OPC UA Server
Setup Overview

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.
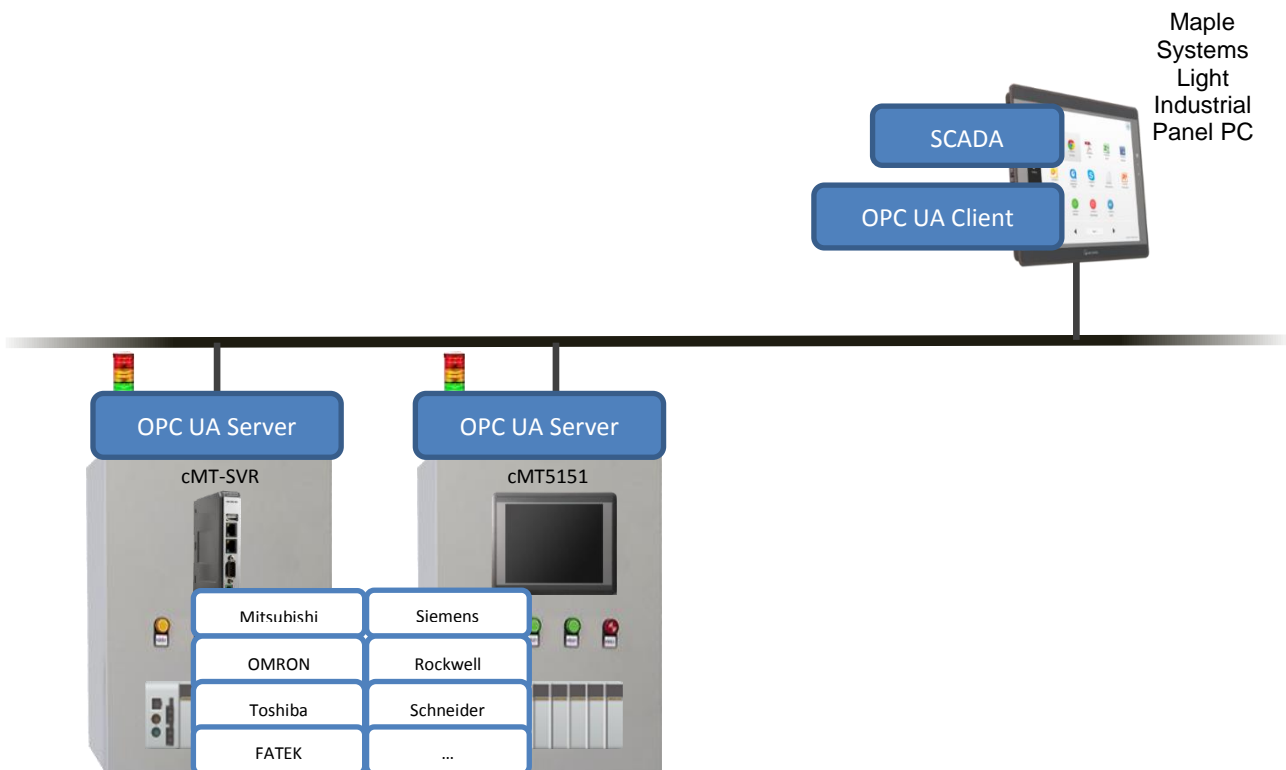
EZwarePlus Settings

