

OPC UA Server Setup Overview

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For use with the following:

- cMT Series
- EZwarePlus

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Overview

OPC UA [Open Platform Communications Unified Architecture] is a machine to machine communication protocol designed for use in the Industrial Automation industry. OPC UA features cross-platform interoperability, unified access, standardized communication, and security. In this environment, the cMT series with a built-in OPC UA server plays a key role as a Communication Gateway allowing OPC UA clients to access HMI or PLC data by subscribing to tags to receive real-time updates.

Hardware & Software requirements:

- HMI Model: cMT5151 or cMT-SVR (Note: A one-time license fee is required for each cMT-SVR)
- Software: EZwarePlus V5.05.01 or later
- Recommended OPC UA Client: Indusoft Web Studio

Maple Systems HMIs and OPC UA

In the following example of an OPC Unified Architecture, we are running Indusoft Web Studio as our SCADA software on a Maple System Light Industrial Panel PC. The Panel PC is the OPC UA client and is used to access data in the OPC UA Server, running on a cMT5151, to receive data updates from any of the PLCs connected to cMT5151. No additional Web Studio drivers required.



EZwarePlus Settings

In an EZwarePlus cMT5151 project, from the top menu bar select **IIoT -> OPC UA Server** to open the OPC UA Server options.

Server Settings

Select the **Enable** check box to open the OPC UA Server settings dialog box. Enter a name for your OPC UA Server into the **Comment** field. You may leave the rest of the settings at their defaults. EZwarePlus provides the relevant system tags needed to monitor and control the server in the dialog box.

	OPC UA Server	7
	General User Authentication	
	Comment : dMT5151 OPC UA Server	
OPC UA Server	OPC TCP	
	opc.tcp:// <hmi ip="">:4840/</hmi>	
Enable	Port: 4840	
	Server name :	
	Security policy : 📝 None	
	✓ Basic128Rsa15 Sign; Sign & Encrypt ▼	
	✓ Basic256 Sign: Sign & Encrypt ▼	
	V Basic 256Sha 256	
	You can use the following OPC UA system tags :	
	LW-11435 (16bit) : OPC UA status (0: stopped, 1: running)	
	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].	
		5 .*
		Exit
	OK Cancel Help	

The **User Authentication** tab is used to select an authentication method when the client logs in. Browse, Read, and Write permissions can be granted to Anonymous logins or restricted to users with a username and password. Usernames and passwords are specified on the **Security** tab of the **System Parameter Settings** (from the top menu bar select **Edit -> System Parameters...**). These settings apply globally to all tags available to the OPC UA client. Access can also be restricted at the individual tag level when adding tags to the server as described below. Click **OK** to create the OPC UA Server.

	OPC UA Server	0
	General User Authentication	
OPC UA Server	General User Authentication Methods Methods Anonymous Browse Read Write Wire User name & password Browse class : Class : A Read class : Class : A Write class : Class : A Write class : Class : A * Edit user accounts in [Security] of [System Parameter Settings].	
	OK Cancel Help	Exit

Creating Tags

Once the OPC UA Server has been created, tags can be added. The client program can browse these tags to monitor and control the automation system through the OPC UA Server. Click the **New Tag** button to specify a new address to add to the OPC UA server. The **New group** button is used to create a new node in the tag list under which tags can be added. The structure of the tag list created here will be visible when configuring the OPC UA client.

As shown in the following screenshot, Mixer Status is configured as readable bit address while Mixer Start_Stop is both a readable and writable bit address. Similarly, Last Alarm and Current Alarm are readable only word addresses underneath the Alarms grouping. 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		
Settings	New Tag	
Tag Local HMI Tags	Name : Mixer Status Type Bit Address PLC : Local HMI Address : LB Image: Comparison of the status Type Image: Comparison of the status OK Cancel	New group New Tag Delete Settings
		Exit

OPC UA Server	ettings 53 Name : Mixer Start_Stop Type Image: Type Image: Bit Word Address PLC : Local HMI V Settings Address : LB Image:	New group New Tag Delete Settings
	Type	Exit

OPC UA Server		
Enable Server Settings Tag Local HMI Tags Mixer Start_Sty Mixer Status	oup 23 Old name : New name : Alarms OK Cancel	New group New Tag Delete Settings
		Exit



