



PUERTO **UA** *Monitor*

User's Guide

Ver2.1

Puerto Co., Ltd.

March, 11, 2018

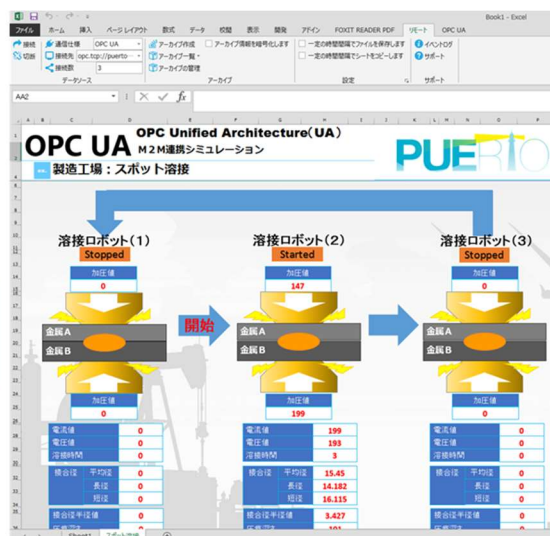
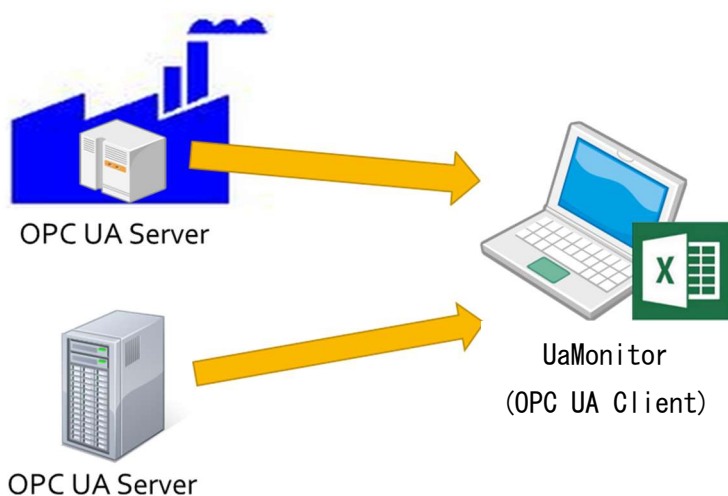
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Introduction

This document is a user's guide to UaMonitor, Microsoft Excel add-on for the OPC UA client. OPC UA provides secure communication while remotely monitoring or analyzing your system running in Excel.



Supported OPC UA Service Sets:

Service Set	Function
Discovery	FindServers
	GetEndpoints
SecureChannel	CreateSecureChannel
	CloseSecureChannel
Session	CreateSession
	ActivateSession
	CloseSession
View	Browse
Attribute	Read
	Write
Method	Call
MonitoredItem	CreateMonitoredItems

	SetMonitoringMode
	DeleteMonitoredItems
Subscription	CreateSubscription
	ModifySubscription
	SetPublishingMode
	Publish
	DeleteSubscriptions

Preconditions are as follows:

Summary	Description
Microsoft Excel must be installed.	UaMonitor is an add-on to Microsoft Excel. Therefore, user need to have Microsoft Excel installed before installing UaMonitor. The Excel version that UaMonitor support as follows: <ul style="list-style-type: none"> -Excel 2016 -Excel 2013 -Excel 2010 -Excel 2007
UaMonitor is used for report generation.	UaMonitor provides the ability to read or write UA server address space. It provides many other UA APIs. So, these functions are suitable for UA server debugging or report generation. Therefore, UaMonitor is expected to be used for report generation. It is not suitable for monitoring over a long period of time. When monitoring over a long period of time it is recommended to use a PC that has many resources.

UaMonitor Configuration

In UaMonitor, the OPC UA ribbon and the Monitor Control ribbon are newly added features configured for Microsoft Excel.

OPC UA

"OPC UA" has summarized the functions for OPC UA communication certificate management and communication management can be done here.

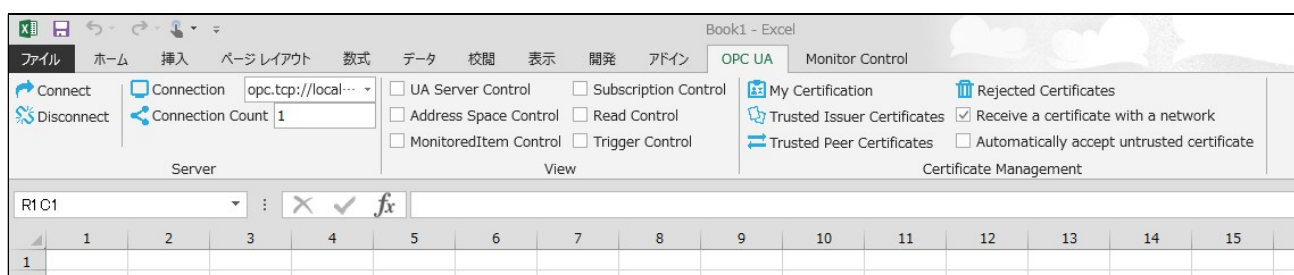
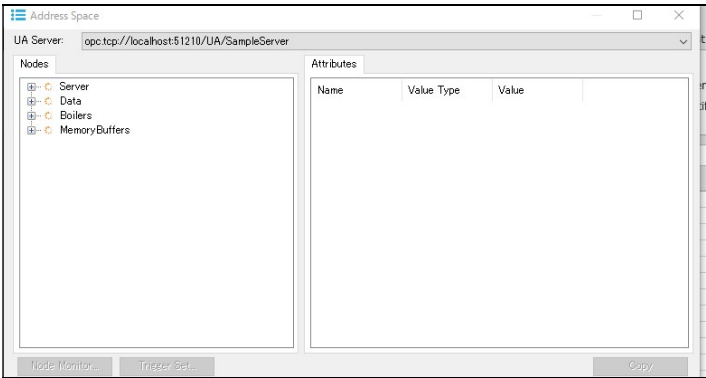
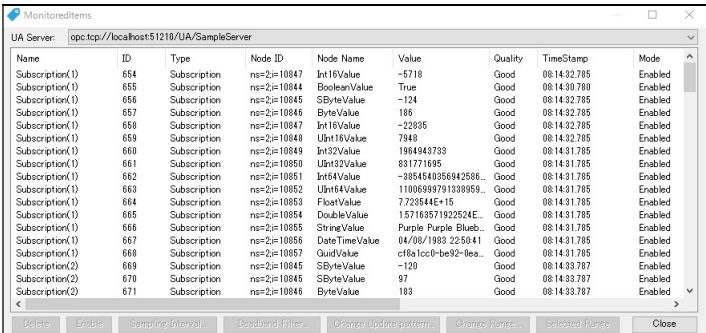
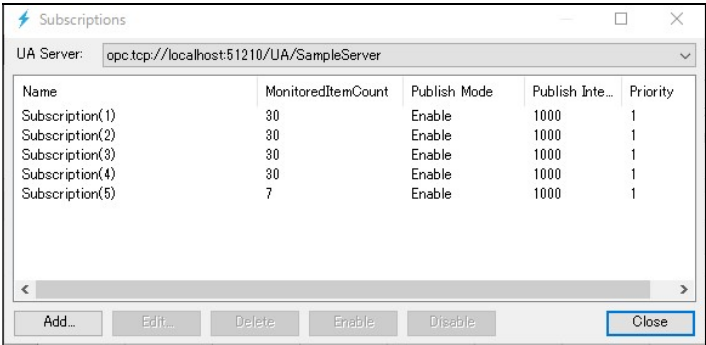

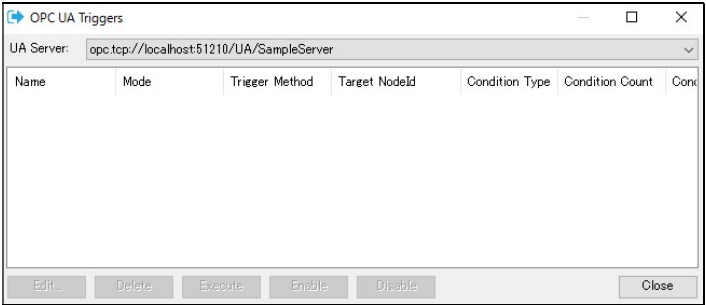


Table 1 OPC UA Ribbon

Category	Name	Description
Server	Connect	Connects to the OPC UA to get access the data.
	Disconnect	Disconnects from the OPC UA server.
	Connection	Displays a list of the end point of the OPC UA server you are currently connected to via drop-down.
	Connection Count	The number of OPC UA servers currently connected.
View	UA Server Control	Displays a list of the end point of the OPC UA server that is currently connected in a different screen, Check to display the screen or uncheck to close the screen.

<p>Address Space Control</p>	<p>Displays the nodes hierarchically. Check to display the screen or uncheck to close the screen.</p> 																																																																																																																																																																											
<p>MonitoredItem Control</p>	<p>Shows value change notifications and displays the update screen for read values. Check to display the screen or uncheck to close the screen.</p>  <table border="1" data-bbox="727 999 1436 1330"> <thead> <tr> <th>Name</th> <th>ID</th> <th>Type</th> <th>Node ID</th> <th>Node Name</th> <th>Value</th> <th>Quality</th> <th>TimeStamp</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>Subscription(1)</td> <td>654</td> <td>Subscription</td> <td>ns=2=10847</td> <td>Int16Value</td> <td>-5716</td> <td>Good</td> <td>08:14:32.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>655</td> <td>Subscription</td> <td>ns=2=10844</td> <td>BooleanValue</td> <td>True</td> <td>Good</td> <td>08:14:30.780</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>656</td> <td>Subscription</td> <td>ns=2=10845</td> <td>SByteValue</td> <td>-124</td> <td>Good</td> <td>08:14:32.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>657</td> <td>Subscription</td> <td>ns=2=10846</td> <td>ByteValue</td> <td>188</td> <td>Good</td> <td>08:14:32.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>658</td> <td>Subscription</td> <td>ns=2=10847</td> <td>Int16Value</td> <td>-22836</td> <td>Good</td> <td>08:14:32.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>659</td> <td>Subscription</td> <td>ns=2=10848</td> <td>UInt16Value</td> <td>7849</td> <td>Good</td> <td>08:14:32.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>660</td> <td>Subscription</td> <td>ns=2=10849</td> <td>Int32Value</td> <td>1984943733</td> <td>Good</td> <td>08:14:31.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>661</td> <td>Subscription</td> <td>ns=2=10850</td> <td>UInt32Value</td> <td>831771695</td> <td>Good</td> <td>08:14:31.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>662</td> <td>Subscription</td> <td>ns=2=10851</td> <td>Int64Value</td> <td>-3854540356842586...</td> <td>Good</td> <td>08:14:31.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>663</td> <td>Subscription</td> <td>ns=2=10852</td> <td>UInt64Value</td> <td>11006399791088959...</td> <td>Good</td> <td>08:14:31.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>664</td> <td>Subscription</td> <td>ns=2=10853</td> <td>FloatValue</td> <td>7.228344E+15</td> <td>Good</td> <td>08:14:31.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>665</td> <td>Subscription</td> <td>ns=2=10854</td> <td>DoubleValue</td> <td>1.57163571922524E...</td> <td>Good</td> <td>08:14:31.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>666</td> <td>Subscription</td> <td>ns=2=10855</td> <td>StringValue</td> <td>Purple Purple Blue...</td> <td>Good</td> <td>08:14:31.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>667</td> <td>Subscription</td> <td>ns=2=10856</td> <td>DateTimeValue</td> <td>04/08/1988 22:50:41</td> <td>Good</td> <td>08:14:31.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(1)</td> <td>668</td> <td>Subscription</td> <td>ns=2=10857</td> <td>GuidValue</td> <td>c18a1cc1-b692-bea...</td> <td>Good</td> <td>08:14:31.785</td> <td>Enabled</td> </tr> <tr> <td>Subscription(2)</td> <td>669</td> <td>Subscription</td> <td>ns=2=10845</td> <td>SByteValue</td> <td>-120</td> <td>Good</td> <td>08:14:33.787</td> <td>Enabled</td> </tr> <tr> <td>Subscription(2)</td> <td>670</td> <td>Subscription</td> <td>ns=2=10845</td> <td>SByteValue</td> <td>97</td> <td>Good</td> <td>08:14:33.787</td> <td>Enabled</td> </tr> <tr> <td>Subscription(2)</td> <td>671</td> <td>Subscription</td> <td>ns=2=10846</td> <td>ByteValue</td> <td>188</td> <td>Good</td> <td>08:14:33.787</td> <td>Enabled</td> </tr> </tbody> </table>	Name	ID	Type	Node ID	Node Name	Value	Quality	TimeStamp	Mode	Subscription(1)	654	Subscription	ns=2=10847	Int16Value	-5716	Good	08:14:32.785	Enabled	Subscription(1)	655	Subscription	ns=2=10844	BooleanValue	True	Good	08:14:30.780	Enabled	Subscription(1)	656	Subscription	ns=2=10845	SByteValue	-124	Good	08:14:32.785	Enabled	Subscription(1)	657	Subscription	ns=2=10846	ByteValue	188	Good	08:14:32.785	Enabled	Subscription(1)	658	Subscription	ns=2=10847	Int16Value	-22836	Good	08:14:32.785	Enabled	Subscription(1)	659	Subscription	ns=2=10848	UInt16Value	7849	Good	08:14:32.785	Enabled	Subscription(1)	660	Subscription	ns=2=10849	Int32Value	1984943733	Good	08:14:31.785	Enabled	Subscription(1)	661	Subscription	ns=2=10850	UInt32Value	831771695	Good	08:14:31.785	Enabled	Subscription(1)	662	Subscription	ns=2=10851	Int64Value	-3854540356842586...	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<p>Subscription Control</p>	<p>Displays the screen to manage the interval of values that have changed in the UA server. Check to display the screen or uncheck to close the screen.</p>																																																																																																																																																																											

		
	Read Control	<p>Displays a screen to read node values from the UA server. Check to display the screen or uncheck to close the screen.</p> 
	Trigger Control	<p>Displays the established UA server node's writing trigger or method trigger on separate screens. Check to display the screen or uncheck to close the screen.</p> 
Certificate Management	My Certificate	Displays the certificate information assigned to UaMonitor.
	Trusted Issuer Certificates	Displays the screen to manage the trusted issuer

ent		certificates.
	Trusted Peer Certificates	Displays the screen to manage the trust certificates.
	Rejected Cetificates	Displays the screen to manage the rejected issuer certificates.
	Receive a certificate with a network	Receives a network certificate.
	Automatically accept untrusted certificate	Automatically accepts untrusted certificates over the network.