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.
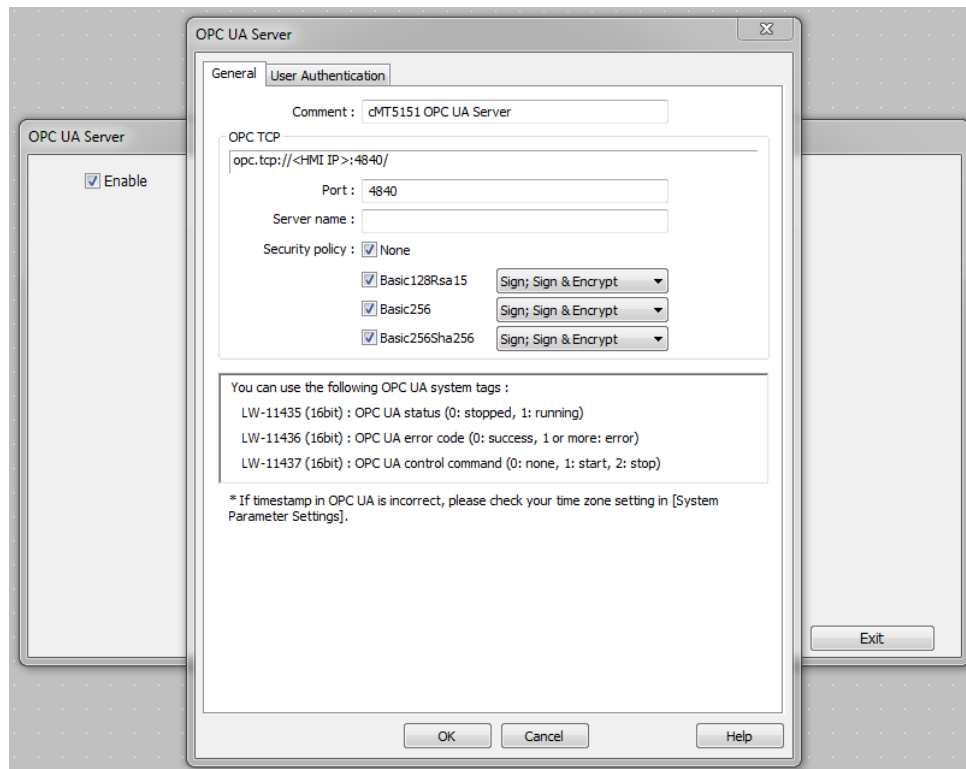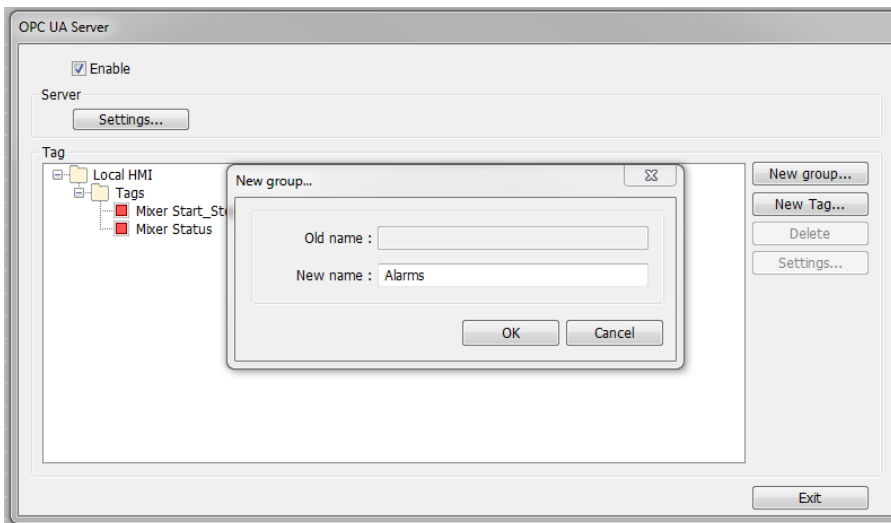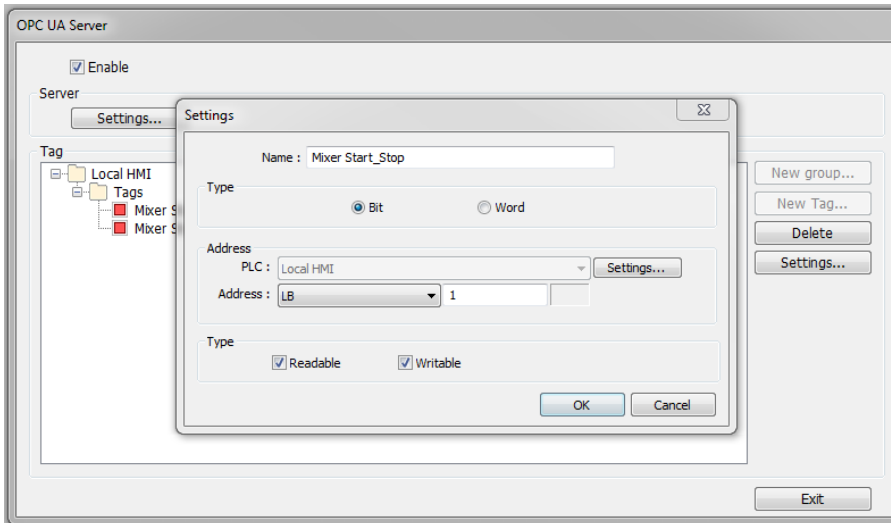

The **User Authentication** tab is used to select an authentication method when the client logs in. Browse, Read, and Write permissions can be granted to Anonymous logins or restricted to users with a username and password. Usernames and passwords are specified on the **Security** tab of the **System 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.
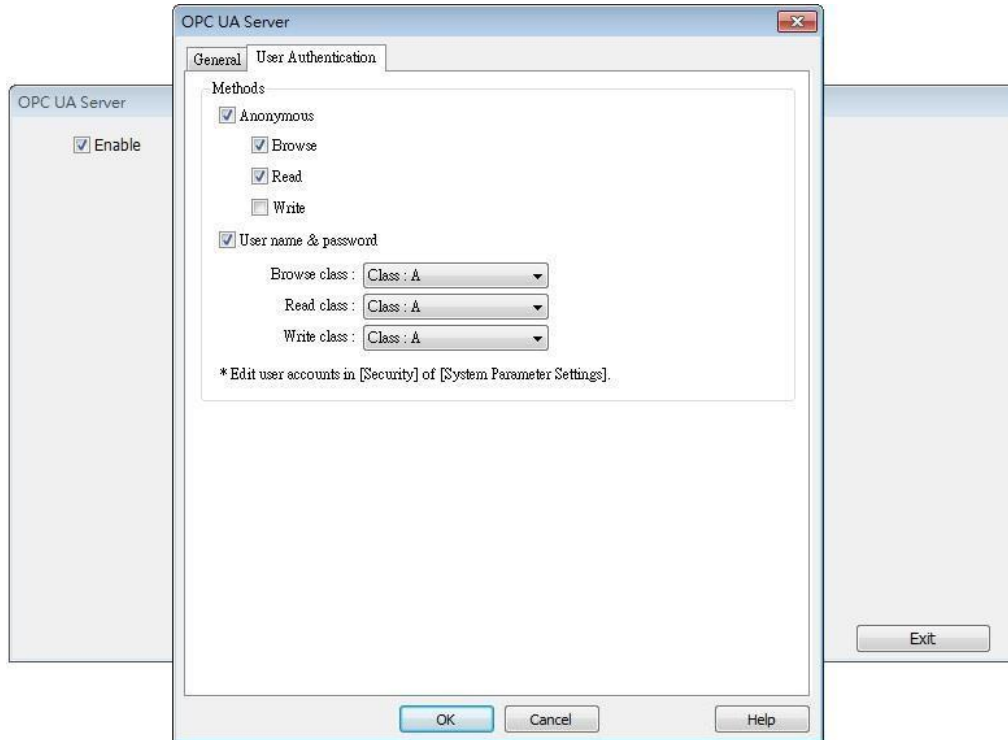
Creating Tags

