



AIOT CLOUD CORP.

AIC Opc Ua

User Manual

AIOT CLOUD CORP.

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FAQ



User Guides

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PREFACE

Disclaimer

The information in this document is subject to change without prior notice and does not represent commitment from AIOT CLOUD CORP. However, users may update their knowledge of any product in use by constantly checking its manual posted on our website: <https://www.aiotcloud.dev>. AIOT CLOUD CORP. shall not be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of any product, nor for any infringements upon the rights of third parties, which may result from such use. Any implied warranties of merchantability or fitness for any particular purpose is also disclaimed.

Acknowledgements

The AIC OpcUa Server is a trademark of AIOT CLOUD CORP. All other product names mentioned herein are registered trademarks of their respective owners.

Revision History

Version	Date	Description
v1.0	July 2022	<ol style="list-style-type: none">1. Support TLS 1.0/1.1/1.2/1.32. Supports multiple role definitions3. Supports Alarm notification4. Supports Historical data logging (csv)5. Supports SQL database connection6. Support PubSub 1.05.01

CHAPTER 1: USING THE AIC OPCUA SERVER

1.1 Introduction

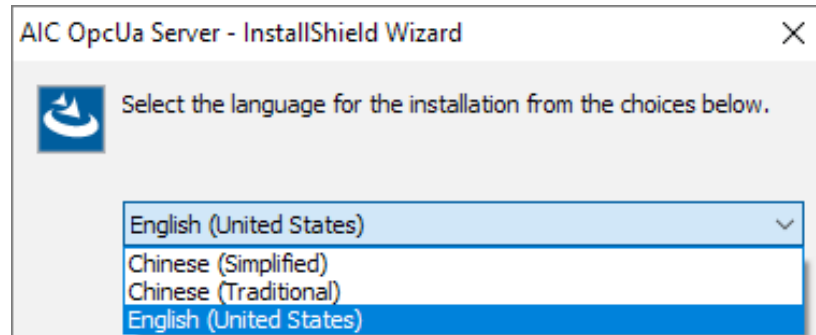
AIC OpcUa Server is an Open Platform Communications Unified Architecture (OPC UA) server package with the focus on communicating with systems for data collection. Based on the OPC UA information model, We provide the platform required for information collection and allows users to leverage the service-oriented architecture of OPC UA to organize their complex data into an OPC UA namespace. With features such as tag subscriptions and real-time updates, AIC OpcUa Server plays a key role as a communication portal that allows OPC UA clients to manipulate HMI or PLC data. AIC OpcUa Server consists of a configurable GUI for parameters and settings as well as an OPC UA server service to act as a hub for gathering data and sending them to OPC UA client applications, enabling a streamlined OPC UA system operation.

Check the operating system requirement before installing the AIC OpcUa Server. The following are the supported operating systems:

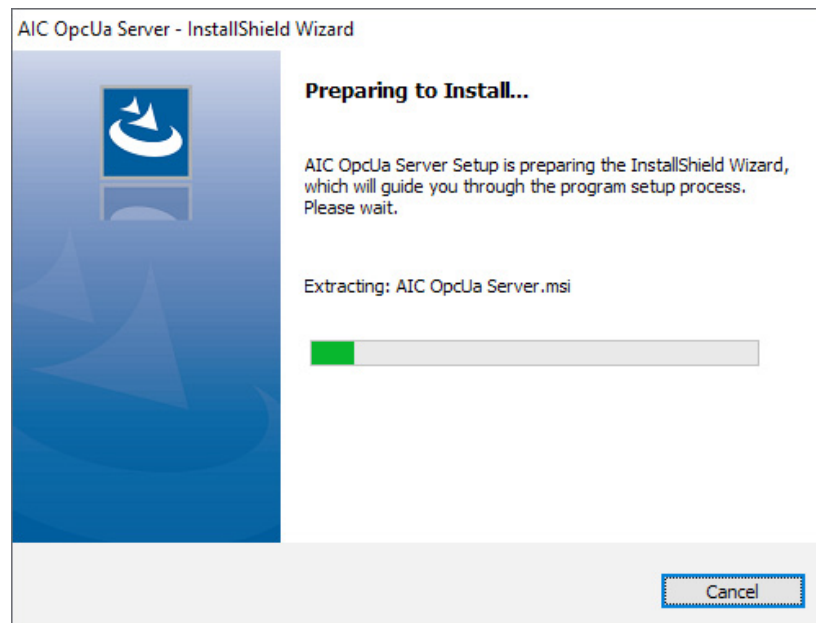
- Microsoft Windows 11, Windows 10, Windows 7 with Service Pack 1, Windows Embedded Standard 7 with Service Pack 1
- Microsoft Windows Server 2019, 2016, 2012 R2

1.2 Installing AIC OpcUa Server

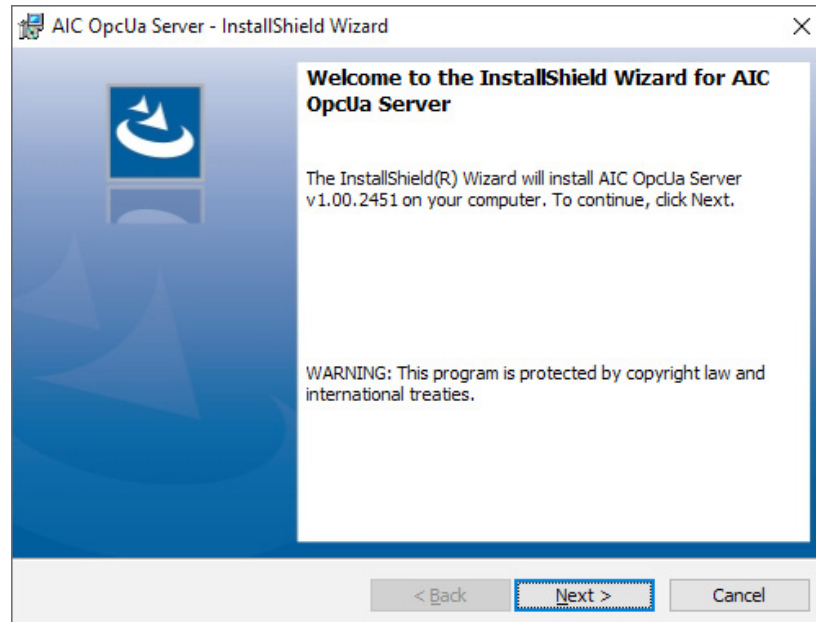
1. Double click on the filename of the AIC OpcUa Server setup file, select the language for the installation, and click **OK**.



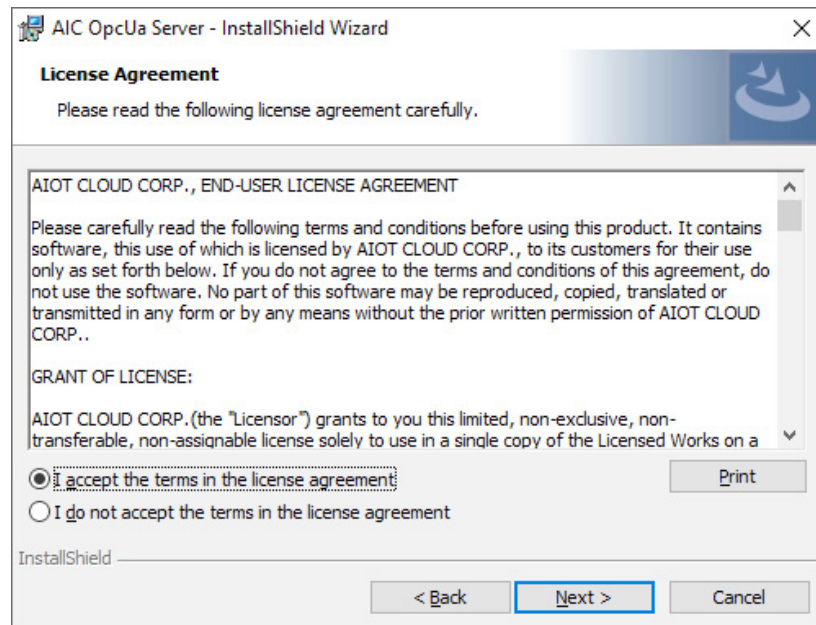
2. The installation wizard will prepare the setup process.



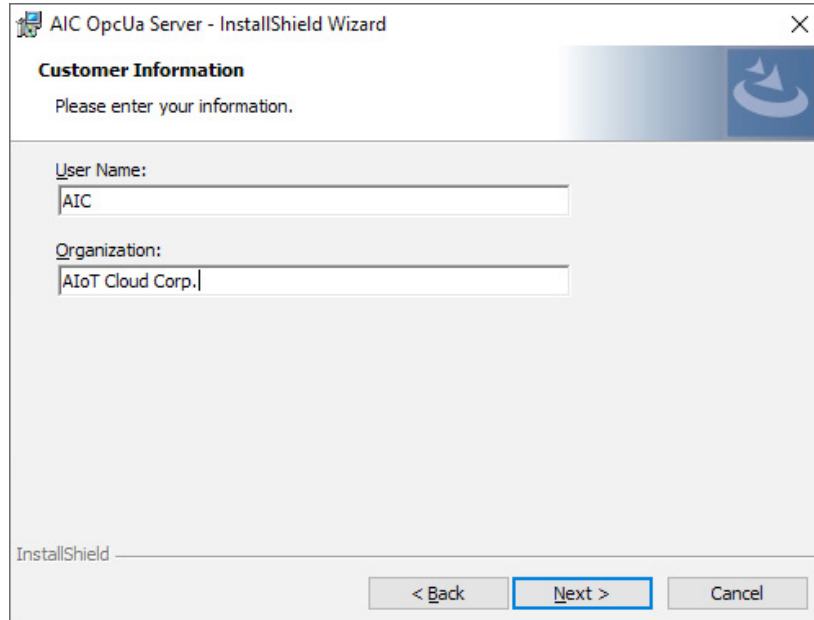
3. Click **Next** to proceed, or click **Cancel** to quit.



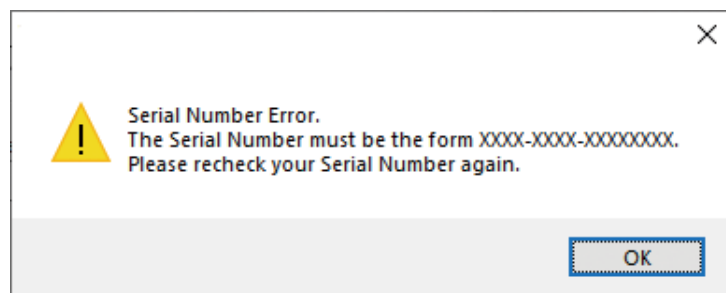
4. Check the **I accept the terms in the license agreement** option, and click **Next** to proceed.