Downloading the Project

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

stem Param	eter Setti	ngs							23
Device	Model	General	System Se	etting	Security	Non-ASCII	Fonts	Font Mappi	ng
Extended	d Memory	Time Syn	ic./DST	e-M	ail	Recipes	Cellula	ar Data Network	¢
	Enable tim	HMI time zone : e synchronization	(UTC-08:(00) : Pacif	ic Standard 1	Time server		-	
V	Automatica Start : (End : (ally set daylight sa March November	aving time (I Sec Firs	DST) ond	▼ Sunday ▼ Sunday	/ • / •	02:00 /	am ¢	
		Daylight	: bias : 01-0	0 1 0	0:30 ~ 12:0))			
* HMI er * Use LV * DST is	nters into D V-11260 ~ not suppor	ST period when L 11272 to modify : ted in on-line simu	B-12355 (re settings on H	ad only) is	s ON.	~			
				OK		Cancel		Helo	

OPC UA Client

Indusoft Web Studio

Web Studio can be run on any of Maple System's Light or Heavy Industrial Panel PCs. If you are new to Web Studio you can download the development software here:

Download Link

Web Studio will run as a full unlocked version for 40 hours before it must be licensed.

Web Studio has a long history of providing support for OPC UA and, before that OPC. You can find a number of videos and documents on the Indusoft website on how to sett up OPC UA clients and servers:

http://www.indusoft.com/Marketing/Article/PID/684/CategoryID/127/CategoryName/OP C

This overview will walk you through creating a simple Web Studio test project to act as an OPC UA client and connect to the cMT project created in EZwarePlus as described above.

Web Studio Project Set Up

Before setting up the Web Studio project, the EZwarePlus project must be downloaded to the cMT5151 and running. The cMT5151 must be accessible on the same Local Area Network (LAN) as the machine running the Web Studio development tools to ensure that the tags created on the cMT5151 can be discovered by the Web Studio application.

ew				_	2
Project	Create	new Project with	the specified settings		
rine -	Project name:				
	OPC_UA_Client_	Example			
	Location:				
	C:\Users\	\Documents\Wo	nderware InduSoft Web Studio v8.0 Proj	ects\	Browse
	Configuration file:				
	C:\Users'	\Documents\Wo	nderware InduSoft Web Studio v8.0 Proj	ects\OPC_UA_0	Client_Exam
	Target platform*:	(All)	-		
	Product type*:	5.5			
	Windows Advant Windows Advant Windows Contro Windows Contro	ced Server Plus ced Server I Room I Room Lite	Windows Operator Workstation Plus Windows Operator Workstation Embedded Professional Windows Local Interface	Embedded Sta Windows Lite Embedded Lite Windows Lite	andard Interface P e Plus Interface
	٠	m			•
	Professional for	Windows Embedde	ed (4000 tags)		
	*Select Windows platform for Windo Windows Mobile, *You can modify t	target platform for ows Embedded and Linux, VxWorks, et he target platform a	Windows Server/Desktop projects. Sele d IoTView projects (Windows Embedded tc.). and product type after creating the proje	ct Embedded ta Compact (Wind ct by using the I	rget Jows CE), Project tab.
				01	

Create a new Web Studio project. To configure the OPC UA client click on the communication tab at the bottom of the project explorer window:



Expand the OPC UA folder in the project tree and right click on the **Connections** folder to insert a new connection:

Project Explorer			
Project: OPC_UA_C Drivers OPC DA 2.05 OPC UA OPC UA Connection Redundanc TCP/IP	lient_Example.APP		
-	Server Configuration		
	Connection Name:		
	Settings		
	End point:		
	User Name:		
	Password:		
	Time out: 100) ms	Security
			Advanced
	Test Connection		OK Cancel

In the Server Configuration window enter the Connection Name and End point. The End point should match the entry under OPC TCP in the OPC UA Server settings window in EZwarePlus with the cMT5151's actual IP address replacing the <HMI IP> field:

	OPC UA Server
Server Configuration	General User Authentication
Connection Name: cMT5151 OPC UA Server	Comment : dMT5151 OPC UA Server
Settings	OPC TCP
End point. opc.tcp.//132.168.100.100.4840/cM15151	ope. up.//<
User Name:	Port: 4840
Password:	Server name : CMT5151
Time out: 1000 ms Security	Security policy : 🔽 None
Advanced	✓ Basic128Rsa15 Sign; Sign & Encrypt
/ WYGHOOD	Basic256 Sign & Encrypt V
Test Connection OK Cancel	Basir 256Sha256 Cione Size & Engruet
	You can use the following OPC UA system tags :
	LW-11435 (16bit) : OPC UA status (0: stopped, 1: running)
	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].
	OK Cancel Help

If anonymous access is restricted, a **User Name** and **Password** must be entered that matches one of the accounts set up in the security tab of the System Parameter Settings window in EZwarePlus (**Edit > System Parameters... > Security**). If anonymous access is unrestricted, make sure that write access is allowed in the OPC Server settings in EZwarePlus. Once the End point is entered, the **Test Connection** button can be used to check the connection to the cMT5151:



Click OK to exit the Server Configuration window.