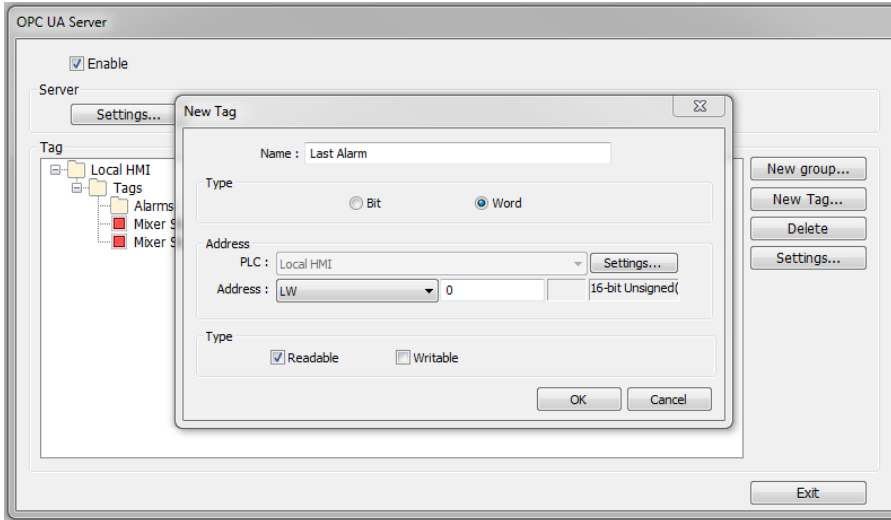Once the OPC UA Server has been created, tags can be added. The client program can browse these tags to monitor and control the automation system through the OPC UA Server. Click the **New Tag** button to specify a new address to add to the OPC UA server. The **New group** button is used to create a 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

☑ Enable

Server

Settings...

Tag

☐ Local HMI
   ☐ Tags

New Tag

Name : Mixer Status

Type

◉ Bit   ○ Word

Address

PLC : Local HMI   Settings...

Address : LB   0

Type

☑ Readable   ☐ Writable

OK   Cancel

New group...
New Tag...
Delete
Settings...

Exit

OPC UA Server

☑ Enable

Server

Settings...

Tag

☐ Local HMI
   ☐ Tags
      ☐ Mixer S
      ☐ Mixer S

Settings

Name : Mixer Start_Stop

Type

◉ Bit   ○ Word

Address

PLC : Local HMI   Settings...

Address : LB   1

Type

☑ Readable   ☑ Writable

OK   Cancel

New group...
New Tag...
Delete
Settings...

Exit

OPC UA Server

☑ Enable

Server

Settings...

Tag

☐ Local HMI
   ☐ Tags
      ☐ Mixer Start_St
      ☐ Mixer Status

New group...

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.
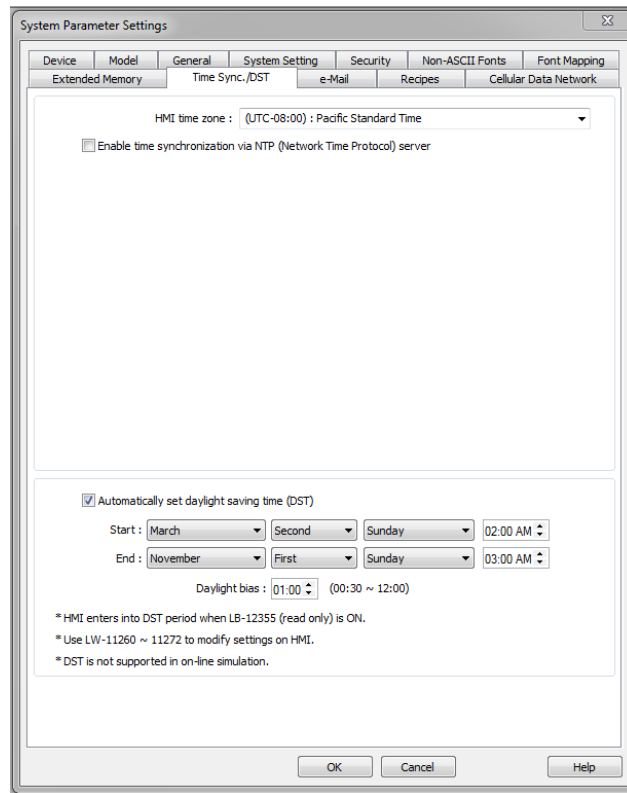
OPC UA Client