5. Enter the user information.

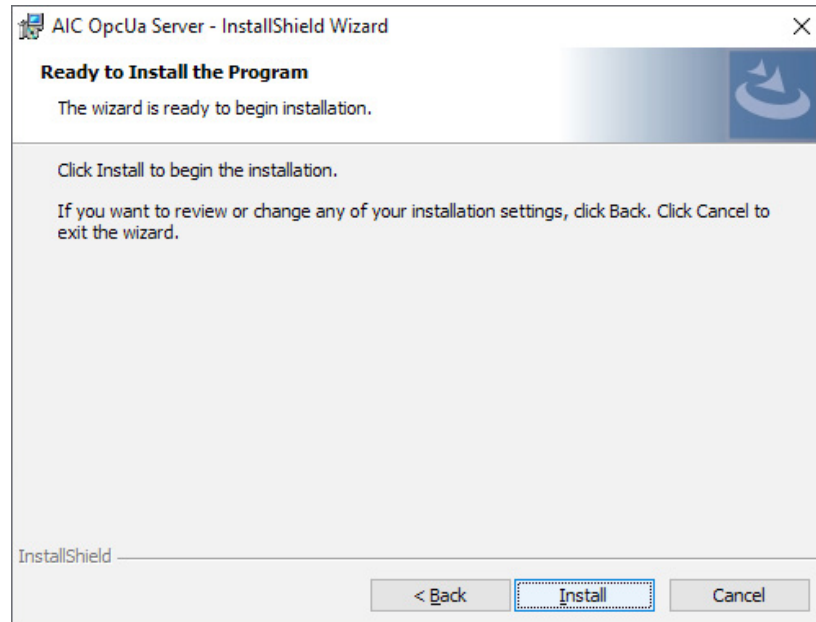


Note: You can use the **Trial Version** option and enter the serial number later. The entered product key will introduce a respective version of AIC OpcUa Server displayed on the title of the GUI.

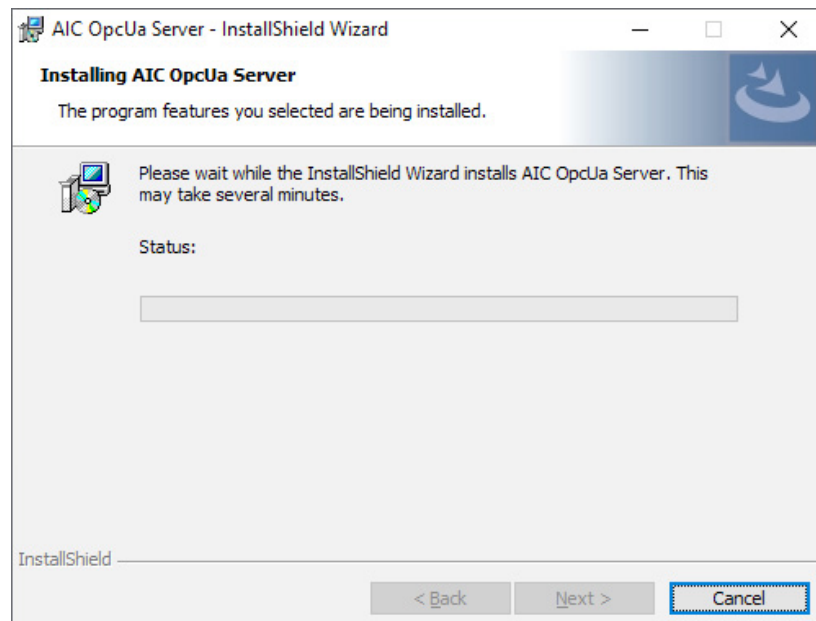


**A warning message will be prompted if the serial number is invalid.*

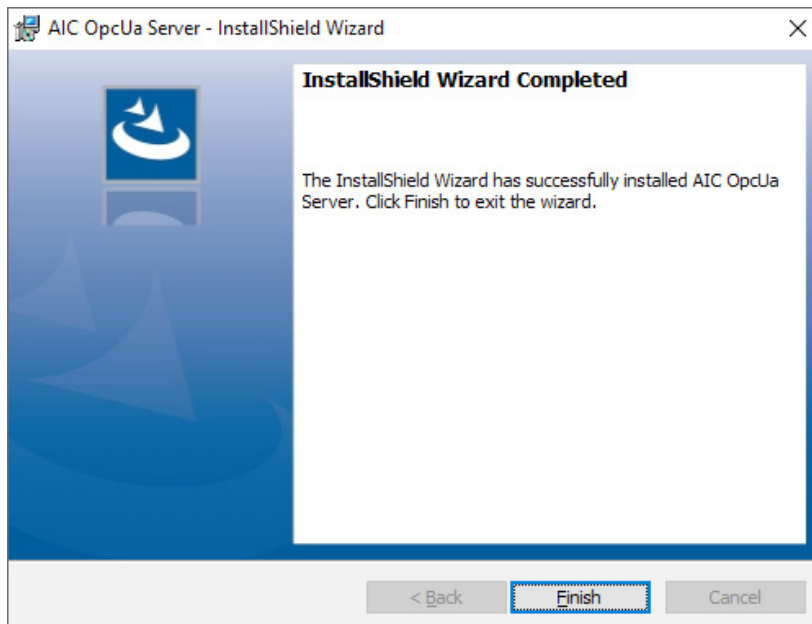
6. Click **Install** to begin installation.



7. The installation will begin and may take a while.

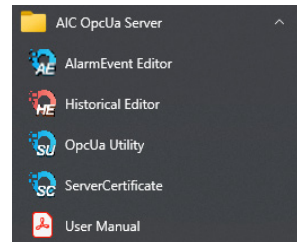


8. Once completed, click **Finish** to exit the installation wizard.

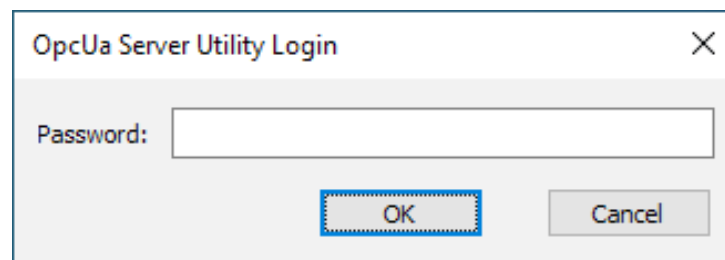


1.2 Launching AIC OpcUa Server

Once installed, you should be able to find the program named **AIC OpcUa Utility** in the **All Programs** list as shown.

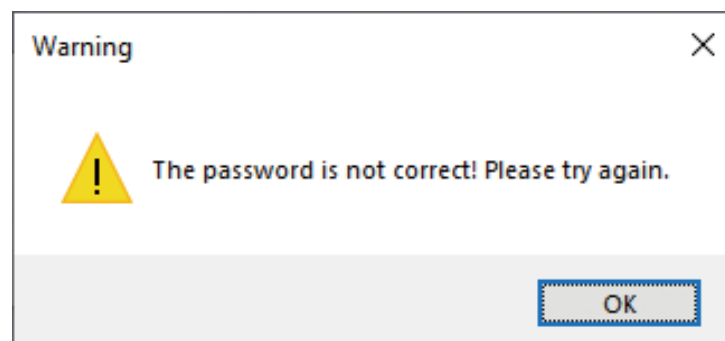


1. Click on the icon or **AIC OpcUa Utility** to launch the AIC OpcUa Server.
2. Enter the password in the respective field and click **OK**.



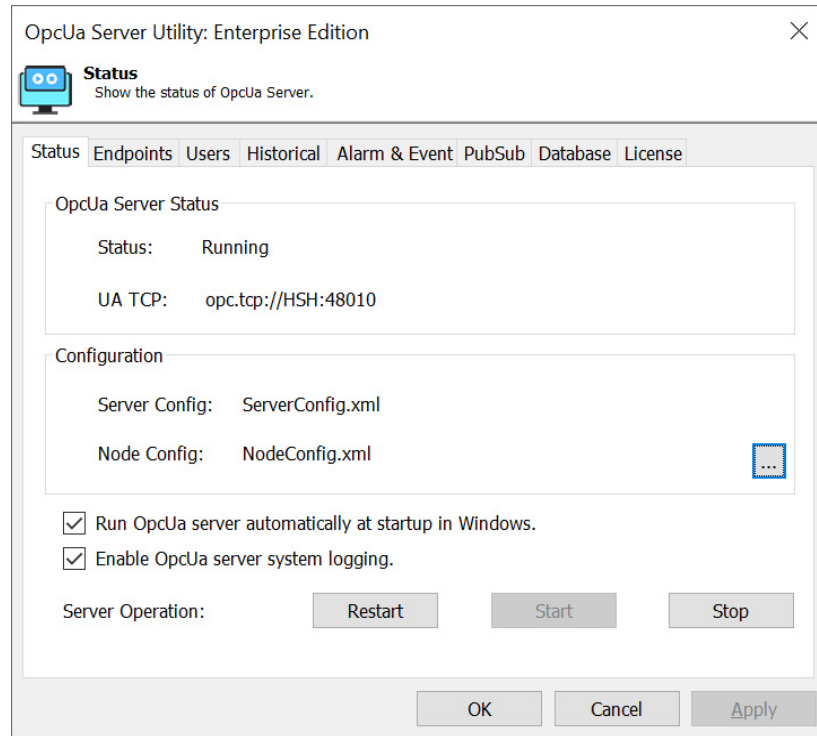
Note:

1. Use the default Password: *0000* to log in if you are logging in for the first time.
2. Remember to change the password frequently and keep it in a safe place to avoid hacking. Refer to *License* for setting the password.



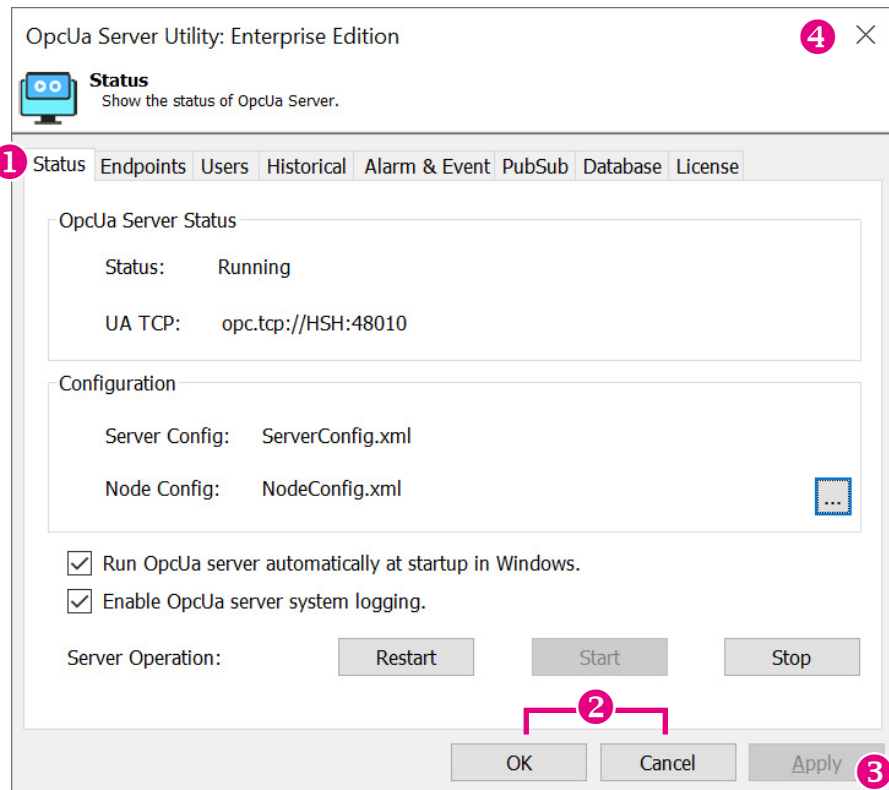
**A warning message will be prompted if an incorrect password is entered.*

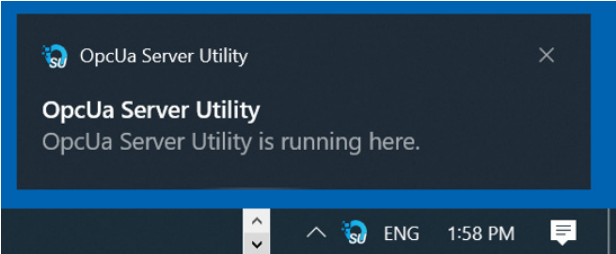
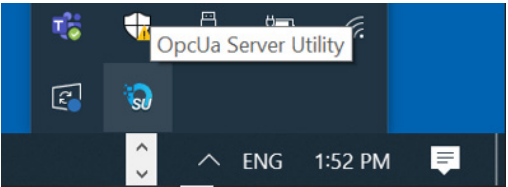
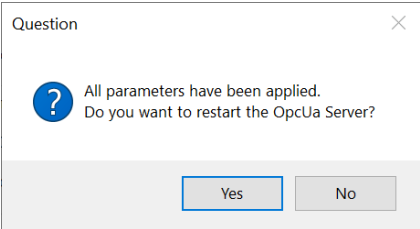
3. The GUI of AIC OpcUa Server will be displayed on the screen.



