

OPC UA User Guide

**OPC UA Server** 

This guide walks through the OPC UA usage in EasyBuilder Pro / Weintek HMI.

V1.00

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#### 1. Overview

OPC UA (Unified Architecture) is a communication technology often used in industrial automation fields. OPC UA features cross-platform interoperability, unified access, standardized communication, and security. In this architecture, cMT Series HMI models with built-in OPC UA server play a key role as Communication Gateway, and allow OPC UA clients to access HMI or PLC data by subscribing to tags to receive real-time updates. This new architecture can help you achieve vertical integration.

Hardware & Software requirements:

- HMI Model: cMT3151
- Software: EasyBuilder Pro V5.05.01 or later
- Recommended OPC UA Client: Unified Automation UaExpert

### Weintek HMI and OPC UA

Toshiba

FATEK

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Schneider

The following is an example of OPC Unified Architecture. In this architecture, the user can run SCADA on cMT-iPC15 as an OPC UA client, and use it to access data in OPC UA Server (implemented on cMT Series models), to receive data updates of the PLCs connected to HMI, regardless of which PLC brand is implemented.





### 2. EasyBuilder Pro Settings

In EasyBuilder Pro, click [IIOT] » [OPC UA Server] to setup OPC UA Server in the project.

#### Server Settings

Firstly and most importantly, OPC UA Server information must be entered. Select [Enable] check box to open OPC UA Server settings dialog box, and enter in Comment and Server Name fields. For the rest, the default settings usually work. Security policy can be configured for the clients to use. EasyBuilder Pro provides system tags related to OPC UA Server, enabling users to monitor the server and give commands.

í		1
	General User Authentication	
OPC UA Server	Comment :	
	OPC TCP	
📝 Enable	opc.tcp:// <hmi ip="">:4840/</hmi>	
	Port : 4840	
	Server name :	
	Security policy : 🔽 None	
	Basic128Rsa15 Sign: Sign & Encrypt	
	Basic 256 Sim: Sim: & Encrypt	
	V Begic 256 Sha 256 Sim & Encrypt	
	► Desicabolisheabo	
	You can use the following OPC UA system tags :	
	LW-11435 (16bit) : OPC UA status (0: Stopped, 1: Started)	
	LW-11436 (16bit) : OPC UA error code (0: Success, 1 or more: Error)	
	LW-11437 (16bit) : OPC UA control command (0: None, 1: Start, 2: Stop)	
	* If timestamp in OPC UA is incorrect, please check your time zone setting in [System Parameter Settings].	
		Exit
	OK Cancel Help	

User Authentication tab is for selecting the authentication method used when the client logs in. Browse, Read, and Write permissions can be granted to anonymous login. The username and password are the same ones as specified in System Parameter Settings » Security tab. When the client logs in using the username and password, the permissions are granted to the security classes specified in System Parameter Settings.



	OPC UA Server	
	General User Authentication	
OPC UA Server	Methods Anonymous	
😨 Enable	Browse     Read     Write     User name & password	
	Browse class : Class : A Read class : Class : A Write class : Class : A * Edit user accounts in [Security] of [System Parameter Settings].	
		Exit

## Tag

After setting OPC UA Server, go to Tag settings. The client program can use the tags to monitor and control OPC UA Server. As shown in the following screenshot, LB-0 is a readable and writable bit address while LB-1 is a readable bit address. Similarly, LW-0 is a readable and writable word address while LW-1 is a readable word address. The addresses that can be monitored and controlled are not limited to Local HMI addresses; PLC addresses can be added as well.

OPC UA Server	
✓ Enable Server Settings Tag	
Local HMI     Tags     LB-0write     LB-1read     LW-1read     MODBUS RTU     Tags     MODBUS 0x-1     MODBUS 3x-1	New group New Tag Delete Settings
	Exit

3



×

OK

### **Downloading Project**

When downloading the project file to HMI, please make sure that the HMI time and time-zone settings are correct. Otherwise, the client program may not be able to authenticate, and the communication may fail due to authentication error caused by incorrect certificate valid time. If this happens, the only solution would be restoring HMI settings to default.