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/OPC

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.
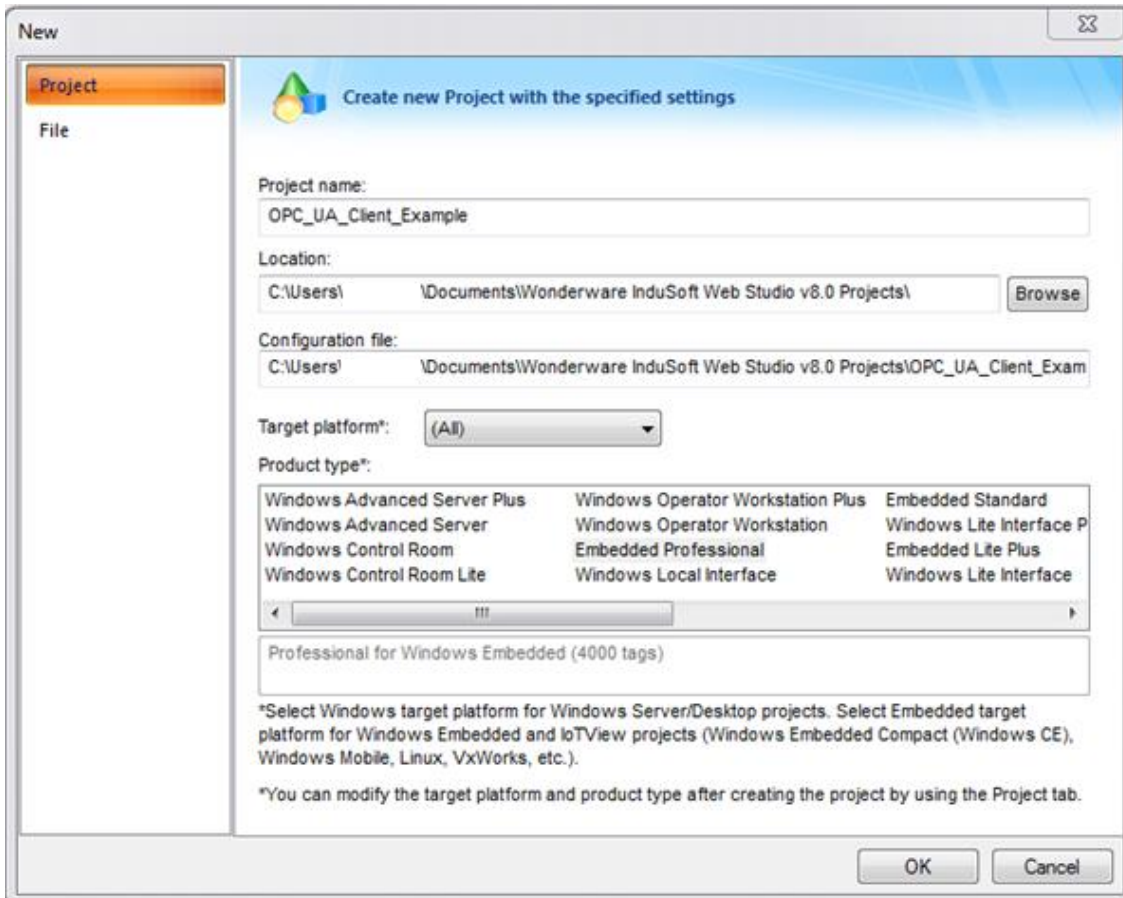

Create a new Web Studio project. To configure the OPC UA client click on the communication tab at the bottom of the project explorer window:
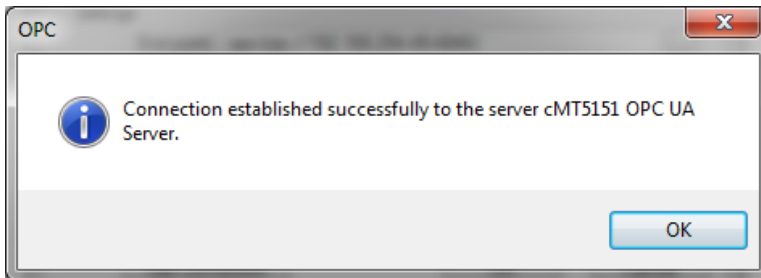