CHAPTER 2: AIC OPCUA SERVER BASICS

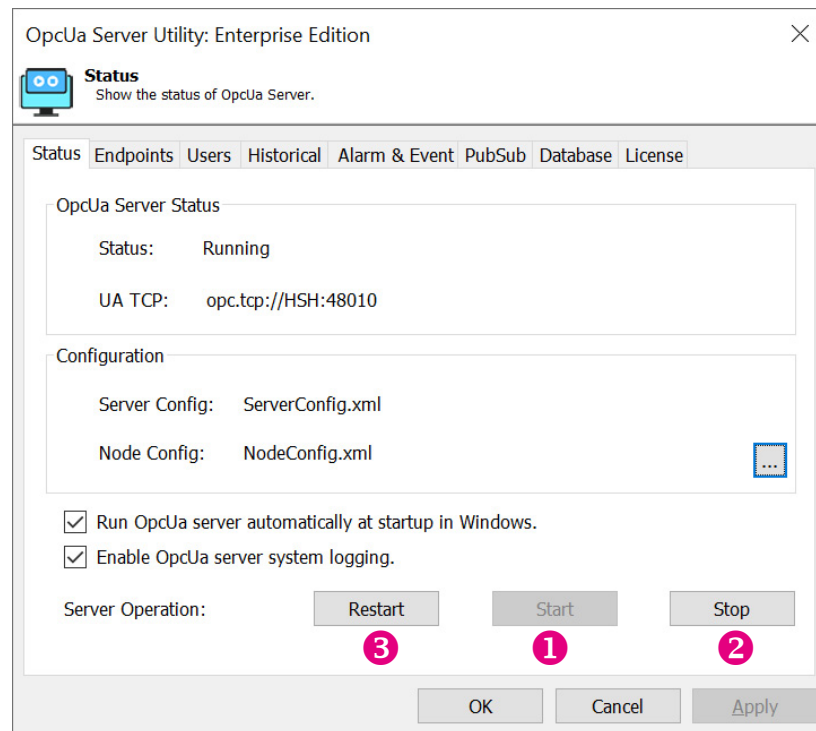
AIC OpcUa Server consists 7 pages of information and menus for server status and configurable parameters. Simply click on the respective tab for further configuration purposes with AIC OpcUa Server.

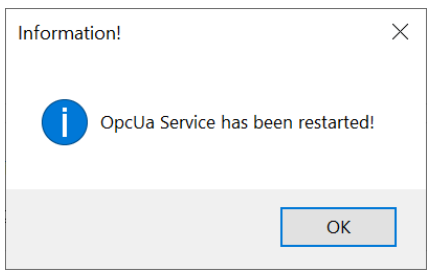


Item	Name	Description
1	AIC OpcUa Server Status	Move the cursor onto the connection address and right click to copy it.
2	OK/Cancel	<p>Click OK or Cancel to hide the interface in the background.</p>  <p>To bring the interface back to the screen, click on Show hidden icons in the taskbar, and click on the icon of AIC OpcUa Server. A message will prompt you to enter the password.</p> 
3	Apply	<p>Click Apply to make the configured parameters take effect. A message will prompt you with the option to restart the server.</p> 
4	X	Click on the X button to exit AIC OpcUa Server.

2.1 Status

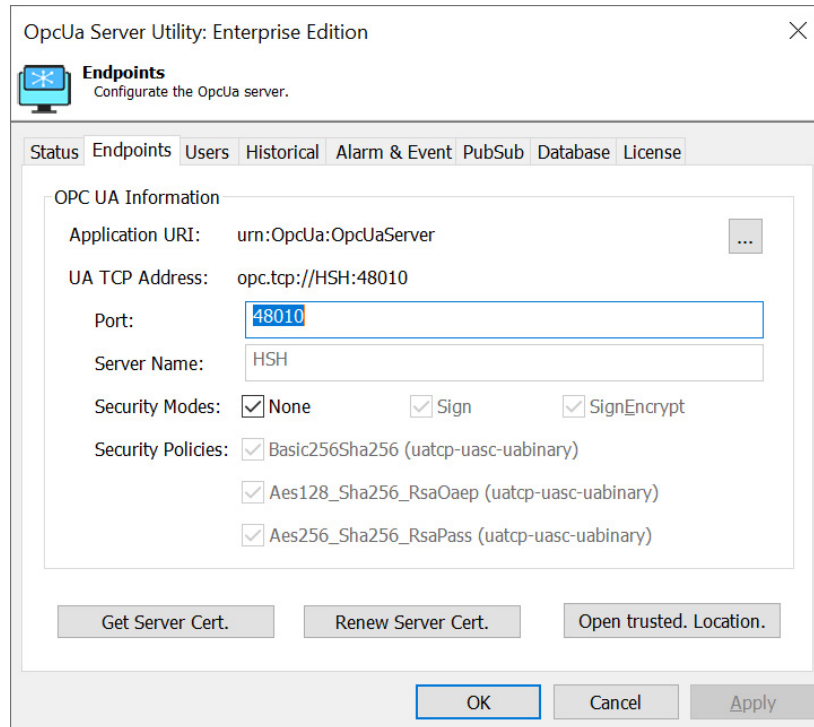
The Status page displays brief information about the current server status. When AIC OpcUa Server is launched, the server operation is initially stopped by default. Once AIC OpcUa Server is up and running, the connection addresses for **UA TCP:** will be displayed respectively, allowing client applications to use the addresses to connect to AIC OpcUa Server.



Item	Name	Description
1	Start	Click Start to get the server running.
2	Stop	Click Stop to stop the server operation.
3	Restart	Click Restart to stop and start the server operation. 

2.2 Endpoints

The Endpoints page allows you to configure all affiliated settings of connections between endpoints. You can edit the settings and save them by clicking **Apply** at the bottom of the user interface. The settings are applied once the server has been restarted.



The screenshot shows the 'Endpoints' configuration window in the OpcUa Server Utility: Enterprise Edition. The window title is 'OpcUa Server Utility: Enterprise Edition' and it has a close button (X) in the top right corner. Below the title bar, there is a 'Endpoints' icon and the text 'Configure the OpcUa server.' The main area contains a tabbed interface with 'Endpoints' selected. The 'OPC UA Information' section includes the following fields and options:

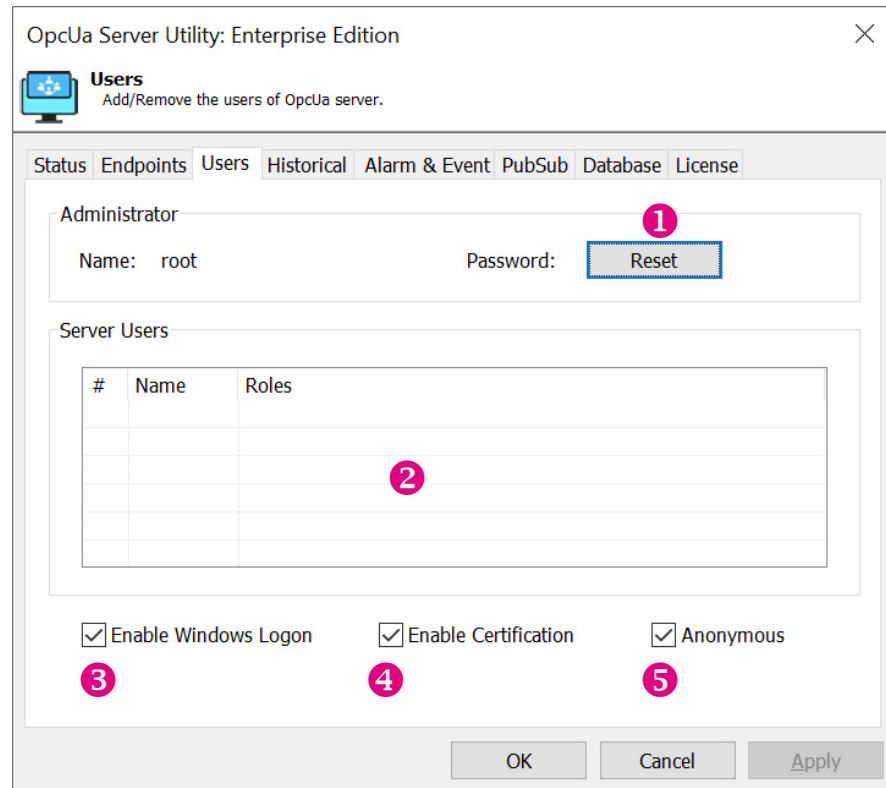
- Application URI: urn:OpcUa:OpcUaServer
- UA TCP Address: opc.tcp://HSH:48010
- Port: 48010 (highlighted in blue)
- Server Name: HSH
- Security Modes: None, Sign, SignEncrypt
- Security Policies: Basic256Sha256 (uatcp-uasc-uabinary), Aes128_Sha256_RsaOaep (uatcp-uasc-uabinary), Aes256_Sha256_RsaPass (uatcp-uasc-uabinary)

At the bottom of the configuration area, there are three buttons: 'Get Server Cert.', 'Renew Server Cert.', and 'Open trusted. Location.'. At the very bottom of the window, there are three buttons: 'OK', 'Cancel', and 'Apply'.

Item	Name	Description
1	Appliation URI	UA TCP is the default network protocol for the endpoints.
2	Port	Enter a number in the Port field to set the dedicated port for the connection address.
3	Server Name	Enter a name in the Server Name field to set the hostname for the connection address.
4	Security Modes	<p>Check either of the checkboxes in Security Modes to set the method for authenticating the connection.</p> <ul style="list-style-type: none"> • None: The connection does not require authentication. • Sign: The connection requires sign-in information. • SignEncrypt: The connection requires and encrypts sign-in information.
5	Security Policies	<p>Check either of the checkboxes in Security Policies to set the encryption algorithm used for the connection.</p> <ul style="list-style-type: none"> • Basic128Rsa15: The connection adopts RSA15 as the key wrap algorithm and 128-bit Basic as the message encryption algorithm. • Basic256: The connection adopts 256-bit Basic as the message encryption algorithm. • Basic256Sha256: The connection uses SHA256 for the signature digest and 256-bit Basic as the message encryption algorithm.

