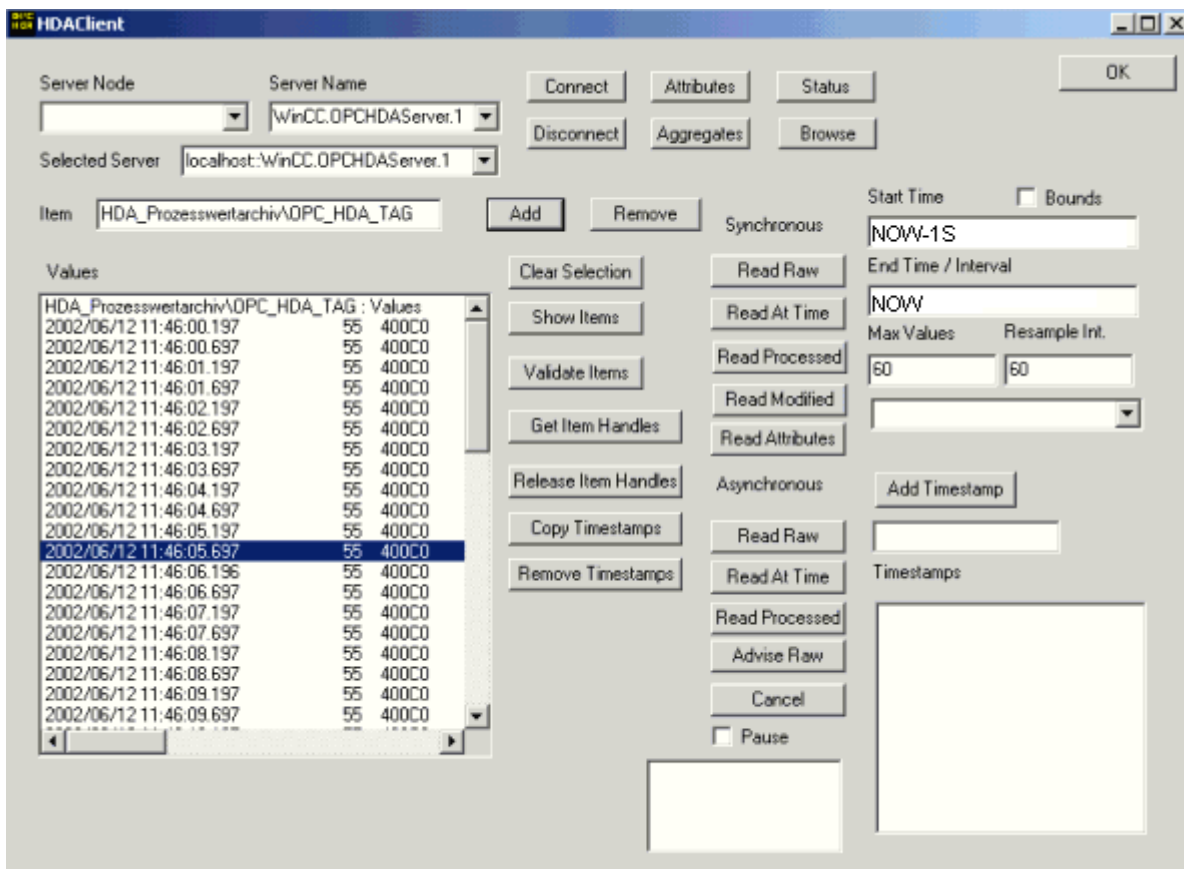
This section explains how you can access and read WinCC archive tags.

Requirement

- The OPC HDA client must be running.

Procedure

1. Click "Show Items" in the HDA client.
2. Click "Get Item Handles" in the HDA client.
3. Double-click "HDA_ProcessValueArchive_HDA_Tag" in the selection field "Value" selection field.
4. Enter "NOW-10S" in the "Start Time" field. Enter "NOW" in the "End Time" field.



5. Click "Read Raw". The values, their quality codes and time stamps are shown in the "Values" selection field.

Special features of the OPC HDA server in WinCC for acyclic logging

Introduction

Tag logging is performed in WinCC cyclically or acyclically. The WinCC OPC HDA server works differently depending on the logging method for tags:

- For all cyclically logged values, the OPC HDA server operates in conformity to the HDA specification of the OPC foundation. The OPC aggregates are linearly interpolated.
- Acyclically logged tags are not included in the HDA specification of the OPC Foundation. The OPC aggregates are interpolated incrementally. Especially when a tag experiences no change for a long period of time, no data is available during a time period. The following should be taken into consideration to nevertheless obtain valid data.

Note

The OPC HDA server is not OPC-compliant for acyclically logged tags. The HDA specification of the OPC Foundation does not recognize acyclically logged tags and, therefore, no archive server can handle acyclically logged tags. The supported aggregates are calculated in conformity to the OPC HDA specification. No non-explicitly called functions are supported.

Note

If write access to process value archives is enabled, no future values may be added.

Configuration of acyclically logged tags

For the configuration of acyclically logged tags, the "Archive after segment change" setting needs to be enabled for the tags. This enters the most recent valid value in the the new log when a segment changes.

Supported aggregates of the WinCC OPC HDA server for acyclically logged tags

The OPC HDA server supports the following aggregates:

- OPCHDA_MINIMUM
- OPCHDA_MAXIMUM
- OPCHDA_AVERAGE
- OPCHDA_END
- OPCHDA_INTERPOLATIVE
- OPCHDA_TIMEAVERAGE
- OPCHDA_TOTAL
- OPCHDA_DURATIONGOOD
- OPCHDA_PERCENTGOOD

Supported functions of the WinCC OPC HDA server for acyclically logged tags

- ReadRaw with "boundings" only. ReadRaw for a tag must always be performed with "boundings", in order to find the last real stored value for an area without logged value change.
- ReadProcessed
- DeleteRaw
- DeleteAtTime
- Insert
- InsertReplace
- Replace

Calculating the aggregates for acyclically logged tags

Calculation of the aggregates is based on the extended "RawData" data record, which contains virtual data points for the calculation in addition to real stored values. The WinCC OPC HDA server prepares the contained "RawData" corresponding to the requirements of the "ReadProcessed". The virtual data points needed for the calculation are formed from the bordering real data points. The following significant points are included for the virtual data points:

- Value for the "StartTime"
- Value for the "EndTime"
- Value for interval limits

Example

The values for "00:59:00", "01:02:00" and "01:03:00" are stored for an acyclical tag logging tags. An OPC HDA client postulates with "ReadProcessed" an aggregate with the following parameters:

- StartTime = 01:00:00
- EndTime = 01:04:00
- Interval = 00:02:00

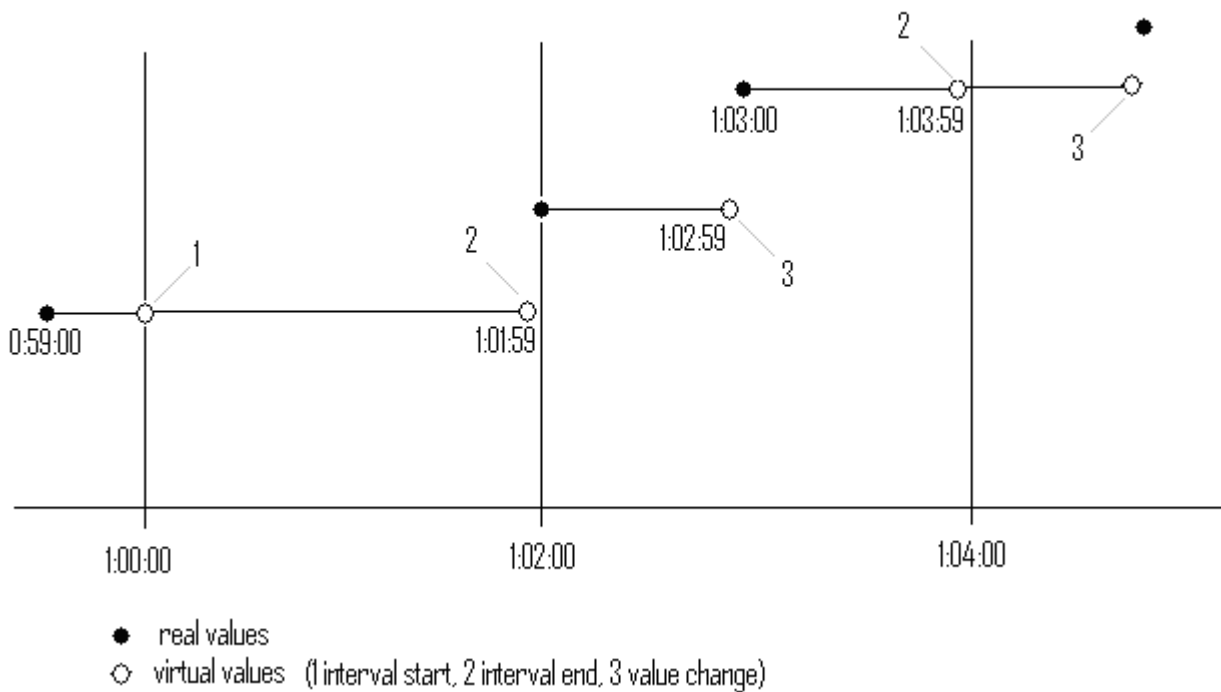
Note

The time period is always 1 μ s less than the time stamp at the limit for the calculation when generating virtual values at limits ("EndTime"/"Interval").

A delta of 1 seconds is used in the following table to provide a better overview. The following graphic illustrates the example.

The OPC server uses the following "RawData" for the calculation of the aggregate:

Number	Time stamp	Real stored values	Generated virtual values
1	00:59:00	1.00	
2	01:00:00		1.00
3	01:01:59		1.00
4	01:02:00	2.00	
5	01:02:59		2.00
6	01:03:00	3.00	
7	01:03:59		3.00



3.6.2.9 WinCC OPC A&E Server

Functionality of the WinCC OPC A&E server

Introduction

The WinCC OPC A&E server is a DCOM application. The OPC A&E client is kept informed of status changes for WinCC messages by means of subscriptions. The OPC A&E client can apply a filter to the subscription. This filter determines which messages and attributes are displayed.

The WinCC OPC A&E server supports the specification OPC Alarm&Event 1.10. This has been confirmed by the compliance test.

The following chapter explains the display of the WinCC message system on OPC A&E, as well as the attributes supported by the WinCC OPC A&E server. This is not a detailed description, but rather a summary of the most important information. For more information, refer to the "OPC Alarms & Events 1.10" specification.

Installation

The WinCC OPC A&E server can be selected during the installation of WinCC. After installation, the WinCC OPC A&E server is immediately available for use without any additional configuration.

As of WinCC V6.2, the WinCC OPC A&E server can be used on a WinCC server and a WinCC client.

Licensing

In order to operate the WinCC OPC A&E server, the following licenses must be installed on each WinCC server implemented as an OPC A&E server:

- A valid RT license for WinCC
- WinCC Option Connectivity Pack

Server types

The WinCC OPC A&E server supports conditional events and simple events. In addition, there are tracking events.

Condition-related event server

With a condition-related event server, the event is associated with a condition. A condition might, for example, be a limit value violation of a tag. A message is generated in WinCC as soon as the bounding value is exceeded. This message is shown as an alarm in OPC A&E.

Simple event server

Simple events are messages that inform the OPC A&E client about events. Simple events include, for example, starting or exiting programs.

Note

Note the following when using redundant systems:

Simple events interconnected to internal tags are sent twice when tags are updated.

The first message is triggered by the master, the second by the standby.

Tracking event server

If a change in a process occurs, the OPC A&E client receives a message. Such a change might for example be a regulator adjustment.

OPC A&E client

All OPC A&E clients conforming to the OPC Alarms & Events 1.10 specification can access the WinCC OPC A&E server. You can also create the OPC A&E client yourself. By creating proprietary OPC clients, most user-specific requirements can be met. An OPC A&E client can, for example, be used for the analysis and common archiving of alarms from multiple OPC A&E servers.

See also

Compatibility (Page 117)

Quality Codes for OPC A&E (Page 166)

Mapping of the WinCC Message System on OPC A&E (Page 160)

www.opcfoundation.org (<http://www.opcfoundation.org>)

Mapping of the WinCC Message System on OPC A&E

Mapping of the WinCC Message System on OPC A&E

Introduction

During the configuration of the WinCC message system, settings are made to determine which process events generate a message. This message is shown as an alarm in OPC A&E. The table below lists the most important parameters of the alarm. It also describes how the information is made available by the WinCC message system. For more information, refer to "Alarm Structure".

Overview

OPC	WinCC message system
Source	Indicates the source of the message. The source has the format "<server prefix>::@LOCALMACHINE::".
Time	Issues a time stamp for received, sent and acknowledged messages. Issues a time stamp in UTC (Universal Time Coordinated).
Type	Indicates whether the event is a simple, tracking or condition-related event. WinCC - POC A&E server supports simple, condition-related and tracking events.
Severity	Indicates the priority of the WinCC message.
EventCategory	Returns the category of the message. For more information on this topic, refer to "Displaying Message Classes and Types".
Message	Indicates the message text of the corresponding message number.
ConditionName	Indicates the message number.
ChangeMask	Indicates the changed status of the message. For more information, refer to "Acknowledgement Theory".

OPC	WinCC message system
NewState	Returns the message status. For more information, refer to "Acknowledgement Theory".
ConditionQuality	Returns the quality of the message. For more information, refer to "Quality Codes".
AckRequired	Indicates whether the message requires acknowledgement (receipt).
ActiveTime	Returns the time stamp for received messages.
EventAttribute	Lists the attributes required for the respective message. For more information, refer to "Attributes of the WinCC Message System".
Quality	Returns the quality code of the message.
Cookie	Returns the cookie from the OPC A&E server. The cookie corresponds to the message number in the WinCC alarm system

See also

Acknowledgement theory (Page 164)

Attributes of the WinCC Message System (Page 162)

Mapping the WinCC message classes and message types (Page 161)

Mapping the WinCC message classes and message types

Introduction

The WinCC message system informs the user of disturbances and operating conditions in the process. A WinCC message always belongs to a specific message class and message type that is related to the event category.

The mapping of the WinCC message system on OPC is configured via the "CcAeProvider.ini" file.

Event Category

An event category is created on the WinCC OPC A&E server for every combination of a message class and type.

An event category is determined by a category ID and a descriptive "Category Description". The category ID is composed of the WinCC internal IDs for the message class and the message type; the category description is composed of the message class and message type.

Note

If the OPC A&E server is run on a WinCC client of a connectivity station, the OS servers linked to it must have an identical configuration of message classes and message types. If this is not the case, the OPC client used must access the OS server directly.

The names of the message classes and message types can be ascertained exactly via the alarm attributes "CLASSNAME" and "TYPENAME".

Mapping the WinCC message priority

Introduction

The priority of WinCC messages is displayed by the OPC server to the attribute "Severity".

When configuring alarms in the WinCC messaging system, you can configure a priority between 0 and 16. The OPC A&E specification defines a value range from 1 to 1000 for the severity where 1 stands for the lowest and 1000 for the highest severity.

Therefore, the values of the WinCC priority are suitably displayed to the OPC severity. In the standard mapping, the WinCC priority 0 becomes OPC severity 1. All other priority values are interpolated in a linear manner up to severity 1000. Other priority mapping rules can be configured in the CcAeProvider.ini file.

Attributes of the WinCC Message System

Introduction

The following table lists the OPC attributes of the WinCC message system. The attributes are configured in the WinCC message system. Some attributes are intended for internal use in WinCC only and are therefore not relevant to an OPC A&E client. These attributes are not listed.

Attributes

OPC attributes	WinCC message system	Data type
CLASSNAME	Returns the message class name.	VT_BSTR
TYPENAME	Returns the message type name.	VT_BSTR
FORECOLOR	Returns the text color for the display of received, sent and acknowledged messages.	VT_I4
BACKCOLOR	Returns the background color for the display of received, sent and acknowledged messages.	VT_I4
FLASHCOLOR	Returns the flashing color.	VT_I4
FLAGS	Indicates whether the message requires acknowledgment (receipt).	VT_I4
TEXT01	Returns the content of UserTextBlock01.	VT_BSTR
TEXT02	Returns the content of UserTextBlock02.	VT_BSTR
TEXT03	Returns the content of UserTextBlock03.	VT_BSTR
TEXT04	Returns the content of UserTextBlock04.	VT_BSTR
TEXT05	Returns the content of UserTextBlock05.	VT_BSTR
TEXT06	Returns the content of UserTextBlock06.	VT_BSTR
TEXT07	Returns the content of UserTextBlock07.	VT_BSTR
TEXT08	Returns the content of UserTextBlock08.	VT_BSTR
TEXT09	Returns the content of UserTextBlock09.	VT_BSTR

OPC attributes	WinCC message system	Data type
TEXT10	Returns the content of UserTextBlock10.	VT_BSTR
PROCESSVALUE01	Returns the content of ProcessValueBlock01.	VT_VARIANT
PROCESSVALUE02	Returns the content of ProcessValueBlock02.	VT_VARIANT
PROCESSVALUE03	Returns the content of ProcessValueBlock03.	VT_VARIANT
PROCESSVALUE04	Returns the content of ProcessValueBlock04.	VT_VARIANT
PROCESSVALUE05	Returns the content of ProcessValueBlock05.	VT_VARIANT
PROCESSVALUE06	Returns the content of ProcessValueBlock06.	VT_VARIANT
PROCESSVALUE07	Returns the content of ProcessValueBlock07.	VT_VARIANT
PROCESSVALUE08	Returns the content of ProcessValueBlock08.	VT_VARIANT
PROCESSVALUE09	Returns the content of ProcessValueBlock09.	VT_VARIANT
PROCESSVALUE10	Returns the content of ProcessValueBlock10.	VT_VARIANT
STATETEXT	Returns the status message.	VT_BSTR
INFOTEXT	Returns the information text for the message.	VT_BSTR
LOOPINALARMA	States if LoopInAlarm has been configured.	VT_I4
CLASSID	Returns the message class ID.	VT_I4
TYPEID	Returns the message type ID.	VT_I4
MODIFYSTATE	Outputs the value of the status tag of the message.	VT_I4
AGNR	Returns the number of the automation device that generated the message.	VT_I2
CPUNR	Returns the number of the CPU that generated the message.	VT_I2
DURATION	Indicates the period of time between message received, sent and acknowledged.	VT_I4
COUNTER	Outputs the number of messages after the start of Runtime.	VT_I4
QUITSTATETEXT	Indicates whether the message has been acknowledged.	VT_BSTR
QUITCOUNT	Outputs the number of active, unacknowledged messages.	VT_I4
PARAMETER	Outputs the message parameter. (image of the message configuration).	VT_BSTR
BLOCKINFO	Returns the current content of the message block.	VT_BSTR
ALARMCOUNT	Outputs the number of messages pending.	VT_I4
LOCKCOUNT	Outputs the number of locked messages.	VT_I4
PRIORITY	Indicates the configured priority of the message.	VT_I4
APPLICATION	Outputs the application which triggered the message.	VT_BSTR
COMPUTER	Outputs the name of the computer which processed the message.	VT_BSTR

OPC attributes	WinCC message system	Data type
USER	Outputs the name of the user who processed the message.	VT_BSTR
COMMENT	Outputs the message comment.	VT_BSTR

Acknowledgement theory

Introduction

For WinCC, the acknowledgment philosophy is how a message is displayed and processed from "came in" to "went out". On the WinCC OPC A&E server, this message status is managed in parameters "ChangeMask" and "NewState".

Conditional, Simple and Tracking Events

Typically, messages from the WinCC system are sent to the client as conditional events. In order for a message to be treated as a simple event, the following conditions must be met during configuration of the message class:

- "Acknowledgment Came In" is not activated.
- "Message Without Status Went Out" is activated.

Depending on the mapping configuration, the messages of the message class "System without Acknowledgement" and of the message type "Operations message" are transferred as OPC Tracking Events.

ChangeMask

The "ChangeMask" parameter keeps track of where the message status was changed.

Parameter values:

- OPC_CHANGE_ACTIVE_STATE
- OPC_CHANGE_ENABLE_STATE
- OPC_CHANGE_ACK_STATE

NewState

The "NewState" parameter indicates the message status after a change.

Parameter values:

- OPC_CONDITION_ACTIVE
- OPC_CONDITION_ENABLED
- OPC_CONDITION_ACKED

Overview

WinCC	NewState	ChangeState
Received message	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACTIVE_STATE
Sent message with receipt	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACTIVE_STATE
Sent message without receipt	OPC_CONDITION_ENABLED	OPC_CHANGE_ACTIVE_STATE
Acknowledged messages (message pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ACKED OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Acknowledged messages (message no longer pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Locked message	-----	OPC_CHANGE_ENABLED_STATE
Unlocked message	OPC_CONDITION_ENABLED	OPC_CHANGE_ENABLED_STATE
Received, acknowledged message	OPC_CONDITION_ACTIVE OPC_CONDITION_ACKED OPC_CONDITION_ENABLED	OPC_CHANGE_ACTIVE_STATE
Received, sent message with receipt	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Received, sent message without receipt	OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Message acknowledged by the system (message pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ACKED OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Message acknowledged by the system (message no longer pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Emergency-acknowledged message (message pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ACKED OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Emergency-acknowledged message (message no longer pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE

See also

www.opcfoundation.org (<http://www.opcfoundation.org>)

Quality Codes for OPC A&E

Introduction

Quality codes are used to evaluate the status and quality of a message. The quality codes for OPC are described under "6.8 OPC Quality flags" of the "Data Access Custom Interface Standard Version 3.00" specifications.

Quality codes

Code	Quality	Status
0xC0	OPC_GOOD	OK
0x40	OPC_UNCERTAIN	Returned in cases of uncertainty, e.g. in the event of delayed acknowledgement (receipt).
0x00	OPC_BAD	Returned if the connection to the source is interrupted.

Example of an OPC A&E Connection

Example of an OPC A&E Connection

Introduction

In the example below, a connection between WinCC and an OPC A&E client is configured. Data from the WinCC message system are made available via the WinCC OPC A&E server.

The OPC A&E client is kept informed of status changes of WinCC messages by means of a subscription.

All OPC A&E clients conforming to the OPC Alarms&Events 1.10 specifications can access the WinCC OPC A&E server.