Expand the OPC UA folder in the project tree and right click on the **Connections** folder to insert a new connection:
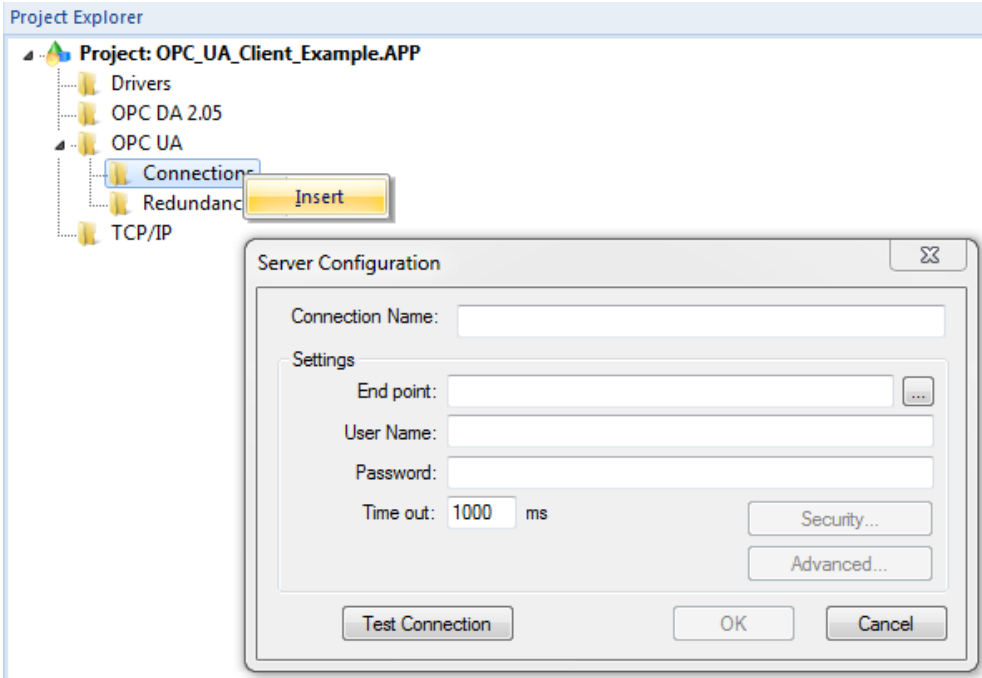
In the **Server Configuration** window enter the **Connection Name** and **End point**. The **End point** should match the entry under **OPC TCP** in the **OPC UA Server** settings window in EZwarePlus with the cMT5151's actual IP address replacing the **<HMI IP>** field:
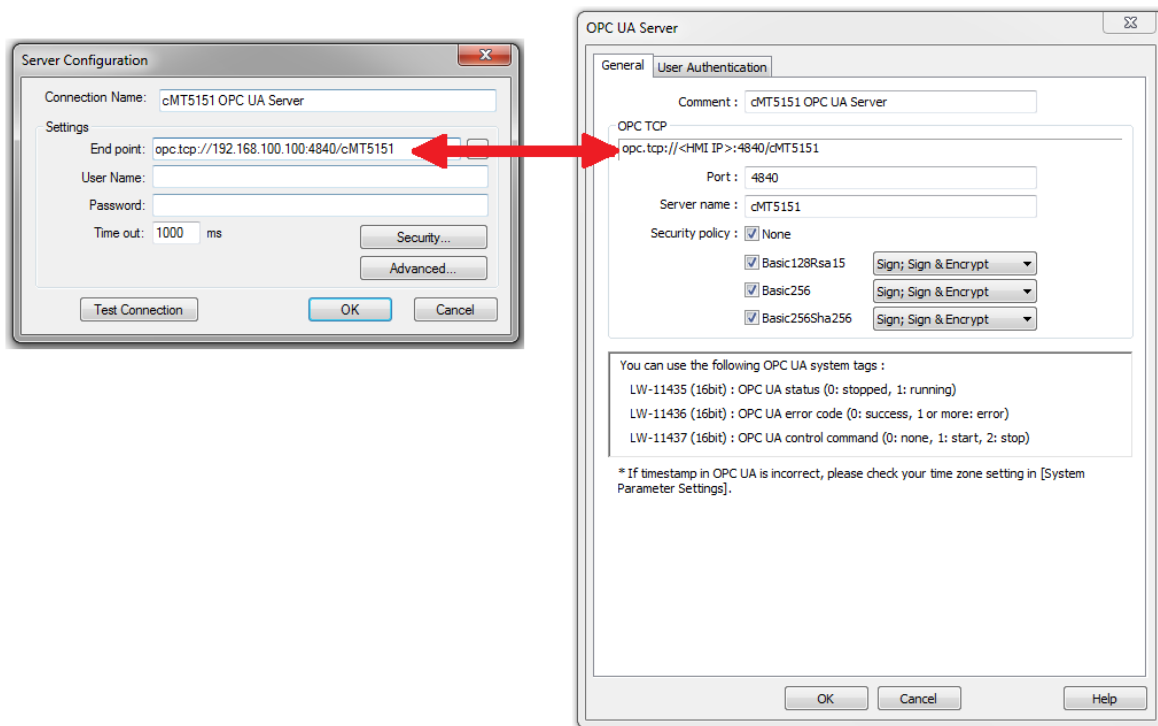
If anonymous access is restricted, a **User Name** and **Password** must be entered that matches one of the accounts set up in the security tab of the System Parameter Settings window in EZwarePlus (**Edit > System Parameters… > Security**). If anonymous access is unrestricted, make sure that write access 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:
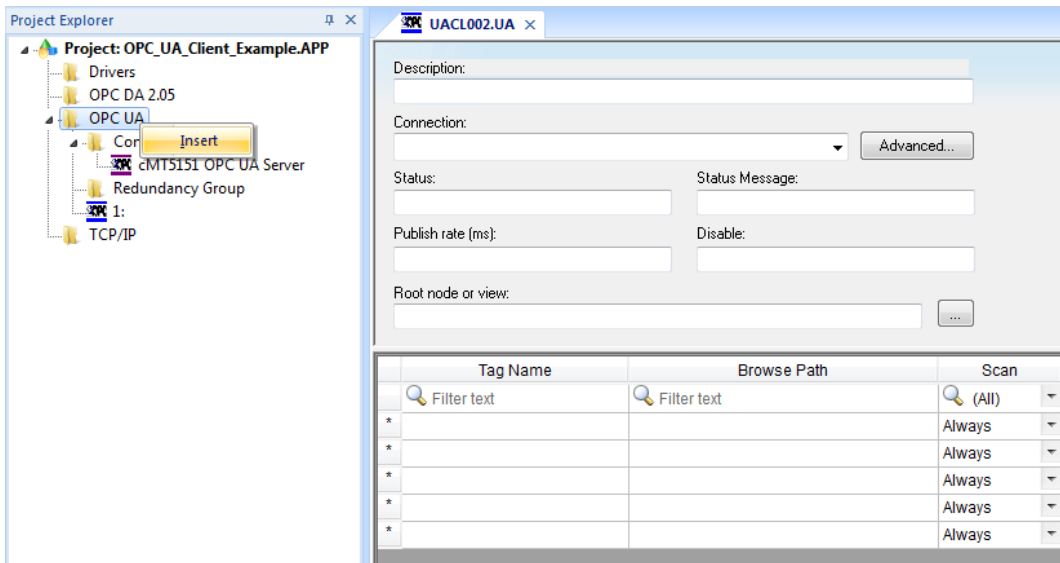