2.3 Users

The Users page displays user authentication settings. Connections to AIC OpcUa Server can be authenticated with username/password, Windows Logon, or Certification.



OpcUa Server Utility: Enterprise Edition

Users
Add/Remove the users of OpcUa server.

Status Endpoints **Users** Historical Alarm & Event PubSub Database License

Administrator

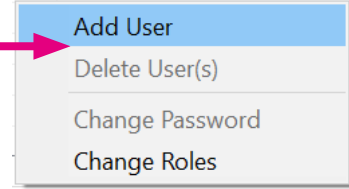
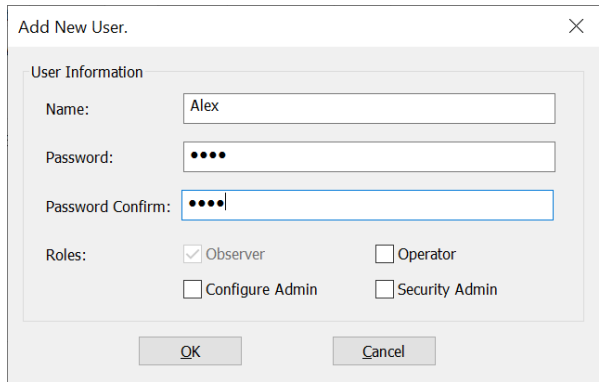
Name: root Password: Reset **1**

Server Users

#	Name	Roles

Enable Windows Logon **3** Enable Certification **4** Anonymous **5**

OK Cancel Apply

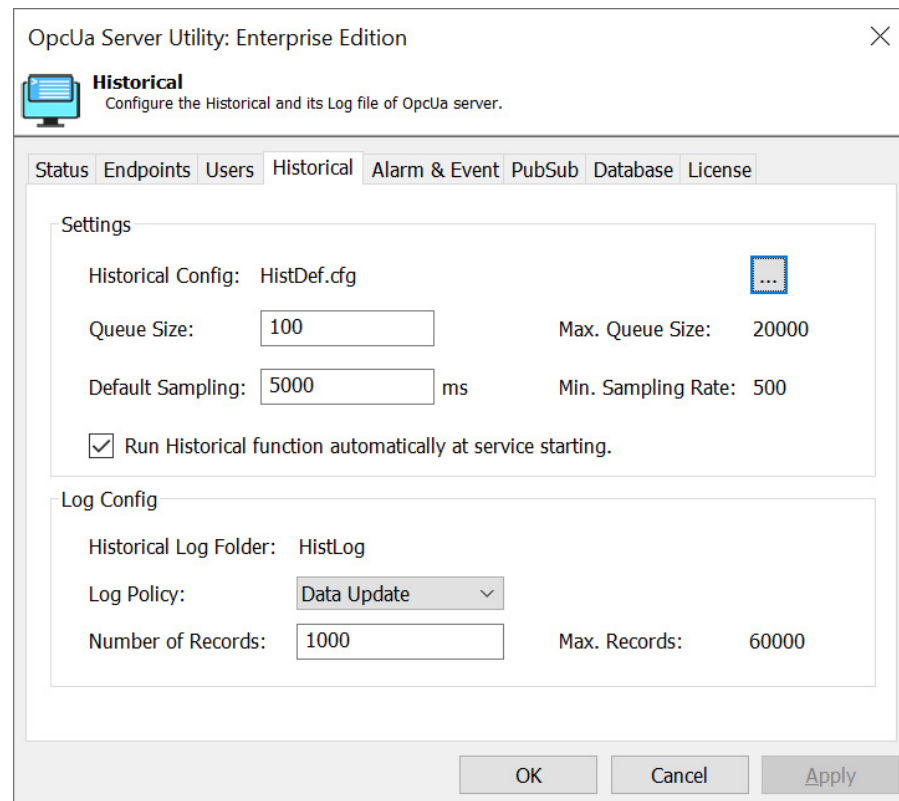
Item	Name	Description
1	Reset	Click Reset to change the password of the Administrator .
2	Server Users	<p>Right click on the table in Server Users to Add a user, Delete one or multiple users, Change Password of a user, and Change Access Right of a user.</p> <p>Note: Press and hold the Shift key and click on the name of the user to select multiple users.</p> 
	Add User	<p>Select Add User in the pop-up window to add a new account. Enter the required information in the respective fields, and select the required Access Right option by selecting the respective checkboxes. Click OK when done.</p> 
3	Enable Windows Logon	Check the checkbox on the left of Enable Windows Logon to enable or disable Windows logon, which is a feature that uses username and password of the local windows installation for AIC OpcUa Server connection.

4	Enable Certification	<p>Check the checkbox on the left of Enable Certification to enable or disable asymmetrical cryptography to authenticate with the self-signed certificate for AIC OpcUa Server connection.</p> <p>The trusted self-signed public key is stored in the following path: C:\Program Files\NEXCOM\AIC OpcUa Server\pkuser\trusted\certs</p> <p>The rejected self-signed public key is stored in the following path: C:\Program Files\NEXCOM\AIC OpcUa Server\pkuser\rejected</p> <p>Note: Moving a rejected self-signed public key from the "rejected" location to the "trusted" location results in its status becoming trusted.</p>
5	Anonymous	<p>Check the checkbox on the left of Anonymous to enable or disable anonymous login.</p>

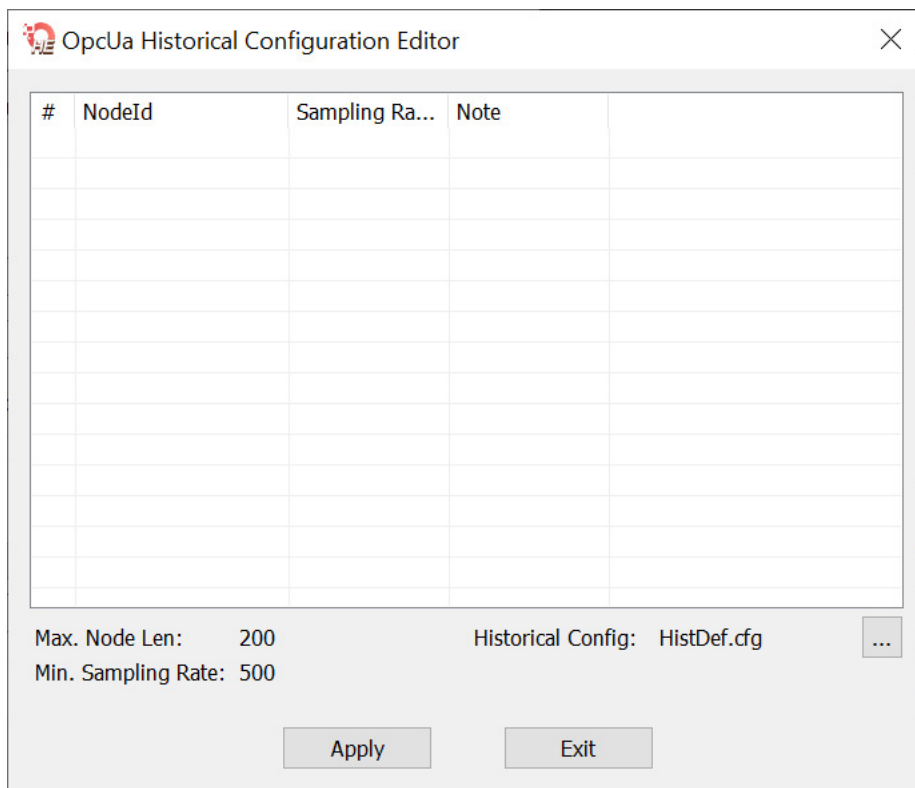
Note: Moving a rejected self-signed public key from the "rejected" location to the "trusted" location results in its status becoming trusted.

2.4 Historical

The Historical page displays the Settings and Log Config of the OpcUa Server Utility. The historical configuration is used to provide historical data for a variable from the OpcUa Server Utility.



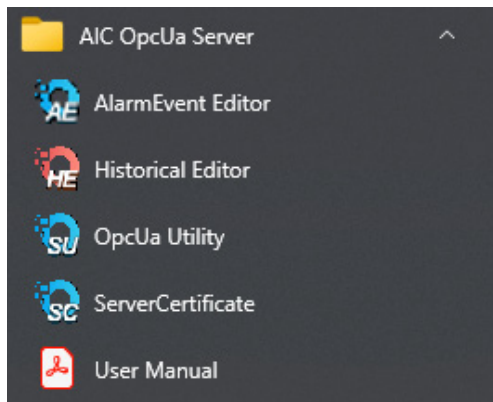
Click "..." will start the OpcUa Historical Configurator Editor, you can add NodeId, Sampling Rate and Note here.



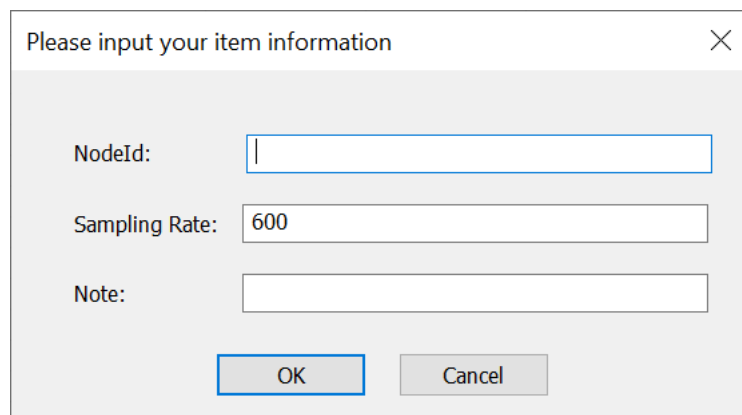
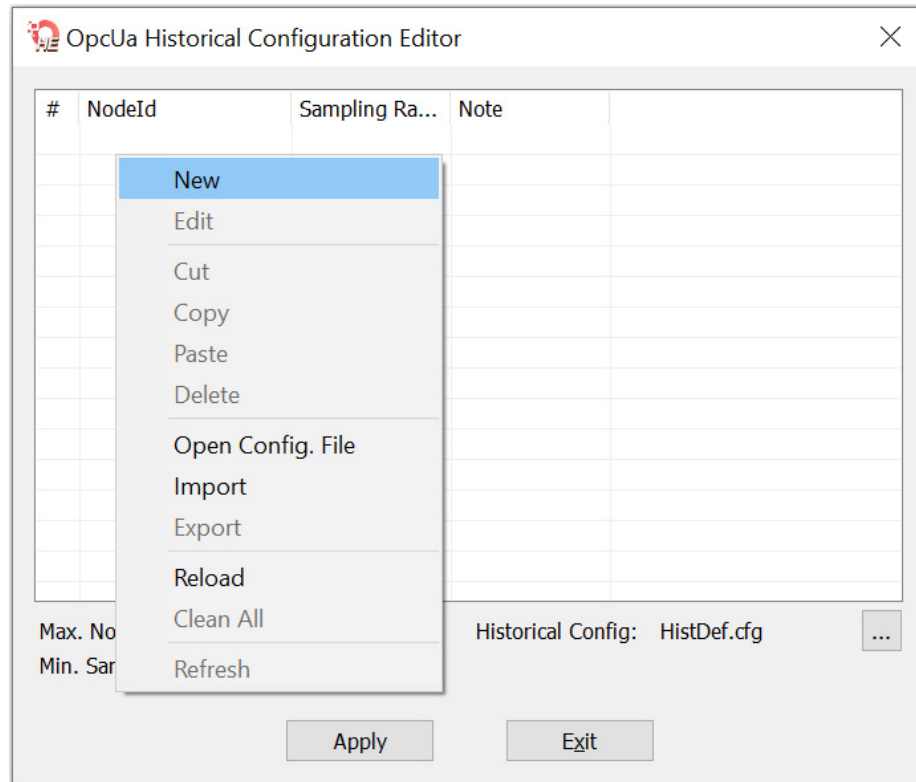
2.4.1 Historical Editor

For Historical data, we offer the tool for customer to view and editing the OPC UA historical data.