Configuration Step

The following configurations are required for connection between WinCC and the OPC A&E client:

1. Configuring access to the WinCC message system

See also

How to Configure Access to the WinCC Message System (Page 167)

www.opcfoundation.org (<http://www.opcfoundation.org>)

How to Configure Access to the WinCC Message System

Introduction

In this section, the OPC A&E client of the OPC foundation accesses the WinCC message system.

Note

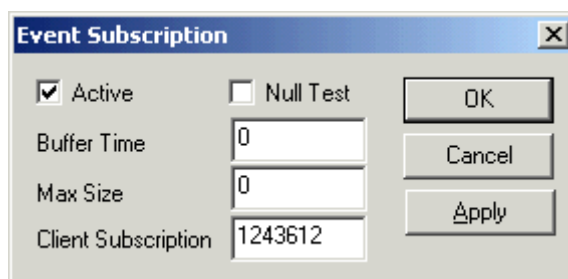
The OPC A&E client described here is the demo client from the OPC Foundation. The source code for it is found on the Internet at <http://www.opcfoundation.org>.

Requirement

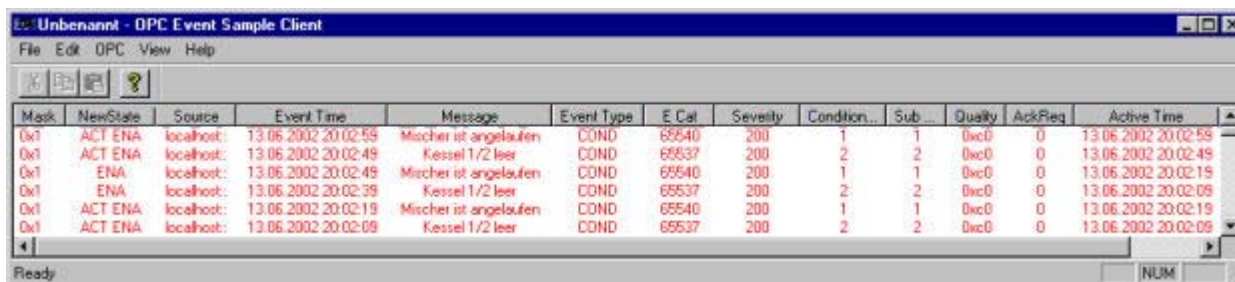
- Create several internal tags of the "binary" data type in the WinCC project of the WinCC OPC A&E server.
- Configure the WinCC message system in the WinCC project of the WinCC OPC A&E server. Link the messages to the internal tags.
- Configure a picture with the Graphics Designer. Add the WinCC alarm control and an I/O field to the picture. Link the message tags to the graphic objects.
- Enable the "Alarm Logging Runtime" in the start list.
- Enable the WinCC project of the WinCC OPC A&E server.

Procedure

1. Copy the "SampleClientAE.exe" "binary" file to a directory of your choice. This application is only available in the online help.
2. Select "OPC" > "Connect..." in the menu bar. Select "OPC.WinCC-AlarmsEvent" in the "OPC Alarm Server" dialog. Click "OK" to close the dialog.
3. Select "OPC" > "Event Subscription..." from the menu bar. The "Event Subscription" dialog is opened.
4. Select the check box labeled "Active" in the dialog. Enter "1000" in the "Buffer Time" and "Max Size" fields. Click "OK" to close the "Event Subscription" dialog.



- The messages from the WinCC message system are displayed in the OPC Event Sample Client.



- Select "OPC" >"Filter" from the menu bar. The "Filter" dialog is opened. Select a category from the "Event Category" field. Click "OK" to close the "Filter" dialog.
- The messages meeting the filter criteria are displayed in the OPC Event Sample Client.

"Buffer Time" and "Max Size" Parameters

According to OPC specification, the "Buffer Time" and "Max Size" parameters are configured in WinCC as follows:

OPC Client demands return value	WinCC uses
Buffer time < 100 OPC_S_INVALIDBUFFERTIME	Revised buffer time = 100
100 <= buffer time <= 600000 S_OK	Revised buffer time = buffer time
Buffer time > 600000 OPC_S_INVALIDBUFFERTIME	Revised buffer time = 600000
Max size = 0 OPC_S_INVALIDMAXSIZE	Revised max size = 1000
0 < max size < 10 OPC_S_INVALIDMAXSIZE	Revised max size = 10
10 <= max size <= 1000 S_OK	Revised max size = max size
Max Size = 1000 OPC_S_INVALIDMAXSIZE	Revised max size = 1000

Parameters may be set while creating a subscription. However, you cannot change an existing subscription using SetState() after the fact.

For more information, refer to <http://www.opcfoundation.org>.

See also

www.opcfoundation.org (<http://www.opcfoundation.org>)

OPC A&E server with hierarchical access

Functionality of the OPC A&E server

Introduction

The OPC-A&E server uses DCOM services for transferring messages between OPC-capable applications. The OPC A&E server supports the specification OPC Alarm&Event 1.10.

The following chapter explains the mapping of the WinCC message system on OPC A&E with hierarchical access and the attributes supported by the OPC A&E server. This documentation includes an overview of the specific information. For more information, refer to the "OPC Alarms & Events 1.10" specification.

Principle of operation

The OPC-A&E client receives WinCC messages via subscription. You can use the subscription filter to reduce the number of events that will be transferred with a subscription. The OPC-A&E client can be set for every event category that displays message attributes.

Installation

The WinCC OPC A&E server can be selected during the installation of WinCC. After installation, the WinCC OPC A&E server is immediately available for use without any additional configuration.

As of WinCC V6.2, the WinCC OPC A&E server can be used on a WinCC server and a WinCC client.

Licensing

In order to operate the OPC A&E server, one of the following licenses must be installed on each computer running an OPC A&E server:

- A valid RT license for WinCC
- WinCC Option Connectivity Pack

Event types

The OPC-A&E server with hierarchical access supports conditional events, simple events and tracking events.

Condition related events

With a condition related event, the event is associated with a condition. A condition might, for example, be a limit value violation of a tag. This limit violation generates a message that is shown as an alarm with OPC A&E.

3.6 Access via OPC - Open Connectivity

Simple events

Simple events are messages that inform the OPC A&E client about events. Simple events include, for example, starting or exiting programs.

Note

Note the following when using redundant systems:

Simple events interconnected to internal tags are sent twice when tags are updated.

The first message is triggered by the master, the second by the standby.

Tracking events

A tracking event is sent with a operator input message to the OPC A&E client. An operator input message is triggered by manual intervention in the process.

OPC A&E client

All OPC A&E clients conforming to the OPC Alarms & Events 1.10 specification can access the OPC A&E server. You can also create the OPC A&E client yourself. By creating proprietary OPC clients, most user-specific requirements can be met. An OPC A&E client, for example, may be used for analysis and joint archiving of alarms from different OPC A&E servers. The acknowledgement of archived messages is not possible; only current alarms and events can be acknowledged.

Note

Documentation on OPC

You can find additional information on OPC in the Chapter "Interfaces > OPC - OLE for Process Control".

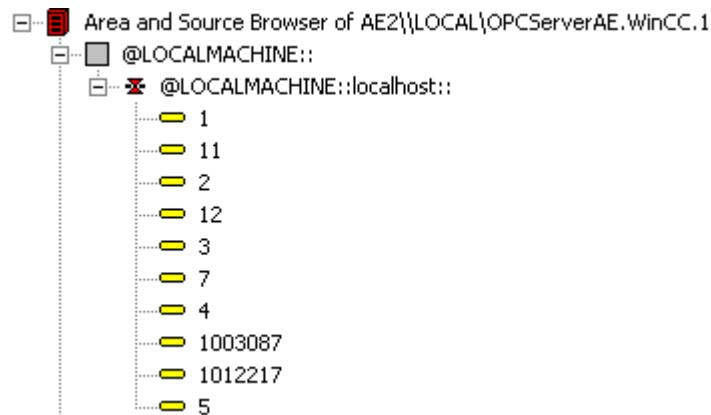
OPC A&E Server of WinCC V6.2 SP2 or higher

Differences between OPC A&E and OPC A&E with hierarchical access

Displaying messages with OPC A&E

The OPC A&E server supports "conditional events" and "simple events" for accessing the message system. With "conditional events", the message numbers are shown for each source. Since an WinCC server can hold many more message numbers, it is difficult to maintain an overview of the messages.

The following figure shows an example of the display in an OPC browser:



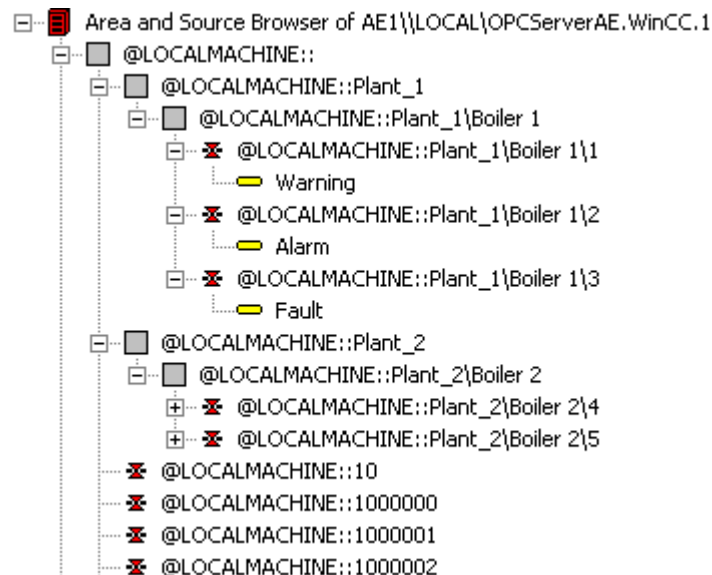
Displaying the messages with OPC A&E and hierarchical access

The OPC A&E server with hierarchical access supports the event types, conditional events, simple events and tracking events.

The user text block 2 determines the source of the messages for "conditional events". With the default setting, user text block 2 corresponds to the fault location. In order to present messages hierarchically, they must be combined in user-defined group messages in alarm logging messages. The structure of group messages is determined by the areas in OPC A&E.

Tracking events occur when operator input messages are triggered in the system.

The following figure shows an example of the display of conditional events in an OPC browser. The "Condition" is shown in addition to "Area" and "Source":



Recommendation

Use an OPC A&E server with hierarchical access when creating a new project.

3.6 Access via OPC - Open Connectivity

After a project upgrade to WinCC V6.2 SP2 or higher, OPC A&E Server can be used as before, or be converted for hierarchical access. The conversion can be undone again without any loss of data. For further information, refer to "How to upgrade OPC A&E to WinCC V6.2 SP2 or higher".

How to upgrade OPC A&E to WinCC V6.2 SP2 or higher

Introduction

OPC A&E for WinCC V6.2 SP2 or higher was enhanced with functions for hierarchical access to the message system. The OPC-A&E server with non-hierarchical access remains the standard.

Upgrading from OPC A&E

If you are using the OPC A&E with hierarchical access and want to use all functions, you may need to adapt the OPC A&E client currently used.

Starting with the WinCC version of your project, possible upgrade scenarios are described for OPC A&E:

- Upgrading the project from WinCC V6.2 to WinCC V6.2 SP2
- The project is created in WinCC V6.2 SP2 or higher.

Upgrading from WinCC V6.2 to WinCC V6.2 SP2

You can upgrade a project with WinCC V6.2 to WinCC V6.2 SP2 in regard to OPC A&E as follows:

Retaining previous OPC A&E without hierarchical access

If you want to continue to work with the previously used OPC A&E server, the following scenarios are possible:

- If you have not changed the standard "CcAeProvider.ini" file, you do not need to make any other settings.
- If you have changed the standard "CcAeProvider.ini" file and want to keep these changes, proceed as follows:
 - Save the "CcAeProvider.ini" file from the WinCC installation path in the "OPC\AlarmEvent\bin" folder.
If you are working on a distributed system or a system integrated in STEP 7, save the file from the project on the WinCC client or on the OS.
 - Following the upgrade, copy the file into the WinCC project directory.
If you are working on a distributed system or a system integrated in STEP 7, copy the file on the WinCC server or on the ES into the project directory of the client projects or OS projects.
- If you have changed the standard "CcAeProvider.ini" file and want to replace it with the standard "CcAeProvider.ini" file supplied with the product, before the upgrade delete these files on the servers and clients or on the ES computers and OS computers. The project folder is located in "wincproj" sub-folder on the ES.

Switching to OPC A&E with hierarchical access

If you want to work with the OPC A&E server with hierarchical access, proceed as follows:

1. After upgrading, copy the "CcAeProvider.ini" file to the project folder. The file is located in the WinCC installation path in the folder "OPC\AlarmEvent\Hierarchical-Access".
2. Update the clients or perform a complete download for the OS servers.

Creating a project in WinCC V6.2 SP2 or higher

New projects created in WinCC V6.2 SP2 or higher still use OPC A&E Server without hierarchical access. You do not have to make any additional settings.

If you want to work with the OPC A&E server with hierarchical access, proceed as follows:

1. After upgrading, copy the "CcAeProvider.ini" file to the project folder of the ES projects. You can find the file in the "OPC\AlarmEvent\Hierarchical-Access" folder below the installation path of WinCC.
2. Update the clients or perform a complete download for the OS servers.

Mapping the WinCC Message System on OPC A&E

Mapping the WinCC message system

Introduction

The WinCC message system resulting from the configuration defines which event in the process will generate a message. This message is shown as an event notification in OPC A&E.

Mapping the WinCC message system on OPC A&E with hierarchical access

The OPC source of the WinCC user text block "2" and the OPC message of WinCC user text block "1" are used in WinCC as a default setting for mapping the WinCC message systems.

Overview

The following table shows the most important attributes of the event notifications and the respective information from the WinCC message system.

The events that use the configured attributes are shown in the third column of the table:

- "S" means a simple event
- "C" means a conditional event
- "T" means a tracking event

OPC	WinCC message system	Event type
Area	The structure of the group messages determine the areas in OPC A&E. If there is no group message configured for the message, only the OPC area corresponding to the server prefix is available.	S, C, T
Source	Indicates the source of a message. The source has the format "<server prefix>::Area \user text block 2". The server prefix of a local computer is "@LOCALMACHINE". The server prefix always shows the top Areas in the hierarchy of the server.	S, C, T
Time	Issues a time stamp for received, sent and acknowledged messages. Issues a time stamp in UTC (Universal Time Coordinated).	S, C, T
Type	Indicates whether the event is a simple, tracking or conditional event.	S, C, T
Severity	Returns the priority of the message.	S, C, T
EventCategory	Indicates the message class. "Event Category" is made up of the "CategoryID" and the "Category Description". "CategoryID" corresponds to the internal ID of the message class. "Category Description" corresponds to the name of the message class.	S, C, T
Message	Indicates the message text of the corresponding message number.	S, C, T
Condition	Indicates the message type.	C
Sub-condition	Corresponds with the "Condition" parameter.	C
ChangeMask	Specifies the change of the condition. For more information, refer to "Acknowledgment Theory".	C
NewState	Indicates the current status of the condition. For more information, refer to "Acknowledgment Theory".	C
ConditionQuality	Returns the quality of the message. For more information, refer to "Quality codes".	C

OPC	WinCC message system	Event type
AckRequired	Indicates whether the message requires acknowledgment.	C
EventAttribute	Lists the attributes required for the respective message. For more information, refer to "Attributes of the WinCC message system".	C
Quality	Returns the quality code of the message.	C
Cookie	Does not include any usable information for the client	C
ActorID	Indicates which user acknowledged the message.	T

Note

If text without wild cards are specified as a filter for the area, only the messages of the area are returned. If you want to include sources that are located in areas outside the specified area, you need to use wild cards.

Note

The message classes and message types **must** be configured identically on the connected OS servers, if you run the OPC A&E server as follows:

- On a WinCC Client
- On a Connectivity station

If the OS server is not configured identically, the employed OPC client must access the respective OS server directly.

Mapping the message priority

Introduction

The priority of messages is mapped by the OPC A&E server to the attribute "Severity".

When configuring alarms in the messaging system, you can configure a priority between "0" and "16". The OPC A&E specification defines a value range of "1" to "1000" for the severity. In this case, "1" stands for the lowest and "1000" for the highest severity.

Therefore, the values of the priority are suitably displayed to the OPC severity. In the standard mapping, priority "0" is assigned to OPC severity "1" and priority "16" to OPC severity "1000". All other priority values are interpolated linearly between "0" and "1000".

Attributes of the WinCC Message System

Introduction

The following table lists the OPC attributes of the WinCC message system. The attributes are configured in the WinCC message system. Some attributes are intended for internal use in

3.6 Access via OPC - Open Connectivity

WinCC only and are therefore not relevant to an OPC A&E client. These attributes are not contained in the table.

Attributes

OPC attributes	WinCC message system	Data type
CLASSNAME	Outputs the message class name.	VT_BSTR
TYPENAME	Outputs the message type name.	VT_BSTR
FORECOLOR	Outputs the text color for activated, deactivated and acknowledged messages.	VT_I4
BACKCOLOR	Outputs the background color for activated, deactivated and acknowledged messages.	VT_I4
FLASHCOLOR	Outputs the flash color.	VT_I4
FLAGS	Indicates mandatory message acknowledgment	VT_I4
TEXT01	Outputs the content of UserTextBlock01.	VT_BSTR
TEXT02	Outputs the content of UserTextBlock02.	VT_BSTR
TEXT03	Outputs the content of UserTextBlock03.	VT_BSTR
TEXT04	Outputs the content of UserTextBlock04.	VT_BSTR
TEXT05	Outputs the content of UserTextBlock05.	VT_BSTR
TEXT06	Outputs the content of UserTextBlock06.	VT_BSTR
TEXT07	Outputs the content of UserTextBlock07.	VT_BSTR
TEXT08	Outputs the content of UserTextBlock08.	VT_BSTR
TEXT09	Outputs the content of UserTextBlock09.	VT_BSTR
TEXT10	Outputs the content of UserTextBlock10.	VT_BSTR
PROCESSVALUE01	Outputs the content of ProcessValueBlock01.	VT_VARIANT
PROCESSVALUE02	Outputs the content of ProcessValueBlock02.	VT_VARIANT
PROCESSVALUE03	Outputs the content of ProcessValueBlock03.	VT_VARIANT
PROCESSVALUE04	Outputs the content of ProcessValueBlock04.	VT_VARIANT
PROCESSVALUE05	Outputs the content of ProcessValueBlock05.	VT_VARIANT
PROCESSVALUE06	Outputs the content of ProcessValueBlock06.	VT_VARIANT
PROCESSVALUE07	Outputs the content of ProcessValueBlock07.	VT_VARIANT
PROCESSVALUE08	Outputs the content of ProcessValueBlock08.	VT_VARIANT
PROCESSVALUE09	Outputs the content of ProcessValueBlock09.	VT_VARIANT
PROCESSVALUE10	Outputs the content of ProcessValueBlock10.	VT_VARIANT
STATETEXT	Outputs the status message.	VT_BSTR
INFOTEXT	Outputs the message infotext.	VT_BSTR
LOOPINALARM	Indicates whether LoopInAlarm was configured.	VT_I4
CLASSID	Outputs the message class ID.	VT_I4
TYPEID	Outputs the message type ID.	VT_I4
MODIFYSTATE	Outputs the value of the status tag of the message.	VT_I4
AGNR	Outputs the number of the AS that generated the message.	VT_I2
CPUNR	Outputs the number of the CPU that generated the message.	VT_I2
DURATION	Outputs the interval between the activation, deactivation and acknowledgment of a message.	VT_I4

OPC attributes	WinCC message system	Data type
COUNTER	Outputs the number of messages after the start of Runtime.	VT_I4
QUITSTATETEXT	Indicates whether the message has been acknowledged.	VT_BSTR
QUITCOUNT	Outputs the number of active, unacknowledged messages.	VT_I4
PARAMETER	Outputs the message parameter. (image of the message configuration).	VT_BSTR
BLOCKINFO	Outputs the current content of the message block.	VT_BSTR
ALARMCOUNT	Outputs the number of messages pending.	VT_I4
LOCKCOUNT	Outputs the number of locked messages.	VT_I4
PRIORITY	Indicates the message priority configured.	VT_I4
APPLICATION	Outputs the application which triggered the message.	VT_BSTR
COMPUTER	Outputs the name of the computer which processed the message.	VT_BSTR
USER	Outputs the name of the user who processed the message.	VT_BSTR
COMMENT	Outputs the message comment.	VT_BSTR
HIDDEN-COUNT	Outputs the number of hidden messages.	VT_I4
BIG COUNTER	Outputs the number of messages after the start of Runtime.	VT_CY
OS-HIDDEN	Outputs the hidden status of the message.	VT_BOOL
OS-EVENTID	Outputs the message ID configured for the message.	VT_I4

Acknowledgement Theory

Introduction

The acknowledgment policy in WinCC is how a message from "came in" to "went out" is displayed and processed. On the OPC A&E server, this message status is displayed in the "ChangeMask" and "NewState" parameters.

Conditional events, simple events and tracking events

Messages from the system are sent to the client as conditional events with acknowledgment.

In order for a message to be handled as a simple event, the message class of the message must meet the following conditions:

- "Acknowledgment came in" is not activated.
- "Message without status went out" is activated.

In WinCC, messages of message class "System, does not require acknowledgment" with "Operator input message" message type are transferred as tracking events.

Note

Messages with "System, does not require acknowledgment" message class and "Process control system" message type are transferred as simple events with the "System message" event category.

ChangeMask

The "ChangeMask" parameter keeps track of where the message status was changed.

Parameter values:

- OPC_CHANGE_ACTIVE_STATE
- OPC_CHANGE_ENABLE_STATE
- OPC_CHANGE_ACK_STATE

NewState

The "NewState" parameter indicates the message status after a change.