Click OK to exit the **Server Configuration** window.

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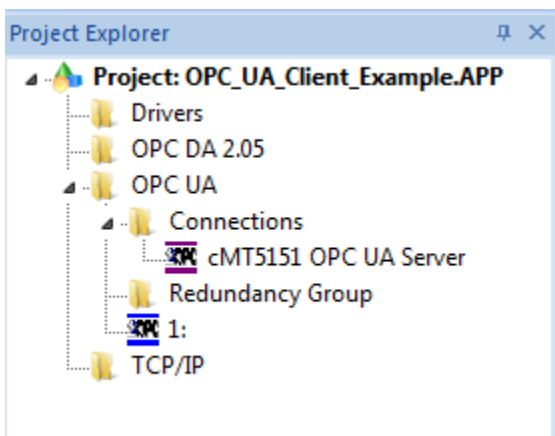

Right click on the **OPC UA** folder in the project tree and select **Insert** from the context menu. This will open an OPC UA client driver sheet:

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.
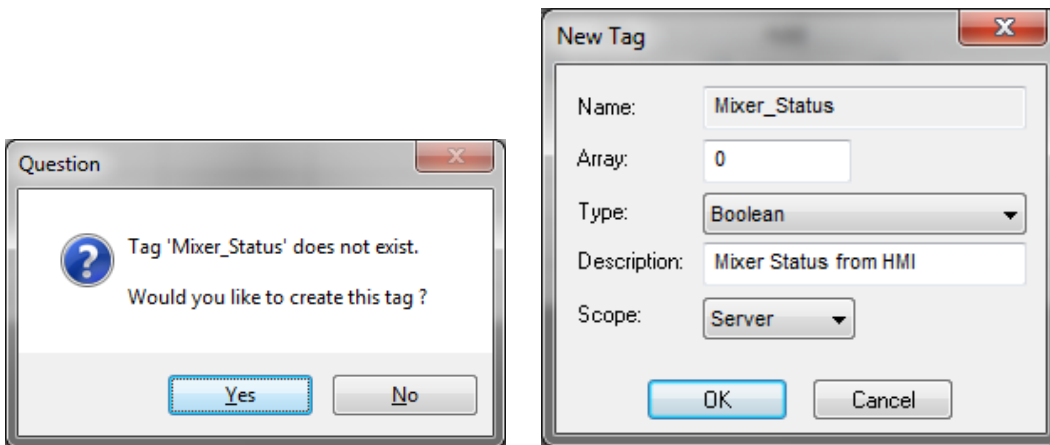
Double click in the **Browse Path** column of the driver sheet. A browser window will appear. The tag will be located under the **Objects > Local HMI > Tags** folder. Any other groups created on the HMI will be available under the **Objects** folder as well as tags containing information about the HMI:
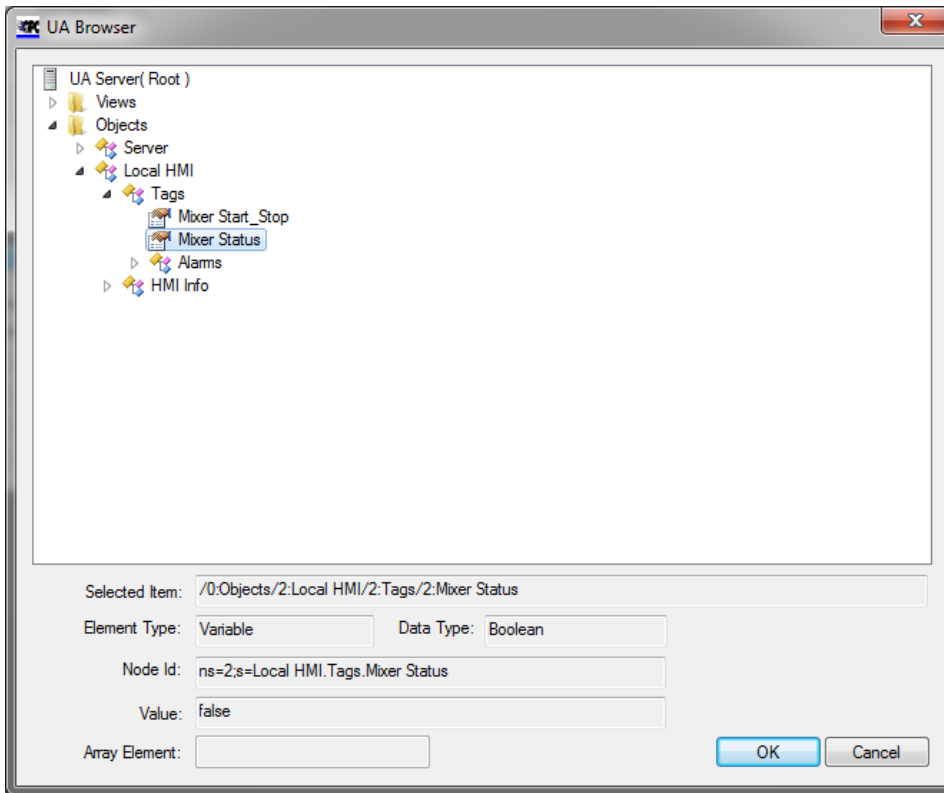
Select the desired tag and click **OK**. The selected path will be added to the driver sheet. Repeat this process until all desired tags are added to the driver sheet.