Monitor Control

"Monitor Control" has summarized the support function as a monitor.

The support function;

- Save a created screen and the connection status (named 'Archive')
- Restore a created screen and the connection status (named 'Restore')
- Save the file.
- Copy the sheet.

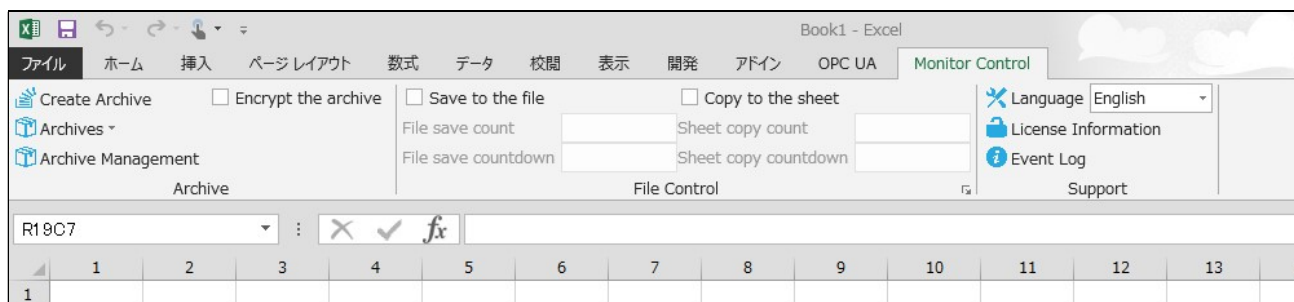
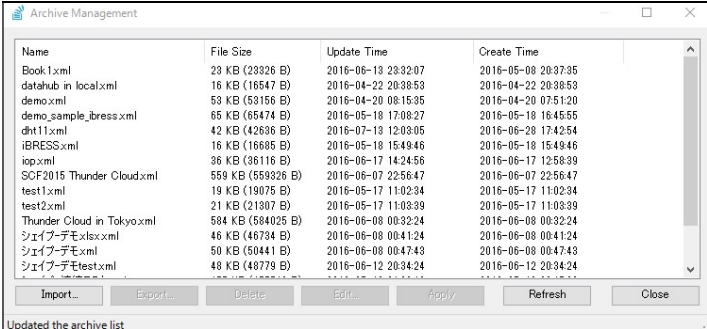
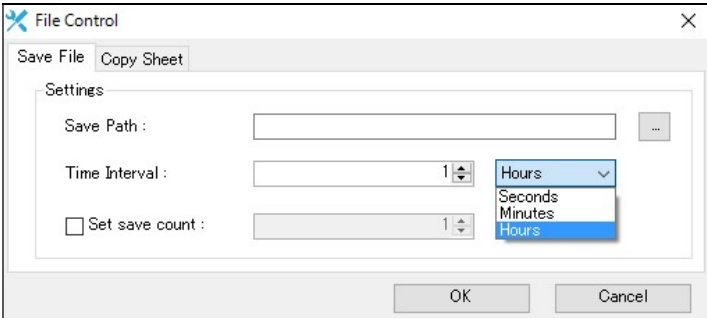
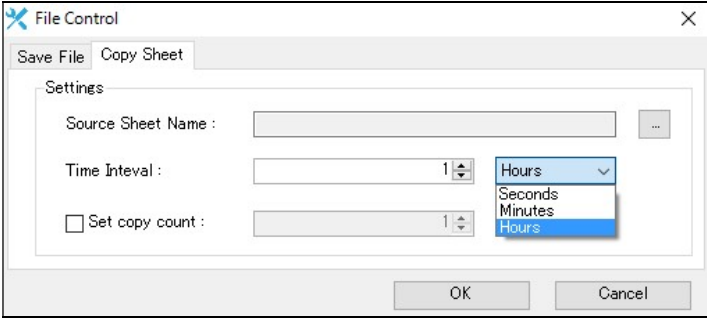
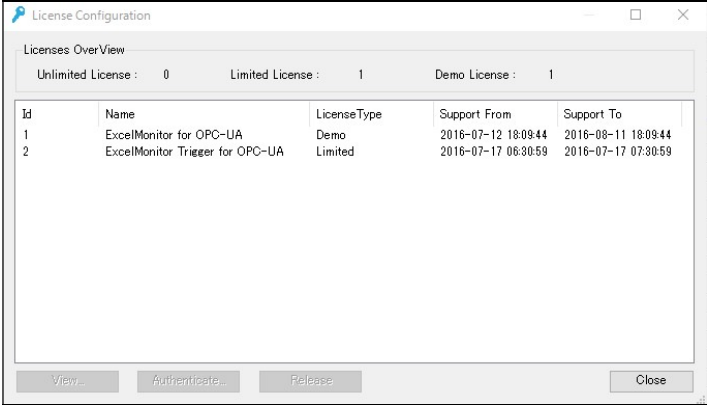
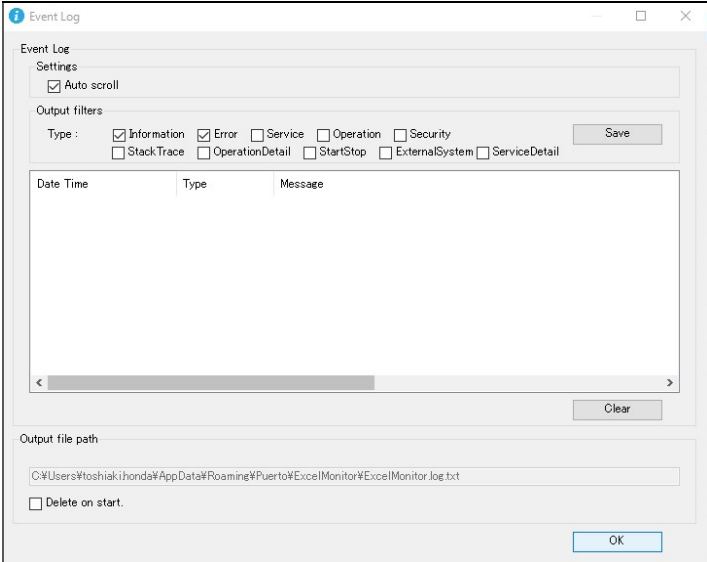


Table 2 Monitor Control Ribbon

Category	Name	Description
Archive	Create Archive	Save the created screen and the connection status.
	Archives	Displays the list of saved archives in the drop-down. Click the archive in the drop-down to restore the archives.

	<p>Archive Management</p>	<p>Display the list of the saved archives. You can edit the UA Server URL or remove the Archive.</p> 
	<p>Encrypt the archive</p>	<p>Encrypts and stores the archive information. This setting is applied when you click "Create Archive".</p>
<p>File Control</p>	<p>Save to the file</p>	<p>Save the file.</p> 
	<p>Copy to the sheet</p>	<p>Copy the sheet.</p> 
<p>Support</p>	<p>Language</p>	<p>Select the language you want to support. Supported languages; - English</p>

		<p>- Japanese</p> <p>The initial value depends on the language setting of the OS in use. For example, if your supported OS is in Japanese, Japanese will be selected by default.</p>															
	<p>License Information</p>	<p>Displays a screen that shows the function license information of UaMonitor.</p>  <p>The screenshot shows a window titled "License Configuration" with a sub-header "Licenses OverView". It displays summary statistics: Unlimited License: 0, Limited License: 1, and Demo License: 1. Below this is a table with columns: Id, Name, LicenseType, Support From, and Support To.</p> <table border="1" data-bbox="740 725 1425 792"> <thead> <tr> <th>Id</th> <th>Name</th> <th>LicenseType</th> <th>Support From</th> <th>Support To</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>ExcelMonitor for OPC-UA</td> <td>Demo</td> <td>2016-07-12 18:09:44</td> <td>2016-08-11 18:09:44</td> </tr> <tr> <td>2</td> <td>ExcelMonitor Trigger for OPC-UA</td> <td>Limited</td> <td>2016-07-17 06:30:59</td> <td>2016-07-17 07:30:59</td> </tr> </tbody> </table> <p>Buttons at the bottom include View, Authenticate, Release, and Close.</p>	Id	Name	LicenseType	Support From	Support To	1	ExcelMonitor for OPC-UA	Demo	2016-07-12 18:09:44	2016-08-11 18:09:44	2	ExcelMonitor Trigger for OPC-UA	Limited	2016-07-17 06:30:59	2016-07-17 07:30:59
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	<p>Event Log</p>	<p>Displays the event log screen for UaMonitor.</p>  <p>The screenshot shows a window titled "Event Log" with a sub-header "Event Log". It includes a "Settings" section with an "Auto scroll" checkbox checked. Below is an "Output filters" section with checkboxes for Information, Error, Service, Operation, Security, Stack Trace, OperationDetail, StartStop, ExternalSystem, and ServiceDetail. A "Date Time", "Type", and "Message" table is visible but empty. At the bottom, there is an "Output file path" field containing "C:\Users\toshiaki.honda\AppData\Roaming\Puerto\ExcelMonitor\ExcelMonitor.log.txt" and a "Delete on start" checkbox.</p>															

OPC UA Communication

OPC UA

The OPC Unified Architecture (UA), released in 2008, is a platform independent service-oriented architecture that integrates all the functionality of the individual OPC Classic specifications into one extensible framework. OPC UA supports PLC and SCADA and provides safe and stable information exchange in MES and ERP for the specified region.

Connection

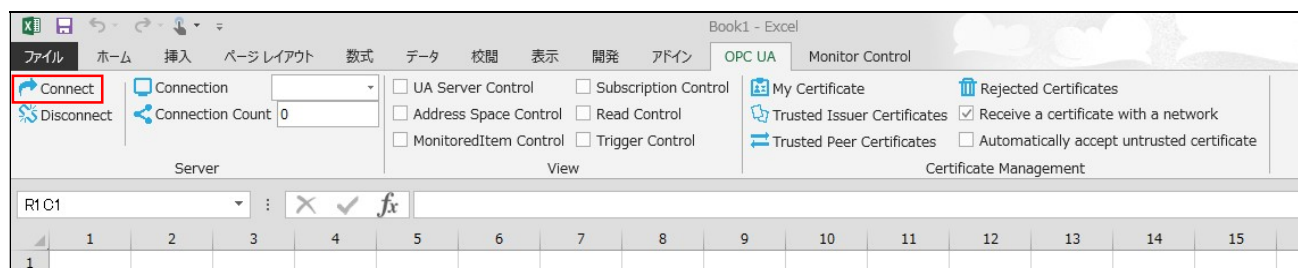
This section describes how to connect to the UA server.

UaMonitor provides several ways to connect to the UA server;

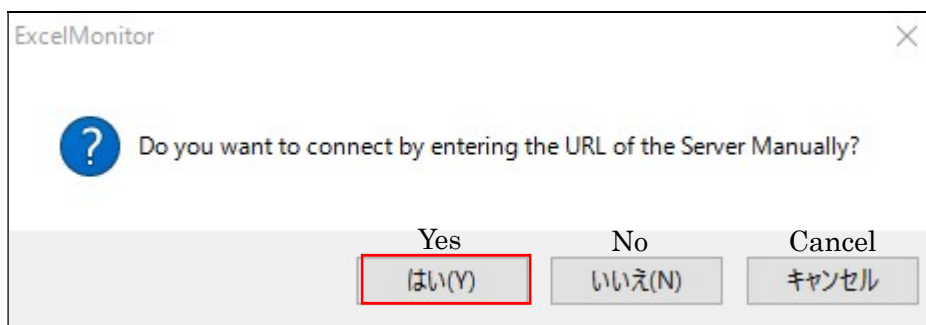
- (1) Connect by entering the URL of the UA server directly
- (2) Connect to get the URL of the UA server from DiscoveryServer

(1) Connect by entering the URL of the UA server directly

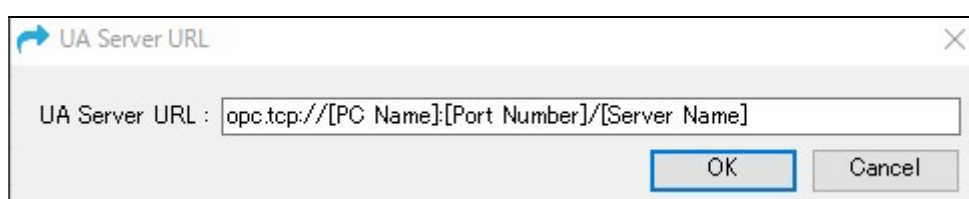
(1) – 1 . Click on the "Connect" button



(1) – 2. Click "Yes"



(1) – 3. Enter the URL and click "OK"



Use the "opc.tcp://[PC Name]:[Port Number]/[Server Name]" format If you want to connect with TCP.

Use the "http:// [PC Name]:[Port Number]/[Server Name]" format If you want to connect with HTTP.

Use the "https:// [PC Name]:[Port Number]/[Server Name]" format If you want to connect with HTTPS.

※Note: There are no problems with using the IP address instead of the PC name.