Parameter values:

- OPC_CONDITION_ACTIVE
- OPC_CONDITION_ENABLED
- OPC_CONDITION_ACKED

Overview

WinCC	NewState	ChangeState
Received message	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACTIVE_STATE
Went out message with acknowledgment	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACTIVE_STATE
Went out message without acknowledgment	OPC_CONDITION_ENABLED	OPC_CHANGE_ACTIVE_STATE
Acknowledged messages (message pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ACKED OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Acknowledged messages (message no longer pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Locked message	-----	OPC_CHANGE_ENABLED_STATE
Unlocked message	OPC_CONDITION_ENABLED	OPC_CHANGE_ENABLED_STATE
Came in, acknowledged message	OPC_CONDITION_ACTIVE OPC_CONDITION_ACKED OPC_CONDITION_ENABLED	OPC_CHANGE_ACTIVE_STATE
Came in, went out message with acknowledgment	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Came in, went out message without acknowledgment	OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Message acknowledged by the system (message pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ACKED OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE

WinCC	NewState	ChangeState
Message acknowledged by the system (message no longer pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Emergency-acknowledged message (message pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ACKED OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE
Emergency-acknowledged message (message no longer pending)	OPC_CONDITION_ACTIVE OPC_CONDITION_ENABLED	OPC_CHANGE_ACK_STATE

Note

Historical alarms and events are not acknowledged. The OPC A&E historical events interface only has read access.

Quality Codes for OPC A&E**Introduction**

Quality codes are used to evaluate the status and quality of a message. The quality codes for OPC are described under "6.8 OPC Quality flags" of the "Data Access Custom Interface Standard Version 3.00" specifications.

Quality codes

Code	Quality	Status
0xC0	OPC_GOOD	OK
0x40	OPC_UNCERTAIN	Returned in cases of uncertainty, for example in the event of delayed acknowledgment (receipt).
0x00	OPC_BAD	Returned if the connection to the source is interrupted.

Reading archived messages

Accessing archived events

Introduction

You can access the archived messages via the OPC A&E server using an OPC client. Two methods are supported for accessing archived messages:

- Output archived messages from a time period in the past
- Output archived messages from a time period in the past without mentioning end of period. After the output of archived messages, all other newly generated messages are automatically sent to the OPC client.

Note

After reading archived messages, you cannot use the returned "ActiveTime" of a message for acknowledging the message or tracing transitions of the message. To ensure this, the OPC A&E client must check the "EventType" of a message with the extra flag "OPC_HAE_HISTORICAL_EVENTFLAG". The "ActiveTime" is incorrect on archived messages. You can find information on the additional flag under "Identifying archived messages".

Querying the "Historic Alarms and Events" functionalities

In addition to the standard filters, the following filters are offered with the expanded OPC A&E server of WinCC:

Filter	Filter Values	Description
OPC_HAE_FILTER_BY_TIMEFRAME	0x80000000	Matches "ReadRaw" function for OPC historical data access
OPC_HAE_FILTER_BY_STARTTIME	0x40000000	Matches "AdviseRaw" function for OPC historical data access

Source filter and historical alarm request

To request the archive messages, the OPC client must support the "SetFilter" to a subscription functionality. The OPC server will also send archived messages if you also insert keyword "OPCHAEServer" the array of the "Source Filter" of a subscription. In addition to this keyword, you can use other parameters to define which messages are to be read:

- Method
- Time period
- With or without limits

The lists of sources that are assigned in the filter can include other source names besides the "OPCHAEServer" source. In such a case, the subscription delivers only the historic events of the given sources. The sequence of the source names is inconsequential.

After configuring the source filter, the selected time period can be called up from the client with a "Refresh" call.

Syntax for accessing archived messages using OPC

Syntax

```
OPCHAEServer hMode=(read|advise) htStartTime=szTime  
[hEndTime=szTime] [bBounds=(TRUE|FALSE)]
```

Parameter

hMode = [read|advise]

This parameter is required. Defines how the archived messages and events are to be read.

Read: Outputs archived messages and events of a definite period from the past (comparable to ReadRaw in case of OPC Historical Data Access).

The following is an example for setting a filter for reading over the last 30 minutes:

```
OPCHAEServer hMode=read htStartTime=NOW-30M bBounds=TRUE
```

Advise: Outputs archived messages and events from a definite period, After receiving all archived messages, new messages are sent in the same way as in the case of an active subscription (comparable to AdviseRaw in case of OPC historical data access).

In the following example, the messages of the last 30 minutes are read (subscription must be active):

```
OPCHAEServer hMode=advise htStartTime=NOW-30M
```

Note

The following notation is supported for parameters "htStartTime" and "htEndTime":

- Relative notations, for example NOW
- Symbolic values, for example NOW, YEAR, MONTH
- Specification of absolute UTC data/time values according to XML notation:
2006-09-01T10:00:00.000Z

Using the symbolic notation corresponds to the syntax from OPC historical data access.

htStartTime =

This parameter is required. Defines the time from when the messages and events are to be read from the archive.

htEndTime =

This parameter is optional. Defines the time up to which the messages and events are to be read from the archive. With "hMode = read", the default setting "NOW" is used.

bBounds = [TRUE|FALSE]

This parameter is optional. Defines how messages close to the start and end time are to be handled. The function is identical to OPC historical data access.

bBounds=FALSE:

- The time stamp of the first transferred message \geq htStartTime
- The time stamp of the last transferred message \geq htEndTime

bBounds=TRUE:

- The time stamp of the first transferred message \leq htStartTime
- The time stamp of the last transferred message \geq hEndTime

Default setting is FALSE.

Read methods for archived messages

Introduction

You can use one of the two read modes to read archived messages:

- Read
- Advise

"Read" mode

"Read" mode is used to read archived messages from a defined period in the past. The sequence of read messages is always read from the alarms in chronological sequence in reference to each OS server. By setting the start and end time, you can specify whether the last message is to be read first or last. If the start time is earlier than the end time, the last message is last in the output.

To use the "read" mode, you need to run the following functions on the subscription:

1. SetFilter
2. Refresh

"SetFilter" during "Refresh" will be rejected. Activating the subscription during "Refresh" does not have any effect on refresh.

The historic events continue to be transferred with the Refresh flag.

The newly generated events are transferred according to the standard reaction of an active subscription:

- Taking into account the set filter values with the exception of "historic" source "OPCHAEServer"
- Without the Refresh flag

The client can therefore distinguish between the received events based on the Refresh flag. An event package never contains historic and new events at the same time.

- Event packages with Refresh flag only contain historic events. These events can also be in queue.
- Event packages without the Refresh flag only contain newly generated events.

"Advise" mode

"Advise" mode is used to read archived messages from a defined period onwards in the past. After reading all archived messages, new messages are sent in the same way as for an active subscription. The archived messages are transferred in chronological sequence in reference to each OS server: The archived messages from a start time onwards are transmitted. Thereafter, the newly archived messages transferred.

Note that you should not define an end time for "advise".

An active subscription is used for "advise" mode. If you run the "SetFilter" function on an active subscription, the historical alarms are transferred immediately.

If you run "SetFilter" function on an inactive subscription, the archived messages are only sent after activating the subscription. If you want to use "advise" read mode with an inactive subscription, proceed as follows:

1. SetFilter
2. Set subscription to active using SetState

The transmission is interrupted if you deactivate the subscription.

The transmission is ended if you set the subscription to "inactive". "SetFilter" is rejected when the subscription is active.

A "Refresh" on an active "historic" subscription in the "advise" mode functions in the same way as for a standard subscription:

All queued condition related events are transferred to packages with Refresh flag. The last package also contains an additional flag "Last Refresh".

A "Refresh" call has no influence on reading historical alarms in "advise" mode.

Identifying archived messages

General procedure

Archived messages are distinguished using an additional flag in EventType. This flag is linked to the real EventType via a OR link.

Name	EventType	EventType (archived message)
OPC_SIMPLE_EVENT	0x01	0x81
OPC_CONDITION_EVENT	0x04	0x84
OPC_TRACKING_EVENT	0x02	0x82
OPC_HAE_HISTORICAL_EVENTFLAG		0x80

Examples

Example 1

The following source filter is used to output archived messages and events of the last 30 minutes in "read" mode. The oldest message for each OS server is output as the first one. The low limit value is also sent.

```
OPCHAEServer hMode=read htStartTime=NOW-30M bBounds=TRUE
```

Example 2

The following source filter is used to output archived events on September 1, 2006 from 10:00 to 12:00 hours in "read" mode. The newest message for each OS server is output as the first one. The limits for this time period are also sent.

```
OPCHAEServer hMode=read htStartTime=2006-09-01T12:00:00.000Z  
htEndTime=2006-09-01T10:00:00.000Z bBounds=TRUE
```

Example 3

The following source filter is used to output archived messages and events of the last 30 minutes in "advise" mode. After reading the archived messages, newly generated messages are sent in the same way as for an active subscription.

```
OPCHAEServer hmode=advise htStartTime=NOW-30M
```

3.6.2.10 WinCC OPC UA Server

Principle of operation the WinCC OPC UA Server

Principle of operation

The WinCC OPC UA Server provides the following values:

- Process values
- Values from tag archives

The WinCC OPC UA server is installed as Windows service and started automatically. The WinCC OPC UA server supports only the "UA-TCP UA-SC UA Binary" communication profile. The used port number is adjustable.

Supported specifications

OPC Unified Architecture is a specification for the transmission of process values and archive data. The WinCC OPC A&E Server supports the transfer of process values and archive data. For additional information about supported UA functions, refer to "OPC UA Services support (Page 187)".

Installation

After WinCC is installed, the WinCC OPC UA server can be used immediately without the need for any further configuration.

The WinCC OPC UA server can be used on a WinCC server or a WinCC client.

URL of the WinCC OPC UA server

You access the WinCC OPC UA server via the following URL:

- "opc.tcp://[HostName]:[Port]"

Parameter	Description
HostName	Placeholder for the computer name. Is used automatically
Port	Port number. The default setting is "4862".

Discovery Server

The "Discovery Server" is available by the OPC foundation. The "Discovery Server" is by default installed on the HMI device as Windows service.

On the "Discovery Server" via OPC UA server UA clients information is available that is registered on the "Discovery Server".

The WinCC OPC UA server registers for Runtime-Start, depending on the configuration, on no, one or all available "Discovery Servers" If you end Runtime, the WinCC OPC UA server is automatically logged off from the "Discovery server".

Supported languages in the WinCC address area

The WinCC OPC A&E Server supports the WinCC address area in the following languages:

- German
- English
- French
- Italian
- Spanish

Security concept of OPC UA

Introduction

The WinCC OPC UA server uses the TCP/IP protocol for data exchange. For authorization between WinCC OPC UA server and OPC UA client certificates are exchanged. In addition, you can encode the data transfer.

Security concept

The WinCC OPC UA server and each OPC UA client authorize themselves mutually by exchanging certificates.

By default, the WinCC OPC UA server creates during installation a self signed instance certificate. You can alternatively replace this instance certificate with a project-specific instance certificate.

Note

Private key and own certificates

If you have an own certification center, you can create your own certificates and make them available for all communication partners. In this case, delete the instance certificate created by WinCC OPC UA server.

The instance certificate is stored in the certificate memory. Depending on the configuration of the WinCC OPC UA server, one of the following certificate memories is used:

- Certificate memory of the WinCC OPC UA server under:
" <WinCC installation folder>\OPC\UAServer\PKI"
- Certificate memory of the operating system in "UA Applications" folder

In order for the WinCC OPC UA server and an OPC UA client to communicate with each other, the certificates must be known to each other:

- Use the common certificate memory of the operating system.
Or
- Copy the certificates to the certificate memory of the participating communication partners:
 - WinCC OPC UA Server
 - OPC UA client
 - Discovery server (optional)

Security settings

The following table lists the security settings supported by the WinCC OPC UA server:

Security Policy	Message Security Mode		
None ¹	None		
Basic128Rsa15 ²	None ⁴	Sign ⁵	SignAndEncrypt ⁶
Basic256 ³	None ⁴	Sign ⁵	SignAndEncrypt ⁶
1: The certificate exchange is switched off. Every OPC UA client can log on to the WinCC OPC UA server.			
2: Certificate exchange with depth of encryption of 128 bit.			
3: Certificate exchange with depth of encryption of 256 bit.			
4: Unsecured exchange of data packages between client and server after a certificate check.			
5: The data packages are signed with the certificates, but not encoded			
6: The data packages are signed with the certificates and encoded			

Note**Unsecured communication between client and server**

Use the "none" setting only for test and diagnostics purposes.

For a secure communication between client and server, use in operating mode at least the following settings:

- SecurityPolicy: Basic128Rsa15
- Message Security Mode: Sign

You can deactivate the application of SecurityPolicy "none" in the configuration file of the WinCC OPC UA server. For further details, refer to the section "Configuring the WinCC OPC UA server".

User identification

For user account identification of an OPC UA client, the WinCC OPC UA server supports the methods "Anonymous" and "Windows user name / Password". For this purpose, the WinCC OPC UA server must be familiar with the respective user account in the Windows user administration.

The user identification is only used for setting up a communication session. Different access rights are not supported.

You can deactivate the support of anonymous users in the configuration settings of the WinCC OPC UA server.

OPC UA Services support**Introduction**

The WinCC OPC A&E Server supports the following described functionality.

OPC UA Service Sets

The following table shows the supported OPC UA Service Sets:

OPC UA Service Sets	Services	Comment
Discovery Service	All	-
Secure Channel Service	All	-
Session Service		
View Service	Browse BrowseNext RegisterNodes UnregisterNodes	Detect the displayed WinCC data: Process values and archived process values

3.6 Access via OPC - Open Connectivity

OPC UA Service Sets	Services	Comment
Attribute Service	Read	only WinCC tags
	Write	only WinCC tags
	HistoryRead	only archive tags
	HistoryUpdate*)	only archive tags
Subscription Service	All	only "Value" attribute of WinCC tags
MonitoredItem Service	All	only "Value" attribute of WinCC tags
*): With restrictions, see "Supported Write-Accesses (Page 148)"		

OPC UA profile and Conformance Units

Note

The OPC UA profiles for "Historical Access" are not yet released, that is why they are not listed in the following:

The WinCC OPC A&E Server supports the following OPC UA profiles without restrictions:

- 6.5.17 SecurityPolicy - Basic128Rsa15
- 6.5.18 SecurityPolicy - Basic256
- 6.5.19 SecurityPolicy - None
- 6.5.21 Base Server Behaviour Facet
- 6.5.22 Standard DataChange Subscription Server Facet
- 6.5.28 Enhanced DataChange Subscription Server Facet
- 6.5.39 UA-TCP UA-SC UA Binary

The WinCC OPC A&E Server supports the following OPC UA profiles shown in the following table, however with restrictions:

Profile	"Group"	Not supported "Conformance Unit"
6.5.25 Core Server Facet	Attribute Services	Attribute Write Index
6.5.26 Data Access Server Facet	Data Access	Data Access Analog Data Access Multistate Data Access PercentDeadBand Data Access Semantic Changes Data Access Two State
6.5.35 Standard UA Server	Attribute Services	Attribute Write StatusCode & TimeStamp

Name area of the WinCC OPC UA server

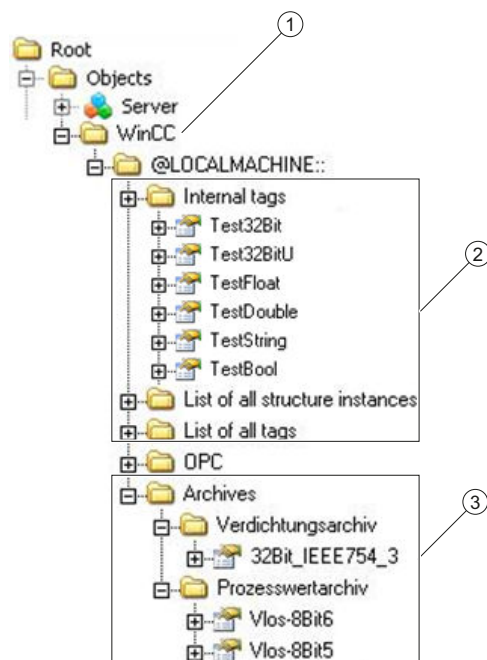
Introduction

The WinCC OPC UA server provides OPC UA clients with an hierarchical name area to display the following Runtime data:

- Process values (WinCC tags and WinCC tag groups)
- Data log inclusive logging tags

The name area of the WinCC OPC UA server is attached in the "Objects" default folder.

The following screen shows the name area of the WinCC OPC UA server of an active WinCC project on the local PC ("@LOCALMACHINE::"):



- ① Start node of the specific name area of WinCC.
- ② Display of the WinCC tags; the structure corresponds to the structure of the tags in WinCC.
- ③ Display of the data log

Display of the WinCC tags

Tag groups, communication drivers and connections are displayed by OPC UA objects of the "FolderType" type. Each of these folders has references of the "Organizes" type to the subordinate objects and tags.

Internal and external WinCC tags are displayed by OPC UA tags of the "DataItemType" type. If a WinCC tag is additionally logged, the displayed OPC UA tag has additionally a reference of the "HasHistoricalConfiguration" type for a log configuration. The "Historizing" and "AccessLevel" attributes are respectively set.

3.6 Access via OPC - Open Connectivity

The following table shows the most important attributes of the OPC UA tags that represent a WinCC tag. You can find the complete list of attributes in the "OPC UA Part 3 - Address Space Model 1.01 Specification" document under "§5.6":

Attribute	Description	Comment
NodId	Unique designation of the WinCC tag	-
BrowseName	WinCC tag name	-
DisplayName	WinCC tag name	-
Value	Tag value and status	-
DataType	OPC UA data type that corresponds to the WinCC tag type, for example: <ul style="list-style-type: none"> • Int32; signed 32 bit value • UInt32; unsigned 32 bit value 	-
AccessLevel	"CurrentRead" / "CurrentWrite" "HistoryRead" / "HistoryWrite"	correspondingly to the WinCC tag configuration
ValueRank	Always "Scalar"	-

Display of the logging tags

Process values and compressed logs are displayed by OPC UA objects of the "FolderType" type. Each of these folders has references of the "Organizes" type to the related logging tags.

Logging tags from process value or compressed logs are displayed by OPC UA tags of the "BaseDateVariableType" type. A logging tag always has a reference of the "HasHistoricalConfiguration" type for a log configuration.

The following table shows the most important attributes of the OPC UA tags that represent a WinCC logging tag. You can find the complete list of attributes in the "OPC UA Part 3 - Address Space Model 1.01 Specification" document under "§5.6":

Attribute	Description	Comment
NodId	Unique designation of a logging tag	-
BrowseName	Name of the logging tag	-
DisplayName	Name of the logging tag	-
Description	Node description	-
Value	Not available	For a logging tag, this attribute cannot be read nor changed.
DataType	OPC UA data type that corresponds to the WinCC tag type, for example: <ul style="list-style-type: none"> • Double; 64-bit floating point number • UInt32; unsigned 32 bit value 	-
AccessLevel	"HistoryRead" / "HistoryWrite"	-
ValueRank	Always "Scalar"	-

OPC UA Data Access

Internal and external WinCC tags are displayed by OPC UA tags of the "DataItem" type. Other DataAccess tag types as "AnalogItem" or "DiscreteType" are not supported.

The WinCC OPC A&E Server supports the reading access on the OPC UA tag attributes as "DataType" or "AccessLevel". Writing access and subscriptions are only supported for the "Value" attribute.

OPC UA Log Access

Introduction

"OPC Historical Access" enables access to archives and includes the "Historical Data" and "Alarms & Events" services. The WinCC OPC UA server supports only the "Historical Data" service.

The WinCC OPC UA Server offers the OPC clients access to the raw data of tag archives via "Services".

- HistoryRead (READRAW)
- HistoryUpdate (INSERTDATA, REPLACEDATA, UPDATEDATA, DELETE_RAW)

You can read and limitedly write with an OPC UA client the values of archive tags in the tag archives. Depending on the configuration of the tag archive, the archive tag can contain either raw data or already processed process values.

Characteristics of archive tags

According to the OPC "OPC UA Part 11 - Historical Access 1.00 Specification" document, the tags to be archived must have a precise reference to an archive configuration ("HistoricalConfiguration"). A process tag can be contained in WinCC and also in several data archives. In this case the process tag is linked to one of the corresponding archive tags.

Properties / Properties of archive configurations

The following table shows the Properties of an OPC UA tag configuration of the "HistoricalConfigurationType" type: In the "Description" property, the archive tag comment configured in WinCC is displayed. You can find the complete list of properties in the "OPC UA Part 11 - Historical Access 1.00 Specification" document under "§4.7.1.4":

Property	Description / Value	Comment
Definition	WinCC process tag name	For a process value archive
Stepped	True	-

The following optional Properties are not supported:

- MaxTimeInterval
- MinTimeInterval

3.6 Access via OPC - Open Connectivity

- ExceptionDeviation
- ExceptionDeviationFormat

Limitations for Service "HistoryUpdate"

You can use the Service "HistoryUpdate" only on process value archives.

The following table lists the functions supported by the WinCC OPC UA server: Which functions are supported depends on the configuration of the WinCC OPC UA server as well as the process value archive configuration. You will find additional information in the "OPC UA Part 11 - Historical Access 1.00 Specification" document under "§5.5":

Service	Function	Description
HistoryUpdate	INSERTDATA	Insert new archive values
	REPLACEDATA	Replace existing archive values
	UPDATEDATA	Replace of insert archive values
	DELETE_RAW	Delete archive values

Configuring the WinCC OPC UA server

Configuration file

Introduction

The WinCC OPC UA server is configured using the configuration file "OPCUAServerWinCC.xml". This chapter describes the layout of the configuration file. The chapter "How to configure the OPC UA server (Page 193)" describes how you configure the WinCC OPC UA server.

File location

The project-specific configuration file "OPCUAServerWinCC.xml" is stored in the WinCC file system under:

"<WinCC project folder>\OPC\UAServer"

Layout

The configuration file is broken down into multiple sections.

Section <Secured Application>

In this section, the OPC UA application security is set in compliance with OPC UA Specification / Part 6 / § "Security Settings Management".

<Secured Application>	
<pre><BaseAddresses> <...></...> </BaseAddresses>.</pre>	Configuration of the URL of the WinCC OPC UA server. For additional information about the URL, refer to "Security concept of OPC UA (Page 185)".
<pre><SecurityProfileUris> <SecurityProfile> <...></...> </SecurityProfile> ... </SecurityProfileUris></pre>	Configuration of the supported security policies Use the "none" setting only for test and diagnostics purposes For more information about security policies, refer to "Security concept of OPC UA (Page 185)".
<pre><ApplicationCertificate> <TrustedCertificateStore> <TrustedCertificates> <...></pre>	Revision of the default certificate configuration according to OPC UA Specification / Part 6. (optional)
</Secured Application>	

Section <Server Configuration>

In this section you can set further server-specific parameters.