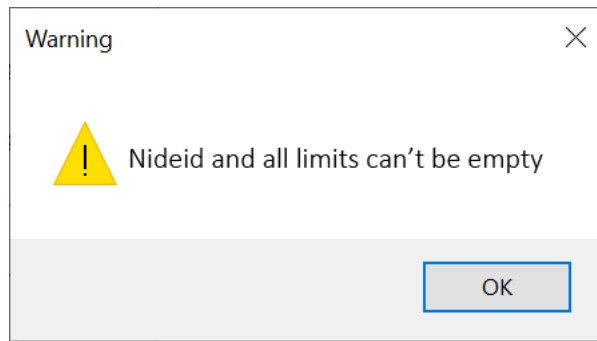
Please start it from Microsoft START menu, it will start the OpcUa Historical Configurator Editor, you can add NodeId, Sampling Rate and Note here.



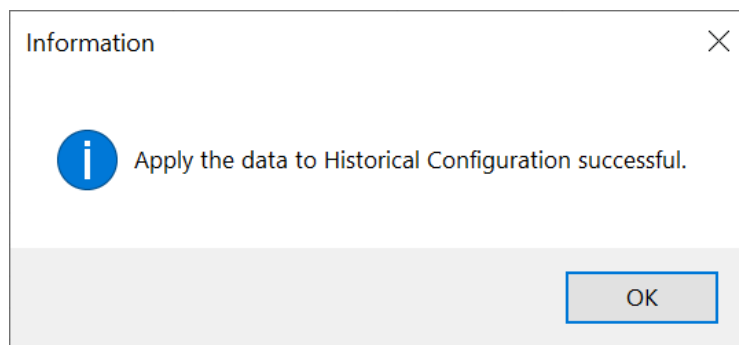
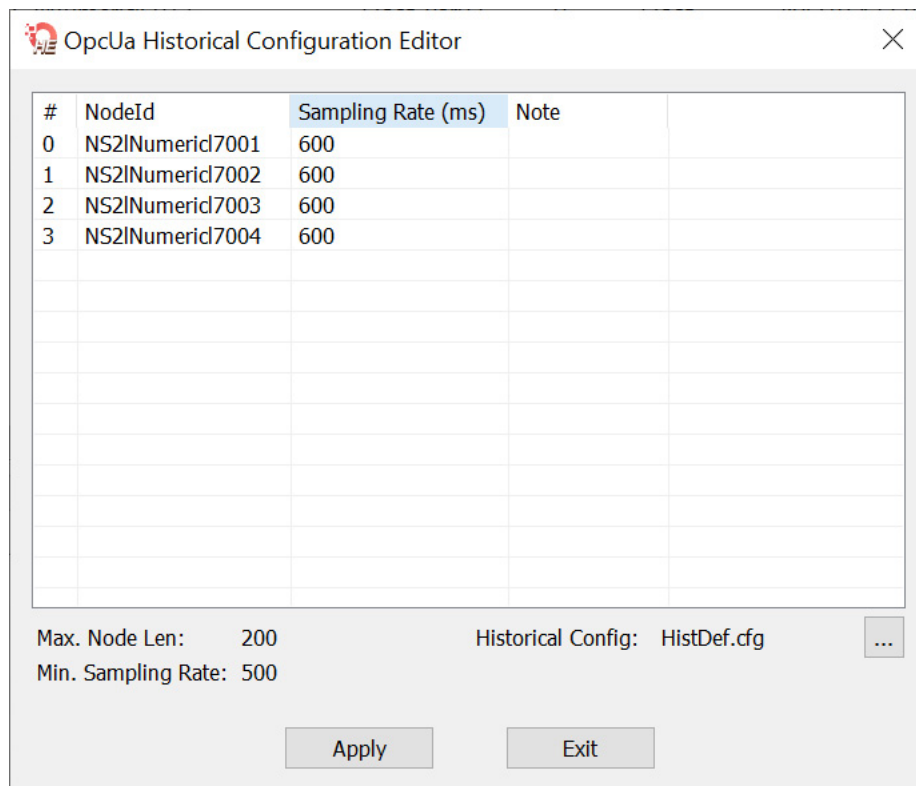
Right Click the mouse, it will show following menus.
Please click "New" to add NodeId, Sampling Rate and Note here.



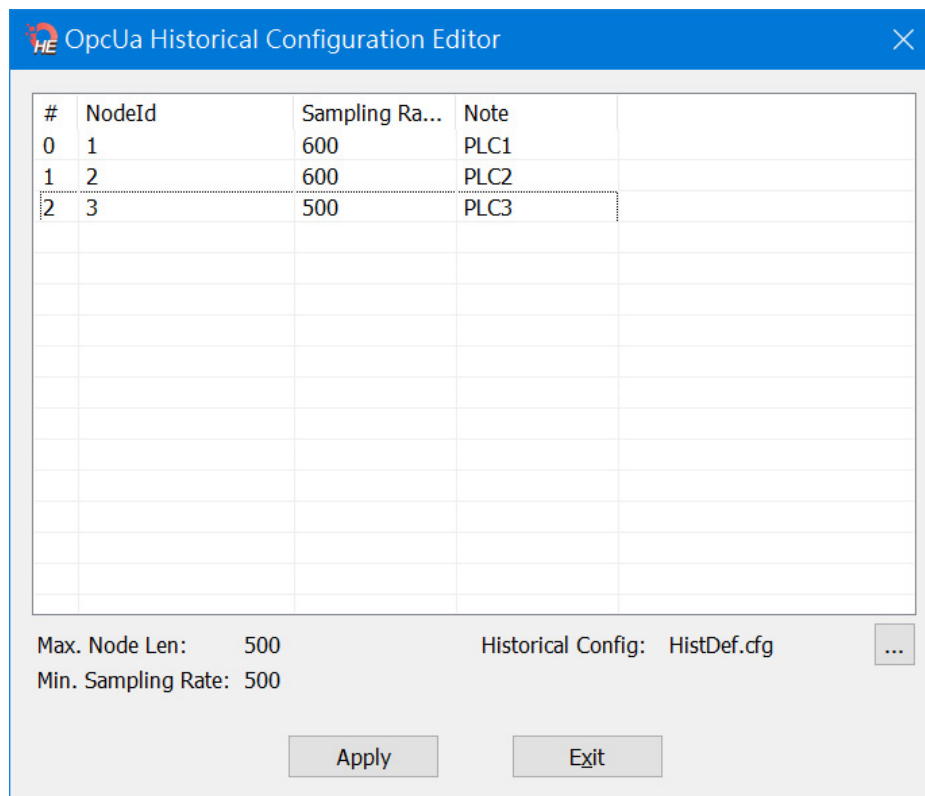
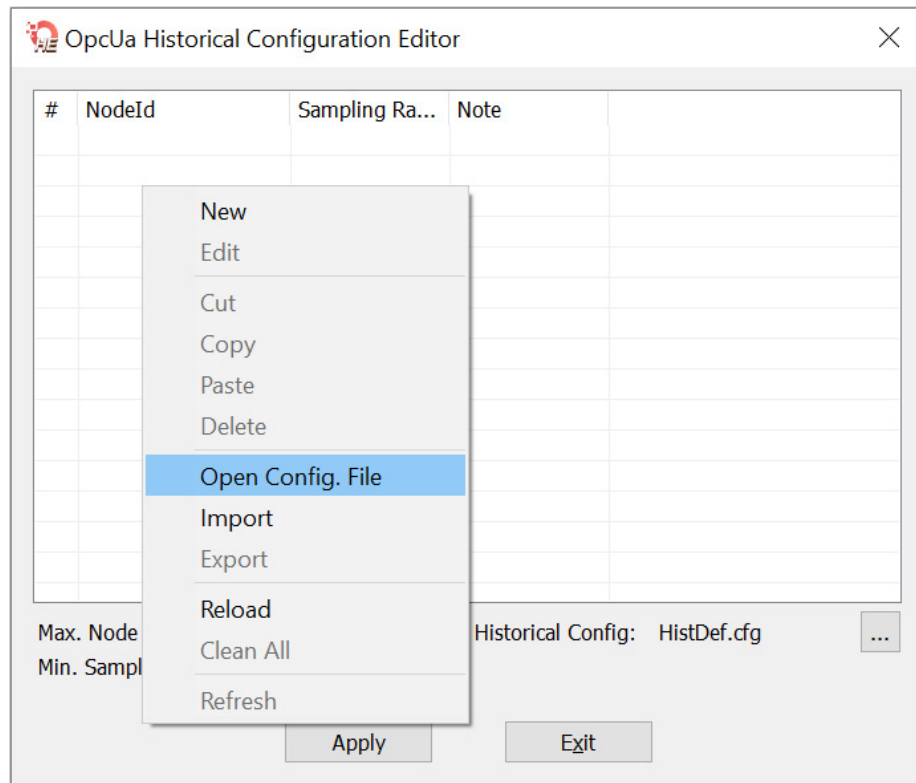
The screenshot shows a dialog box titled 'Please input your item information'. It contains three input fields: 'NodeId:' (empty), 'Sampling Rate:' (containing '600'), and 'Note:' (empty). At the bottom, there are 'OK' and 'Cancel' buttons.

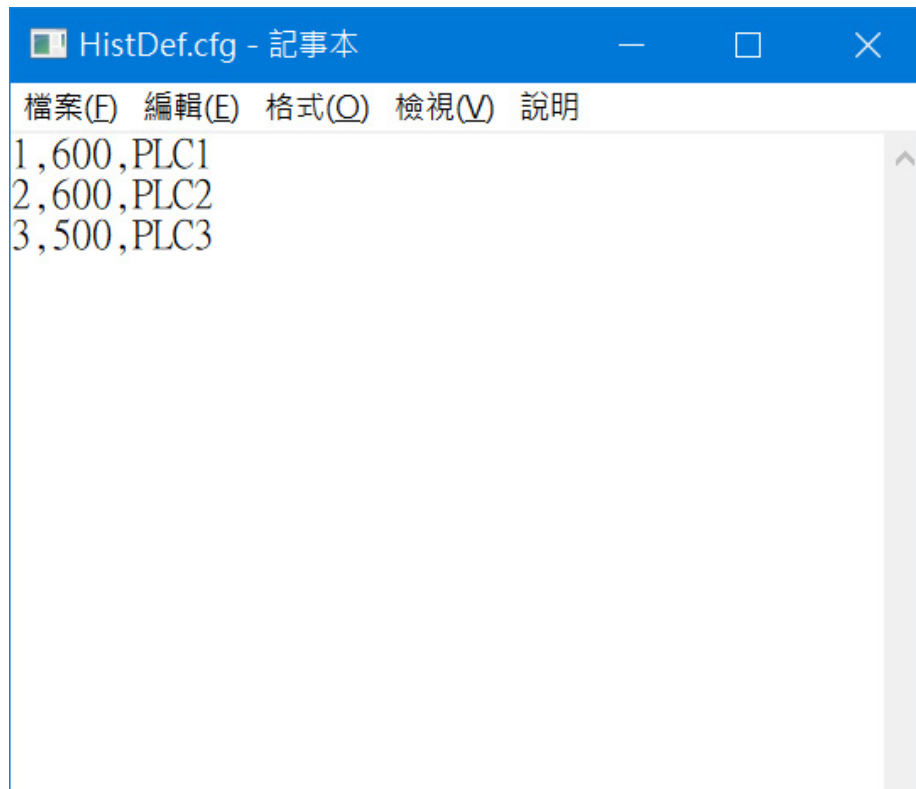


When you finish the inputs, please click "Apply" to enable the settings.