(1) – 4. Specify how to connect and then click the "OK" button

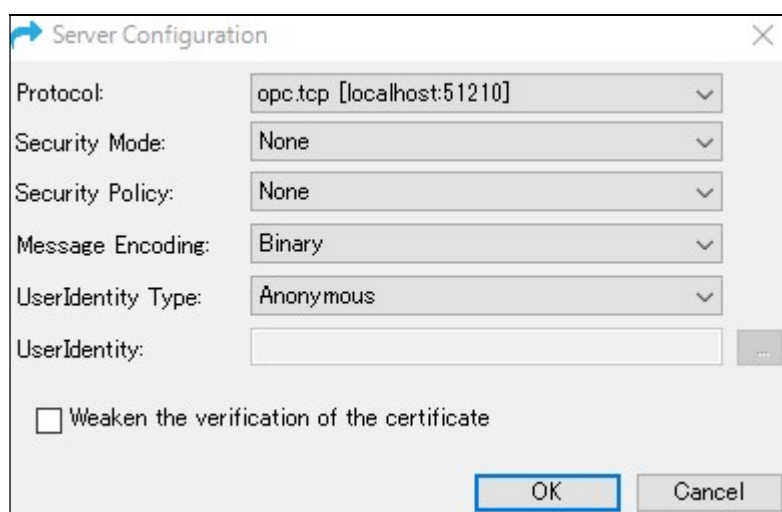
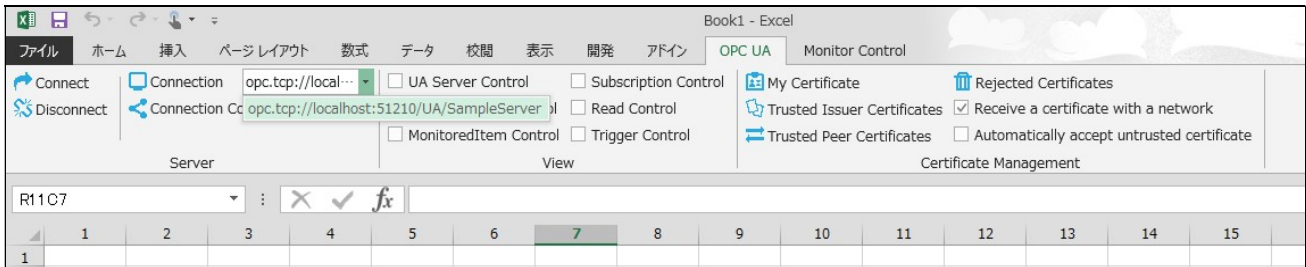


Table 3 Server Configuration

Name	Description
Protocol	Specifies the preferred protocol type.
Security Mode	Sets the Security Mode that the server provides. Security Mode; <ul style="list-style-type: none"> - None: Communicate without security - Sign: Communicate with authentication when connecting to a server - SignAndEncrypt : To communicate with authentication when connecting to a server and to encrypt the communication data
Security Policy	Sets the Security Policy provided by the server. Security Policy; <ul style="list-style-type: none"> - None - Basic128Rsa15 - Basic256
Message Encoding	Sets the message encoding.. <ul style="list-style-type: none"> ▪ Binary ▪ XML(HTTP/HTTPS)
User Identity Type	Sets user authentication. <ul style="list-style-type: none"> ▪ Anonymouse ▪ UserName and Password ▪ Certificate
User Identity	Sets user authentication information.
Weaken the verification of the certificate	If the domain name and domain name of the certificate that you received from the UA server does not match, it can be specified as an alias. Verifies the UA server; sets the SignAndEncrypt or Sign. If the domain of the certificate received from the domain name and the UA server that is specified in the URI does not match, it generates an exception. In this case, you must assign a certificate that matches the domain name from UA server. However, if you accept a domain name that does not match without changing the certificate, specify it

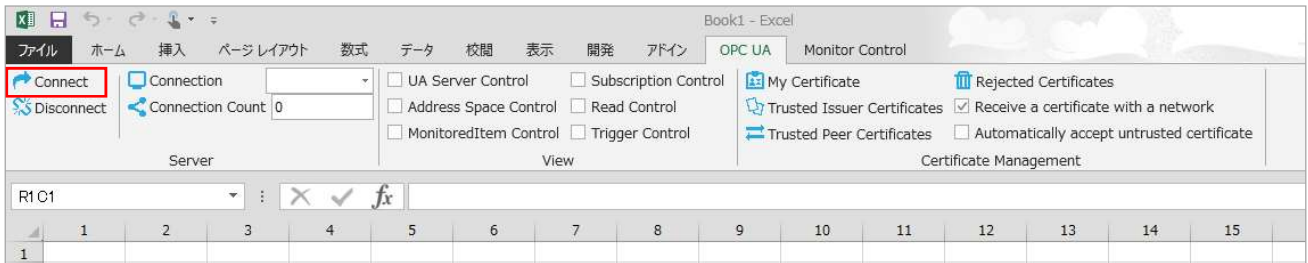
Name	Description
	as an alias. Caution; Please be careful because this reduces security.

(1) – 5 . Adds the end-point of the UA server via the drop down of the “Connection”.

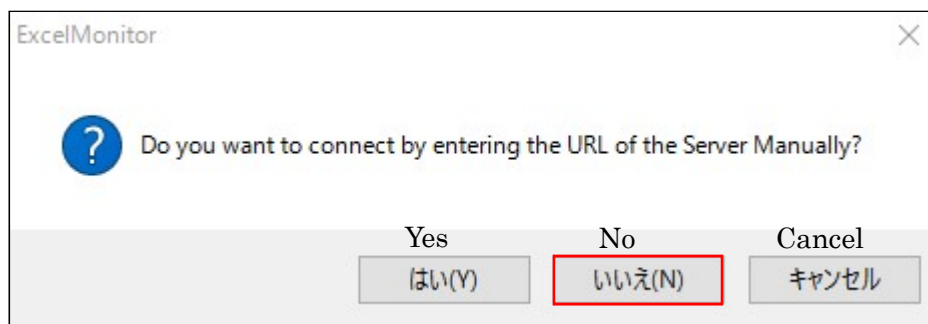


(2) Connect to get the URL of the UA server from DiscoveryServer

(2) – 1 . Click "Connect"



(2) – 2 . Click "No"



(2) – 3 . Select the UA Server

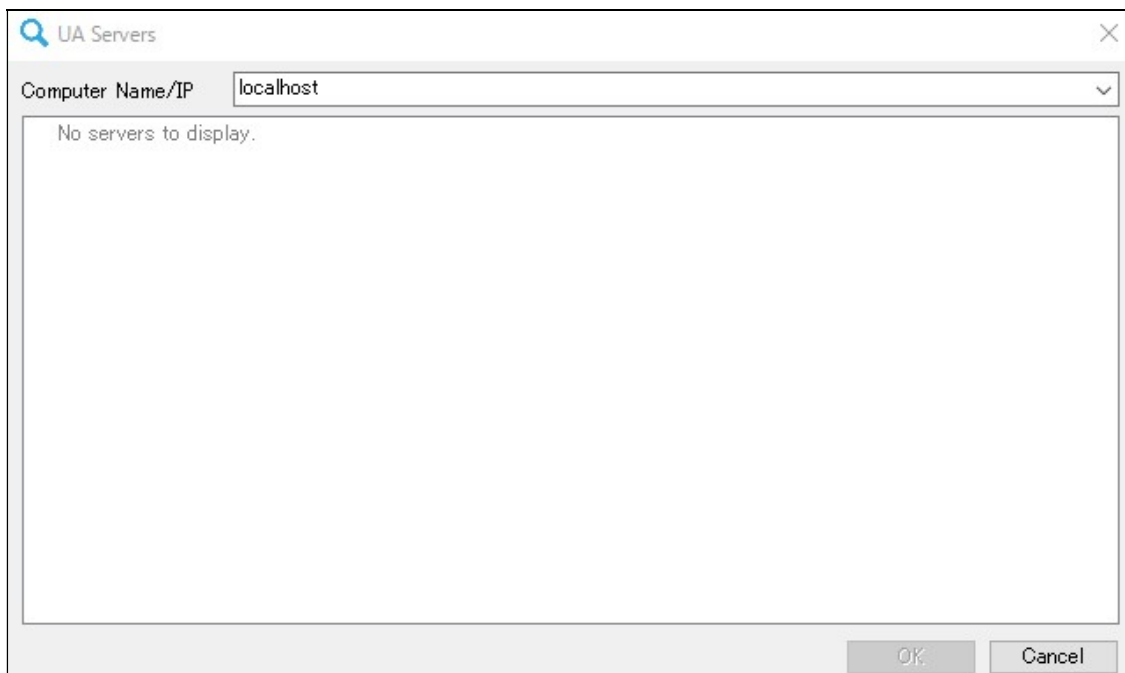


Table 4 UA Servers

Name	Description
Host PC	Specifies the PC name or IP address.
OK	Connects with the selected UA Server.
Cancel	Cancel the connection.

(2) – 4. Specify how to connect and then click "OK"

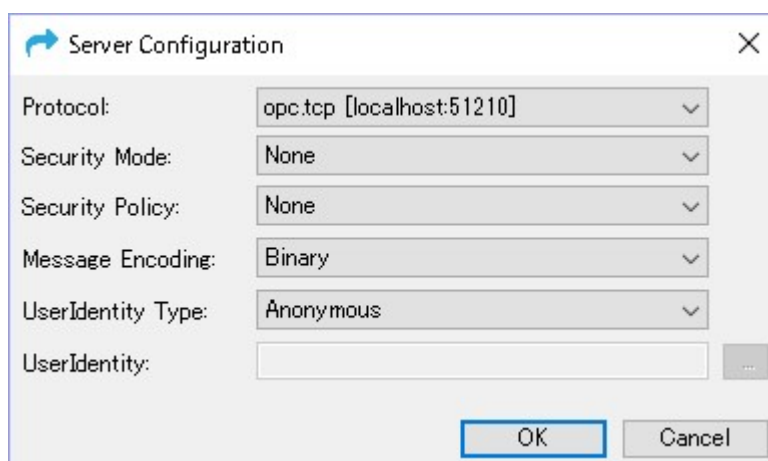
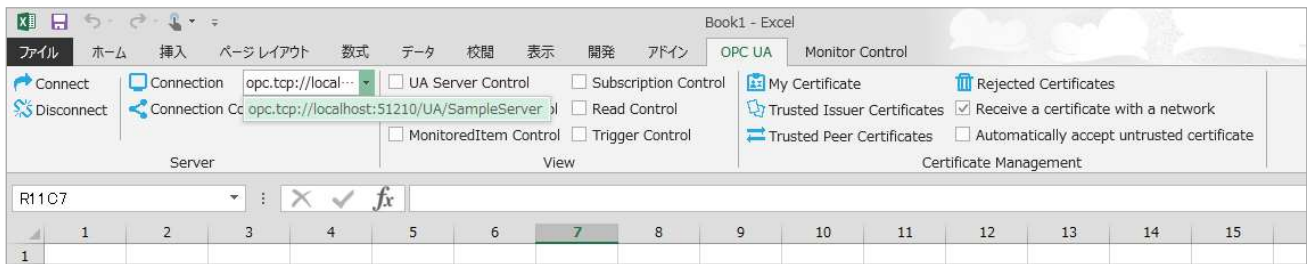


Table 5 Server Configuration

Name	Description
Protocol	Specifies the protocol type to communicate.
Security Mode	Sets the Security Mode provided by the server. Security Mode; <ul style="list-style-type: none"> - None : Communicate without security - Sign : Communicate with authentication when connecting to a server - SignAndEncrypt : To communicate with authentication when connecting to a server and to encrypt the communication data
Security Policy	Sets the Security Policy that the server provides. Security Policy; <ul style="list-style-type: none"> - None

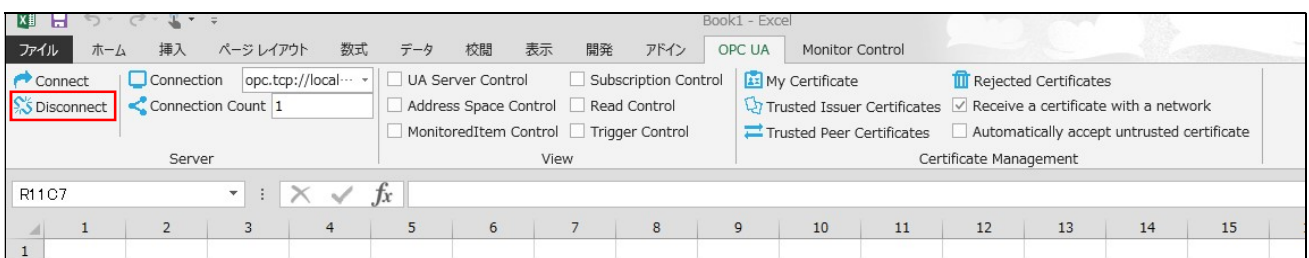
	<ul style="list-style-type: none"> - Basic128Rsa15 - Basic256
Message Encoding	<p>Sets the message encoding.</p> <ul style="list-style-type: none"> ▪ Binary ▪ XML(HTTP/HTTPS)
User Identity Type	<p>Sets user authentication information.</p> <ul style="list-style-type: none"> ▪ Anonymouse ▪ UserName and Password ▪ Certificate
User Identity	<p>Sets the information of user authentication.</p>

(2) – 5 . Add the end-point of the UA server via the drop down of the “Connection”



Disconnection

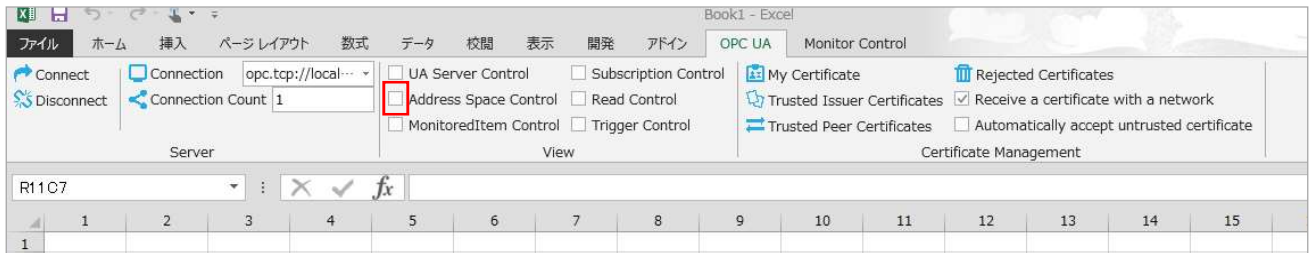
Clicking "Disconnect" will disconnect you from the UA server that is specified in the "Connection".