<Server Configuration>	
<pre><SecurityPolicies> <SecurityPolicy> <...></...> </SecurityPolicy> ... </SecurityPolicies></pre>	Configuration of the message security modes. Use the "none" setting only for test and diagnostics purposes For more information about message security modes, refer to "Security concept of OPC UA (Page 185)".
<pre><UserTokenPolicies> <UserTokenPolicy> <...></...> </UserTokenPolicy> ... </UserTokenPolicies></pre>	Configuration of user identification Use the "Anonymous" setting only for test and diagnostics purposes For more information about message security modes, refer to "Security concept of OPC UA (Page 185)".
<pre><FastInsert> <Users> <...></...> </Users> <Clients> <...></...> </Clients> </FastInsert></pre>	Configuration of the optimized WinCC archive write access
<Server Configuration	

How to configure the OPC UA server

Requirement

A WinCC project has been created.

Opening the configuration file

1. Open Windows Explorer. Navigate to the directory "<WinCC project folder>OPC\UAServer".
2. Open the "OPCUAServerWinCC.xml" configuration file. For more information, refer to "Configuration file (Page 192)"

Changing the port number of the WinCC OPC UA server

1. If necessary, change the port number 4862 under <BaseAddresses>. Do not use a port number that is already assigned to another application. The parameter [HostName] is the placeholder for the computer name and is determined during runtime.

Example:

```
<BaseAddresses>
<ua:String>opc.tcp://[HostName]:5210</ua:String>
</BaseAddresses>
```

Specifying security settings

1. Specify the security settings for communication. For additional information, refer to "Security concept of OPC UA (Page 185)"
2. Under <SecurityProfileUris>, you configure the supported "Security Policies".
 - Enable the setting with "true".
 - Disable the setting with "false".

Example:

```
<SecurityProfile>
  <ProfileUri>http://opcfoundation.org/UA/SecurityPolicy#None</
ProfileUri>
  <Enabled>>false</Enabled>
</SecurityProfile>
```

3. Under <SecurityPolicies>, you configure the associated "Message security modes". To deactivate a setting, delete the entire entry <SecurityPolicy>... </SecurityPolicy>.

Example:

```
<SecurityPolicy>
  <ProfileUri>http://opcfoundation.org/UA/SecurityPolicy#None</
ProfileUri>
  <MessageSecurityModes>None</MessageSecurityModes>
</SecurityPolicy>
```

Note

Unsecured communication between client and server

Use the "none" setting only for test and diagnostics purposes.

For secure client/server communication in production mode, you need to use at least the following settings:

- SecurityPolicy: Basic128Rsa15
Message Security Mode: Sign
-

Specifying user identification

1. Specify the user identification for setting up the connection under `<UserTokenPolicies>`. For more information, refer to "Security concept of OPC UA (Page 185)"

To deactivate a setting, delete the entire entry.

Example

```
<UserTokenPolicy>
<TokenType>Anonymous</TokenType>
</UserTokenPolicy>
```

Configuring optimized WinCC archive write access

1. If necessary, configure optimized WinCC archive write access under `<FastInsert>`.
 - Set "true" to activate the optimized write access to WinCC archives for all OPC UA clients.
 - Set "false" to set optimized WinCC archive write access for specific Windows users or OPC UA clients.

You specify the Windows users under `<Users>`.

You specify the OPC UA clients under `<Clients>`. Use the "Common Name" that is entered in the client certificate as `ClientName`.

Example:

```
<EnabledByDefault>>false</EnabledByDefault>
<Users>
  <User>domain\user1</User>
</Users>
<Clients>
  <Client>ClientName1</Client>
</Clients>
```

3.6.2.11 Commissioning

OPC Commissioning

Introduction

Data exchange between a WinCC OPC server and OPC client is completed via DCOM.

After installation of WinCC, the DCOM settings of the WinCC OPC server are correctly configured.

If a WinCC OPC server or client communicates with an external OPC system, corresponding adaptations must be performed.

The "Local access" and "Remote access" authorizations must be entered for the user in "DCOM/Workplace/COM Security/Access rights/Edit default" of User Administration.

Configuring Windows

This is how you configure Windows accounts for the use of WinCC OPC

Introduction

The OPC client and the OPC server are DCOM applications. A distributed DCOM application can only be run under the same user account. Therefore the OPC server must recognize the OPC client's user account and vice-versa.

If the WinCC OPC servers are used with WinCC OPC clients, the correct configuration is already warranted by the installation.

Declaration of the user account, if an external OPC server or client is used

For further information on the granting of user rights, refer to the Windows XP documentation.

Requirements

Log on as the administrator to both the WinCC OPC server and OPC client workstations to configure the user permissions.

Procedure

1. Go to "Control Panel > Administration > Computer Management > Local Users and Groups".
2. In the "Users" shortcut menu, select "New User".
In the "New User" dialog, enter the user account details of the communication partner. Click "Create" and close the dialog.

The screenshot shows the "New User" dialog box. The "User name" field contains "UserX". The "Full name" and "Description" fields are empty. The "Password" and "Confirm password" fields are masked with asterisks. The "User must change password at next logon" checkbox is checked. The other three checkboxes are unchecked. The "Create" and "Close" buttons are at the bottom.

3.6 Access via OPC - Open Connectivity

3. Click the "Users" icon. Double-click the relevant user. The "Properties" dialog for this user is displayed.
4. Select the "Member Of" tab. Click "Add". The "Select group" dialog is opened.
5. Add the group "users".
If you are on a computer that has WinCC installed, also add the group "SIMATIC HMI".
Click "OK" to close all open dialogs.

How to adapt the Windows firewall settings

Introduction

After installation of WinCC, the Windows firewall settings of the WinCC OPC servers are correctly configured.

If OPC clients access OPC servers in different subnets, you must adapt the configuration of the permitted network areas to the OPC servers.

XML

Commissioning - OPC XML

Introduction

The OPC XML server of WinCC is realized as a web service. It makes the PC accessible via Internet. It is therefore necessary to define appropriate access rights.

Defining the Security Settings with IIS

Introduction

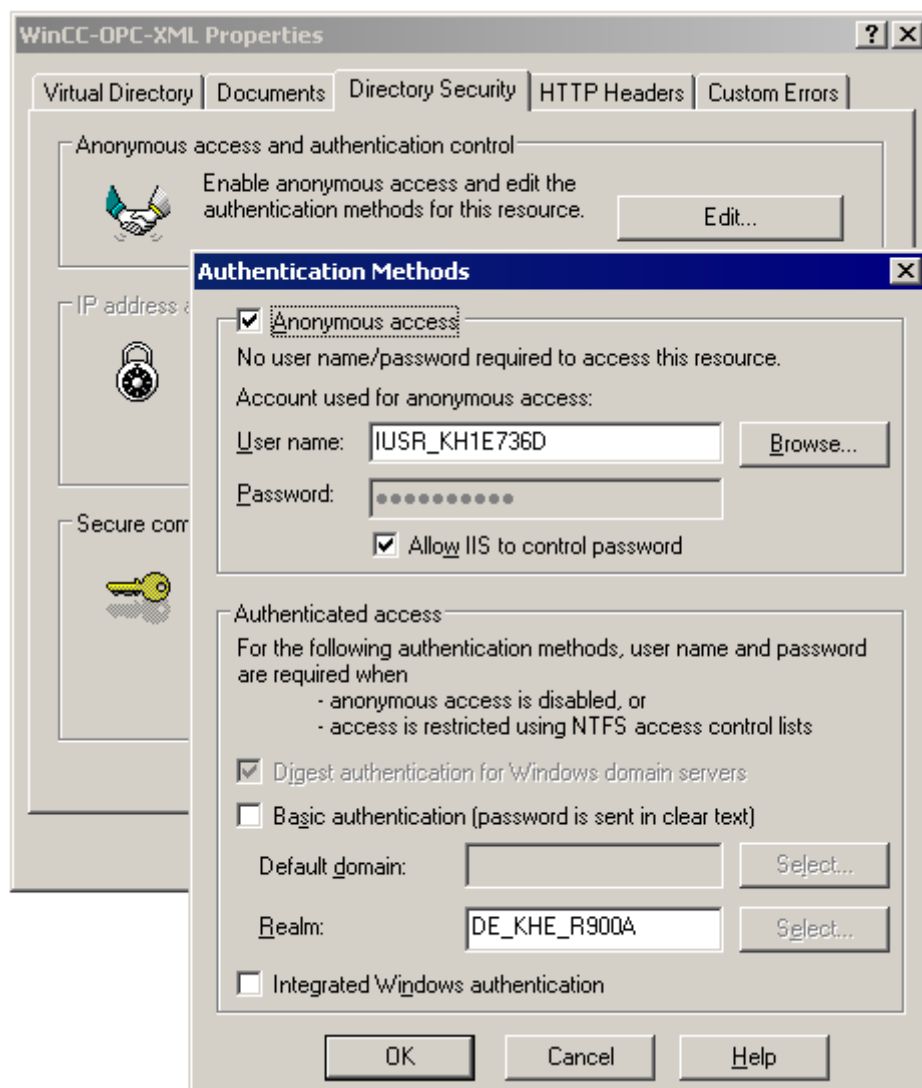
The Internet Information Services make the PC accessible via the Internet. It is therefore necessary to define appropriate access rights.

Note

If you have any questions or experience problems with the following settings, contact your Intranet/Internet administrator.

Procedure

1. Start the Management Console in Windows 2003 via "Control Panel > Administration > Internet Information Services Manager".
In Windows XP, select "Control Panel" > "Administration" > "Internet Information Services" and activate the Management Console.
2. Select the virtual directory "WinCC-OPC-XML". Choose the "Properties" option from the shortcut menu. The "WinCC OPC XML Properties" dialog is opened.
3. Click the "Directory Security" tab. On this tab, select the relevant web server security features.
4. Click the "Edit" button in the "PLC for Anonymous Access and Authentication". The "Authentication Methods" dialog is displayed.



5. Activate the "Integrated Windows Authentication" option in the "Authenticated access" area. Anonymous access to the web service is possible but should not be activated for security reasons.
6. Close all open dialogs.

See also

How to Test the Installation (Page 200)

How to set the correct version of ASP.NET

Introduction

If you want to use the WinCC-OPC-XML-DA server, ensure you have set the correct version of "ASP.NET" for the Web site for the installation through which the WinCC-OPC-XML Web service is linked.

Note

If you have any questions or experience problems with the following settings, contact your Intranet/Internet administrator.

Procedure

1. Start the Management Console in Windows 2003 via "Control Panel > Administration > Internet Information Services Manager".
In Windows XP, select "Control Panel" > "Administration" > "Internet Information Services" and activate the Management Console.
2. Select the virtual directory "WinCC-OPC-XML". Choose the "Properties" option from the shortcut menu. The "WinCC OPC XML Properties" dialog is opened.
3. Click the "ASP.NET" tab. In this tab, configure the settings for the "ASP.NET" of the Web server.
4. Click on text selection box for the "ASP.NET version". If version "2.x" is not yet set, select version "2.x".
5. Close all open dialogs.
6. The Web service needs to be restarted after changes are made.

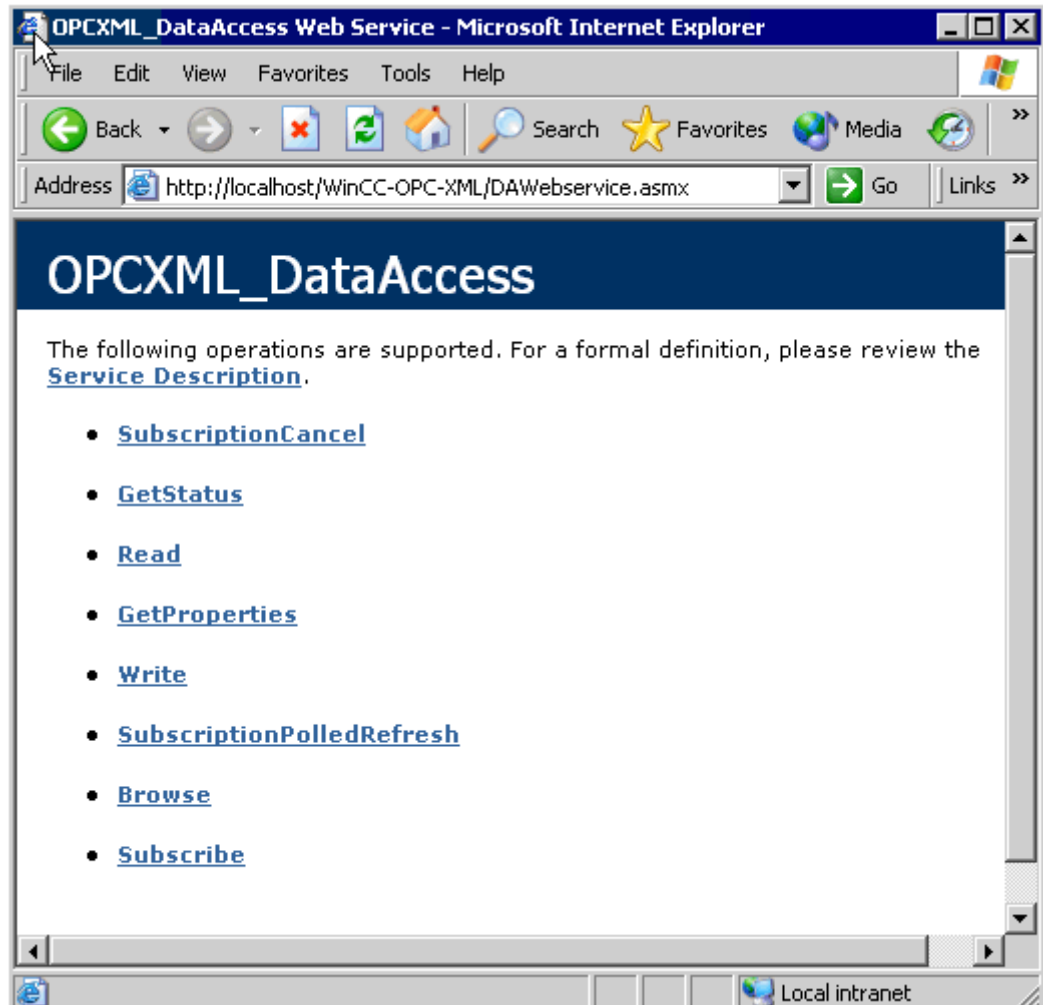
How to Test the Installation

Introduction

OPC XML-DA makes the OPC process data available as a web page. The web page can be accessed via the Internet using HTTP. The following section explains how to test the installation.

Procedure

1. Start Internet Explorer on the computer run as the WinCC OPC XML server.
2. Enter the URL "http://localhost/WinCC-OPC-XML/DAWebService.asmx" in the address bar. Confirm your entry with <ENTER>.
3. When the OPC XML DA function requests appear, installation was successful.



See also

Defining the Security Settings with IIS (Page 198)

Trace

Introduction

The "Trace" function can be used to log tag values and function calls for purposes of testing and error analysis.

The entries are stored in a trace file. The trace shows the step-by-step progress of the establishment of the connection, thus making it easier to identify the source of a connection problem.

Settings

Trace output must be set in the registry of the operating system. For more information, refer to the SIMATIC Customer Support.

3.7 Examples for Access Using OLE DB Provider

3.7.1 Examples for Access Using OLE DB Provider

Overview

The following examples demonstrate different ways of displaying and analyzing archive data.

See also

Example: Reading Message Archive Data with the WinCC OLE DB Provider and Visual Basic 6 (Page 226)

Example: Reading Process Value Archive With WinCC OLE DB Provider and Visual Basic 6 (Page 213)

Example: Configuring Access to Archive Data Using DataConnector Wizard (Page 205)

Example: Configuring the Access to Archive Data Using VB (Page 203)

Example: Reading Message Archive Data With WinCC OLE DB Provider and Visual Basic.NET (Page 229)

Example: Reading Process Value Archive With WinCC OLE DB Provider and Visual Basic.NET (Page 216)

3.7.2 Example: Configuring the Access to Archive Data Using VB

Introduction

The following example shows how to configure a tabular display with Microsoft Controls. You may also use other Controls or program your own.

Requirements

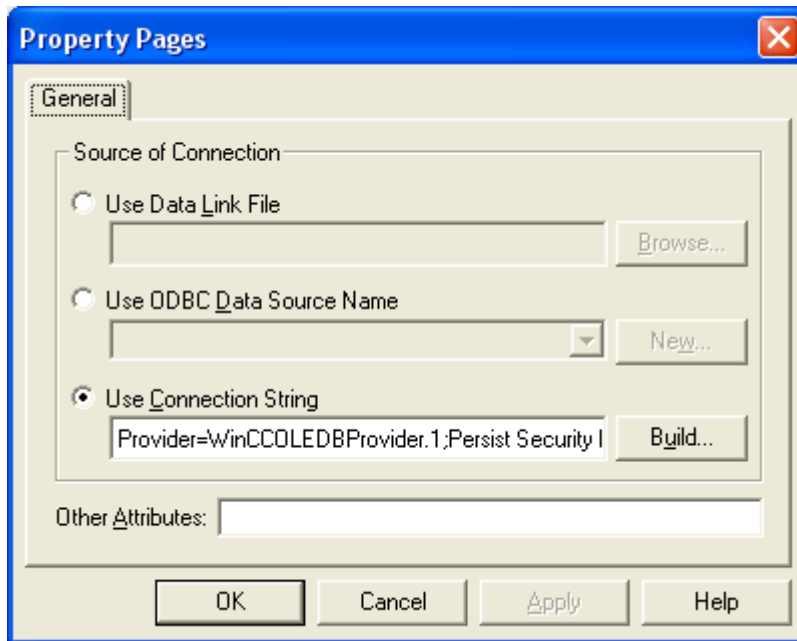
Archive files are local on the computer and must be connected to the SQL server, e.g., using the WinCC Archive Connector.

Procedure

1. In Visual Basic Editor, create a new form that you want to use for displaying the archive data.
2. In Visual Basic Editor, select the menu commands "Project" > "Components".
3. Activate the Controls that you want to use, e.g. an "MS Data Grid Control" and an "MS ADO Data Control".
The respective symbols are displayed in the tool collection.

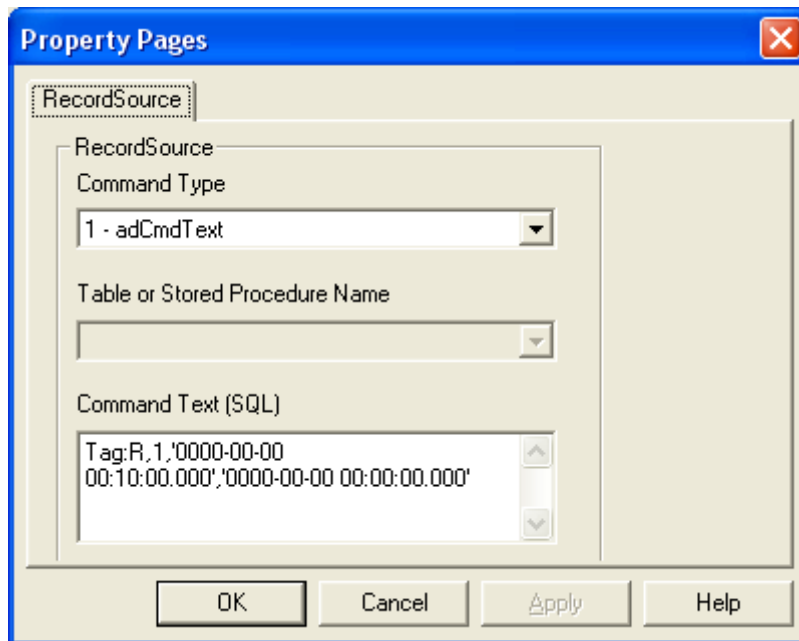
3.7 Examples for Access Using OLE DB Provider

4. In your form, create an "MS Data Grid Control" for tabular display of archive data, and an "MS ADO Data Control" for navigation within the tabular display.
5. Mark the MS Data Grid Control and select the entry "Adoc1" in the property window under "DataSource" in order to link the two controls.
6. Mark the MS ADO Data Control and click the button "..." in the Property window under "Connection String".
This will open the "Property pages" dialog.



7. Click on the "Create..." button next to the entry "Use Connection Character Sequence".
The dialog "Data Link Properties" opens.
8. On the "Provider" tab, select "WinCC OLE DB Provider for Archives" and click on "Next".
9. In the tab "Connection", enter the data source in the field "DataSource": <Computer name> WinCC.
Test the connection by clicking on the button "Test Connection".
Select the "Extended" tab. After that, switch to the "All" tab without further changes. This step is necessary to correctly set all parameters for the subsequently created connection character set.
10. In the "All" tab, enter the name of the WinCC database in the field "Catalog". The database name can be found in the SQL Enterprise Manager at "SQL Server Group" > "<Computer Name>\WinCC" > "Databases" > "<Database name_R>".
If the project is active, only use database names that end with "R".
If you have connected swapped out WinCC archives to the SQL Server via the WinCC Archive Connector, use the symbolic name of the database or the swap out directory.
Confirm your settings with "OK".

11. Mark the MS ADO Data Control and click the button "..." in the Property window under "RecordSource". This will open the "Property pages" dialog.
For command type select the setting "1 - adCmdText" and enter a valid statement such as TAG:R,1,'0000-00-00 00:10:00.000','0000-00-00 00:00:00.000' in the field "Command text (SQL)".



12. Confirm your entries with "OK" and start Visual Basic Runtime.

3.7.3 Example: Configuring Access to Archive Data Using DataConnector Wizard

Introduction

The following example shows how to configure a tabular display of process values using the DataConnector Wizard in WinCC Graphics Designer.