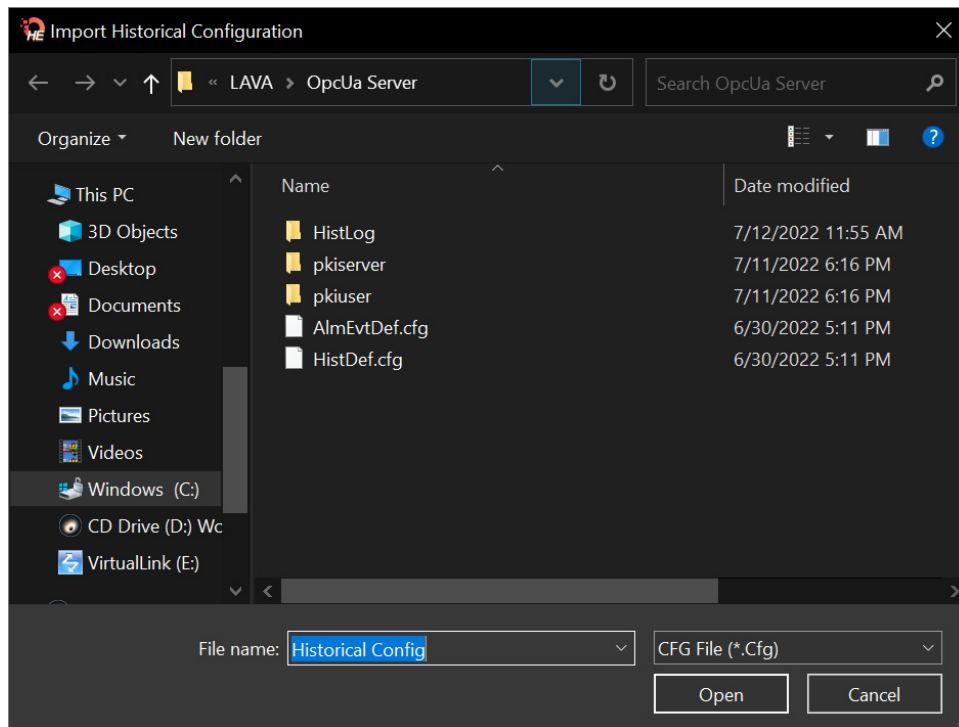
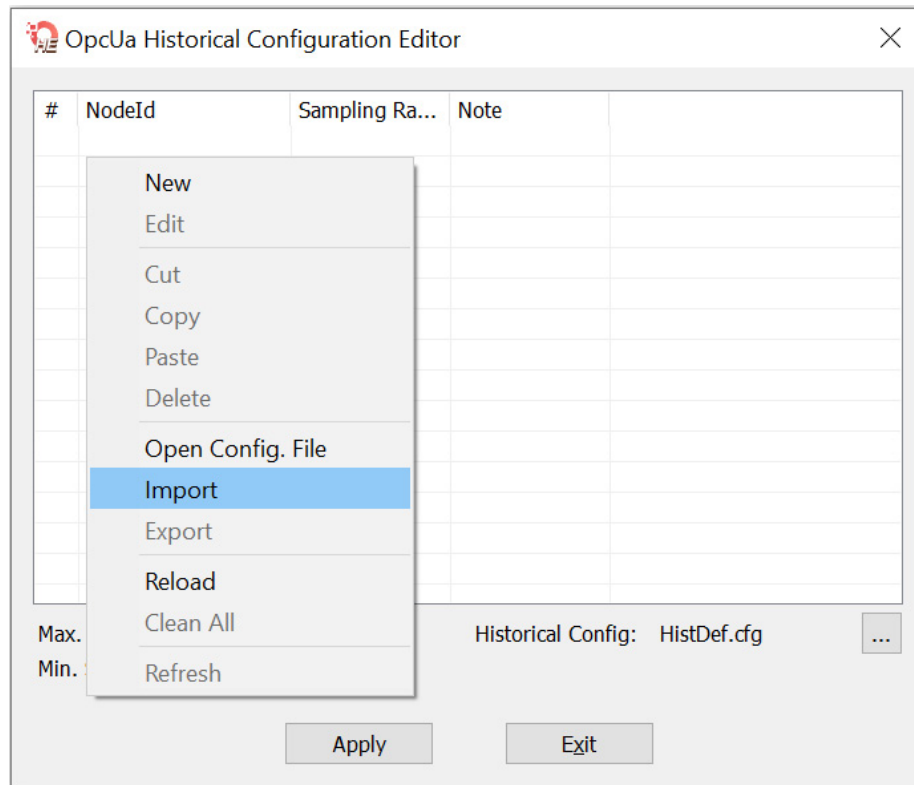


If you want to see detail configuration file, you can use "Open Config. File," we will give you row data in txt format.



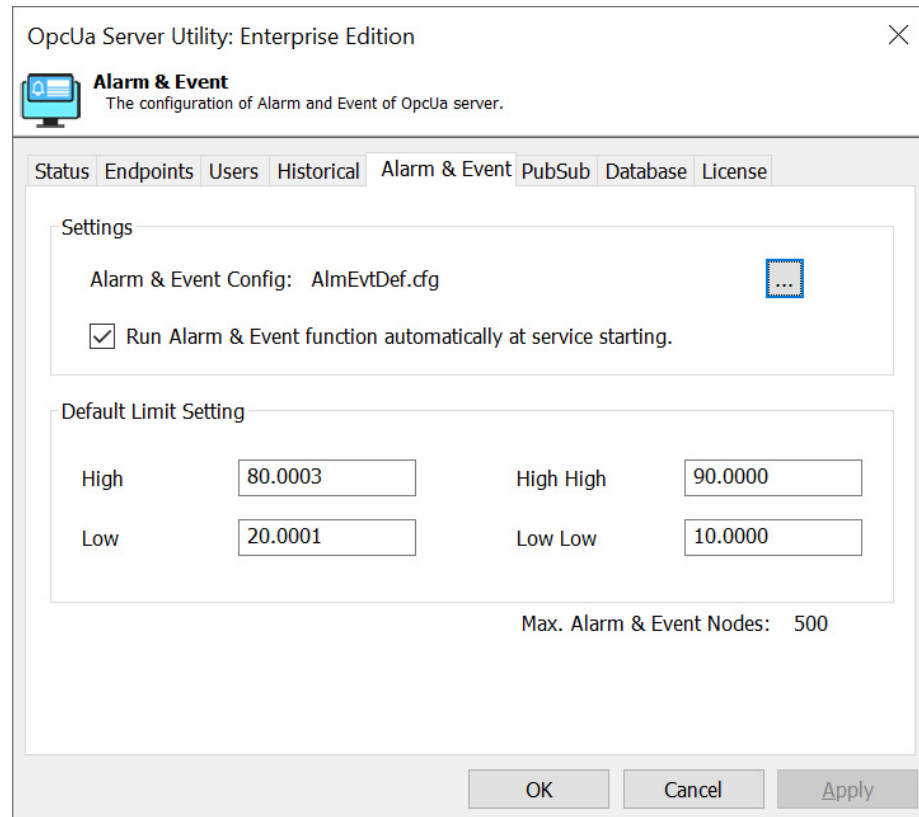


If you already have an old configuration file, you can use "import."



2.5 Alarm & Event

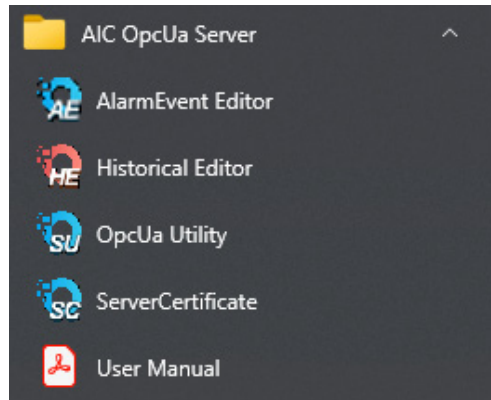
The Alarm and Event page is for users to browse and setup all the nodes with alarm notification values, including High High, Low Low, High, Low. Please click "... " to open the "OpcUa Alarm& Event Configuration Editor."