## 3. OPC UA Client

## Unified Automation UaExpert Download Link

At the first time using this client software, please follow these settings steps:

1. Click OK to create an application instance certificate to identify your installation.

Welcome to the UaExpert Initial Application Setup

(j

When starting UaExpert for the first time, you have to create an application instance certificate to identify your installation. This is needed to use OPC Unified Architecture security. UA security allows you to authenticate your application as well as to use encryption and digital signatures to protect your communication.

Press OK to generate your personal X.509 application instance certificate and the corresponding RSA keys.

#### 2. Fill in Organization and Organization Unit.

Kew Application Instance Certificate						
	Subject:					
	Common Name:	UaExpert@MAO-LAPTOP	1			
	Organization:	ORG	1			
	Organization Unit:	OU	<b>V</b>			
	Locality:		**			

And then, connect to OPC UA Server.

1. Click [Server] » [Add] to add the server.

4



💹 Unified Automation UaExpert - The OPC Unified Architecture Client - NewProject											
File	View	Ser	ver Document	Set	tings	Help	)				
	0	•	Add		0	$\otimes$	2	2		N	
Project		-	Remove						ā	ΡX	Data Acc
4	Projec	0	Connect							 	#
	🗂 Se	$\times$	Disconnect								
4	D Do	2	Properties								
		2	Change User								

2. Double click on [Double click to Add Server], and enter the OPC UA Server URL. The IP address is the HMI IP address.

🚟 Add Server	? ×	
Configuration Name Discovery Advanced Endpoint Filter: No Filter Local	•	
<ul> <li>Local Network</li> <li>Microsoft Terminal Services</li> <li>Microsoft Windows Network</li> <li>Web Client Network</li> <li>Custom Discovery</li> </ul>	Enter Url Enter the Url of a com	nputer with discovery service running:
<ul> <li>Couble click to Add Server &gt;</li> <li>Recently Used</li> </ul>	opc.tcp://192.1682.	50:48404 OK Cancel

3. OPC UA Server information shows, in this tab, authentication methods can be specified.



Mdd Server	8 23
Configuration Name JaServer@cMT-4B20 - None - None (uat	p-uasc-uabinary)
Discovery Advanced	
Enderside Eller	
Enapoint Futer: No Futer	
	<u>^</u>
Local Network	
Microsoft lerminal Services	
Wale Client Naturals	
Clusterin Discovery	=
A Operter://192.168.2.50:4840/	
UaServer@cMT-4B20 (opc.tcp)	
📲 None - None (uatcp-uasc-uabin	ary)
Basic128Rsa15 - Sign (uatcp-uas	c-uabinar
Basic128Rsa15 - Sign & Encrypt	(uatcp-ua:
🔒 Basic256 - Sign (uatcp-uasc-uab	inary)
Basic256 - Sign & Encrypt (uatcp	-uasc-uak 👻
<	•
-Authentication Settings	
Anonymous	
Password	Store
Certificate	
Private Key	
Connect Automatically	
OK	Cancel

4. When the following message window shows, click [Yes].



5. Click the right mouse button and then click [Connect] to connect with OPC UA Server.



🔡 Unified Automation UaExpert - The OPC Unified Architecture Client - NewProject*															
File	View	/ Sei	rver	Docur	nent	Sett	ings	Help	0						
	Ø	Ð	Ø	0	•		$\langle \rangle$	×	2				X	9	
Project												ſ	5 ×	Data A	.ccess Viev
4 🚺	Project     Servers     Servers														
	_ [	🚴 Ua	Serve	r@cMT	-4B20	) - No	ne - N	lone	(uatcp	)-uasc		R	emo	ve	
4		Docun 🗊 Da	nents ta Aco	cess Vie	w						2	C	onne	ect	
											$\otimes$	( D	iscor	nnect	
Noper-									rties						
	🙎 Change										je User				