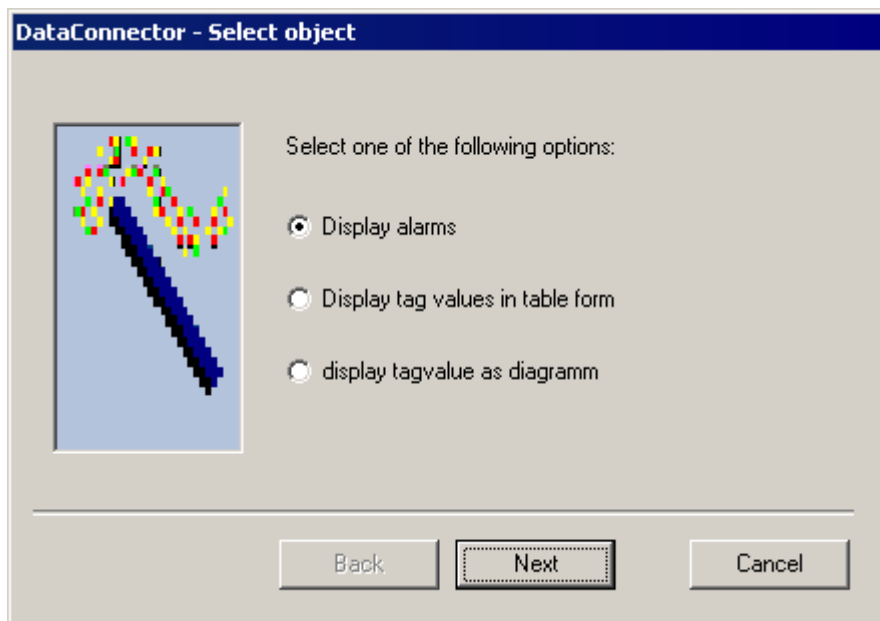
Alternatively, you may also use the DataConnector Wizard to configure the display of messages or graphical display of process values.

Requirements

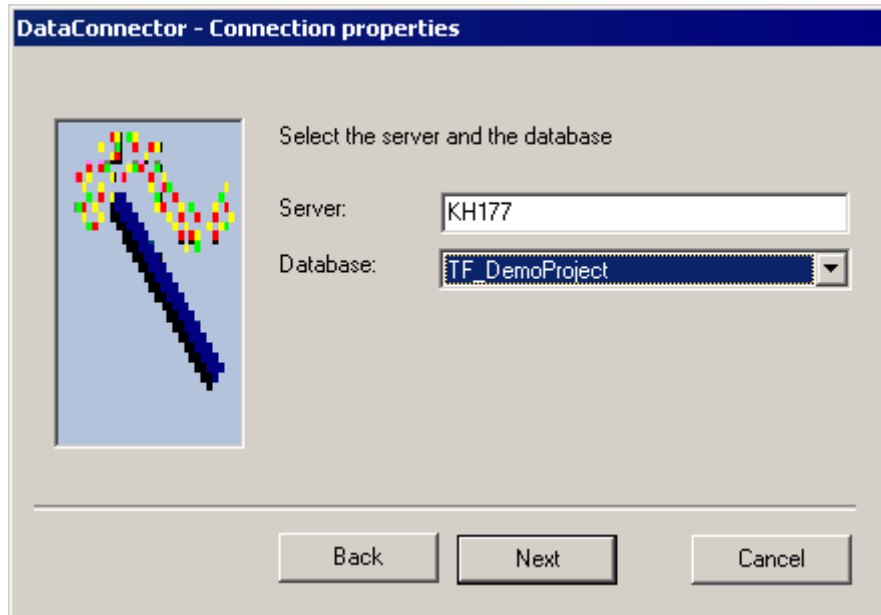
- WinCC Basic system and Connectivity Pack are installed.
- Archive files are connected to the desired SQL server, e.g., using WinCC Archive Connector.

Procedure

1. Open Graphics Designer and select the entry "Create New Picture" in the "DataConnector" menu. A new process picture opens and the dialog "DataConnector - Select Object" is displayed.
2. For this example, select the option "Display Tag Values in Table Form" and then click the "Continue" button.



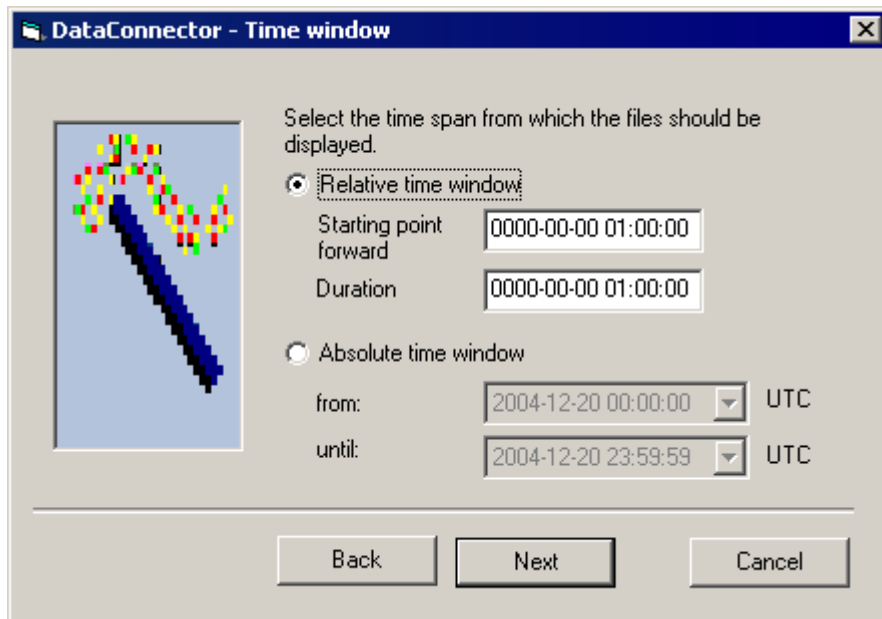
3. The dialog "DataConnector - Connection Properties" opens.
Enter the name of the server in the "Server" field that contains the desired interlinked databases. The name of the local computer is prescribed.
Select the desired database in the "Database" field. The currently connected databases of the selected server are available.



Click "Continue".

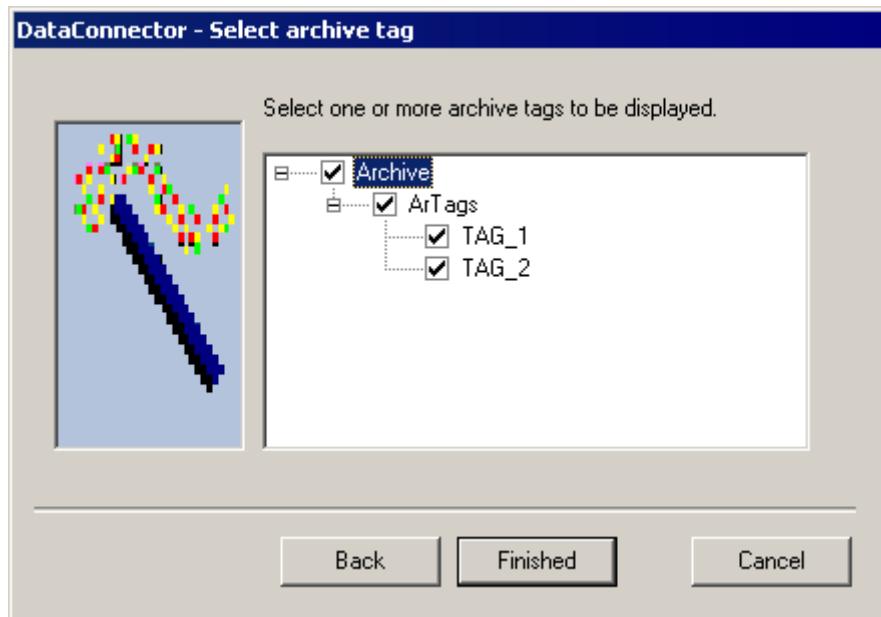
3.7 Examples for Access Using OLE DB Provider

- 4. The dialog "DataConnector - Time window" will open. Select the desired time frame from which the data should be displayed, e.g. "Relative time window". Prescribed is a time window for the previous hour. Change the specifications as needed, e.g., in the field "Starting point forward" to the value "0000-00-00 01:00:00" and in the field "Duration" to the value "0000-00-00 01:00:00" in order to display the previous hour. The value in the "Duration" field cannot be larger than the value in field "Starting point forward".



Click "Continue".

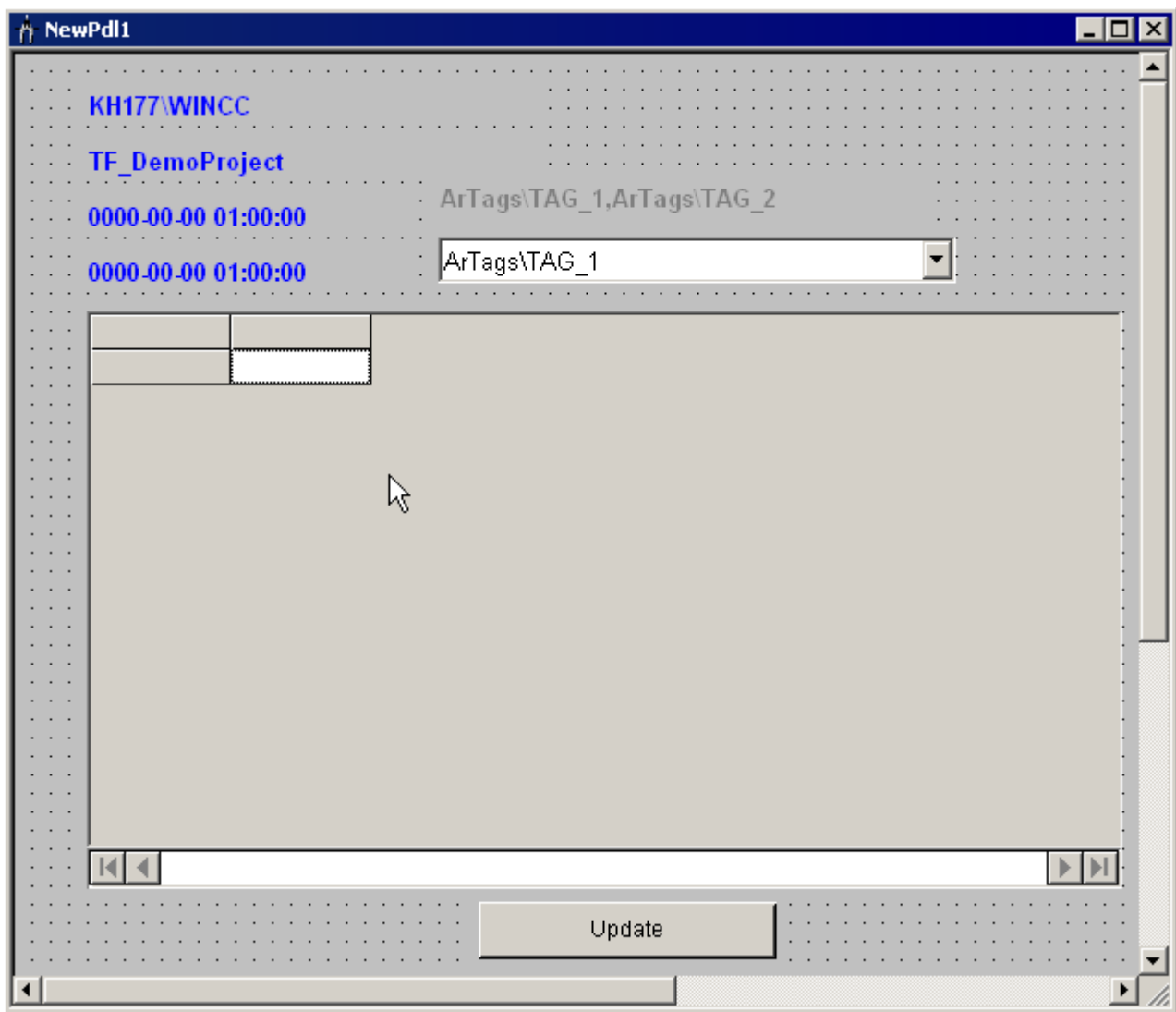
5. The dialog "DataConnector - Select Archive Tag" opens.
Select at least one archive tag.



Click on the "Finish" button.

3.7 Examples for Access Using OLE DB Provider

- The DataConnector Wizard will insert several elements into the opened process picture. The selected server, the database and the time frame are displayed in the static text fields at the top. Next to them there will be a text with the selected archive tags and the selection field for the archive tag. As per the selection "Display tag values as tables", a data grid control, an ADO data control and a button are inserted below them. Save the process screen. In order to change the configured values, open this process picture and select the entry "Modify existing connection" in the "DataConnector" menu. The Wizard will restart and you may change the configured values.



- Start WinCC Runtime and open this process picture with the database query. The query will be initially executed directly upon opening of the process picture. In Runtime, the data found will be displayed in tabular form in Data Grid Control, and you may navigate within the table using ADO Data Control. With more than one configured archive tags, the tag, whose values are to be displayed can be chosen in the selection field.

The displayed data can be updated via the "Update" button, for example, if the most recent hour was indicated as a relative time frame.

Note

Archive query using data connector control on the Web client

If an archive query is to be performed on a WebNavigator client using the DataConnector control in a process picture, the Connectivity Pack client must also be installed on the Web client.

See also

Querying Alarm Message Archives (Page 57)

Querying Process Value Archives (Page 51)

3.7.4 Examples: Analyzing Process Value Archives

3.7.4.1 Example: Analyzing Process Value Archives in WinCC Project

Introduction

This example shows the operation of the WinCC project "OPConPack". The WinCC project contains the process value archives used. The queries are created for this archive data. The query result is displayed in tabular form with time stamp, value and quality code. Statistics show the number, the average value, the sum and the standard deviation of the process values. The result can be exported as a csv file.

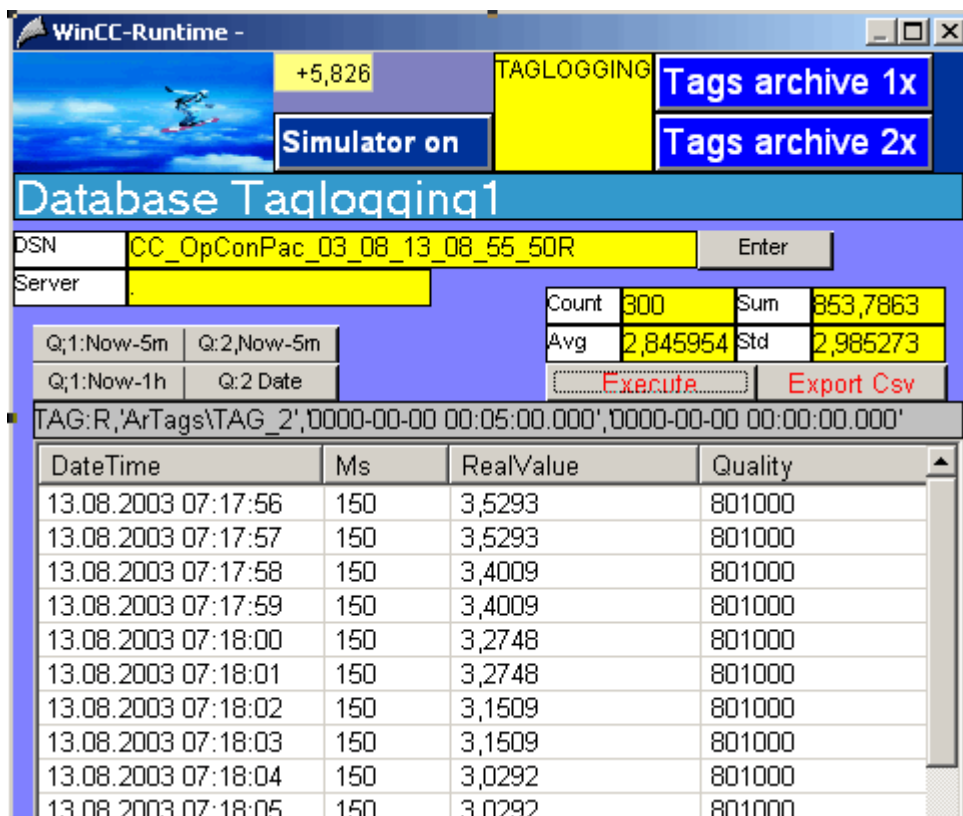
The WinCC project can also be copied to the hard drive of your computer at a later time from the folder "Samples\Connectivity Pack\DemoProject."

Requirement

- The computer has been entered as a server in the computer list of the WinCC project.
- The WinCC project "OPConPack" has been activated.
- The folder "D:\out" has been created.

Procedure

1. Click on the button "Simulator on". The simulator supplies the tags with values.
2. Click on the button "Tags archive 1x". The dialog box "Database Taglogging1" will open.



How to Analyze Process Value Archives

1. Click on the button "Q:1,Now-1h".
 The buttons "Q:..." are linked to queries. The corresponding query is shown in the field below the buttons. "Q:1" and "Q:2" represent the queried ValueID, respectively.
 - "Q:1,Now-5m" and "Q:2,Now -5m" return as result the process values of the last 5 minutes.
 "Q:1,Now-1h" returns the process values of the last hour as a result.
 "Q:2,Date" returns the process values of a certain day as a result.
2. Click on the button "Execute". Confirm the next dialog. The query will then be performed. The data will be displayed with a time stamp (DateTime and Ms), process value (RealValue), and quality code (Quality) in a table.
 The field "Count" delivers the number of selected process values. The field "Sum" contains the sum of all process values. The field "Avg" contains the average value of the column "RealValue" and the field "Std" the standard deviation.
3. Click on the button "Export Csv". Confirm the next dialog.
 The query results are stored in the CSV file "OutTAGEXP1.csv" in the folder "D:\out".

3.7.4.2 Example: Reading Process Value Archive With WinCC OLE DB Provider and Visual Basic 6

Introduction

In this example, the values of the last 10 minutes of the tag "Tag_1" are read from the local WinCC RT database. The data is displayed in a ListView with a time stamp, value and quality code. The output of values is limited to 100 (constant NMAX = 100).

The example does not include error processing.

Procedure

1. Create a WinCC tag named "Tag_1".
2. Create a process value archive named "ArTags". Connect the WinCC tag "Tag_1" with the process value archive.
3. Create a Visual Basic project. Connect the MS Windows Common Controls 6.0 "ListView Control" with the name "ListView1". The columns in the ListView are created by the script. Set the property "View" to the option "3 - lvwReport" on the ListView control.
4. Create a "CommandButton". Copy in the script from the section "Example Script" below.
5. In the script, adjust the name of the WinCC Runtime database "CC_OpConPac_04_10_01_10_36_36R" to your own project. The database name can be found in the SQL Enterprise Manager at "SQL Server Group" > "<Computer Name>\WinCC" > "Databases" > "<Database name_R>".
6. Activate WinCC Runtime and start the VB application.
7. Click on the "CommandButton".

Example Script

```
Option Explicit
Const NMAX = 100
Private Sub Command1_Click()
Dim sPro As String
Dim sDsn As String
Dim sSer As String
Dim sCon As String
Dim sSql As String
Dim conn As Object
Dim oRs As Object
Dim oCom As Object
Dim oItem As ListItem

Dim m, n, s, nRec
```

3.7 Examples for Access Using OLE DB Provider

```
Dim strDateTime As String
Dim iMS As Long

'1.1 Make connection string for ADODB
sPro = "Provider=WinCCOLEDBProvider.1;"
sDsn = "Catalog=CC_OpConPac_04_10_01_10_36_36R;"
sSer = "Data Source=.\WinCC"
sCon = sPro + sDsn + sSer

' 1.2 Define command text in sSql (relative time)
sSql = "TAG:R,'ArTags\Tag_1','0000-00-00 00:10:00.000','0000-00-00 00:00:00.000'"

MsgBox "Open with:" & vbCrLf & sCon & vbCrLf & sSql & vbCrLf

' 2.1 Make connection
Set conn = CreateObject("ADODB.Connection")
conn.ConnectionString = sCon
conn.CursorLocation = 3
conn.Open

' 2.2 Use command text for query
Set oRs = CreateObject("ADODB.Recordset")
Set oCom = CreateObject("ADODB.Command")
oCom.CommandType = 1
Set oCom.ActiveConnection = conn
oCom.CommandText = sSql

' 2.3 Fill the recordset
Set oRs = oCom.Execute
m = oRs.Fields.Count
nRec = NMAX

' 3.0 Fill standard listview object with recordset
ListView1.ColumnHeaders.Clear
ListView1.ColumnHeaders.Add , , CStr(oRs.Fields(1).Name), 2500 ' DateTime
ListView1.ColumnHeaders.Add , , "MS", 1500 ' Milisecond
ListView1.ColumnHeaders.Add , , CStr(oRs.Fields(0).Name), 1500 ' VarID
ListView1.ColumnHeaders.Add , , CStr(oRs.Fields(2).Name), 1500 ' RealValue
ListView1.ColumnHeaders.Add , , CStr(oRs.Fields(3).Name), 1500 ' Quality
ListView1.ColumnHeaders.Add , , CStr(oRs.Fields(4).Name), 1500 ' Flags

If (m > 0) Then
oRs.MoveFirst
```

```
n = 0
Do While (Not oRs.EOF And n < nRec)
n = n + 1
SplitDateTimeAndMs oRs.Fields(1).Value, strDateTime, iMS 'Split Milisecond from DateTime
s = FormatDateTime(strDateTime, 2) & " " & FormatDateTime(strDateTime, 3)
Set oItem = ListView1.ListItems.Add()
oItem.Text = s
oItem.SubItems(1) = iMS
oItem.SubItems(2) = oRs.Fields(0).Value
oItem.SubItems(3) = FormatNumber(oRs.Fields(2).Value, 4)
oItem.SubItems(4) = Hex(oRs.Fields(3).Value)
oItem.SubItems(5) = Hex(oRs.Fields(4).Value)

oRs.MoveNext
Loop
oRs.Close
Else
End If

Set oRs = Nothing
conn.Close
Set conn = Nothing
End Sub

Sub SplitDateTimeAndMs(dtDateTimeWithMs_in, strDateTime_out, strMs_out)

Dim diff
Dim dtTemp
Dim lTemp As Long

lTemp = 86400000 '24 * 60 * 60 * 1000

diff = (CDBl(dtDateTimeWithMs_in) - CDBl(CDate(CStr(dtDateTimeWithMs_in)))) * lTemp
If (diff < 0) Then
diff = 1000 + diff
dtTemp = CDBl(dtDateTimeWithMs_in) - diff / lTemp
strDateTime_out = CDate(dtTemp)
Else
strDateTime_out = CDate(dtDateTimeWithMs_in)
End If
strMs_out = "00" & Round(diff)
strMs_out = Right(strMs_out, 3)
```

End Sub

Note

To improve the performance, note the following information:

- Replace the "Data Source=.WinCC" instruction with the "Data Source=<Computer name>\WinCC" instruction.
 - For the query, use "ValueID" instead of "ArchiveName>\<Tag name>". In the example script under Item 1.2, the expression 'ArTags\Tag_1' should be replaced by "ValueID".
-

See also

Displaying Process Value Archives (Page 48)

Querying Process Value Archives (Page 51)

Querying the Archive Data (Page 49)

Establishing the Connection to the Archive Database (Page 46)

3.7.4.3 Example: Reading Process Value Archive With WinCC OLE DB Provider and Visual Basic.NET

Introduction

In this example, the values of the last 10 minutes of the tag "Tag_1" are read from the local WinCC RT database. The data is displayed: time stamp, value and quality code in a ListView. The output of values is limited to 100 (constant MaxRows = 100).