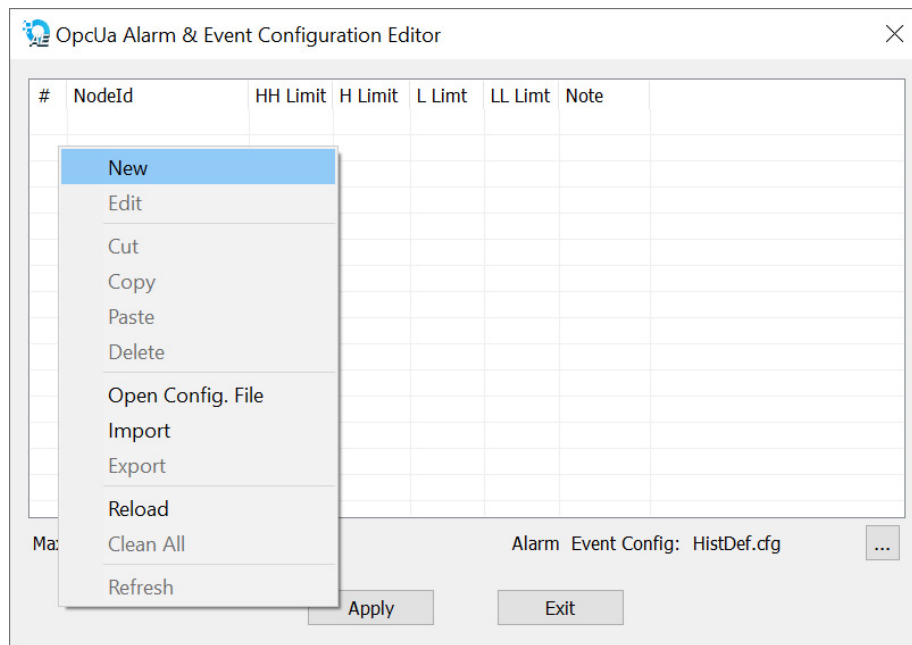
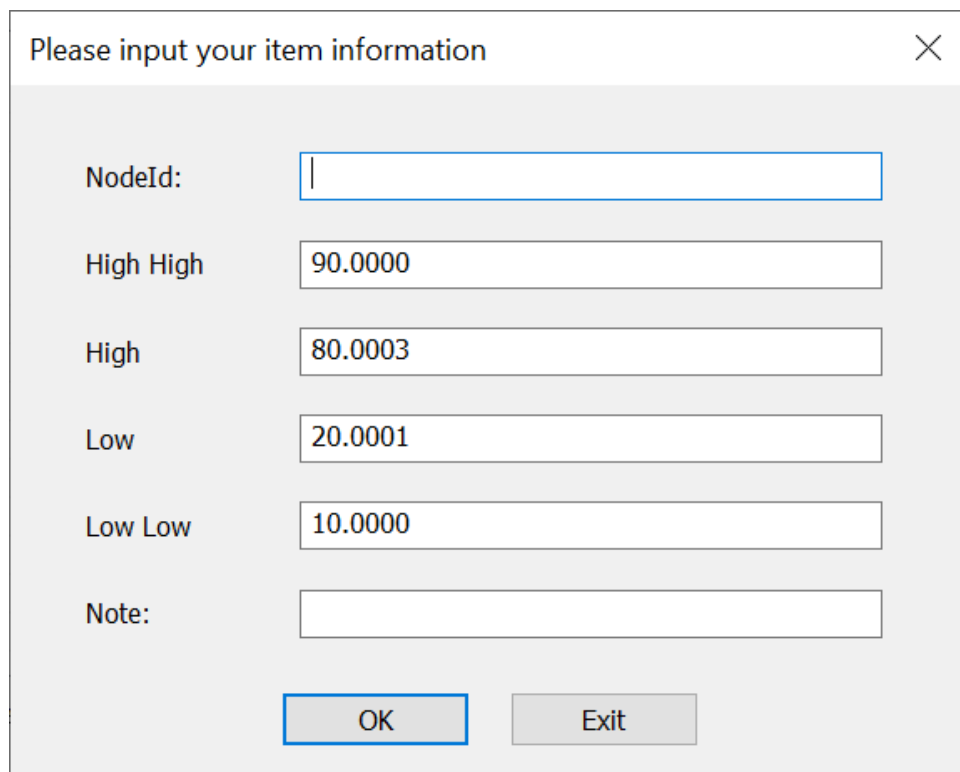
2.5.1 AlarmEvent Editor

For Alarm & Event data, we offer the tool for customer to view and edit the OPC UA High High, High, Low Low, Low data.

You can start it from Microsoft Start menu, AlarmEvent Editor.



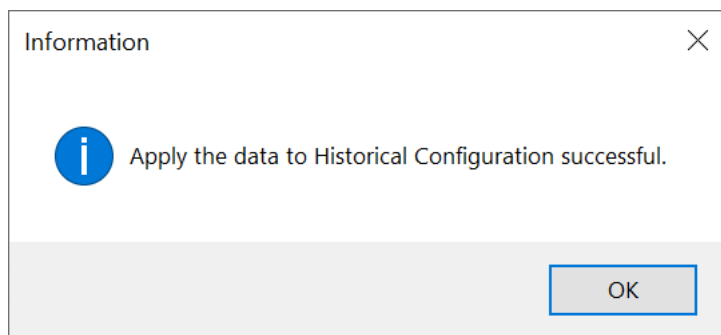
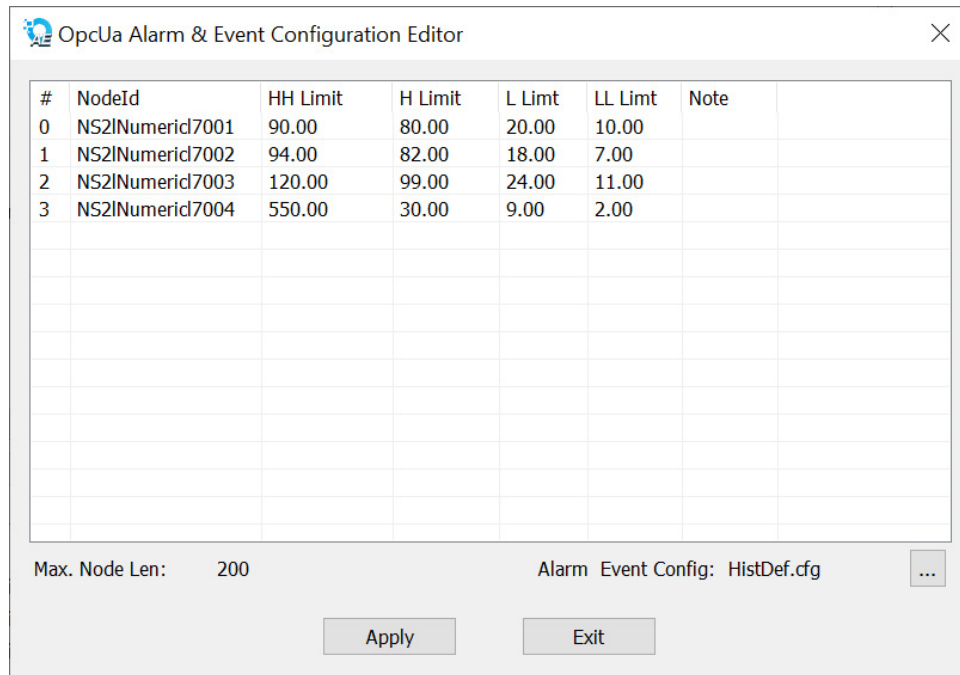
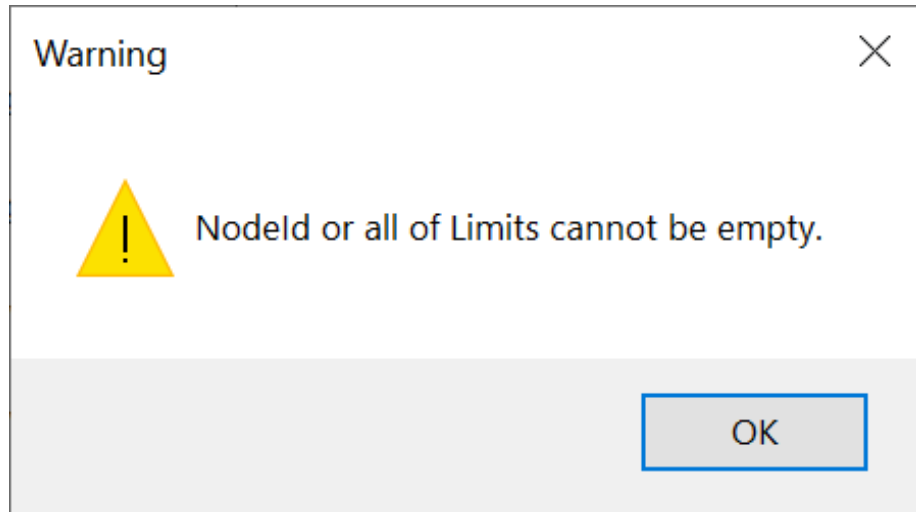
Right click on the mouse to select "New" and add new NodeID.

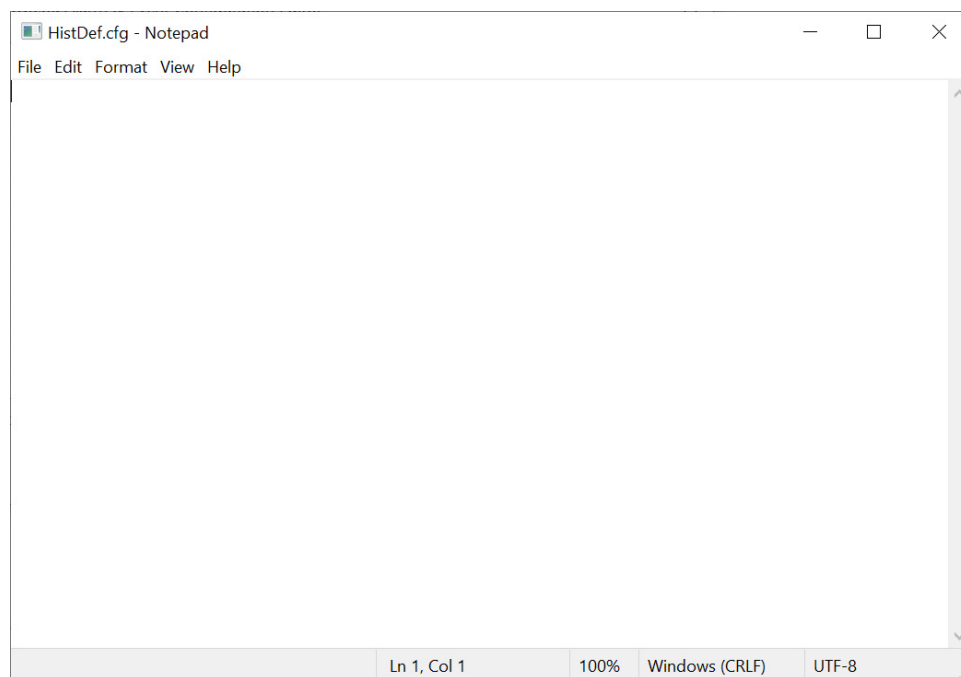
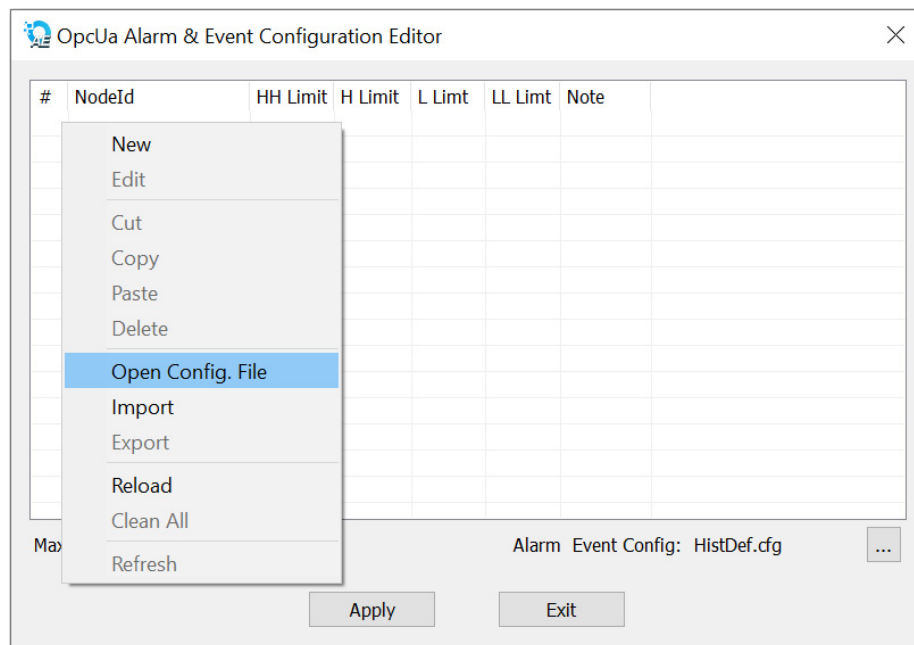
The screenshot shows a dialog box titled 'Please input your item information'. It contains the following fields:

- NodeId:** An empty text input field.
- High High:** A text input field containing the value '90.0000'.
- High:** A text input field containing the value '80.0003'.
- Low:** A text input field containing the value '20.0001'.
- Low Low:** A text input field containing the value '10.0000'.
- Note:** An empty text input field.

