

Platform MX6 / PI

Software option S117

CODESYS OPC UA CLIENT

1 Identification

Identification	
Option identifier	S117
Order number	S-05000318-0000
Short name	CODESYS OPC UA Client
Short description	With the help of this software option it is possible to connect to any OPC UA servers and exchange data with them
Revision identifier document	V1.0

2 System requirements and restrictions

System requirements and restrictions	
Supported platforms or devices	Berghof SPS devices of the MX6 and PI platform (e.g.: MC, CC, DC). Further information regarding availability and compatibility can be found in the product catalog in the options section.
Firmware	MX6-SPS from version 1.27.1, CODESYS from 3.5 SP18 Patch 4 PI-PLC from version 1.3.2, CODESYS from 3.5 SP18 Patch 4
Further requirements	— IP network interface Network access
Restrictions	—

3 Product description

An extension for CODESYS SoftPLC systems for data exchange with OPC UA servers.

The CODESYS OPC UA Client can be used to connect to any OPC UA servers and exchange data with them. The client provides an API to connect to an OPC UA server and execute the different kind of OPC UA requests.

The OPC UA Client API supports the following services:

Discovery:

- GetEndpoints
- FindServers
- FindServersOnNetwork

Session:

- CreateSession
- ActivateSession
- DeleteSession

View:

- Browse
- BrowserNext
- RegisterNodes
- UnregisterNodes
- TranslateBrowsePathsToNodeIds

Attribute:

- Read
- Write
- Subscription:
 - CreateSubscription
 - ModifySubscription
 - SetPublishing
 - Publish
 - DeleteSubscription

MonitoredItems:

The client is able to handle both types of monitored items (event and sampling). The only difference in handling is the callbacks that are called for both types.

- CreateMonitoredItems
- DeleteMonitoredItems
- ModifyMonitoredItems
- SetMonitoringMode

Security:

The OPC UA client uses the existing security related runtime interfaces to handle the encryption algorithms and certificates. The client registers itself to the certificate store for easy configuration of the client certificates.

SecurityProfiles:

- None
- Basic256Sha256 (Sign, Sign_and_Encrypt)
- Aes128_Sha256_RsaOaep
- Aes256_Sha256_RsaPss

User token policy:

- Anonymous
- Username

4 Technical data

Technical data		
UA Features	Profiles	Link
Core	Core 2017 Client Face	http://opcfoundation.org/UA-Profile/Client/Core2017
	Discovery Client Face	http://opcfoundation.org/UA-Profile/Client/Discovery
	AddressSpace Lookup Client Facet	http://opcfoundation.org/UA-Profile/Client/AddressSpaceLookup
	UA-TCP UA-SC UA-Binary	http://opcfoundation.org/UA-Profile/Transport/uatcp-uasc-uabinary
Data Access	Attribute Read Client Facet	http://opcfoundation.org/UA-Profile/Client/AttributeRead
	Attribute Write Client Facet	http://opcfoundation.org/UA-Profile/Client/AttributeWrite
	DataChange Subscriber Client Facet	http://opcfoundation.org/UA-Profile/Client/DataChangeSubscriber
Events	Event Subscriber Client Facet	http://opcfoundation.org/UA-Profile/Client/EventSubscriber
Methods	Method Client Facet	http://opcfoundation.org/UA-Profile/Client/Method
Alarms & Conditions	A & C Base Condition Client Facet	http://opcfoundation.org/UA-Profile/Client/ACBaseCondition
	A & C Refresh2 Client Facet	http://opcfoundation.org/UA-Profile/Client/ACRefresh2
	A & C Enable Client Facet	http://opcfoundation.org/UA-Profile/Client/ACEnable
	A & C Alarm Client Facet	http://opcfoundation.org/UA-Profile/Client/ACAlarm
Historical Access		not yet supported
Redundancy		not yet supported
Security	User Token – Anonymous Facet	http://opcfoundation.org/UA-Profile/Security/UserToken/Anonymous
	User Token – User Name Password Client Facet	http://opcfoundation.org/UA-Profile/Security/UserToken/Client/UserNamePassword
	None	http://opcfoundation.org/UA/SecurityPolicy#None
	SecurityPolicy [B] – Basic256Sha256	http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256
	Aes128-Sha256-RsaOaep	http://opcfoundation.org/UA/SecurityPolicy#Aes128_Sha256_RsaOaep
	Aes256-Sha256- RsaPss	http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss

5 Quick Start Guide

An example for using the API is available in the CODESYS Store: 'OPC UA Client Example'.

<https://store.codesys.com/de/opc-ua-client-example.html>

In addition, it is possible to connect the OPC UA Client to an OPC UA Server within the CODESYS IDE via the "Data Source Manager" object. OPC UA servers can be added online or offline.

Online: Via the IP address, the client connects to the server and recognizes the existing variables and types. The user can select the objects to be searched.

Offline: With the help of a description file, the client reads the variables and types from the information model from the information model. A connection to the server is not required.

Since these are standard CODESYS examples, the devices in the project must be converted to a Berghof IMX or PI device and IP converted if necessary.

5.1 Use of the sample projects

The example 'OPCUA_Client_Example' demonstrates how to use the CODESYS OPC UA Client programmatically. It contains visualizations to access the applied functions via a user interface. The example 'OPCUA_Datasource_Example' demonstrates how a CODESYS OPC UA connection can be set up via data source manager.

1. OPC UA Client Example

The example contains a project with two applications: UAClientDemo and UAServerData.

UAClientDemo contains function blocks for using the CODESYS OPC UA Client.

- You need two Berghof SPS, which are connected via a network.
- UAConnection: To establish the connection to any OPC UA Server
- UABrowse: To send browse requests to an OPC UA Server
- UASubscription: To generate OPC UA subscriptions
- UAMonitoredItem: To monitor OPC UA variables ("Monitored Items")
- UAAttributes: To send read/write commands to the OPC UA Server
- UAClient: bildet den Zustandsautomaten für den OPC UA Client zum Verbindungsauf- und abbau ab und bildet die Grundlage für die Visualisierung
- Visualisierung: Maps the state machine for the OPC UA Client to establish and terminate connections and is the basis for the visualization

UAServerData publishes a data set via the CODESYS OPC UA Server.

2. OPC UA Datasource Example

The example contains two projects OPC_UA_SERVER and OPC_UA_CLIENT with each an application.

In the application of server, Application_DataSource, different values are written in Server_PRG and they are send via symbol configuration.

A data source manager is included to client application to read the data, the received values can be accessed in Main_PRG.

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