The example includes simple error handling.

Procedure

1. Create a WinCC tag named "Tag_1".
2. Create a process value archive named "ArTags".
3. Connect the WinCC tag "Tag_1" with the process value archive.
4. Create a new Visual Basic project in Visual Studio 2005 of the type "Windows Application."
5. Change to Designer View mode and enlarge the Windows Form "Form1" to a size of ca. 500x600.
6. Drag a "ListView Control" from the Toolbox to the left upper corner of the form and enlarge it to ca. 400x450.
7. Drag a button from the Toolbox to the middle of the form below the Control. The button will automatically be named "Button1."

8. Double-click the button and add the VB.NET sample code listed below IN FRONT OF the instruction "End Sub" in the method "Private Sub Button1_Click."
9. Select "Build > Build Solution" in the menu or press <CTRL+Shift+B> to compile the finished VB.NET project.
10. In the script, adjust the name of the WinCC Runtime database "CC_CPSample_07_10_09_13_44_26R" to your own project.
The database name can be found in the SQL Server Management Studio under "Object Explorer > <Computer Name>WinCC > Databases > <Database name_R>".
11. Start WinCC Runtime and select "Debug->Start Debugging" in the menu or press <F5> to start the VB application.
12. Click on the "Button1" button.

Sample code

```
Const MaxRows = 100

'1.1 Make connection string for ADO.NET access
Dim ProviderName As String
Dim CatalogName As String
Dim DataSourceName As String
Dim ConnectionString As String
Dim CommandString As String

ProviderName = "Provider=WinCCOLEDBProvider.1;"
CatalogName = "Catalog=CC_CPSample_07_10_09_13_44_26R;"
DataSourceName = "Data Source=.\\WinCC"

ConnectionString = ProviderName + CatalogName + DataSourceName

' 1.2 Define command string for OLE DB access (relative time range, last 10 minutes)
CommandString = "TAG:R, 'ArTags\\Tag_1', '0000-00-00 00:10:00.000', '0000-00-00 00:00:00.000'"

Try

Dim DBConnection As System.Data.OleDb.OleDbConnection
Dim DBCommand As System.Data.OleDb.OleDbCommand
Dim DBReader As System.Data.OleDb.OleDbDataReader

' 2.1 Open an OLE DB connection
DBConnection = New System.Data.OleDb.OleDbConnection(ConnectionString)

DBConnection.Open()
```

3.7 Examples for Access Using OLE DB Provider

```
' 2.2 Execute command
DBCommand = New System.Data.OleDb.OleDbCommand(CommandString, DBConnection)

DBReader = DBCommand.ExecuteReader()

' 3.1 Prepare list view control
Dim DBTimeStamp As System.DateTime
Dim DBValue As System.Double
Dim DBQualityCode As Integer
Dim DBFlags As Integer
Dim ColumnEntry As String

Me.ListView1.View = View.Details
Me.ListView1.GridLines = True
Me.ListView1.TabIndex = 0
Me.ListView1.Width = 400

Me.ListView1.Columns.Add("TimeStamp", HorizontalAlignment.Center)
Me.ListView1.Columns(0).Width = 150
Me.ListView1.Columns(0).Text = "Time Stamp"

Me.ListView1.Columns.Add("Value", HorizontalAlignment.Center)
Me.ListView1.Columns(1).Width = 60
Me.ListView1.Columns(1).Text = "Value"

Me.ListView1.Columns.Add("QC", HorizontalAlignment.Center)
Me.ListView1.Columns(2).Width = 60
Me.ListView1.Columns(2).Text = "Quality Code"

Me.ListView1.Columns.Add("Flags", HorizontalAlignment.Center)
Me.ListView1.Columns(3).Width = 60
Me.ListView1.Columns(3).Text = "Flags"

Dim SingleRow As ListViewItem

Dim Count As Integer
Count = 0

' 3.2 Fetch subsequent rows of the result set
While (DBReader.Read And Count < MaxRows)

DBTimeStamp = DBReader.GetDateTime(1)
DBValue = DBReader.GetDouble(2)
DBQualityCode = DBReader.GetInt32(3)
```

```
DBFlags = DBReader.GetInt32(4)

' 3.3 Fill list view columns
ColumnEntry = String.Format("{0:dd.MM.yy HH:mm:ss.}{1:D2}", DBTimeStamp, DBTimeStamp.Millisecond)
SingleRow = New ListViewItem(ColumnEntry)

ColumnEntry = String.Format("{0:F}", DBValue)
SingleRow.SubItems.Add(ColumnEntry)

ColumnEntry = String.Format("{0:X2}", DBQualityCode)
SingleRow.SubItems.Add(ColumnEntry)

ColumnEntry = String.Format("{0:X4}", DBFlags)
SingleRow.SubItems.Add(ColumnEntry)

Me.ListView1.Items.Add(SingleRow)

Count = Count + 1

End While

' 4 Clean up
DBReader.Close()
DBConnection.Close()

' 5 Exception (error) handling
Catch ex As Exception
MessageBox.Show(ex.Message, "Error Occured !")

End Try
```

3.7.4.4 Example: Comparing Measured Value Profiles in the WinCC Project

Introduction

This example shows how a comparison of measured value profiles can be configured. To keep the WinCC project simple, only measured value profiles from a single and not two process value archives are compared. From the local WinCC RT database, the process values of the tag with the ID = 1 are selected. For the comparison, the process values are read time-delayed. The query results are exported in two csv files.

The WinCC project can also be copied to the hard drive of your computer at a later time from the folder "Samples\Connectivity Pack\DemoProject."

3.7 Examples for Access Using OLE DB Provider

Requirement

- The computer has been entered as a server in the computer list of the WinCC project.
- The WinCC project "OPConPack" has been activated.
- The folder "D:\out" has been created.

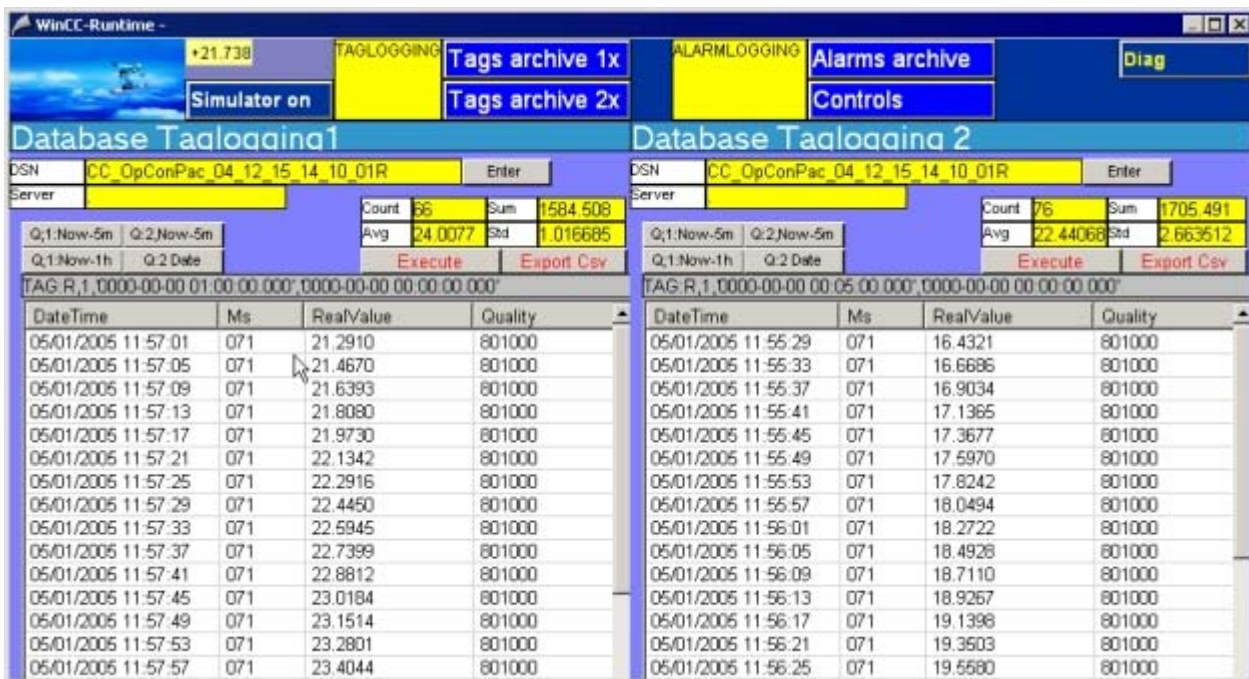
Procedure

1. Click on the button "Simulator on". The simulator supplies the tags with values.
2. Click on the button "Tags archive 2x".

How to Analyze Process Value Archives

1. In the area "Database Taglogging1", click the "Q:1,Now-1h" button. Click on the button "Execute".
2. In the area "Database Taglogging2", click on the button "Q:1,Now-5m". Click on the button "Execute".

The data will be displayed with a time stamp (DateTime and Ms), process value (RealValue), and quality code (Quality) in tables.



3. The field "Std" contains the standard deviation. You can now compare the standard deviation of the databases TagLogging1 and TagLogging2 with each other.
4. Click on the button "Export Csv". Confirm the next dialog. The query result of the database TagLogging1 is exported in the csv file "OutTAGEXP1.csv". The query result of the database TagLogging2 is exported in the csv file "OutTAGEXP2.csv".

3.7.4.5 Example: Analyzing Process Value Archives with a VB Application

Introduction

This example shows the operation of the VB application "WinCCDBPr". This application contains several query examples. The query result is displayed in ListView with time stamp, value, and quality code. Statistics show the number, the average value, the sum and the standard deviation of the process values. The results are exported in a csv file.

You can also install the VB application "WinCCDBPr" from the WinCC DVD. Do to so, double-click the "setup.exe" file in the "Samples\Connectivity Pack\VB_Sample" directory.

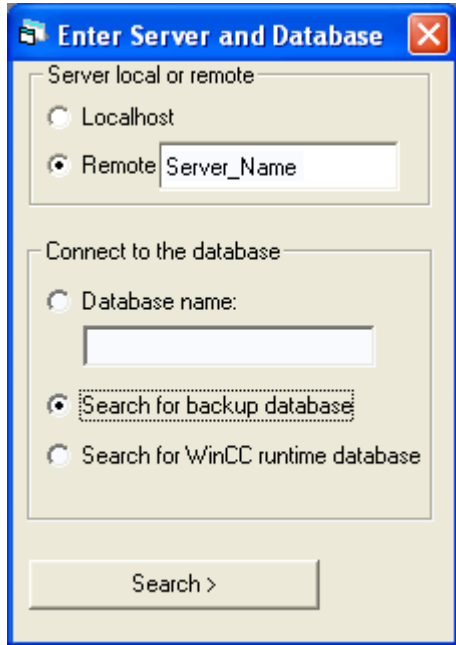
You will find the sources for this example in the directory "Samples\Connectivity Pack\VB_Sample\Sourcecode." The "Samples\Connectivity Pack\VB_Sample\DATABASES" directory contains Tag Logging databases for testing.

Requirement

- The folder "D:\out" has been created.
- The desired, swapped-out databases of Tag Logging must be connected to the SQL server, e.g., using the Archive Connector.
- The VBA application "WinCCDBPr" has been installed and started.

Procedure

1. From the "Database" menu, select the entry "1.Connect". The dialog box "Enter Server and Database" will open.



For the local access, activate the radio button "Localhost". For the remote access, activate the radio button "Remote". Enter the server name in the field "Remote".

2. In the area "Connect to database", the database can be directly specified or searched for. Activate the option "Search for backup database". Click on the button "Search". The dialog box "WinCC Database Example - [Select the Data ...]" will open.
3. Highlight the archive database and click on the button "Connect".
4. From the "Database" menu, select the entry "2.TagLogging".
5. Via the button "Next Example", the various query examples can be accessed. The query is shown in the field above the button. The following query examples are available:
TAG:R,1,'0000-00-00 00:01:00','0000-00-00 00:00:00'
TAG:R,(1;2),'0000-00-00 00:30:00.000','0000-00-00 00:00:00.000'
TAG:R,1,'0000-00-00 01:00:00.000','0000-00-00 00:00:00.000'
TAG:R,2,'0000-00-00 00:05:00.000','0000-00-00 00:00:00.000'
TAG:R,3,'0000-00-00 00:05:00.000','0000-00-00 00:00:00.000'
In addition, an example for the query of the current day will be displayed while the VBA application automatically suggests the date of the current and the subsequent day. (Format: TAG:R,1,'<Date>','<Date+1>')
6. Click on the button "Execute". The query will then be performed. The data will be displayed in a table. The display field above the buttons will show the number of selected process values.
In order to check whether the query was performed without errors, click the button "Show ERR". The display field will show errors occurred, if any.

7. Click the "Statistics" button.
The statistical values for the performed query will be displayed in the display field:
 - N = number of selected process values
 - Sum = sum of all process values
 - Avg: = average of process values
 - Sta = Standard deviation
8. Click on the button "Export(csv)". The query result is exported in the file "WCCTAG.csv" in the folder "D:\out".
9. Click on the button "Show Connection". The display field will show the ConnectionString and the query.

3.7.5 Examples: Analyzing Alarm Message Archives

3.7.5.1 Example: Analyzing Alarm Message Archives in the WinCC Project

Introduction

This example shows the operation of the WinCC project "OpConP". The WinCC project contains the archive databases used. The queries are created for this archive data. The query result is displayed in tabular form. The result can be exported as a csv file. A list contains information about the frequency and duration of the alarms.

The WinCC project can also be copied to the hard drive of your computer at a later time from the folder "Samples\Connectivity Pack\DemoProject."

Requirement

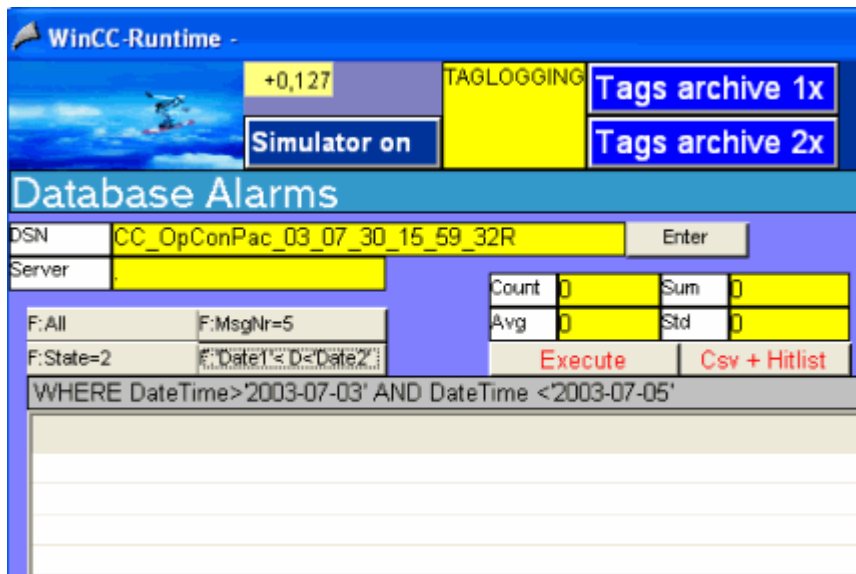
- The computer has been entered as an available server in the computer list of the WinCC project.
- The WinCC project "OPConPack" has been activated.
- The folder "D:\out" has been created.

Procedure

1. Click on the button "Simulator on". The simulator supplies the tags with values.



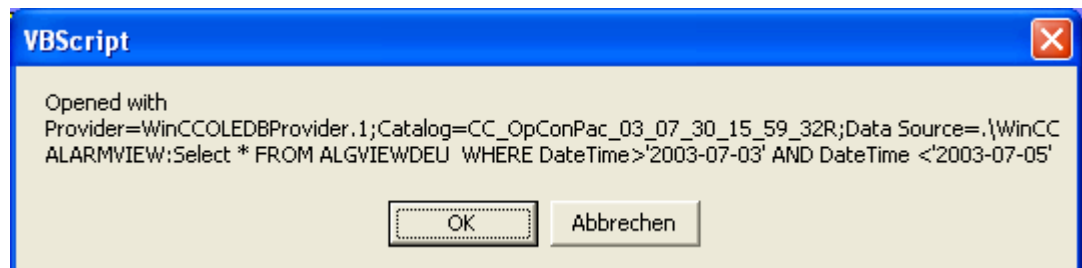
2. Click on the button "Alarms archive". The dialog box "Database Alarms" will open.



3. The field "DSN" contains the name of the WinCC RT database. The field "Server" contains the server name.

How to Analyze Alarm Message Archive Data

- Click on the button "'F:'Date1'<D'<'Date2'".
 The buttons "F:..." are linked to queries. The respective query is displayed in the field below the buttons.
 - "F:All" returns all messages as a result.
 - "F:MsgNr=5" returns the messages of message no. 5 as a result.
 - "F:State=2" returns the messages with message status 2 as a result.
 - "F:'Date1'<D'<'Date2'" returns the messages generated between July 3, 2003 and July 5, 2003.
- Click on the button "Execute". The following dialog box will open.



In this dialog box, the ConnectionString and query used are output. Close the dialog by clicking on the "OK" button. The query will then be performed.

- The data is displayed with a time stamp (DateTime), alarm message number (MsgNr), alarm message state (State) and alarm message class name (TypeName) in a table.

The screenshot shows the "Database Alarms" application window. It includes a header section with fields for "DSN" (CC_OpConPac_03_07_30_15_59_32R) and "Server". Below this are several summary statistics:

Count	4204	Sum	287411
Avg	68,36608	Std	216,5581

There are also buttons for "Execute" and "Csv + Hitlist". The main part of the window is a table with the following columns: DateTime, MsgNr, State, and Typename. The table contains 10 rows of data:

DateTime	MsgNr	State	Typename
08.07.2003 15:21:37	2	1	Alarm
08.07.2003 15:21:59	1	1	Alarm
08.07.2003 15:22:21	1	2	Alarm
08.07.2003 15:22:21	2	2	Alarm
08.07.2003 15:22:21	3	1	Warnung
08.07.2003 15:22:43	1	16	Alarm
08.07.2003 15:22:43	1	1	Alarm
08.07.2003 15:23:05	2	16	Alarm
08.07.2003 15:23:05	2	1	Alarm
08.07.2003 15:23:05	1	2	Alarm

- The field "Count" contains the number of the alarm messages. The fields "Avg", "Sum" and "Std" are displayed, but are irrelevant for this example.

3.7 Examples for Access Using OLE DB Provider

- Click on the button "Csv + Hitlist". Confirm the next dialog. The query results are stored in the csv file "ALGEXP.csv" in the folder "D:\out".
- The data are shown in tabular form. The column "CNT" indicates how many times the alarm message was pending. The column "Total" indicates how long the alarm message was pending in total.

DSN	CC_OpConPac_03_07_30_15_59_32R	Enter
Server		
Count	4035	Sum 279121
Avg	69,17497	Std 220,3618
F:All	F:MsgNr=5	
F:State=2	F:'Date1'< D<'Date2'	Execute Csv + Hitlist
WHERE DateTime>'2003-07-03' AND DateTime <'2003-07-05'		
MsgNr	CNT	Total
1	2119	46532
2	1071	46577
3	528	45465
4	255	43354
5	119	38267
6	57	35437
7	14	13857
8	8	11041
9	2	5409

3.7.5.2 Example: Reading Message Archive Data with the WinCC OLE DB Provider and Visual Basic 6

Introduction

In this example, a time interval of 10 minutes is read from the alarm message archive data. The data are displayed in a ListView Control with a time stamp, message number, status and message type.

The example includes simple error handling.

Procedure

- Create a Visual Basic project. Connect the MS Windows Common Controls 6.0 ListView Control to the name "ListView1".
- The columns in the ListView are created by the script.
- Create a "CommandButton". Copy in the script from the section "Example Script" below.
- In the script, change the name of the WinCC Runtime database "CC_OpenArch_03_05_27_14_11_46R" to that of your own project. The database name can be found in the SQL Enterprise Manager at "SQL Server Group" > "<Computer Name>/WinCC" > "Databases" > "<Database name_R>".
- This example uses "AlgViewEnu". If you want to read the alarm message archive data of another language, this entry needs to be modified.

6. Activate WinCC Runtime. start the VB application.
7. Click on the "CommandButton".

Example Script

```
Dim sPro As String
Dim sDsn As String
Dim sSer As String
Dim sCon As String
Dim sSql As String

Dim conn As Object
Dim oRs As Object
Dim oCom As Object
Dim oItem As ListItem

Dim m, n, s

On Error GoTo ErrorHandlerA

'1.1 Make connection string for ADODB
sPro = "Provider=WinCCOLEDBProvider.1;"
sDsn = "Catalog=CC_OpenArch_03_05_27_14_11_46R;"
sSer = "Data Source=.\WinCC"
sCon = sPro + sDsn + sSer

' 1.2 Define command text in sSql
sSql = "ALARMVIEW:Select * FROM AlgViewEnu WHERE DateTime>'2003-07-30 11:30:00'
AND DateTime<'2003-07-30 11:40:00'"
'sSql = "ALARMVIEW:Select * FROM AlgViewEnu WHERE MsgNr = 5"
'sSql = "ALARMVIEW:Select * FROM AlgViewEnu"
MsgBox "Open with:" & vbCrLf & sCon & vbCrLf & sSql & vbCrLf

' 2.1 Make connection
Set conn = CreateObject("ADODB.Connection")
conn.ConnectionString = sCon
conn.CursorLocation = 3
conn.Open

' 2.2 Use command text for query
Set oRs = CreateObject("ADODB.Recordset")
Set oCom = CreateObject("ADODB.Command")
oCom.CommandType = 1
Set oCom.ActiveConnection = conn
```

3.7 Examples for Access Using OLE DB Provider

```
oCom.CommandText = sSql

' 2.3 Fill the recordset
Set oRs = oCom.Execute
m = oRs.Fields.Count

' 3.0 Fill standard listview object with recordset
ListView1.ListItems.Clear
ListView1.ColumnHeaders.Clear
ListView1.ColumnHeaders.Add , , CStr(oRs.Fields(2).Name), 140
ListView1.ColumnHeaders.Add , , CStr(oRs.Fields(0).Name), 60
ListView1.ColumnHeaders.Add , , CStr(oRs.Fields(1).Name), 60
ListView1.ColumnHeaders.Add , , CStr(oRs.Fields(34).Name), 100
If (m > 0) Then
oRs.MoveFirst
n = 0
Do While Not oRs.EOF
n = n + 1
If (n < 100) Then
s = Left(CStr(oRs.Fields(1).Value), 23)
Set oItem = ListView1.ListItems.Add()
oItem.Text = CStr(oRs.Fields(2).Value)
oItem.SubItems(1) = CStr(oRs.Fields(0).Value)
oItem.SubItems(2) = CStr(oRs.Fields(1).Value)
oItem.SubItems(3) = CStr(oRs.Fields(34).Value)
End If
oRs.MoveNext
Loop
oRs.Close
Else

End If
Set oRs = Nothing
conn.Close
Set conn = Nothing

ErrorHandlerA:
MsgBox Err.Description
```

Note

In order to improve performance, replace the "Data Source=.\WinCC" instruction with the "Data Source=<Computer name>\WinCC" instruction.