Browse address space

You can easily refer to the information represented hierarchically on the OPC UA server.

1. Check "Address Space Control" on the OPC UA ribbon



2. A screen showing the address will be displayed

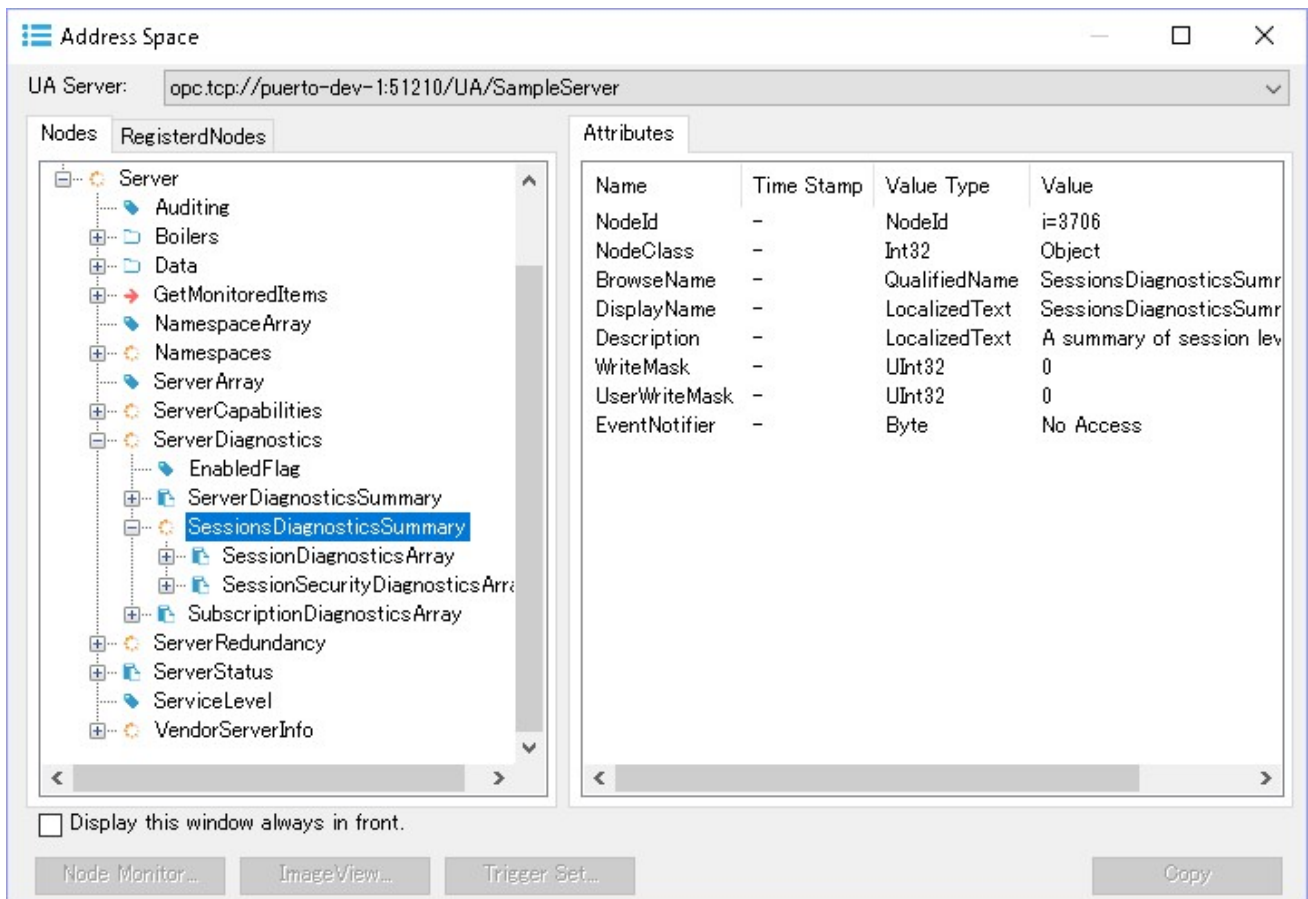
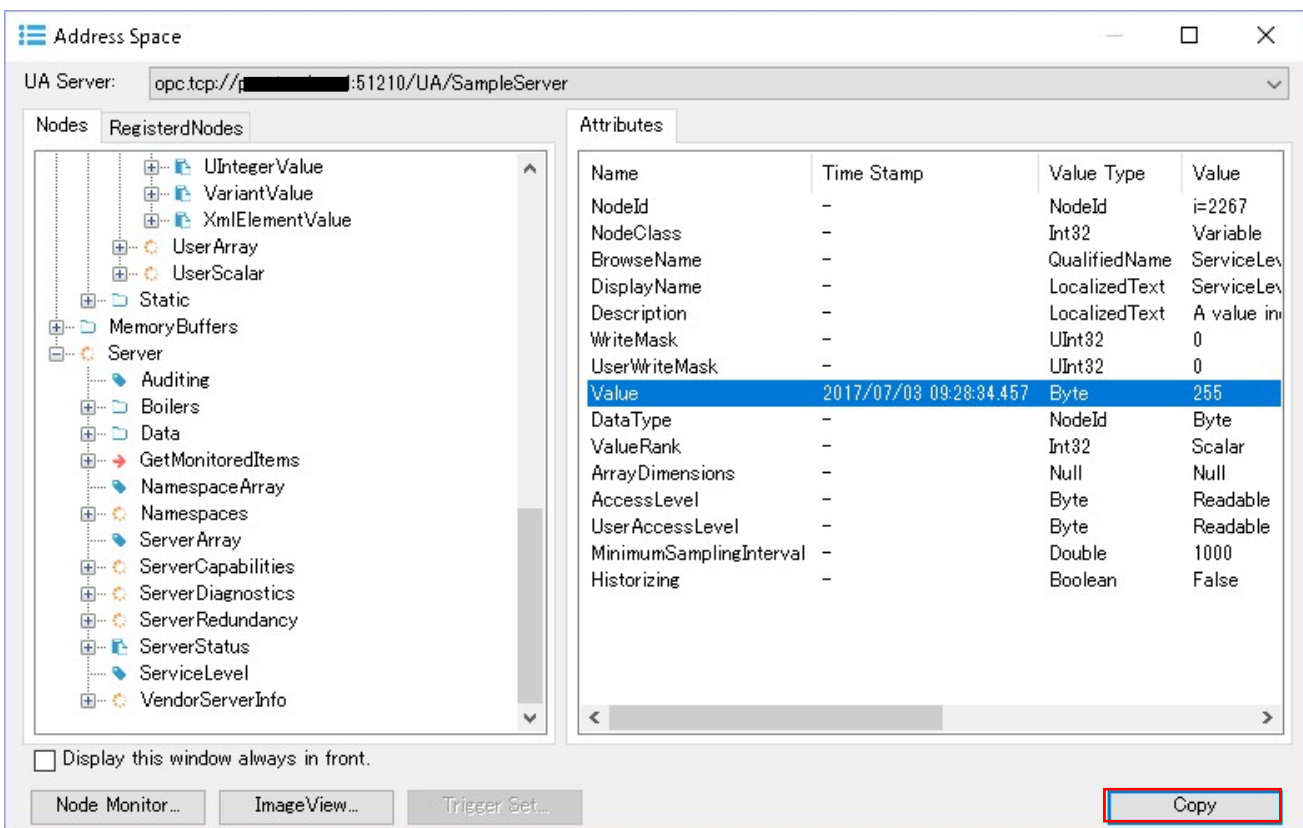


Table 6 Address Space Control

Name	Description
------	-------------

UA Server	The OPC UA server URL.
Nodes	Information (displayed hierarchically) represented in the OPC UA server.
Attributes	All of the selected node attributes will be displayed. "Value" is the node value.

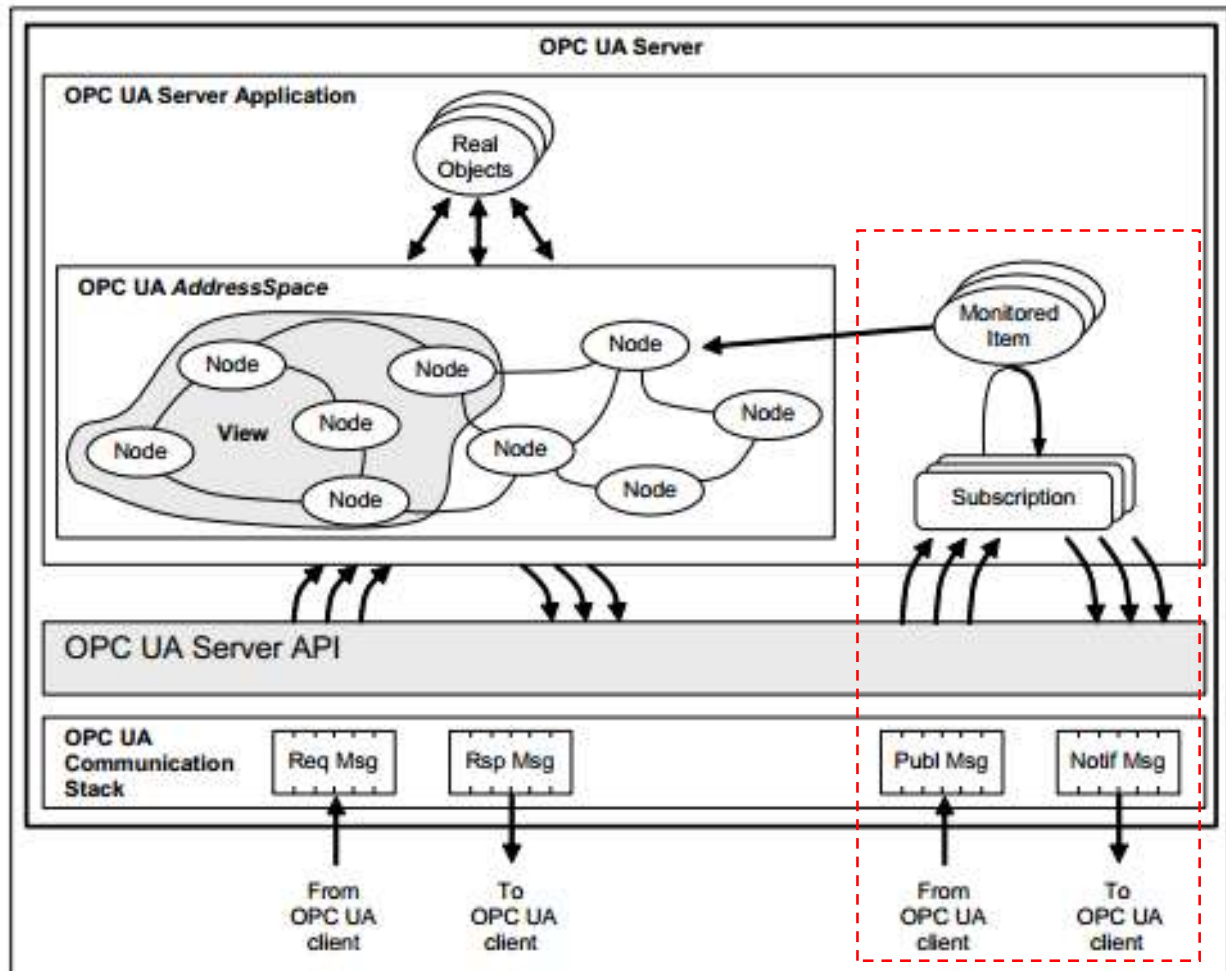
Select an item from "Attributes" to save the information of the selected row by clicking "Copy" or pressing "Ctrl + C". As pictured below, clicking "Copy" in the bottom right-hand corner will enable you to paste the value's information in the cell of your choosing.



A1				
	A	B	C	D
1	Value	Byte	255	
2				
3				

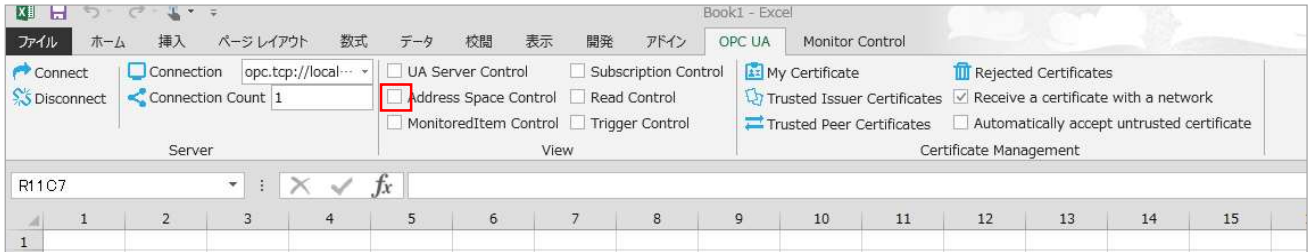
Monitoring node (Subscription)

Monitors the value of the node and pastes it into the cell or AutoShape using the node's monitoring subscription.