6. Select "Trust Server Certificate" and click [Continue], and finish the settings.

🧮 Certificate Validation				×				
Validating the certification	e of server 'UaServer@cMT-6F62' returned an error:							
BadCertificateUnt								
Certificate Chain								
Name	Trust Status							
A UaServer@cMT-6	F62 Untrusted							
Certificate Details								
Subject				^				
Common Name	UaServer@cMT-6F62							
Organization	Organization							
OrganizationUnit	Unit							
Locality	LocationName							
State								
Country	DE							
DomainComponent	cMT-6F62							
Issuer								
Common Name	UaServer@cMT-6F62							
Organization	Organization							
OrganizationUnit	Unit							
Locality	LocationName							
State								
Country	DE							
DomainComponent	cMT-6F62							
Validity								
Valid From	Fri Jun 3 17:39:09 2016							
Valid To	Wed Jun 2 17:39:09 2021							
Info								
Serial Number	5752151D							
Signature Algorithm	RSA-SHA256							
Cipher Strength	RSA (2048 bit)							
Thumbprint (SHA1)	417AFF6C0D1C82B2395593DD9BC08EC37D0CC673			. v 🗌				
		Trust Serve	r Certific	ate				
Accept the server certificat	e temporarily for this session	Continue	Cance	el				

### 4. Accessing OPC UA Server Data

When the connection settings are completed, address information can be found in Address Space field. HMI parameters are in HMI Info folder, and user-defined tags



are in Tags folder. By dragging a tag to the Data Access View filed, the details on the tag can be viewed, and its value can be changed, as long as it's a writeable address, such as LB-0 and LW-0 mentioned earlier. The value of addresses that are only readable, such as LB-1 and LW-1, cannot be changed.

Unified Automation UaExpert - The OPC Unified Architecture Client - NewProject*									• 🔀	
File View Server Document Settings Help										
Project 🗗 🛪	: Data Access View						Attributes			
🔺 🇊 Project 🔺	#	Server	Node Id	Display Name	Value	Datatype	😏 🧹 💺		0	
▲ 💭 Servers 📰	1	UaServer@cM	NS2 String Loc	LB-Owrite	false	Boolean	Attribute	Value	*	
UaServer@cMT-4B20 - I	3	UaServer@cM	NS2 String Loc	LW-Owrite	0	UInt16	▲ Nodeld	NodeId		
A Documents	4	UaServer@cM UaServer@cM	NS2 String Loc NS2 String MO	LW-1read MODBUS 0x-1	false false	Boolean Boolean	NamespaceIndex	2	E	
4	6	UaServer@cM	NS2 String MO	MODBUS 3x-1	0	UInt16	IdentifierType	String		
Address Space 🗗 🗙							Identifier	MODBUS RTU.Tags.MODBUS 3x-1		
😏 No Highlight 👻							NodeClass	Variable		
Cot Root							BrowseName	2, "MODBUS 3x-1"		
Objects							DisplayName	"", "MODBUS 3x-1"		
4 🛅 Local HMI							Description	,		
HMI Info							WriteMask	0	-	
🔺 🚞 Tags							References		đ×	
LB-Owrite							📀 🥪 📇 🏟 Forward 💌		0	
LB-1read								unles Minune	-	
LW-Owrite							Reference larger bis	playivame		
EW-Iread							Has typeDetini BaseData	variable lype		
MODBUS 0v-1										
> Server										
Views	•					4				

#### 5. References

OPC UA Security-How It Works:

https://opcfoundation.org/wp-content/uploads/2014/08/11 OPC UA Security How

It Works.pdf

OPC Support General Information:

https://wikis.web.cern.ch/wikis/display/EN/General+Information