The output of the values is limited to 100 (n >100).

The times indicated refer to system time.

See also

Establishing the Connection to the Archive Database (Page 46)

Displaying Alarm Message Archives (Page 59)

Querying Alarm Message Archives (Page 57)

Querying the Archive Data (Page 49)

3.7.5.3 Example: Reading Message Archive Data With WinCC OLE DB Provider and Visual Basic.NET

Introduction

In this example, a time interval of 10 minutes is read from the alarm message archive data. The data are displayed in a ListView Control with a time stamp, message number, status and message type.

The example includes simple error handling.

Procedure

1. Create a new Visual Basic project in Visual Studio 2005 of the type "Windows Application."
2. Change to Designer View mode and enlarge the Windows Form "Form1" to a size of ca. 600x600.
3. Drag a "ListView Control" from the Toolbox to the left upper corner of the form and enlarge it to ca. 500x450.
4. Drag a button from the Toolbox to the middle of the form below the Control. The button will automatically be named "Button1."
5. Double-click the button and add the VB.NET sample code listed below IN FRONT OF the instruction "End Sub" in the method "Private Sub Button1_Click."
6. Select "Build > Build Solution" in the menu or press <CTRL+Shift+B> to compile the finished VB.NET project.

3.7 Examples for Access Using OLE DB Provider

7. In the script, adjust the name of the WinCC Runtime database "CC_CPSample_07_10_09_13_44_26R" to your own project. The database name can be found in the SQL Server Management Studio under "Object Explorer > <Computer Name>\WinCC > Databases > <Database name_R>".
8. Start WinCC Runtime and select "Debug >Start Debugging" in the menu or press <F5> to start the VB application.
9. Click on the "Button1" button.

Sample code

```
Const MaxRows = 100
'1.1 Make connection string for ADO.NET access
Dim ProviderName As String
Dim CatalogName As String
Dim DSN As String
Dim ConnectionString As String
Dim CommandString As String

ProviderName = "Provider=WinCCOLEDBProvider.1;"
CatalogName = "Catalog=CC_CPSample_07_10_09_13_44_26R;"
DSN = "Data Source=.\WinCC"

ConnectionString = ProviderName + CatalogName + DSN

' 1.2 Define command string for ADO.NET access
CommandString = "ALARMVIEW:Select * From AlgViewEnu WHERE DateTime > '2007-10-10 12:00:00' AND
DateTime > '2007-10-10 12:10:00'"
'CommandString = "ALARMVIEW:Select * From AlgViewEnu WHERE MsgNr = 1"
'CommandString = "ALARMVIEW:Select * From AlgViewEnu"

Try

Dim DBConnection As System.Data.OleDb.OleDbConnection
Dim DBCommand As System.Data.OleDb.OleDbCommand
Dim DBReader As System.Data.OleDb.OleDbDataReader

' 2.1 Open an OLE DB connection
DBConnection = New System.Data.OleDb.OleDbConnection(ConnectionString)

DBConnection.Open()

' 2.2 Execute command
DBCommand = New System.Data.OleDb.OleDbCommand(CommandString, DBConnection)
```

```
DBReader = DBCommand.ExecuteReader()

' 3.1 Prepare list view control
Dim ColumnEntry As String

Me.ListView1.View = View.Details
Me.ListView1.GridLines = True
Me.ListView1.TabIndex = 0
Me.ListView1.Width = 500

Me.ListView1.Columns.Add("Number", HorizontalAlignment.Center)
Me.ListView1.Columns(0).Width = 90
Me.ListView1.Columns(0).Text = "Number"

Me.ListView1.Columns.Add("Date/Time", HorizontalAlignment.Center)
Me.ListView1.Columns(1).Width = 130
Me.ListView1.Columns(1).Text = "Date/Time"

Me.ListView1.Columns.Add("State", HorizontalAlignment.Center)
Me.ListView1.Columns(2).Width = 60
Me.ListView1.Columns(2).Text = "State"

Me.ListView1.Columns.Add("Type", HorizontalAlignment.Center)
Me.ListView1.Columns(3).Width = 150
Me.ListView1.Columns(3).Text = "Type"

Dim SingleRow As ListViewItem
Dim MsgDateTime As DateTime
Dim MsgMilliSecs As Integer
Dim MsgNumber As Integer
Dim MsgState As Integer
Dim MsgTypeName As String

Dim Count As Integer
Count = 0

' 3.2 Fetch subsequent rows of the result set
While (DBReader.Read And Count < MaxRows)

MsgNumber = DBReader.GetInt32(0)
MsgDateTime = DBReader.GetDateTime(2)
MsgMilliSecs = DBReader.GetInt16(3)
MsgState = DBReader.GetInt16(1)
```

3.7 Examples for Access Using OLE DB Provider

```
MsgTypeName = DBReader.GetString(34)

' 3.3 Fill list view columns
ColumnEntry = String.Format("{0:D10}", MsgNumber)
SingleRow = New ListViewItem(ColumnEntry)

ColumnEntry = String.Format("{0:dd.MM.yy HH:mm:ss.}{1:D2}", MsgDateTime, MsgMilliSecs)
SingleRow.SubItems.Add(ColumnEntry)

ColumnEntry = String.Format("{0:D5}", MsgState)
SingleRow.SubItems.Add(ColumnEntry)

ColumnEntry = MsgTypeName
SingleRow.SubItems.Add(ColumnEntry)

Me.ListView1.Items.Add(SingleRow)

Count = Count + 1

End While

' 4 Clean up
DBReader.Close()
DBConnection.Close()

' 5 Exception (error) handling
Catch ex As Exception
MessageBox.Show(ex.Message, "Error Occured !")

End Try
```

3.7.5.4 Example: Analyzing Alarm Message Archives With a VB Application

Introduction

This example shows the operation of the VB application "WinCCDBPr". This application contains several query examples. The query result is displayed in tabular form. The result can be exported as a csv file. A list contains information about the frequency and duration of the alarms.

You can also install the VB application "WinCCDBPr" from the WinCC DVD. Do to so, double-click the "setup.exe" file in the "Samples\Connectivity Pack\VB_Sample" directory.

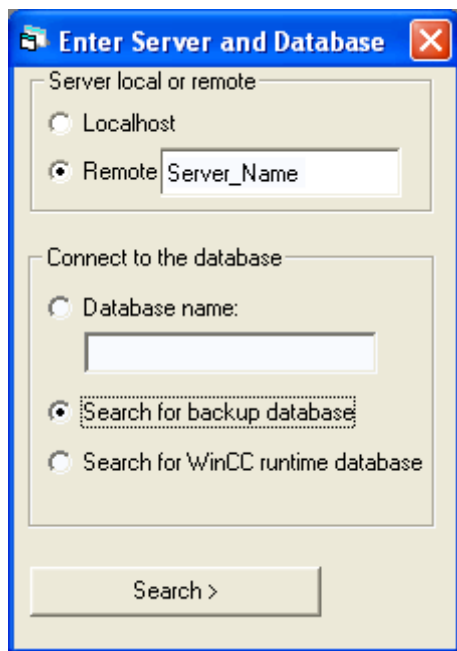
You will find the sources for this example in the directory "Samples\Connectivity Pack\VB_Sample\Sourcecode."

Requirement

- The folder "D:\out" has been created.
- The desired, swapped-out databases of Alarm Logging must be connected to the SQL server, e.g., using the Archive Connector.
- The VBA application "WinCCDBP" has been installed and started.

Procedure

1. From the "Database" menu, select the entry "1.Connect". The dialog box "Enter Server and Database" will open.

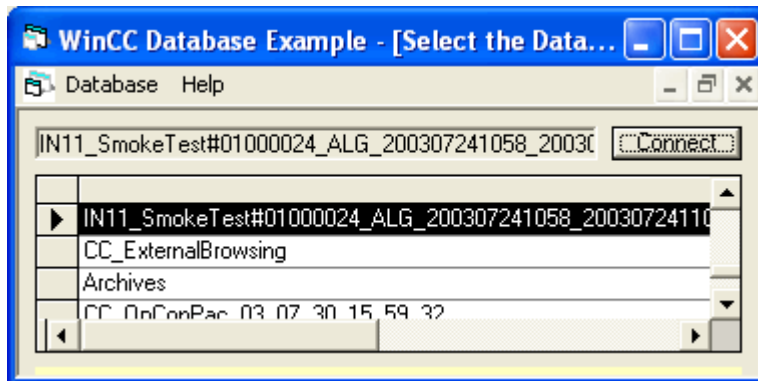


For the local access, activate the radio button "Localhost". For the remote access, activate the radio button "Remote". Enter the server name in the field "Remote".

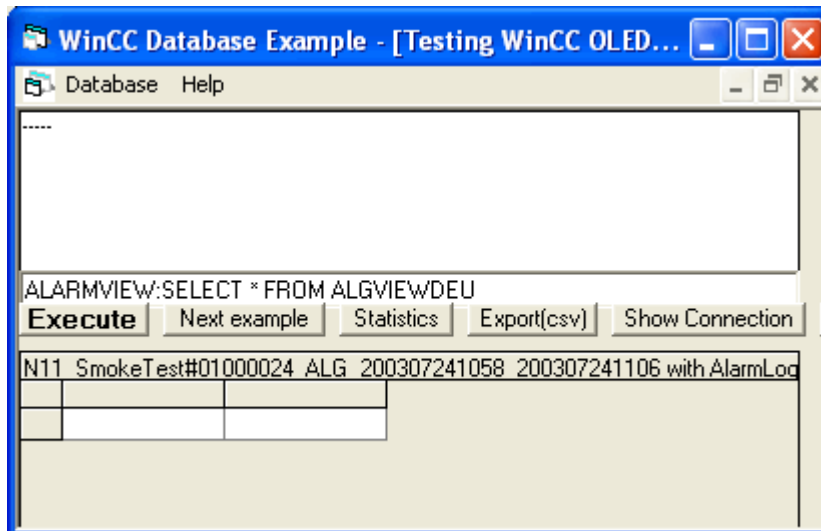
2. In the area "Connect to database", the database can be directly specified or searched for. Activate the option "Search for backup database".

3.7 Examples for Access Using OLE DB Provider

- Click on the button "Search". The dialog box "WinCC Database Example - [Select the Data ...]" will open.

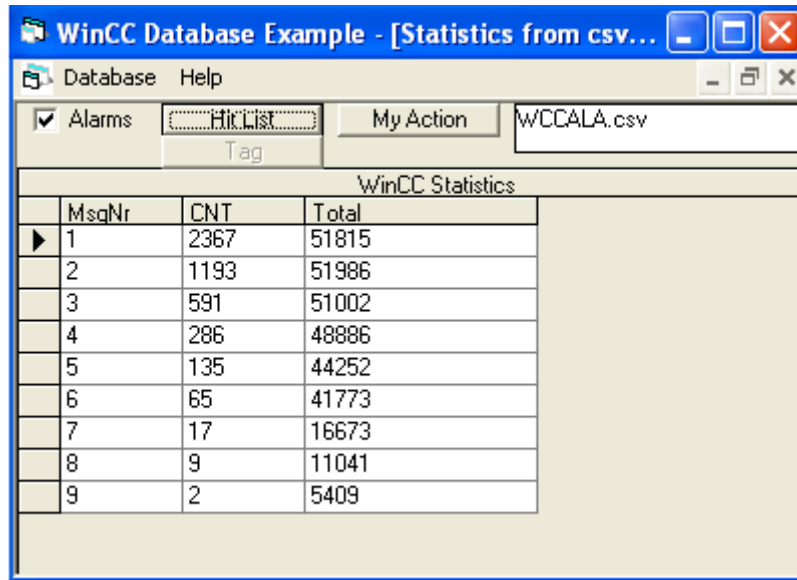


- Highlight the archive database and click on the button "Connect".
- From the "Database" menu, select the entry "3.Alarms".



- Via the button "Next Example", the various query examples can be accessed. The query is shown in the field below the button. The time intervals can be adjusted. The following query examples are available:
 - ALARMVIEW:SELECT * FROM ALGVIEWDEU
 - ALARMVIEW:SELECT * FROM ALGVIEWDEU WHERE DateTime>'2003-07-01' AND DateTime<'2003-08-01'
 - ALARMVIEW:SELECT * FROM ALGVIEWDEU WHERE State=2
 - ALARMVIEW:SELECT * FROM ALGVIEWDEU WHERE DateTime>'2003-08-01'
 - ALARMVIEW:SELECT * FROM ALGVIEWDEU WHERE TimeDiff>100
- Click on the button "Execute". The query will then be performed. The data will be displayed in a table. In the upper field, the number of the selected alarm messages is shown.
- Click the button "Statistics". The upper field will display how often and how long in total the message number 2 was present.

9. Click on the button "Export(csv)". The query result is exported in the file "WCCALA.csv" in the folder "D:\out".
10. Click on the button "Show Connection". In the upper field, the ConnectionString and the query are shown.
11. From the "Database" menu, select the entry "Statistics/Csv".



Click on the button "HitList". The data are shown in tabular form. The column "CNT" indicates how many times the alarm message was pending. The column "Total" indicates how long the alarm message was pending in total. As the database, the csv file "WCCALA.csv" is used.

3.8 Performance Data

Introduction

The following tables show the times required for accessing the archive databases using WinCC OLE DB Provider. The values were measured in a test system using a Connectivity Pack Server and a connected Client. The archive databases located on the server were connected using the Archive Connector.

- Server: Intel Pentium 4; 3,2GHz; Windows Server 2003; 1024 MB RAM
Client: Intel Pentium 4; 3,2GHz; Windows XP SP1; 1024 MB RAM
- Data were read from a Visual Basic application using ADO.
- Network connection: Ethernet 100MBit/s
- The times measured do not include the display of data.

The times are indicated in milliseconds.

Note

Differently structured and compressed data or database segments varying in number and size can result in different access times.

Also, the number of archive tags and the reading of the tag values from different archives affects the access times.

Archive "Tag Logging Fast"

Number of Measured Values	Local Access Time (Server)	Remote Access Time (Client)
100	63	188
1000	78	219
5000	93	234
10000	140	266
20000	219	360
50000	421	563
100000	765	937

Archive "Tag Logging Slow"

Number of Measured Values	Local Access Time (Server)	Remote Access Time (Client)
100	62	79
1000	98	125
5000	219	234

Number of Measured Values	Local Access Time (Server)	Remote Access Time (Client)
10000	328	328
20000	562	563
40000	1047	1227
50000	1289	1621
100000	2515	2678

Archive "Alarm Logging"

Number of Alarm Messages	Local Access Time (Server)	Remote Access Time (Client)
100	109	125
1000	203	206
10000	1073	1093
50000	5118	4964
100000	16160	10330

3.9 Connectivity Station

3.9.1 Basics of the Connectivity Station

Introduction

With the Connectivity Station, you can access WinCC stations with server packages from a central computer without the WinCC software. The WinCC stations can be accessed through two different interfaces:

- OPC interfaces of the Connectivity Station
- OLE DB interface of the Connectivity Pack

The access options include different functions.

OPC interfaces of the Connectivity Station

The Connectivity Station provides interfaces via which you can access the following content with an OPC client:

- OPC DA server: Tags, such as process values
- OPC HDA server: Archives process values
- OPC A&E server: Messages

Licensing

You need the "WinCC Connectivity Station" license to use the OPC interfaces of the Connectivity Station on a computer without WinCC installation.

If you only use the OPC interfaces of a WinCC installation, you only need the "Connectivity Pack" license.

The following table shows the rules:

	New: WinCC-independent installation at Connectivity Station	Conventional installation: OPC with WinCC
OPC DA	"WinCC Connectivity Station" license	No license required
OPC HDA	"WinCC Connectivity Station" license	"WinCC Connectivity Pack" license
OPC A&E	"WinCC Connectivity Station" license	"WinCC Connectivity Pack" license

OLE DB interface of the Connectivity Pack

The Connectivity Pack server or Connectivity Pack client necessary for the operation of the Connectivity Station provides an additional OLE DB interface. You can access messages and tags via such OLE DB interfaces.

Transparent access to archived data

The Connectivity Station supports the transparent access to the archive databases of WinCC stations.

Installation and Configuration

You will need the following to install the Connectivity Station:

- PC with Connectivity Pack Server or Connectivity Pack Client

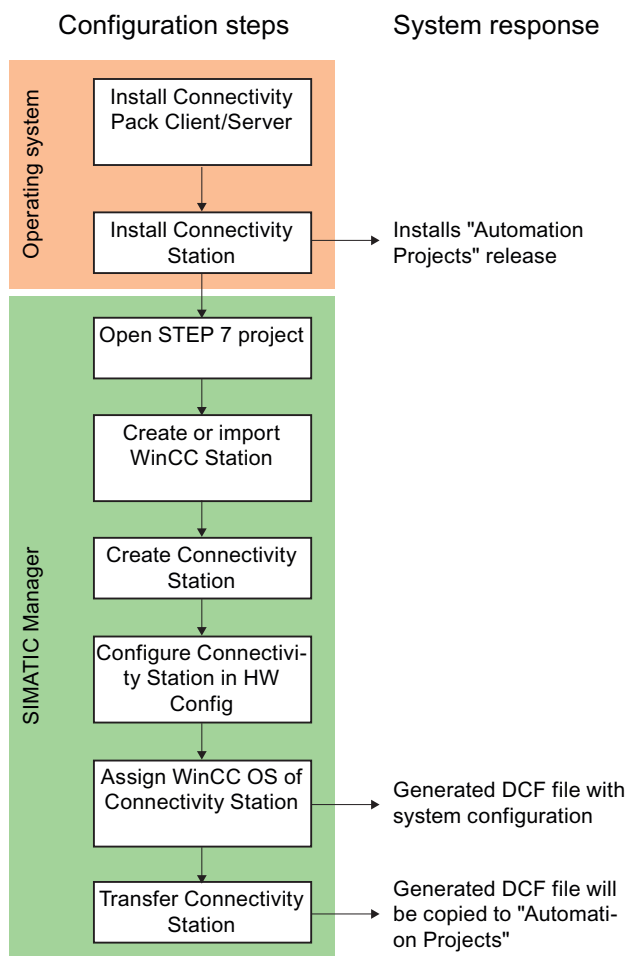
In order to configure a computer as a Connectivity Station, run the Connectivity Pack client setup on the computer.

From the "Installing Software" menu of the installation DVD, select the entry "Connectivity Station".

After the installation, you can set up the access to the WinCC stations with one of the following program:

- SIMATIC Manager of STEP 7 or
- SIMATIC NCM PC Manager of the current SIMATIC NET Edition.

The figure below provides an overview of the configuration steps for the Connectivity Station:



Settings for operation with several network adapters

Make sure that you have selected the correct network card in the settings of the SIMATIC Shell.

Click on the the SIMATIC Shell icon and select "Settings of SIMATIC Shell" in the shortcut menu. You may have to select a different network card under "Selection of terminal bus".

See also

Bases of OLE DB (Page 41)

Licensing (Page 7)

Transparent access to archived data (Page 37)

Functionality of OPC (Page 116)

Use of OPC interface of the Connectivity Station (Page 240)

Use of OLE DB interface of the Connectivity Station (Page 242)

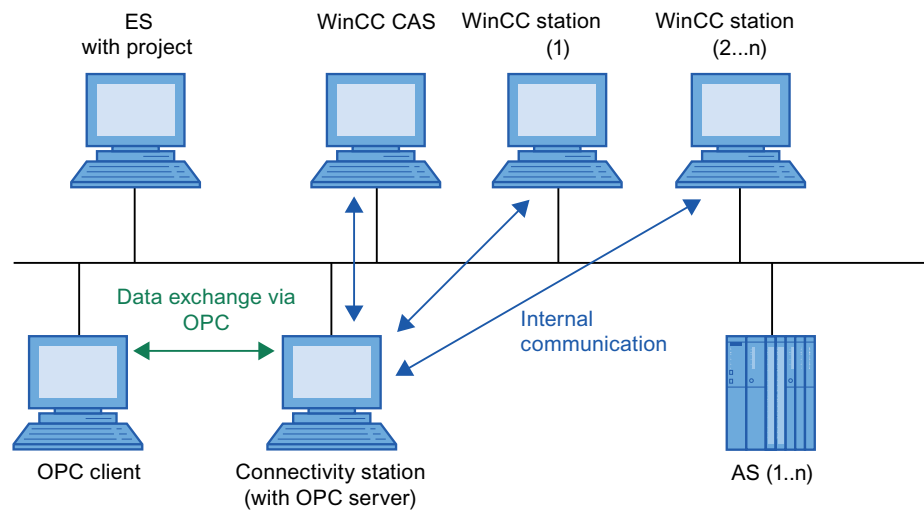
3.9.2 Functionality of the Connectivity Station

3.9.2.1 Use of OPC interface of the Connectivity Station

Principle

The Connectivity Station includes the WinCC OPC-Server through which you can access WinCC stations with server packages, using the OPC client.

You can use the OPC client locally on the Connectivity Station or on a separate computer. The OPC client requires DCOM access rights to the Connectivity Station.