Node Monitoring Steps:

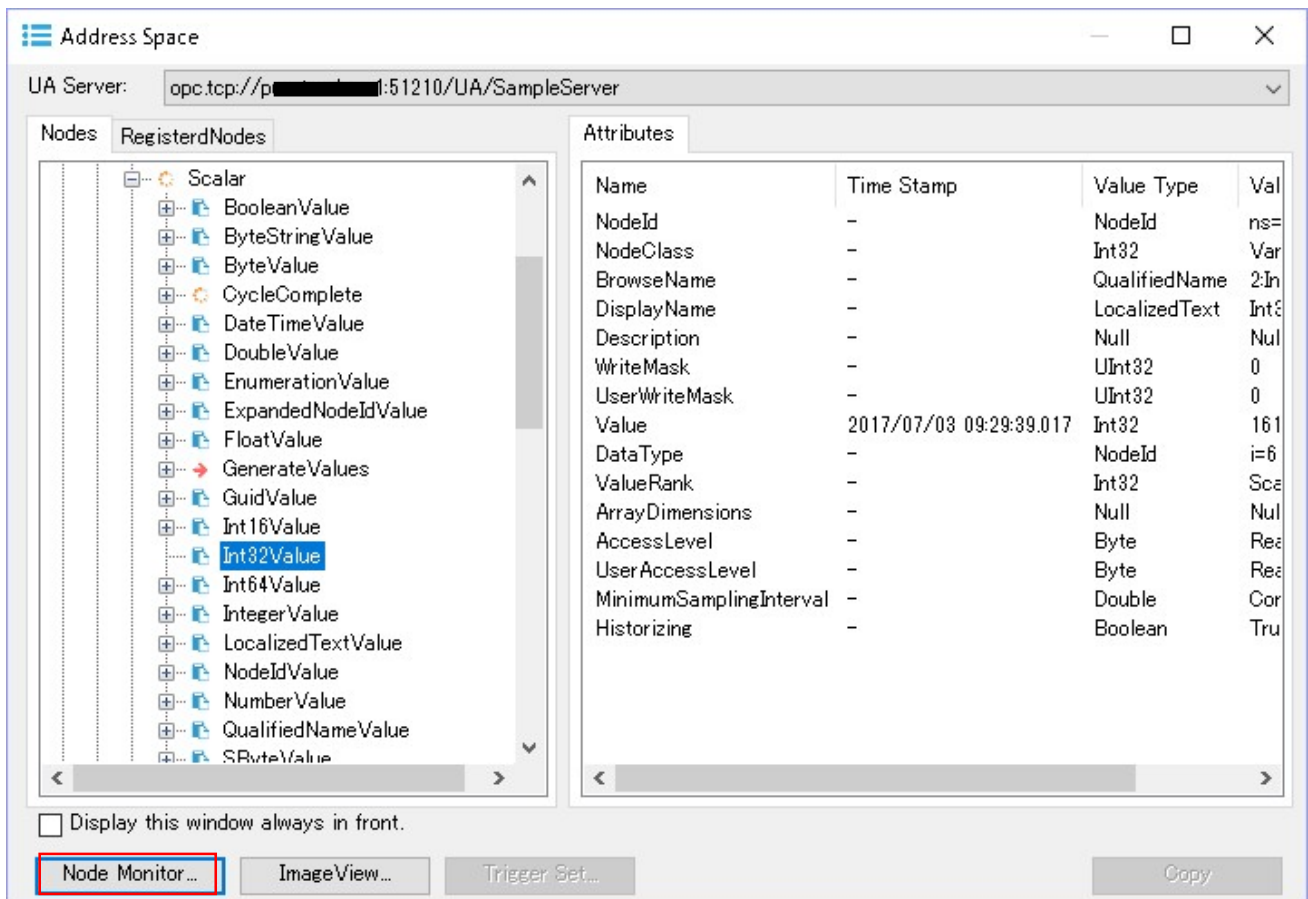
Step1. Open the 'OPC UA' tab in Microsoft Excel



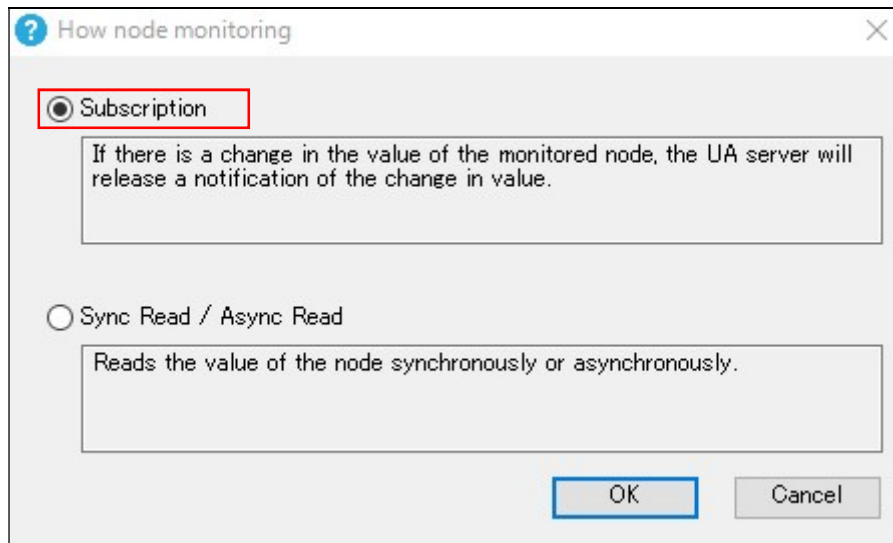
Step2. Check the 'Address Space Control' box

Step3. Select a variable node

Step4. Click 'Node Monitor...'



Step5. Select 'Subscription'



Step6. Select "OK" to add subscription

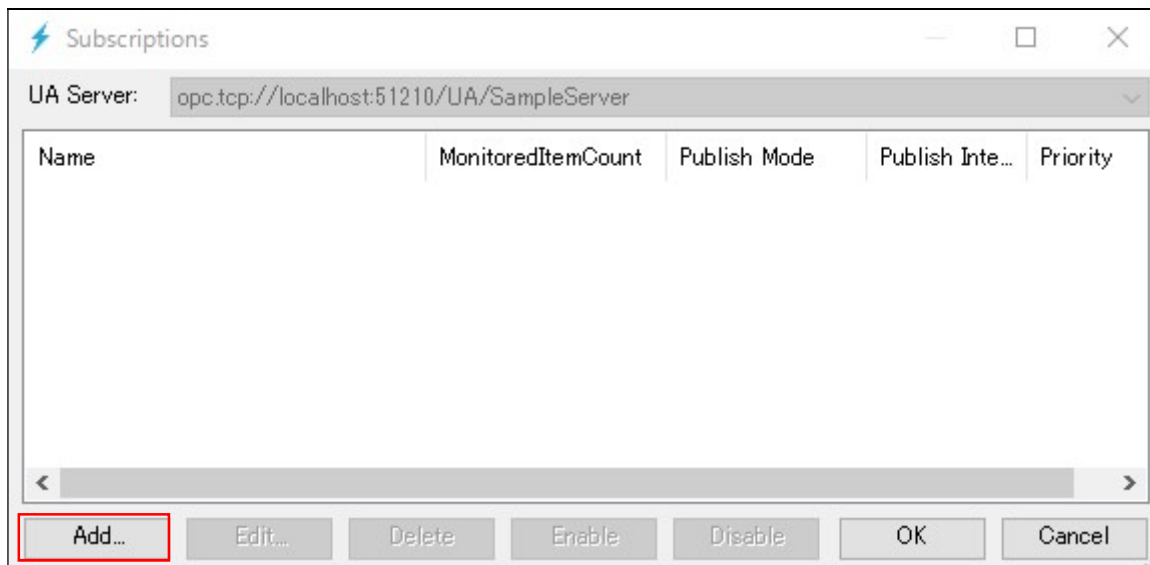


Table 7 Subscriptions

Name	Description
UA Server	The OPC UA Server URL.
Add...	Displays a screen to create a new subscription.
Edit...	Displays the edit screen.
Delete	Deletes the selected subscription.
Enable	Enables the selected subscription.

Disable	Disables the selected subscription.
----------------	-------------------------------------

The subscription creation screen will look like this;

Table 8 The subscription creation screen

Name	Description
Name	Subscription Name
Publishing Mode	Enables the user the enable or disable.
Publishing Interval (ms)	The notification interval set in milliseconds. The initial value is 1000 milliseconds (1 second).
Priority	The priority for the notification.

Step7. Create Monitored Items

Click the "OK" button to begin monitoring the selected items.

Create MonitoredItem

Name : Int32Value

Sheet Setting

Update to worksheet : Book1:Sheet1!\$G\$11 Select

Raw

Fill by Row Change...

Display a time stamp in the left column.

Replace time stamps with local clock time.

Shape Setting

Update to shape : Select...

Raw

Display a time stamp in the shape.

Replace time stamps with local clock time.

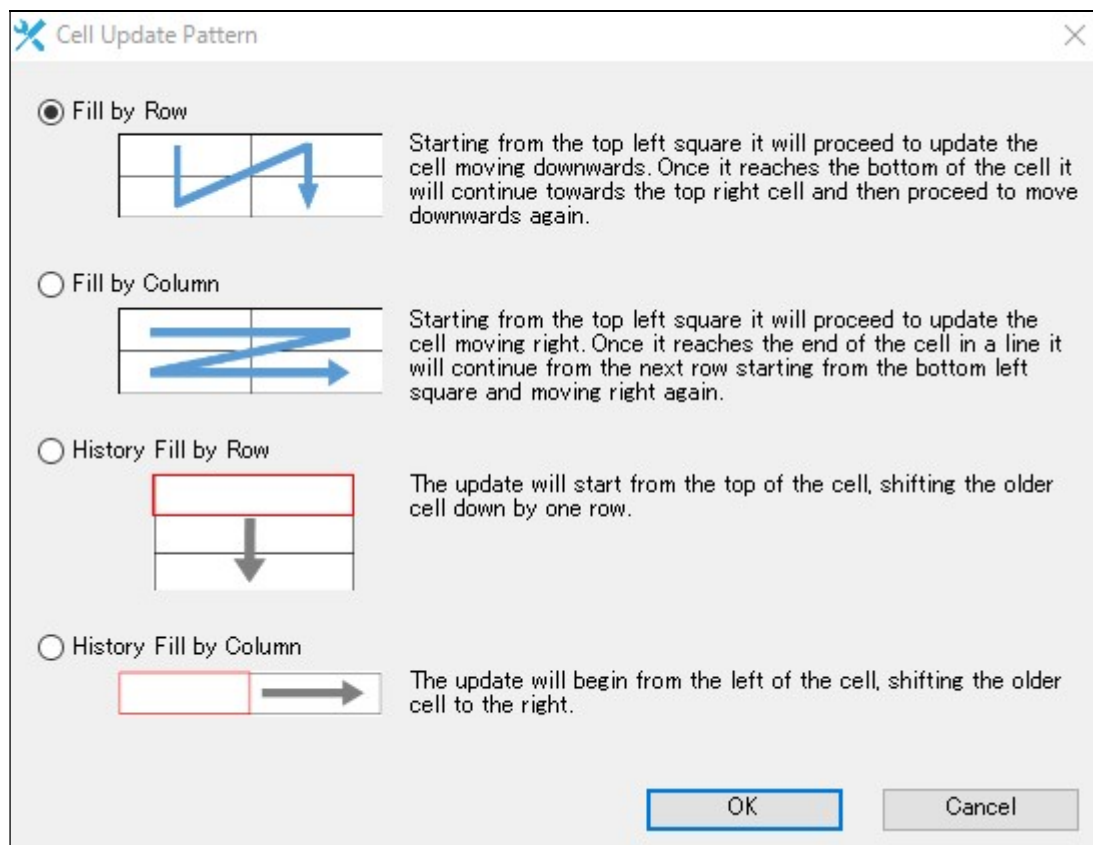
OK Cancel

Sheet Setting

The cell box next the “update to worksheet” section will automatically display the value for the cell that is currently open. If you want to change it, click the “Select” button.

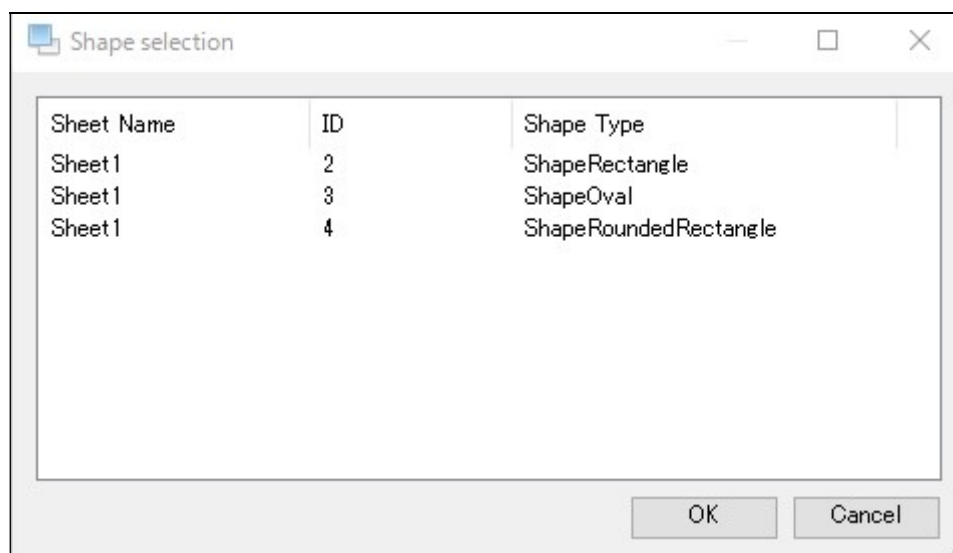
• Update Pattern

Selects the data of the update pattern.