The cMT5151 connection should now be listed under the Connections folder in the project tree:



Right click on the **OPC UA** folder in the project tree and select **Insert** from the context menu. This will open an OPC UA client driver sheet:

Project Explorer 4	× VACL002.UA ×			
Project: OPC_UA_Client_Example.APP Drivers OPC_DA 2.05	Description:			
OPC UA	Connection:	•	Advanced	
CMT5151 OPC UA Server Redundancy Group CMT 1:	Status:	Status Message:		
TCP/IP	Publish rate (ms):	Disable:		
	Root node or view:			
	Root node or view: Tag Name	Browse Path	 Scan	
	Root node or view: Tag Name & Filter text	Browse Path	 Scan	Ŧ
	Root node or view: Tag Name Filter text	Browse Path	 Scan Q. (All) Always	v
	Root node or view: Tag Name Filter text *	Browse Path	 Scan Q. (All) Always Always	v v
	Root node or view: Tag Name Second Second	Browse Path	Scan Scan (All) Always Always Always	v v v
	Root node or view: Tag Name Second Second	Browse Path	 Scan G (All) Always Always Always Always	T T T T

Select the cMT5151 entry from the **Connection** dropdown list.

In **Tag Name** column of the driver sheet, enter a tag name to use for the first tag. This is the name of the tag in the Web Studio project. If no tag with the entered name exists, a popup window will allow a new tag to be created. Make sure the tag's data type matches the data type of the tag in EZwarePlus.

	New Tag	×
	Name:	Mixer_Status
Question Tag 'Mixer_Status' does not exist.	Type:	Boolean
Would you like to create this tag ?	Scope:	Server
<u>Y</u> es <u>N</u> o		OK Cancel

Double click in the **Browse Path** column of the driver sheet. A browser window will appear. The tag will be located under the **Objects > Local HMI > Tags** folder. Any other groups created on the HMI will be available under the **Objects** folder as well as tags containing information about the HMI:

K UA Browser	x
UA Server(Root) Views Cobjects Cobjects Cocal HMI Coca	
Selected Item: /0:Objects/2:Local HMI/2:Tags/2:Mixer Status	
Element Type: Variable Data Type: Boolean	
Node Id: ns=2;s=Local HMI.Tags.Mixer Status	
Value: false	
Array Element:	OK Cancel

Select the desired tag and click **OK**. The selected path will be added to the driver sheet. Repeat this process until all desired tags are added to the driver sheet.

	Tag Name	Browse Path	Scan		Div	Add	Node Id
	🔍 Filter text	🔍 Filter text	🔍 (All)	Ŧ	🔍 Filter text	🔍 Filter text	🔍 Filter text
1	Mixer_Status	/0:Objects/2:Local HMI/2:Tags/2:Mixer Status	Always	Ŧ			ns=2;s=Local HMI.Tags.Mixer Status
2	Mixer_Start_Stop	/0:Objects/2:Local HMI/2:Tags/2:Mixer Start_Stop	Always	Ŧ			ns=2;s=Local HMI.Tags.Mixer Start_Stop
3	Current_Alarm	/0:Objects/2:Local HMI/2:Tags/2:Alarms/2:Current Alarm	Always	Ŧ			ns=2;s=Local HMI.Tags.Alarms.CurrentAlarm
4	Last_Alarm	/0:Objects/2:Local HMI/2:Tags/2:Alarms/2:LastAlarm	Always	Ŧ			ns=2;s=Local HMI.Tags.Alarms.LastAlarm
*			Always	Ŧ			

Now these tags may be used in the Web Studio project. A simple test screen can be created and run on the PC to connect to the cMT5151.

Licensing a cMT-SVR

To use the OPC UA Server feature on a cMT-SVR, you must purchase a license for every cMT-SVR that you plan to use. This is a one-time purchase that is valid for the life of the product.

Note: the cMT5151 includes the OPC UA Server and does not require an additional license.

To purchase the license, please contact Maple Systems sales support at 1-425-745-3229 or email us at <u>sales@maplesystems.com</u>.

After you have purchased an OPC UA license, you will receive a document from Maple Systems that contains the license serial number and activation code. You must download this information to the target cMT-SVR using EZwarePlus, in order to activate the license.