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

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 sales@maplesystems.com.
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:
1. 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: 1234-1234-1234-1234
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.
3. 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:
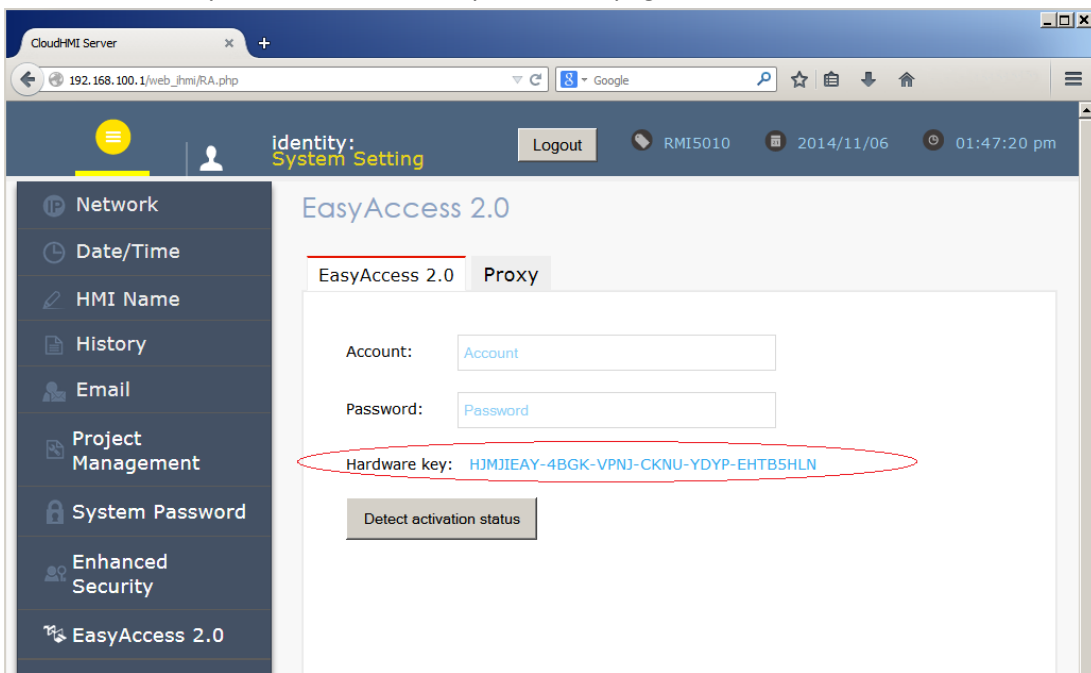
5. Go to https://account.ihmi.net/opcua/activate.php to activate:

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

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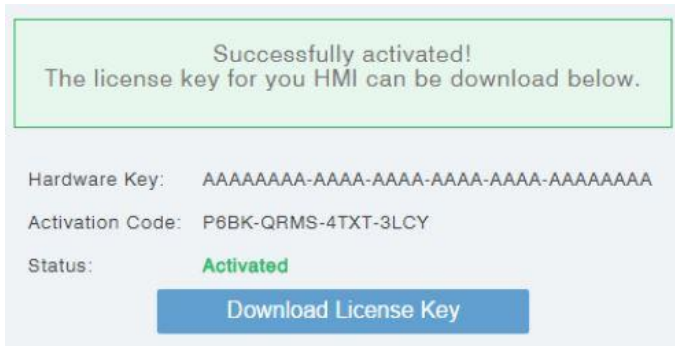
8. The cMT-SVR identified by the hardware key is now activated but to use the OPC UA feature on the cMT-SVR, you must now download the license key "opcua.lic" file to the cMT. Therefore, click the **Download License Key** button to save the opcua.lic file:


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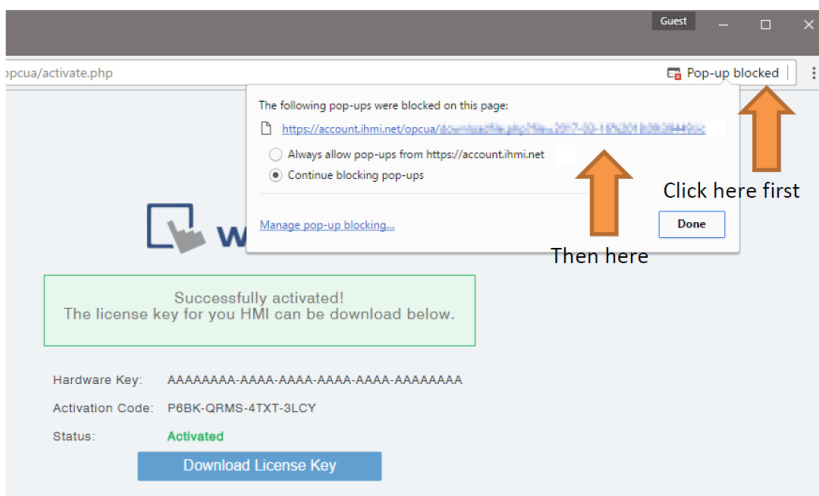
10. Now you can transfer the opcua.lic license file to the cMT-SVR using EZwarePlus.
    a. Start EZwarePlus and open your cMT-SVR project.
    b. Click **Tools->Download** to display the Download window.
    c. Check the **Use OPC UA license** option and link to the opcua.lic file you downloaded:
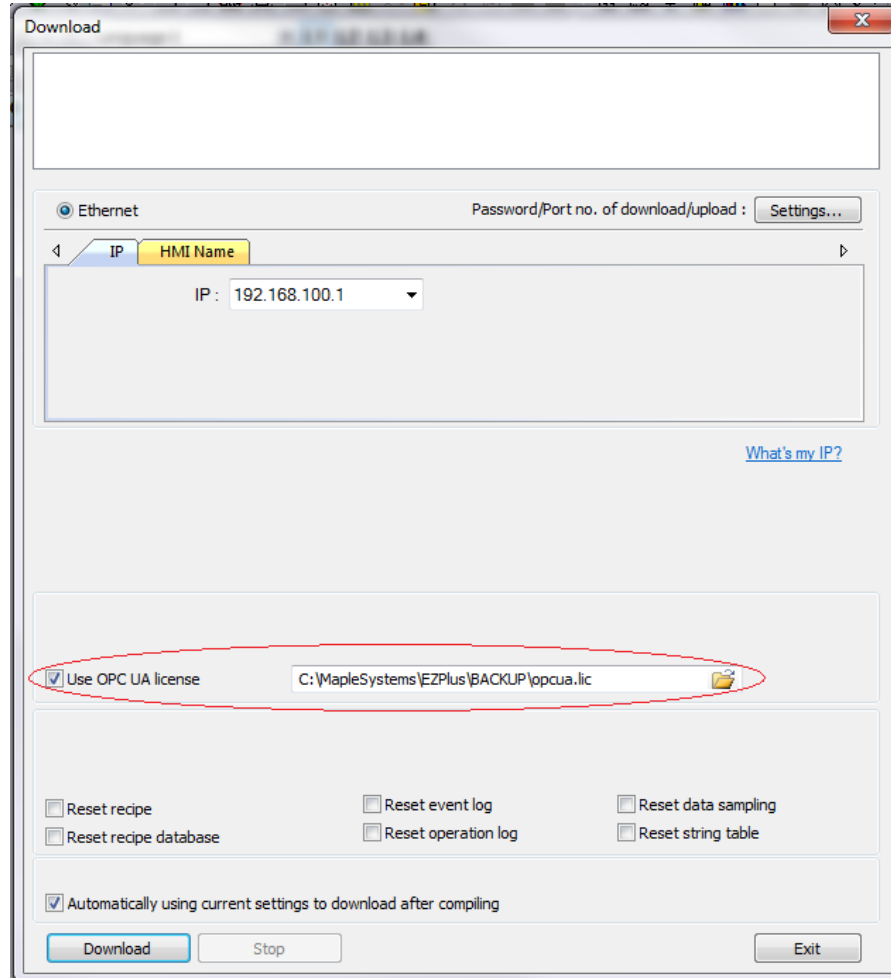
Click the **Download** button.

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 (https://account.ihmi.net/opcua/activate.php) 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 support@maplesystems.com.

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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