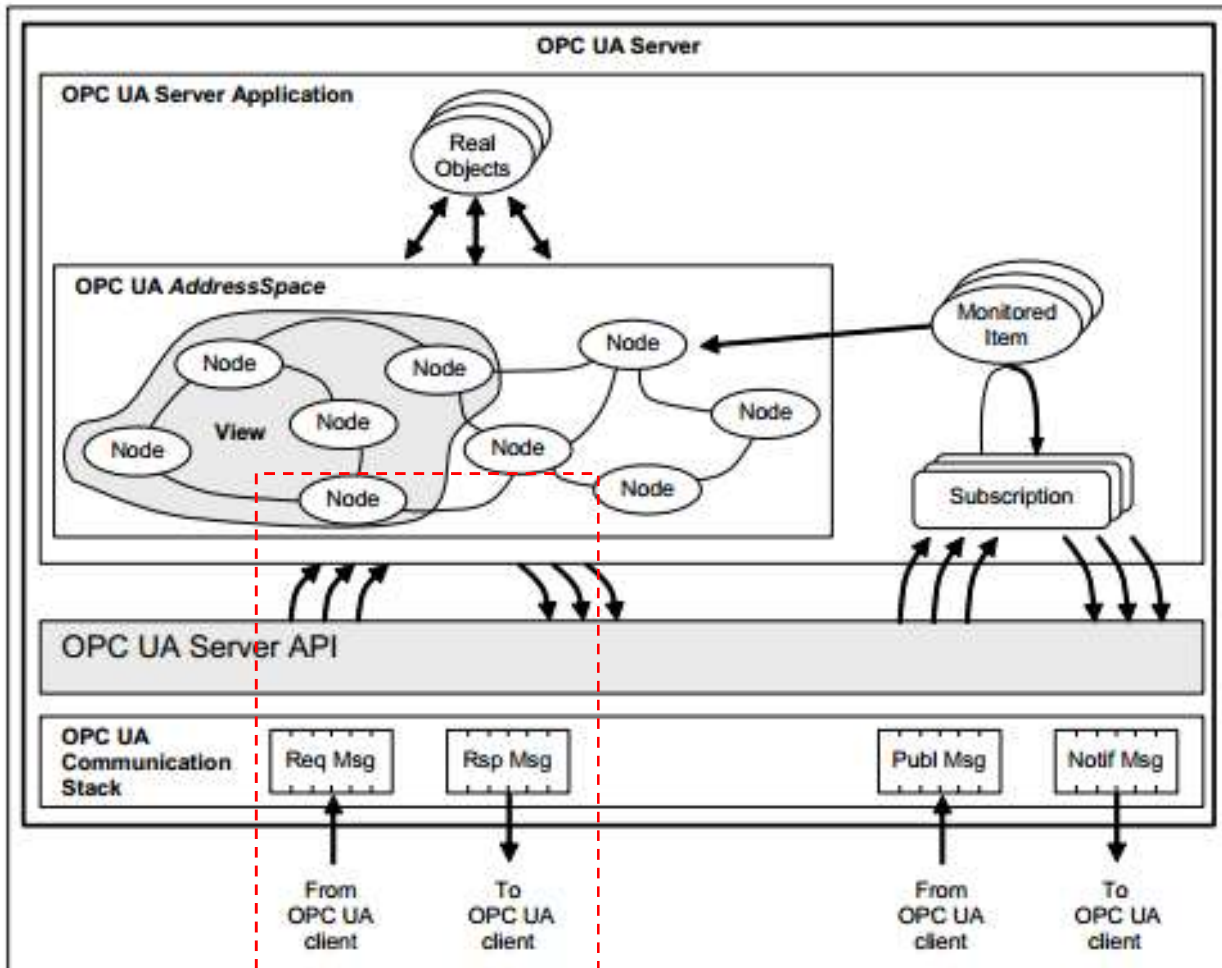
Shape Setting

Select the AutoShape you want to update. When you select an AutoShape on the list, the AutoShape you selected will be active.



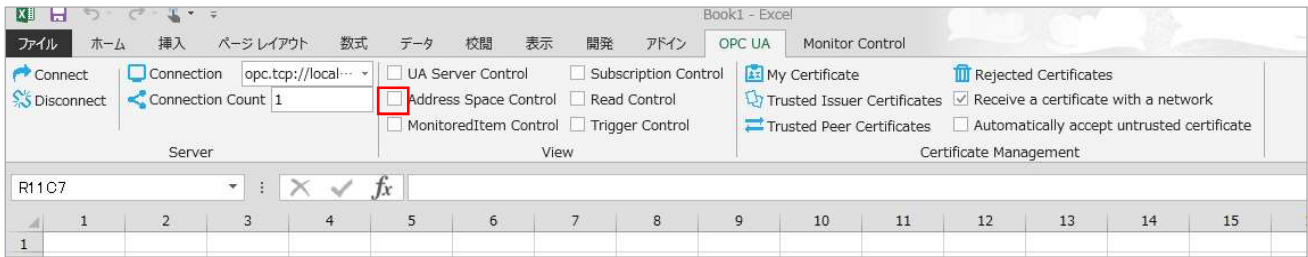
Monitoring node (Read)

Monitors the value of the node and pastes it into the cell or AutoShape using the node's monitoring read.



Node monitoring steps;

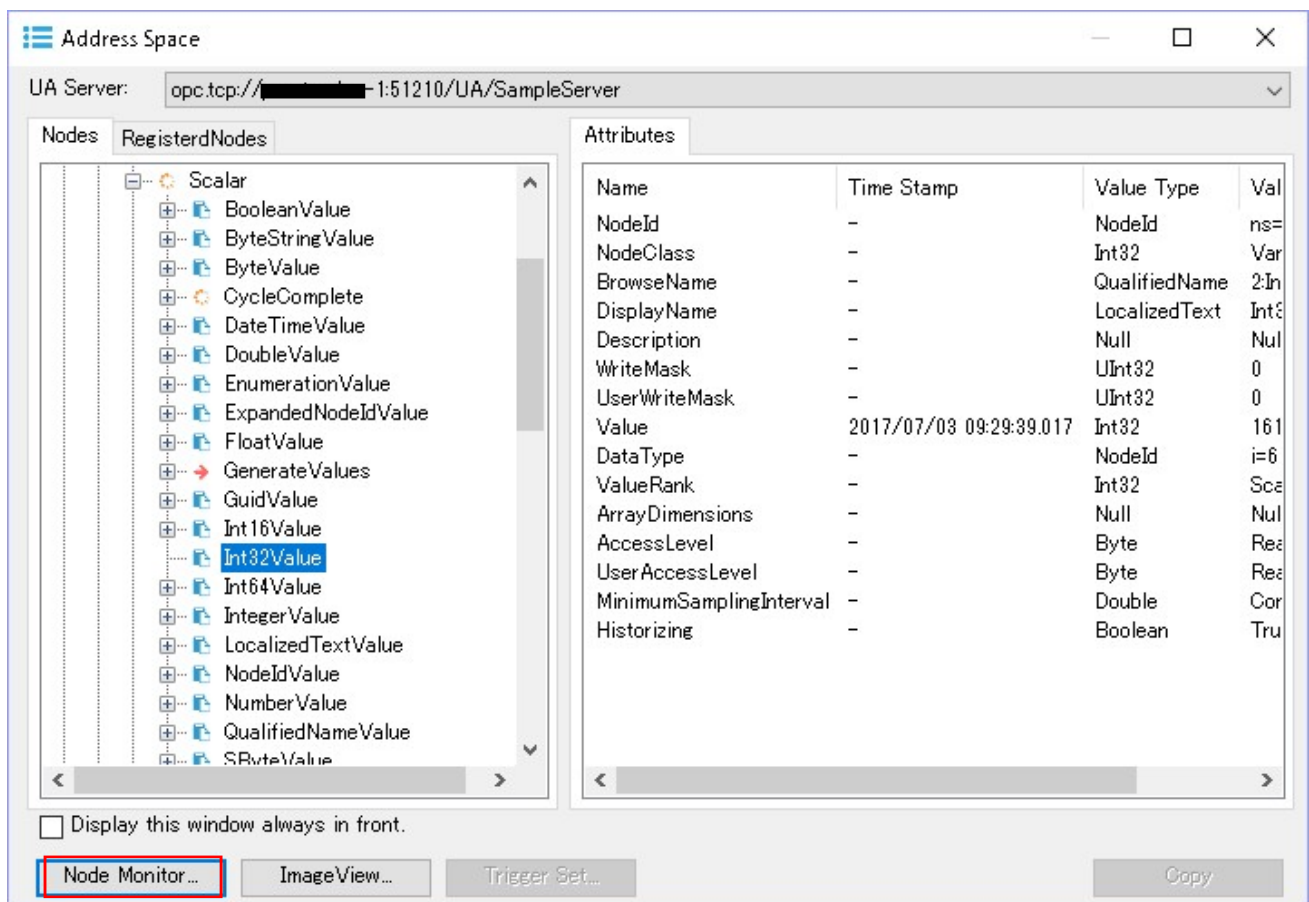
Step1. Open the 'OPC UA' tab on Microsoft Excel



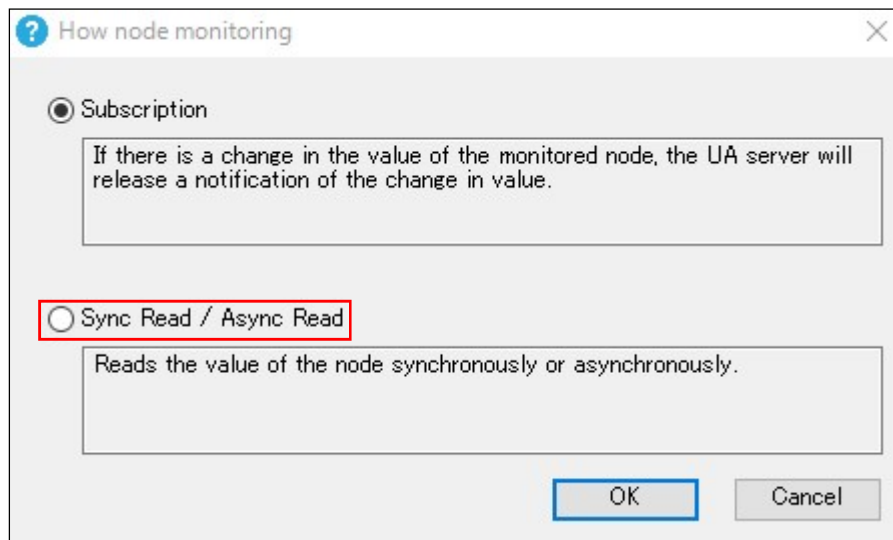
Step2. Click the 'Address Space Control' check box

Step3. Select a variable node

Step4. Click 'Node Monitor...' button located in the bottom left hand corner



Step5. Select 'Sync Read / Async Read'



Step6. Create Node Reader



Table 9 Node Readers

Name	Description
UA Server	The OPC UA Server URL.
Add...	Displays the screen to create a new node reader.
Edit...	Displays the edit screen of the node reader.
Delete	Deletes the selected node reader.
Read	Reads the selected node reader.

Enable	Enables the selected subscription.
Disable	Disables the selected subscription.

The node reader creation screen;

Table 10 The node reader creation screen

Name	Description
Name	Node reader Name.
Read Mode	Select Enable or Disable.
Read Interval (ms)	The notification interval set in milliseconds. The initial value is 1000 milliseconds (1 second).
Read Method	<ul style="list-style-type: none"> - Synchronous Read - Asynchronous Read

Step7. Create MonitoredItem

Creating a monitoring item updates the data. It can start monitoring immediately as soon as you click the "OK" button.

Create MonitoredItem

Name : Int32Value

Sheet Setting

Update to worksheet : Book1:Sheet1!\$G\$11 Select

Raw

Fill by Row Change...

Display a time stamp in the left column.

Replace time stamps with local clock time.

Shape Setting

Update to shape : Select...

Raw

Display a time stamp in the shape.

Replace time stamps with local clock time.

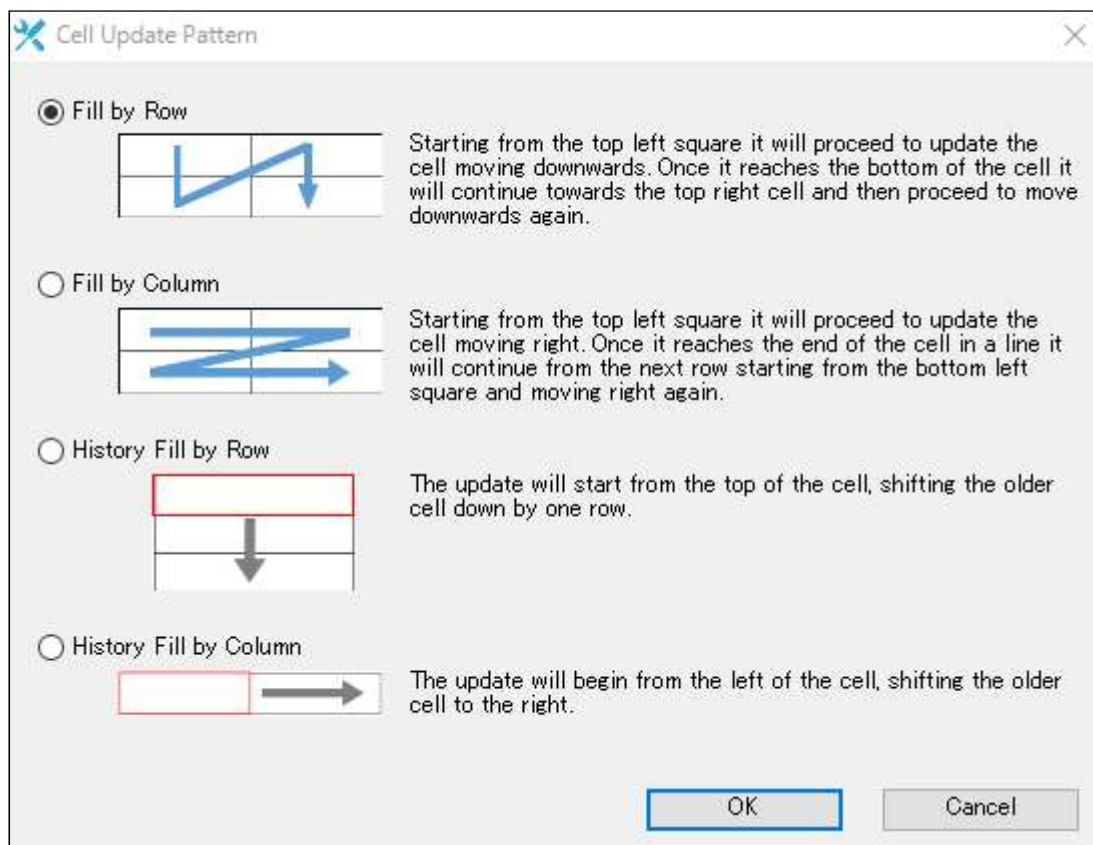
OK Cancel

Sheet Setting

The cell box next the “update to worksheet” section will automatically display the value for the cell that is currently open. If you want to change it, click the “Select” button.