Steps to activate OPC UA Server license on a cMT-SVR:

- Get the document you received from Maple Systems which contains the license serial number and activation code.
 Example: Product Name: cMT-SVR
 License Serial: OPCAxxxxxx
 Activation code: 1234-1234-1234
- 2. Retrieve the Hardware key from the cMT-SVR. To do this, connect your cMT-SVR to your computer via Ethernet connection and start your web browser.
- Type http://<HMI IP Address>/ into the URL address bar. Note: default IP address on the Ethernet2 port is 192.168.100.1. For more information on how to configure the cMT-SVR, please consult the cMT Quick Start Guide (P/N 10101026).
- 4. The Hardware key is located on the EasyAccess 2.0 page:

CloudHMI Server ×	
192. 168. 100. 1/web_ihmi/RA.php	▼ C 🗧 🗸 Google 👂 🏠 🗎 🗮
<u> </u>	identity: System Setting
🕞 Network	EasyAccess 2.0
🕒 Date/Time	Fact/Access 2.0. Provid
🖉 HMI Name	
📄 History	Account: Account
🔈 Email	Password: Password
Project Management	Hardware key: HJMJIEAY-4BGK-VPNJ-CKNU-YDYP-EHTB5HLN
🔒 System Password	Detect activation status
Enhanced Security	
¹⁴ & EasyAccess 2.0	

5. Go to <u>https://account.ihmi.net/opcua/activate.php</u> to activate:

	V.	
Hardware	key:	
Activation	Code:	
	Activate	

6. Type in the Hardware Key and the Activation Code. Then click the **Activate** button.

Hardwa	re Key:
	AA-AAAA-AAAA-AAAA-AAAAAAAAAA
Activati	on Code:
P6BK-QR	MS-4TXT-3LCY

7. A confirmation window displays with the information above listed. If the information is accurate, click the **Yes, activate** button. Note: Once this step is completed, the activation cannot be undone.

Pleas Once the act	e confirm the ivation code is	imformation be used. it canno	low. t be undone
Hardware Key: Activation Code:	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	AA-AAAA-AAAA-AA	AAAAAAAAA
	NO, go back	Yes, activate	

8. The cMT-SVR identified by the hardware key is now activated but to use the OPC UA feature on the cMT-SVR, you must now download the license key "opcua.lic" file to the cMT. Therefore, click the **Download License Key** button to save the opcua.lic file:

The license k	ey for you HMI can be download below.
Hardware Key:	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
Activation Code:	P6BK-QRMS-4TXT-3LCY
Status:	Activated
	Download License Key

Note: The license key is non-transferrable and valid only for the cMT-SVR bearing this hardware key.

9. Your browser might block your download because of a new pop-up window. If so, follow the browser's instruction to allow 'account.ihmi.net' to show pop-ups, so that you can download this file. For example, if using Google Chrome, simply click the icon on the right of the URL address bar, and then click the blue link from the dialog:



- 10. Now you can transfer the opcua.lic license file to the cMT-SVR using EZwarePlus.
 - a. Start EZwarePlus and open your cMT-SVR project.
 - b. Click **Tools->Download** to display the Download window.
 - c. Check the Use OPC UA license option and link to the opcua.lic file you downloaded:

Download	AP 12 LA LA	X
Ethernet	Password/Port no.	of download/upload : Settings
4 IP HMI Name		4
IP : 192.16	8.100.1 👻	
		<u>windts my in z</u>
Use OPC UA license	C: \MapleSystems \EZPlus \BACKUP \opcua.lic	
Reset recipe	Reset event log	Reset data sampling
Reset recipe database	Reset operation log	
Automatically using current setti	ngs to download after compiling	

Click the **Download** button.

You can now enjoy the features of OPC UA Server on your cMT-SVR. If you lose your opcua.lic file, you can go back to the activation website page (<u>https://account.ihmi.net/opcua/activate.php</u>) enter the hardware key and activation code, then download the license key again.

If you are experiencing difficulties getting the OPC UA Server to operate, the HMI may not be activated. You can verify by placing a Numeric Display object on one of your cMT-SVR project screens that is targeted to LW-11436. Then download the project to the cMT-SVR and read the value. If the value is 2, then the OPC UA Server feature is not activated. If so, verify that the license key file has the same hardware key as the cMT-SVR. Try downloading the license key file again. If the OS of the cMT-SVR has been updated, the license key file may need to be downloaded to the cMT again.

If you are still experiencing difficulties, please call us or send an email to <u>support@maplesystems.com</u>.

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

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