ES = Engineering station
with STEP 7 or NCM PC Manager
AS = Programmable logic controller (PLC)
CAS = WinCC Central Archive Server

Server name of the OPC-Servers

The data exchange between the OPC client and the Connectivity Station takes place via the OPC. The following WinCC OPC-Servers are integrated into the Connectivity Station.

WinCC OPC-Server	Server name
OPC DA	WinCCConnectivity.OPCDAServer
OPC HDA	WinCCConnectivity.OPCHDAServer.1
OPC A&E	WinCCConnectivity.OPCAEServer.1

Supported OPC Standards

The Connectivity Station supports the following OPC standards:

- OPC DA 2.05a Specification
- OPC DA 3.00 Specification
- OPC XML DA 1.00 Specification
- OPC AE 1.10 Specification
- OPC HDA 1.20 Specification

Transparent access to archived data

With OPC, you have transparent access to all archive databases of the WinCC stations.

Central restart of OPC servers

The "ConfigureSposa" tool enables central restart of OPC servers. You can find "ConfigureSposa" in the installation folder of the ConnectivityStation. Following the start, an icon appears in the toolbar by which you can control the OPC servers.

See also

Basics of the Connectivity Station (Page 238)

Using OPC in WinCC (Page 117)

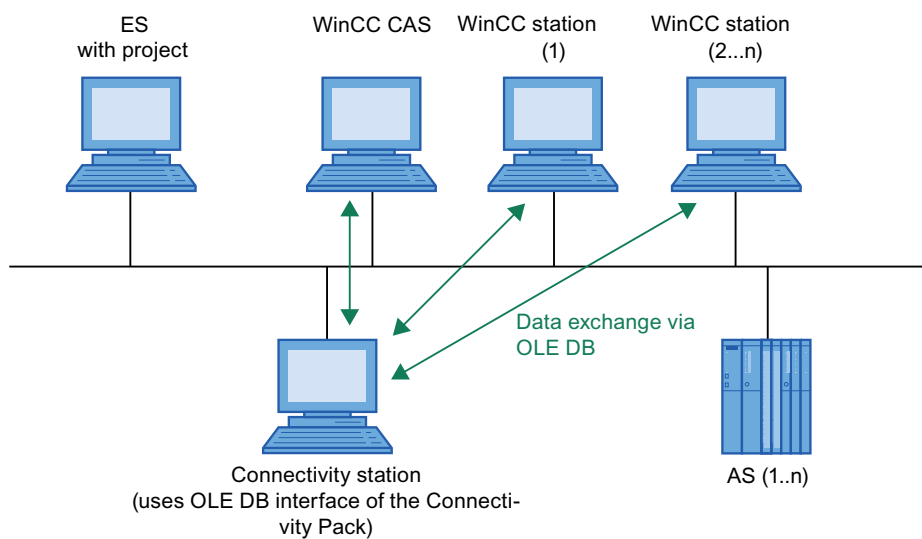
Access Using OPC to WinCC Archives, Tags, and Messages (Page 35)

Transparent access to archived data (Page 37)

3.9.2.2 Use of OLE DB interface of the Connectivity Station

Principle

The Connectivity Station can only be used, if there is a Connectivity Pack Server or a Connectivity Pack Client installed. The WinCC OLE DB provider of the Connectivity Pack Server/Client provides an OLE DB interface. You can access messages and tags via such OLE DB interfaces.



ES = Engineering station
with STEP 7 or NCM PC Manager
AS = Programmable logic controller (PLC)
CAS = WinCC Central Archive Server

Access to databases with OLE DB

For access to databases with WinCC OLE DB, you may write your own applications. For the communication with the WinCC OLE DB Provider, applications - created with, for example, Visual Basic, VBScript or VBA - use the ADO DB.

Note

Use of Connectivity Station on a client with own project

If you use the Connectivity Station on a client with own project and use the OLE-DB interface, then observe the following:

You can only access those WinCC stations, which you entered during the configuration phase of the Connectivity Station. Connectivity Station does not use the server packages available on the client.

Transparent access to archived data

With OLE DB, you can only access process value archives transparently.

Only one WinCC CAS may be used in a project for transparent access via WinCC OLE DB-Provider.

If you want to use a Connectivity station in two projects and both these projects contain a WinCC CAS, you need to remove the DCF file of the previous project before changing the project. You can find the DCF file on the Connectivity station under the following path:

- Installation directory\Siemens\AutomationProjects
 \<<PROJEKTNAME_ConnectivityStationName>.DCF

Note

Enter the WinCC project name for "Catalog" for transparent access; for e.g.:
"Catalog=WinCC_Project_Name".

See also

Basics of the Connectivity Station (Page 238)

Transparent access to archived data (Page 37)

Analysis Functions for Messages and Process Values (Page 67)

3.9.3 Configuring the Connectivity Station in the S7 project

Introduction

In order to set up the Connectivity Station, you will add a new "SIMATIC PC Station" to the system configuration. This "SIMATIC PC Station" receives the properties of the Connectivity Station by configuring the application "SPOSA Application".

3.9 Connectivity Station

Depending on the project type, one of the following objects will be created in the "SPOSA Application".

- "Connectivity Station_(s)" in the "STEP 7" project type.
- With project type "STEP 7", this is the object "Open_PCS7_Station_(n)".

In the following description, the project type "STEP 7" and the respective object name are used.

Requirements

- The required software for the Connectivity Station is installed on the Connectivity Station PC.
- The system configuration contains WinCC stations with server packages.

Procedure

The configuration procedure for the Connectivity Station consists of the following steps:

1. Create and configure SIMATIC PC Station
2. Assign WinCC Station
3. Transfer Connectivity Station

Create and configure SIMATIC PC Station

1. Select the project directory in the navigation window in the SIMATIC Manager. Select the entry "Insert New Object > SIMATIC PC STATION" in the popup menu. A new object, "SIMATIC PC Station" will be inserted into the navigation window and will remain selected.
2. Select the entry "Open object" in the popup menu of the SIMATIC PC Station. The Editor "HW Config" will be opened and the new PC station will be displayed as a blank central rack.
3. Select the entry "SPOSA Application" in the module catalog in the directory "SIMATIC PC Station > HMI". Insert the selected module by Drag&Drop into an open slot of the central rack.
4. Select the menu command "Station > Save and translate".
5. Select the menu command "Station > Exit" to close "HW Config".

Assign WinCC Station

1. Using the "SPOSA Application", navigate to the "Connectivity Station" icon in the directory of the new PC station. Select the "Assign OS Server..." option in the "Connectivity Station" shortcut menu. The "Assignment of OS Server for Open_TIA_Station" dialog is opened.
2. Select the WinCC stations in the table in the column "OS Information", whose data the Connectivity Station is to gain access to. Close the dialog by clicking on the "OK" button.

3. Select the "Connectivity Station" icon in the navigation window. Select the "Object properties" option on the shortcut menu.
The "Properties - TIA application" dialog appears: "Connectivity Station" is opened.
4. Change to "Destination System" tab and enter the path to the Connectivity Station PC in the "Path" field.
As an alternative, you may open a selection dialog via the "Browse..." button and search for the computer in the network.
After you have entered the computer name, you click on the "Apply" button. The directory "Automation Projects" will be appended to the computer name.
Close the dialog by clicking the "OK" button.

Transfer Connectivity Station

1. Check whether the "Connectivity Station" icon is clicked in the directory of the new PC station in the navigation window.
2. Select the "Target System > Load" option in the popup menu. Acknowledge the message after exiting this process.

Result

A computer in the hardware configuration in the S7 project is supplemented and configured for the Connectivity Station. The required project data has been transferred to this computer.

3.9.4 Accessing WinCC data with the Connectivity Station

Introduction

The Connectivity Station allows access to the data of different WinCC stations by means of an OPC client. For this, the OPC client must simply connect to the Connectivity Station.

The data exchange between the OPC client and the Connectivity Station takes place via the OPC. The following WinCC OPC-Servers are integrated into the Connectivity Station.

OPC-Server	Server name
OPC DA	WinCCConnectivity.OPCDAServer
OPC HDA	WinCCConnectivity.OPCHDAServer.1
OPC A&E	WinCCConnectivity.OPCAEServer.1

Requirements

- The software for the Connectivity Station is installed on the Connectivity Station PC.
- The Connectivity Station is configured in the S7 project and the project data is transferred to the computer of the Connectivity Station.
- An OPC client in accordance with the OPC specifications is available.

The Procedure in Principle

The following description depicts the basic procedure.

1. Start the OPC client on the PC.
2. Select the OPC-Server according to the desired data.
The same names as the ones in the above table apply to the WinCC OPC-Server.
3. Define which data should be transferred, e.g. tags.

Result

The OPC client is connected to the Connectivity Station and receives the WinCC data.

See also

Examples for Access Using OLE DB Provider (Page 203)

Access Using OPC to WinCC Archives, Tags, and Messages (Page 35)

Establishing the Connection to the Archive Database (Page 46)

OPC - Open Connectivity (Page 116)

Index

- A&E server
 - Mapping WinCC message classes and message types, 174
- Connecting WinCC - OPC A&E client
 - Example of OPC A&E , 166
- Error report , (See support)
- OPC A&E server , 161, 174
- SQL Server Import/Export-Wizard, 64

A

- A&E server, 158, 160, 169, 170, 174
 - Condition Related Event, 158
 - Conditional event, 169
 - Mapping the WinCC message system, 174
 - Simple event, 169
 - Tracking event, 158, 169
- A&E Server
 - Hierarchical access, 170
 - Mapping of the WinCC message system, 160
- Access protection for SQL database, 73
- Access Via the WinCC OLE DB, 64
- Acknowledgement theory, 164
- Acknowledgment policy, 177
- Adding a tag, 76, 83
 - Example of OPC DA, 127
- Address properties, 87, 102
- Aggregate functions for analysis, 67
- AlarmHitView, 67, 70
- ALARMVIEW, 57
- Analysis functions, 67
 - Alarm Message Archives, 67, 70
 - Process value archives, 67
 - Recordset with the analysis of message archives, 70
- Application
 - Access Using OPC, 35
 - Access Via the WinCC OLE DB Provider, 38
- Application scenario, 31
 - Remote access to WinCC archive databases, 31
- Archive Connector, 24
- Archive data, 40, 49, 57, 61
 - Access Via the WinCC OLE DB Provider, 34
 - Access via WinCC OLE DB Provider, 40
 - as reports on the network, 65

- Configure access with Visual Basic.NET, 216, 229
- Configuring access using DataConnector Wizard, 205
- Configuring access with Visual Basic, 203
- Query, 49, 57, 61

Archive database, 46

- Attach, 46

B

- Bounding values, 143
- Buffer time, 167

C

- CAL, 7
- Client Access License, 7
- CommandText, 49
- Commissioning, 196, 202
- Compatibility, 117
- Configuration file
 - File location, 192
 - Layout, 192
 - Port number, 192
 - Security settings, 192
 - URL of the WinCC OPC UA server, 192
 - User identification, 193
 - WinCC archive write access, 193
- configuring
 - Optimized WinCC archive write access, 196
 - Port number, 194
 - Security settings, 194
 - User identification, 196
 - WinCC OPC UA Server, 194
- Configuring
 - Connectivity Station, 244
- Connecting WinCC - OPC A&E client, 166
- Connection
 - Creating a connection, 76
- Connection Monitoring, 80
- ConnectionString, 46
- Connectivity pack, 24
 - Archive Connector, 24
 - MS OLE DB Provider, 24
 - OPC, 24
 - WinCC OLE DB Provider, 24

Connectivity Pack

- Archive Connector, 42
- Database Access, 42
- Licensing, 7
- Performance Data, 236
- Use of OLE DB interface, 242

Connectivity Station

- Accessing WinCC stations, 246
- Configuring, 244
- Fundamentals, 238
- Installing, 239
- License, 238
- Supported OPC Standards, 241
- Use of OPC interface, 240

cp_TagStatistic, 67

Customer support, (See support)

D

Data type, 79

- Supported WinCC data types, 79
- Supported WinCC data types overview, 79

Database Access, 42

DataConnector, 24

Defining new tag, 133

- Example of OPC DA, 133

E

E-server

- Functionality of WinCC OPC A&OPC, 118

Example:, 203, 211, 213, 219, 221, 223, 226, 232

- Analyzing in a WinCC Project, 211, 223
- Analyzing with VB application, 221, 232
- Read message archive, 226
- Reading Process Value Archives, 213

F

FAQ, (See support)

Filter criteria, 83

Functionality of the OPC A&E server

- Conditional event, 169
- Simple event, 169
- Tracking event, 169

Functionality of the WinCC OPC A&E server

- Simple event, 158

Fundamentals

- Connectivity Station, 238

I

I/O field configuration, 126

- Example of OPC DA, 126

Installation, 10, 12

- Connectivity Pack Client, 12
- Connectivity Pack Server, 10

Installing

- Connectivity Station, 239

Item handle, 143

Item ID, 143

L

Licensing

- Connectivity Station, 238

Linked Server, 24

M

Max size, 167

Message archive, 49, 57

- Access with Visual Basic.NET, 229
- Configuring access using DataConnector, 205
- Displaying data, 59
- Querying archive data, 49, 57
- Recordset, 59

Message Archive, 223, 226, 232

- Access with Visual Basic, 203, 226
- Analyzing in a WinCC Project, 223
- Analyzing with VB application, 232
- Querying archive data, 226

Message archive data

- Access with Visual Basic.NET, 229

Message classes on OPC A&E servers, 174

Message types on OPC A&E servers, 174

Microsoft Message Queuing, 8

- MSMQ Server, 8

MS Message Queuing, 8

MS OLE DB, 41

MSMQ Server, 8

N

New connection, 83

New user, 197

O

- OLE DB
 - Transparent access, 243
- OLE DB interface
 - Connectivity Pack, 242
- Online support, (See support)
- OPC, 24
 - Access to tag, 82
 - Adding a tag, 76, 83
 - Address properties, 87, 102
 - Commissioning, 196
 - Communications concept, 118
 - Compatibility, 117
 - Configuring access to a WinCC archive tag using the HDA server browser, 153
 - Configuring access to a WinCC tag with the OPC Item Manager, 83
 - Configuring access to a WinCC tag without the OPC Item Manager, 87, 102
 - Configuring access to the WinCC message system, 167
 - Configuring an OPC channel on a WinCC OPC DA client, 82
 - Configuring structure, 90
 - Configuring structure tag, 90
 - Creating a connection, 76
 - Error handling in event of disturbed OPC communication, 92, 111
 - Example, 129, 131, 132, 133, 136, 137, 138, 140
 - Example:, 125, 126, 127, 150
 - Filter criteria, 83
 - Functionality of the OPC A&E server, 169
 - Functionality of the WinCC OPC A&E server, 158
 - Functionality of the WinCC OPC DA Client, 80
 - Functionality of the WinCC OPC DA server, 122
 - Functionality of the WinCC OPC HDA server, 141
 - Functionality of the WinCC OPC UA client, 104
 - Functionality of the WinCC OPC XML client, 96
 - Functionality of WinCC OPC XML server, 118
 - HDA server browser, 151
 - New connection, 83
 - New user, 197
 - OPC in WinCC, 74, 117
 - OPC Item Manager, 76
 - OPC1, 87, 102
 - OPCServer.WinCC-(DPC_4001), 83
 - Overview of OPC Item Manager functions, 76
 - Principle of operation of the WinCC OPC UA Server , 184
 - ProgID, 124
 - Querying of ProgID, 76
 - Setting up user account on the OPC computers, 197
 - Specifications, 116
 - Structure properties, 90
 - Supported WinCC data types, 79
 - Supported WinCC data types overview, 79
 - Tag selection, 76
 - Trace, 202
 - Transparent access, 241
 - Using Multiple OPC DA Servers, 123
 - Using structures on a WinCC OPC DA client, 89, 91
 - WinCC as an OPC DA client, 74, 92
 - WinCC as OPC UA client, 111
 - WinCC as OPC XML client, 74
- OPC A&E Client
 - Example of OPC A&E , 166
- OPC A&E server, 158, 166, 169, 170
 - Quality codes, 179
- OPC A&E Server, 167
 - Configuring access to the WinCC message system, 167
 - Quality codes, 166
- OPC A&E servers, 118
- OPC A&Raw Data, 166
- OPC channel
 - Configuring an OPC channel on a WinCC OPC DA client, 82
- OPC communication, 92, 111
 - Error handling in the event of disturbed OPC DA communication, 92
 - Handling errors in OPC UA communication, 111
- OPC DA client, 80
 - Functionality of the WinCC OPC DA Client, 80
- OPC DA server, 122
 - Functionality of the WinCC OPC DA server, 122
 - Using multiple OPC DA servers, 123
- OPC HDA server, 141
 - Assemblies, 144
 - Attributes, 144
 - Bounding values, 143
 - Data structure, 143, 144
 - Item handle, 143
 - Item ID, 143
 - Principle of operation, 141
 - Quality codes, 148, 166
 - Raw data, 141
 - Supported functions, 145
 - Time Format of a WinCC OPC HDA server, 146
 - Write Accesses, 148

OPC interface
 Connectivity Station, 240
 OPC Item Manager, 76, 83, 124
 Overview of OPC Item Manager functions, 76
 OPC Standards
 supported ~ by the Connectivity Station, 241
 OPC UA
 Display of the WinCC tags, 189
 OPC UA Service Sets , 187
 Access to tag, 105
 Conformance units, 188
 Display of the logging tags, 190
 Profile, 188
 OPC UA client, 104
 Functionality of the WinCC OPC UA client, 104
 OPC UA Data Access, 191
 OPC UA Historical Access, 191
 OPC UA Server
 Communication profile, 184
 Configuration file, 192
 Principle of operation, 184
 Security concept, 186
 Security settings, 186
 supported specifications, 184
 URL, 185
 User identification, 187
 OPC XML, 198, 200
 Access to tag, 97
 Security settings in IIS, 198
 Testing installation, 200
 OPC XML client, 96
 Functionality of the WinCC OPC XML client, 96
 OPC XML server, 118
 Installation, 120, 122
 Installing of .NET Framework 1.1, 121
 OPC1, 87, 102
 OPCScout new project1
 Example of OPC DA, 133
 OPC-Server
 Server names, 241
 OPCServer.WinCC-(DPC_4001), 83

P

Process value archive, 48, 49, 51, 211, 213, 219, 221
 Access with Visual Basic, 203, 213
 Access with Visual Basic.NET, 216
 Analyzing in a WinCC Project, 211
 Analyzing with VB application, 221
 Comparing process value profiles, 219

 Configuring access using DataConnector Wizard, 205
 display in Visual Basic Runtime, 213
 Displaying data, 48
 Query, 51
 Querying archive data, 49
 Recordset, 48
 ProgID, 76
 Querying, 124
 Querying of ProgID, 76
 Project
 Example of OPC DA, 127

Q

Quality codes, 148, 166, 179
 Query, 51, 57, 61
 Message archive, 57
 Process value archive, 51
 User archive, 61

R

Raw data, 141
 Recordset, 48, 59
 Reporting Services
 Requirements, 65
 Reports with archive data
 Available on the network, 65

S

Server names
 WinCC OPC-Server, 241
 SQL database, 73
 SQL queries
 to WinCC databases, 64
 SQL Server Import/Export, 34
 Standard SQL queries
 to WinCC databases, 64
 Structure
 Configuring structure, 90
 Using structures on a WinCC OPC DA client, 89
 Using WinCC OPC client, 91
 Structure properties, 90
 Structure tag, 90
 Configuring structure tag, 90
 Support, 18, 21
 Support Request, 21
 Swapped out WinCC archives on removable media, 42

T

Tag

- Adding a tag, 76
- Configuring HDA server browser, 153
- Configuring OPC Item Manager, 83, 87
- Configuring PC Item Manager, 102
- Example of OPC DA, 133, 136, 140
- Example of OPC HDA, 153, 154
- HDA server browser, 151
- OPC Item Manager, 83
- R, 51
- Tag selection, 76

Technical support, (See support)

the Connectivity Station

- Accessing WinCC station via , 246

The WinCC Station

- Access ~ via the Connectivity Station, 246

TIMESTEP, 51

Transparent access

- with OLE DB, 243
- with OPC, 241

U

URL

- OPC UA Server, 185

Use

- OLE DB interface of the Connectivity Pack, 242
- OPC interface of the Connectivity Station, 240

Use case, 28, 29, 30, 32, 33

- Access to local WinCC Archive Database, 30
- Access to local WinCC RT Database, 28
- Access to local WinCC user archives, 32
- Access Via the WinCC OLE DB Provider, 34
- Remote Access to WinCC RT Databases, 29
- Remote Access to WinCC User Archives, 33

User account, 197

- Making OPC computers known, 197

User archive, 61, 63

- Displaying data, 63
- Querying archive data, 61

V

Visual Basic, 203

- Access to Archive Data, 203

Visual Basic .NET, 216, 229

- Access to Archive Data, 216, 229

W

WinCC

- as OPC DA client, 74, 92
- as OPC UA client, 111
- as OPC XML client, 74
- OPC in WinCC, 74, 92, 111, 117

WinCC - Microsoft Excel Connection, 137

- Example of OPC DA, 137

WinCC - OPC HDA client connection, 150

- Example of OPC HDA, 150

WinCC - SIMATIC NET FMS OPC server connection, 129

- Example of OPC DA, 129

WinCC - SIMATIC NET S7 OPC server connection, 132

- Example of OPC DA, 132

WinCC - WinCC connection, 125

- Example of OPC DA, 125

WinCC Archive Connector, 24, 42

WinCC DataConnector, 24

WinCC Explorer-OPC_Client.MPC, 124

WinCC message system

- Attributes, 162, 175
- Configuring access to the WinCC message system, 167
- Mapping WinCC Message Classes and Message Types, 161
- on OPC A&OPC-A&WinCC message system, 160
- WinCC Message Classes on OPC A&E Server, 161

WinCC OLE DB, 41

- basics, 41
- Microsoft, 41
- WinCC, 41

WinCC OLE DB Provider, 24, 40

- Access to Archive Data, 40
- Linked Server, 24
- SQL Server, 24

WinCC OPC A&E server

- Hierarchical access, 170

WinCC OPC UA Server, 184

- configuring, 194
- Discovery Server, 185

WinCC OPC-Server

- Server names, 241

Windows

- Microsoft Message Queuing, 8