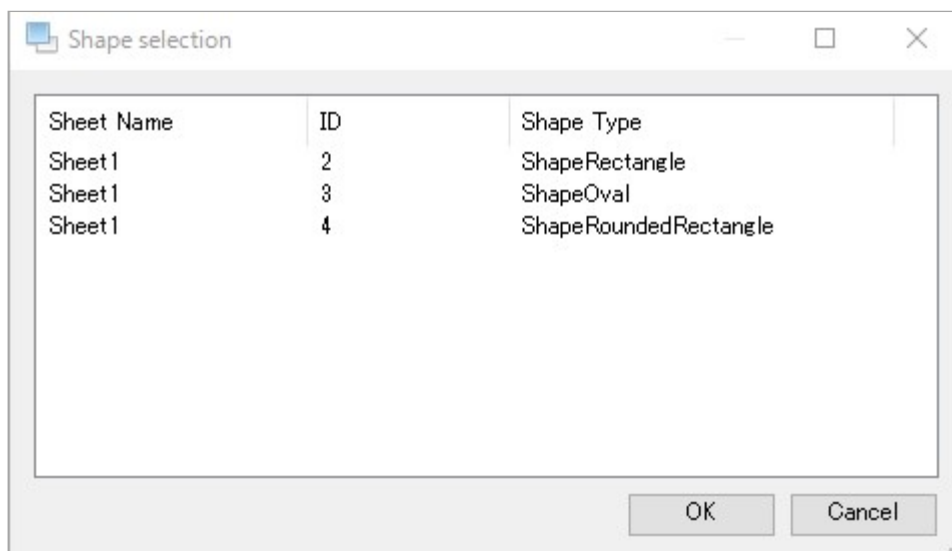
- Update Pattern

Selects the data of the update pattern.



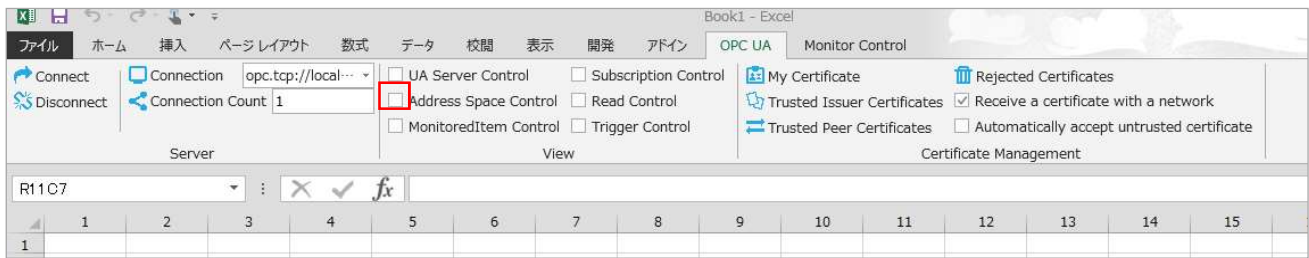
Shape Setting

Select the AutoShape you want to update. When you select an AutoShape on the list, the AutoShape you selected will be active.



Create Trigger (Variable)

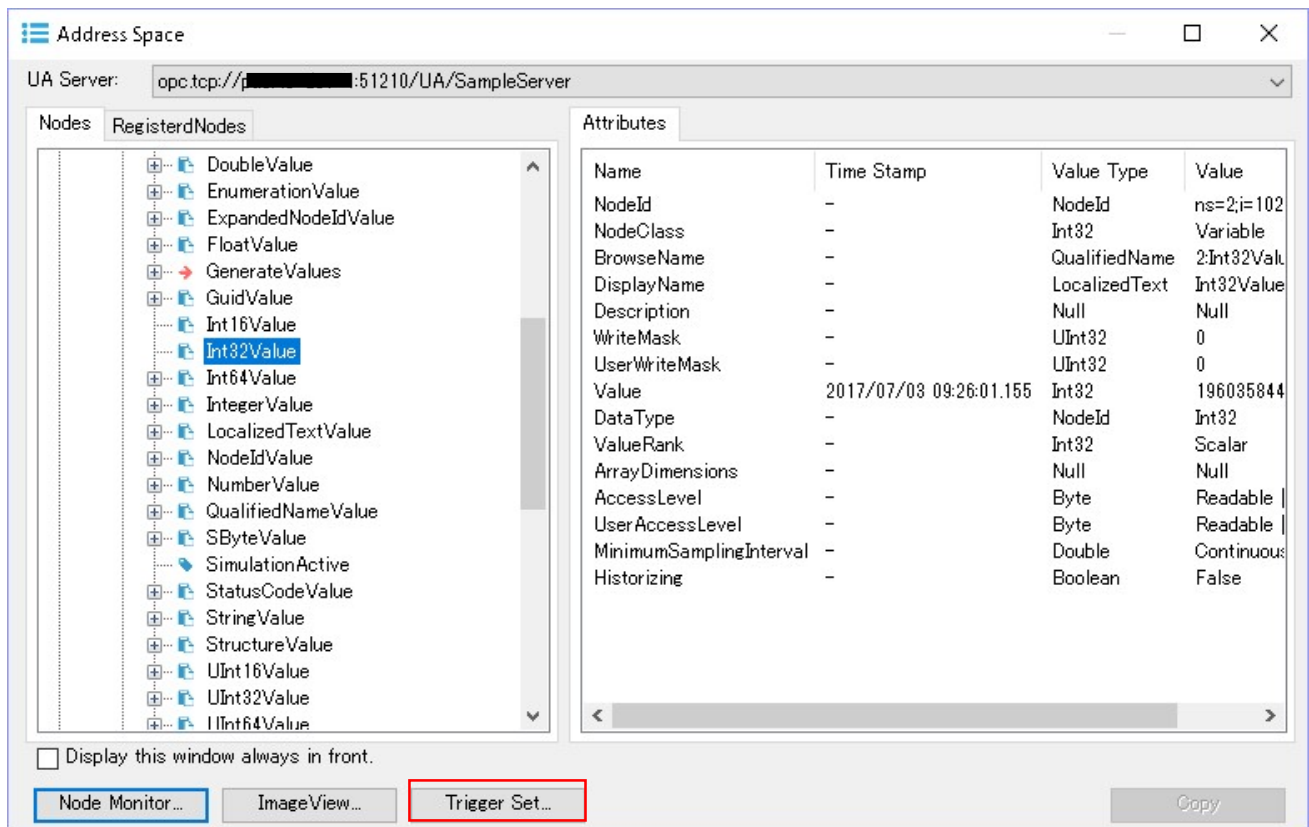
Step1. Open the 'OPC UA' tab on Microsoft Excel



Step2. Click the 'Address Space Control' check box

Step3. Select a variable node

Step4. Click the 'Trigger Set...' button



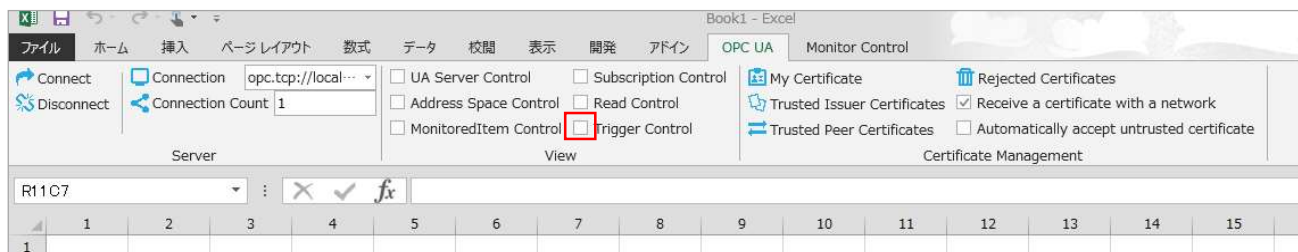
Step5. Click on the 'OK' button write value, to set the conditions.

When "Write Source Type" is "Sheet", this button is enabled.

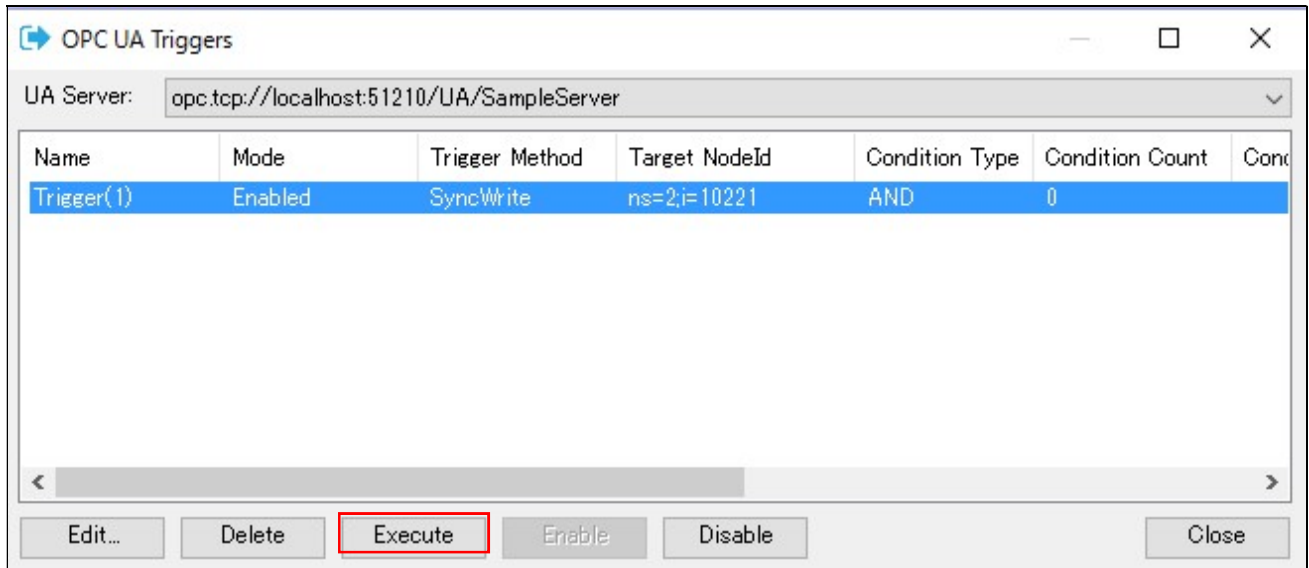
On	Source Type	Source	Operator	Value Type	Value

Step6. Open the 'OPC UA' tab on Microsoft Excel

Step7. Click the 'Trigger Control' check box

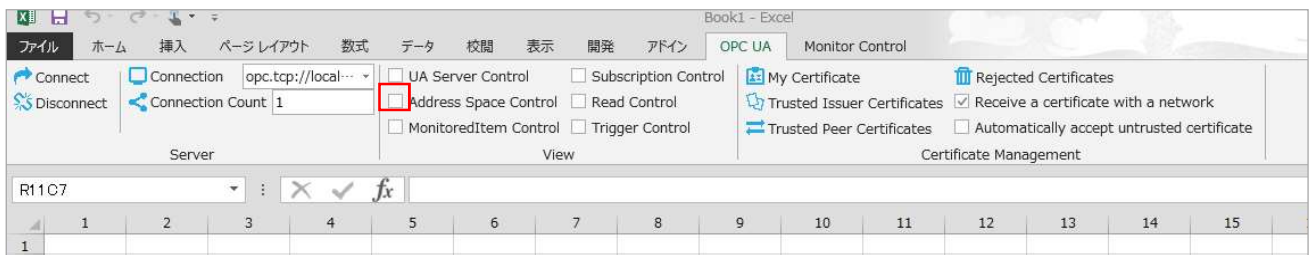


Step8. Click on the 'Execute' button to select an item.



Create Trigger (Method)

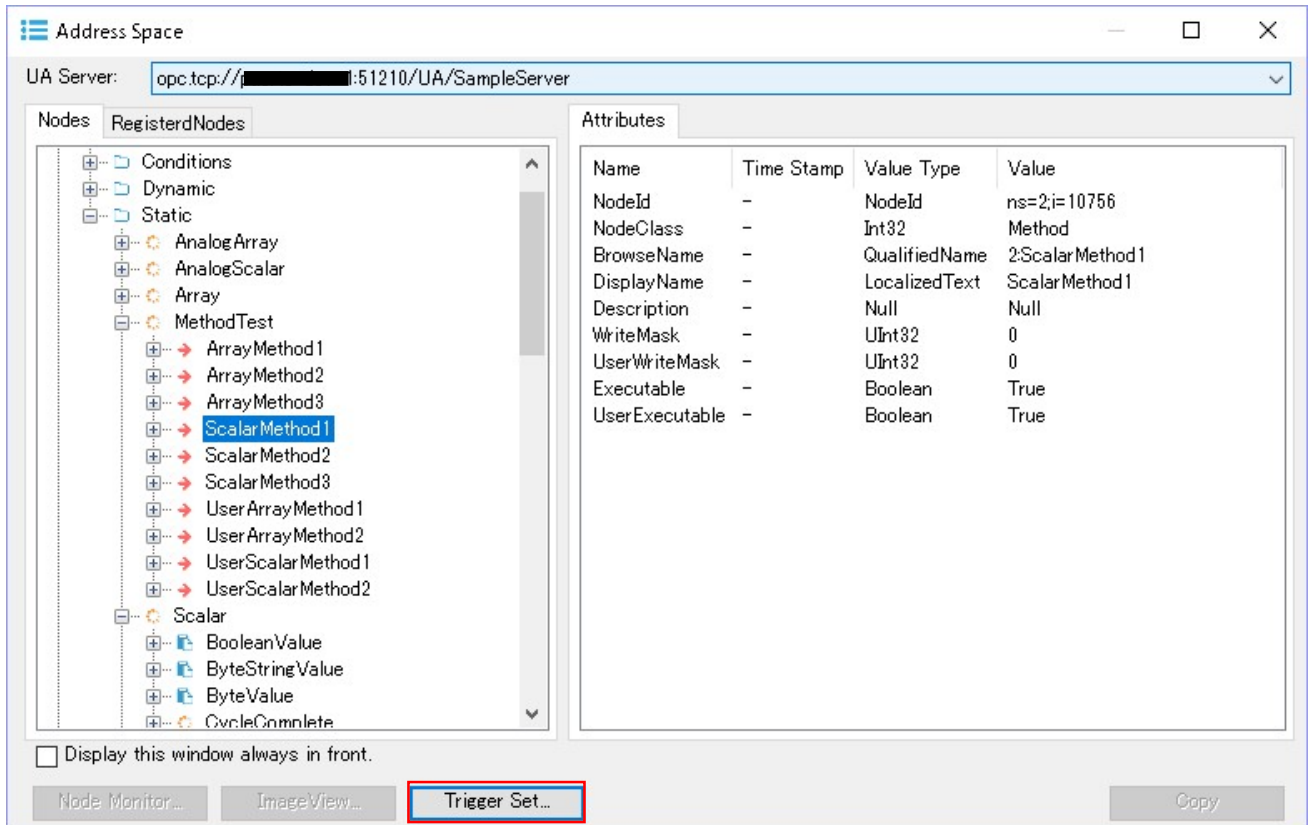
Step1. Open the 'OPC UA' tab in Microsoft Excel



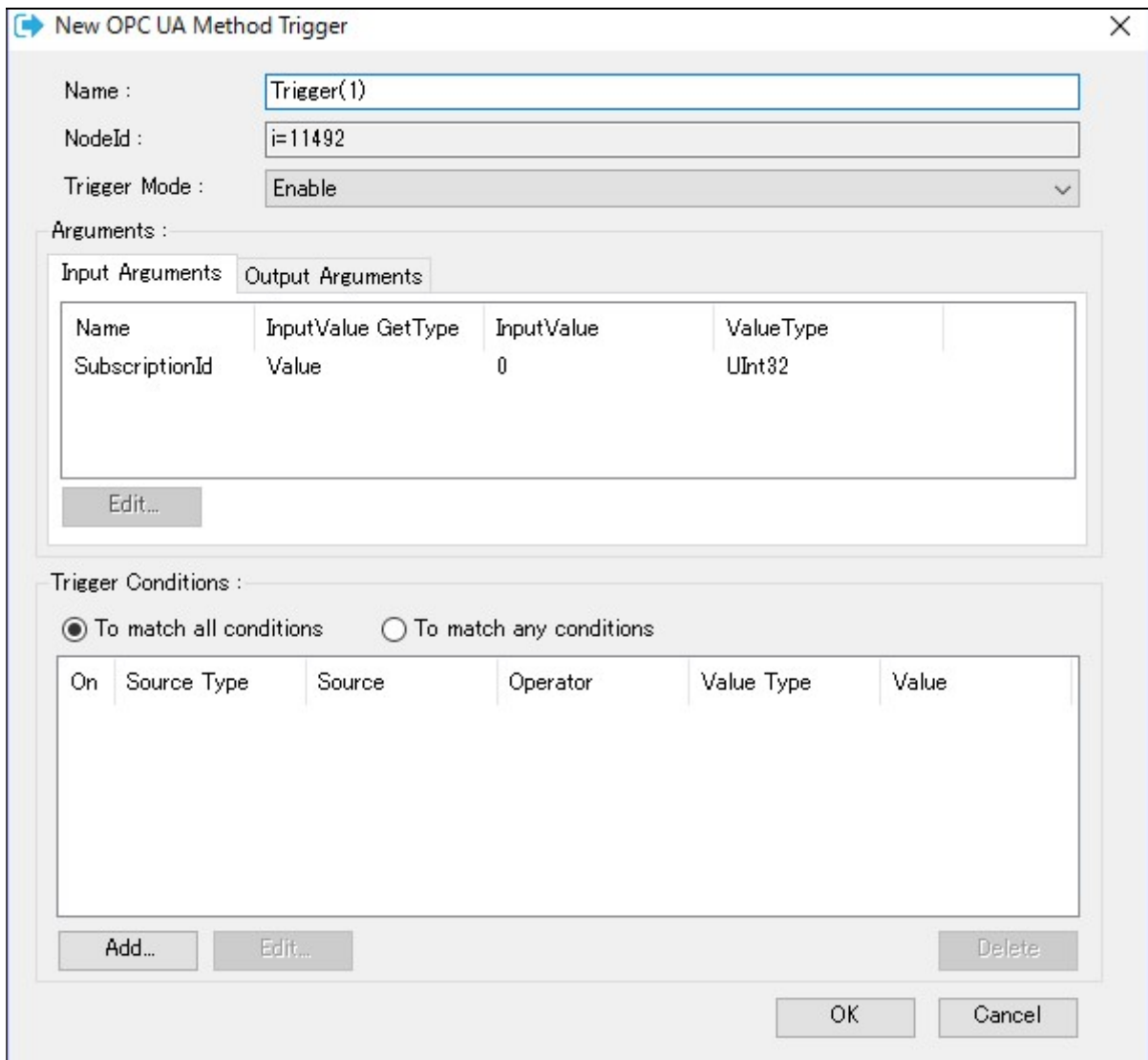
Step2. Click the 'Address Space Control' check box

Step3. Select a variable node

Step4. Click 'Trigger Set...' button



Step5. Click 'OK' to write the value or to set the conditions.

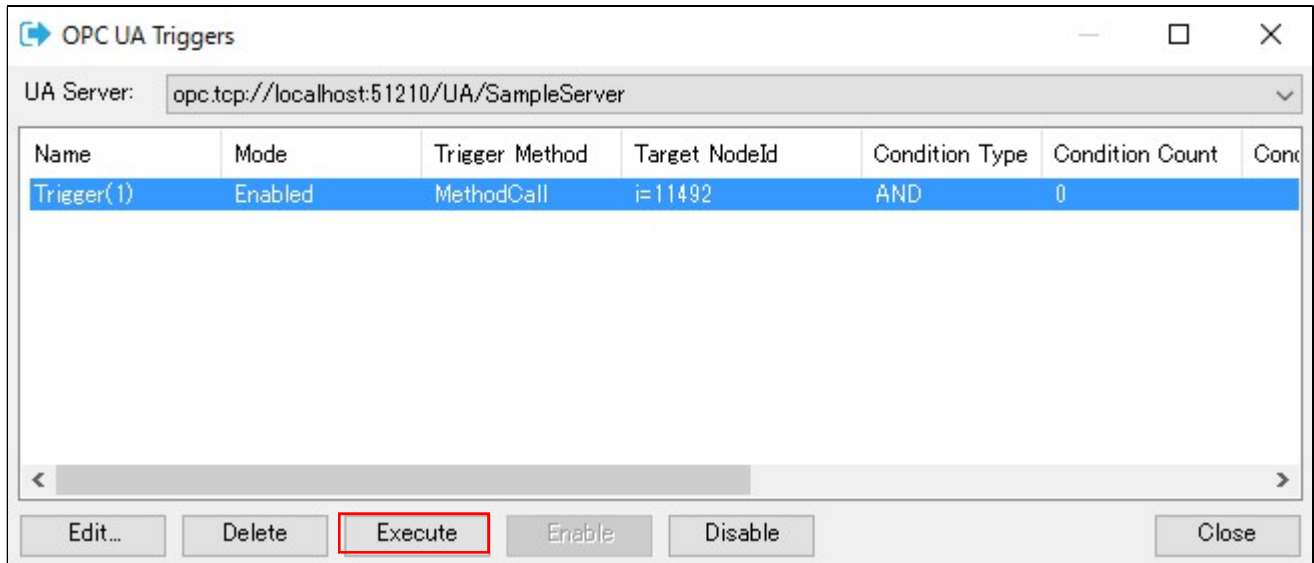


Step6. Open the 'OPC UA' tab on Microsoft Excel

Step7. Click the 'Trigger Control' check box

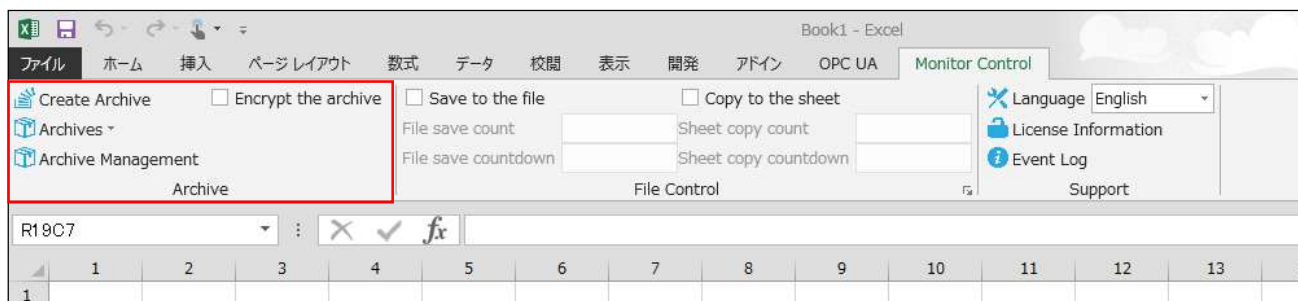


Step8. Click on the 'Execute' button to select an item.



Archive / Restore

Save the created screen and connection status or restore a previously created screen or connection status.



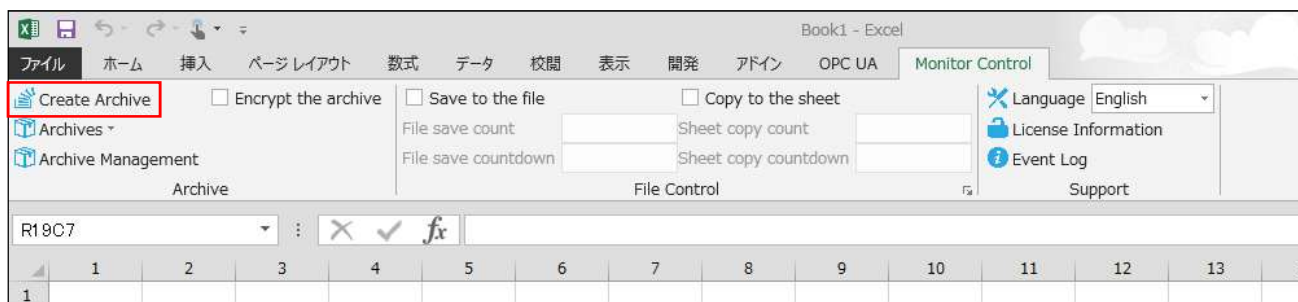
Connection state to be saved;

- UA Server connection
- Subscriptions
- MonitoredItems
- NodeReaders
- Trigger(Variable)
- Trigger(Method)

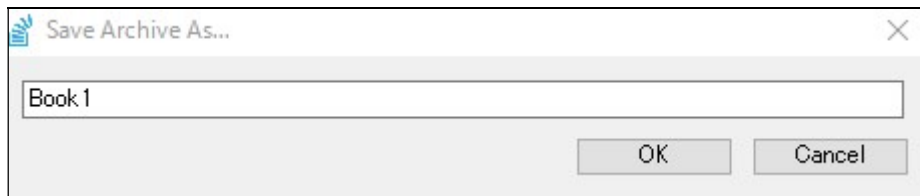
The archive can be saved while maintaining the communication with tables and format and graph settings of Microsoft Excel.

Create Archive

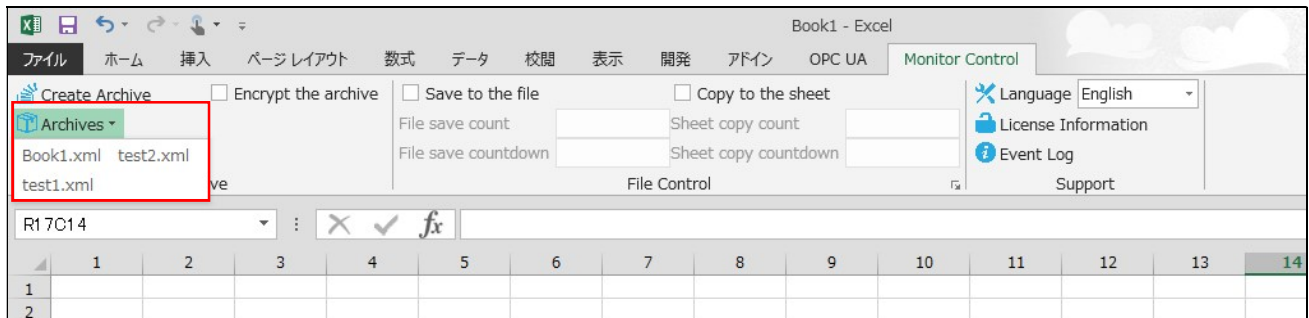
1. Click the "Create Archive"



2. Specify the name of the archive. Then click the "OK" button



3. It will be added to "Archives" and "Archive Management"



Execute Restore

Displays the Excel tables and format and graph settings and allows you to restore the communication state.

1. Click on the name of the "Archives"