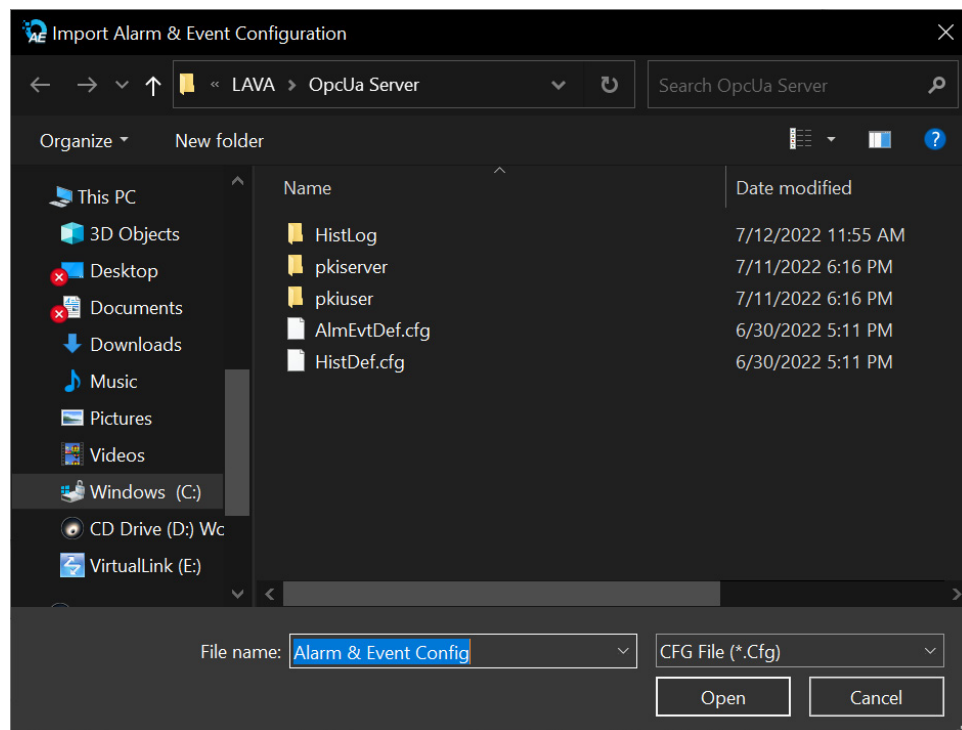
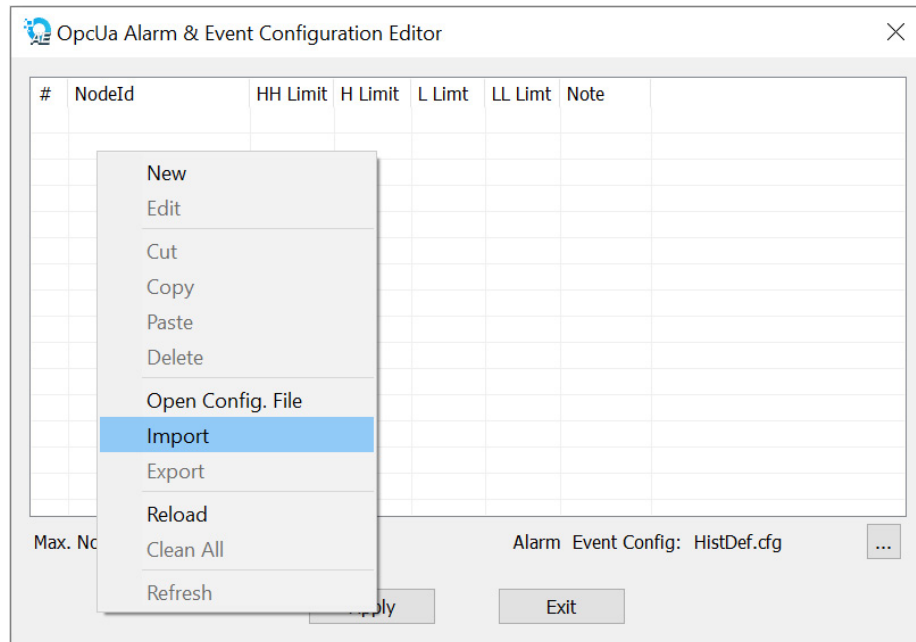
At the bottom of the dialog, there are 'OK' and 'Exit' buttons.



Right click on the mouse to select "Open Config. File" to open the "HistDef.cfg" file, you can use Notepad to edit the value.

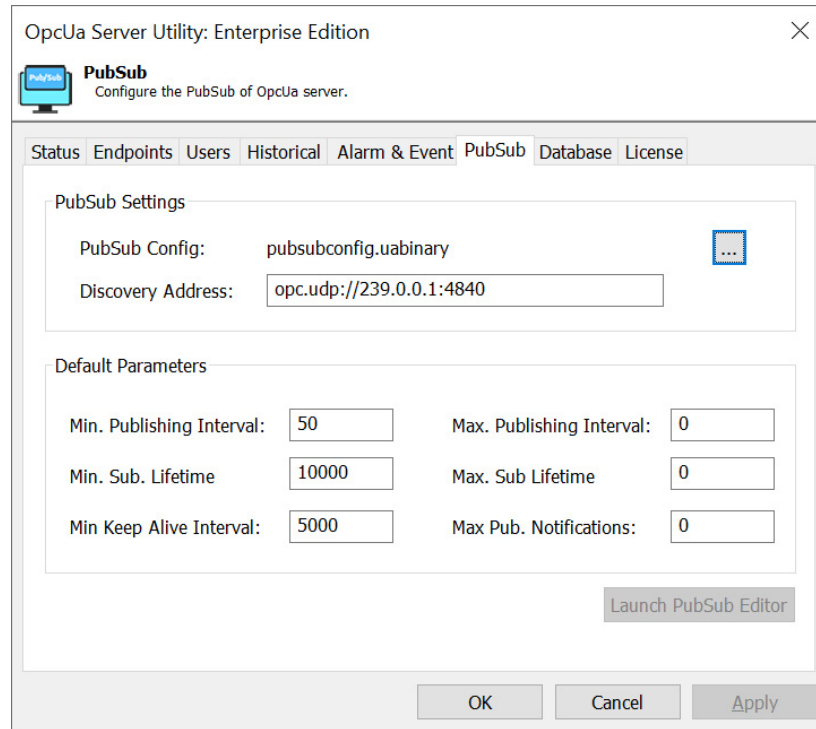


Right click on the mouse to select "import" to import the old file.



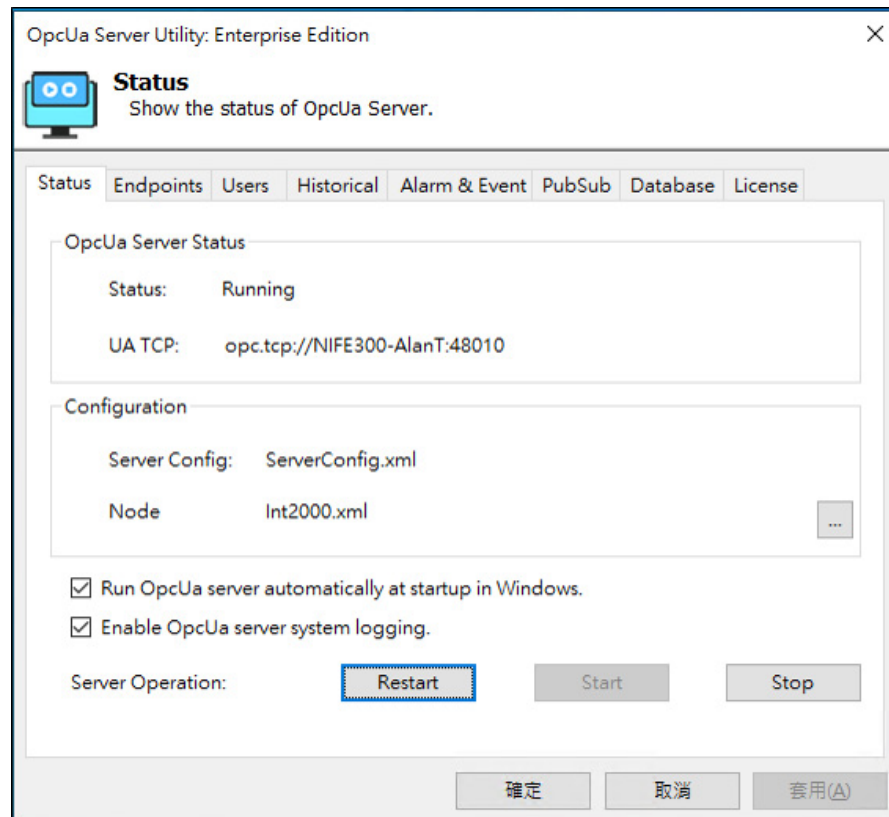
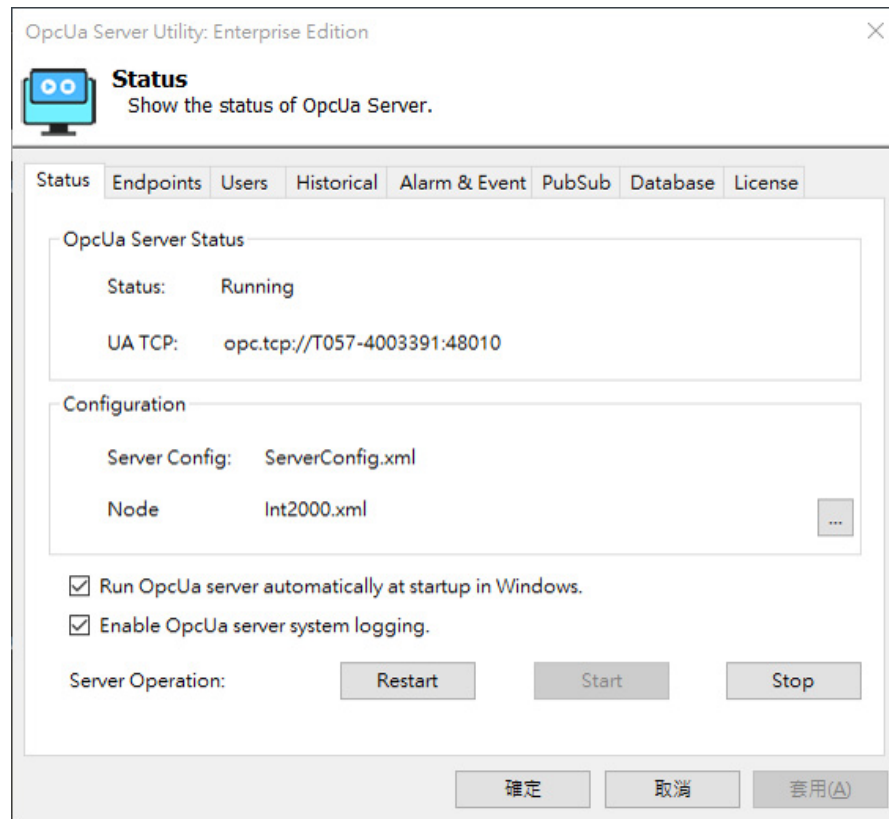
2.6 Pub/Sub

In this page, you can configure the PubSub of AIC OpcUa Server.

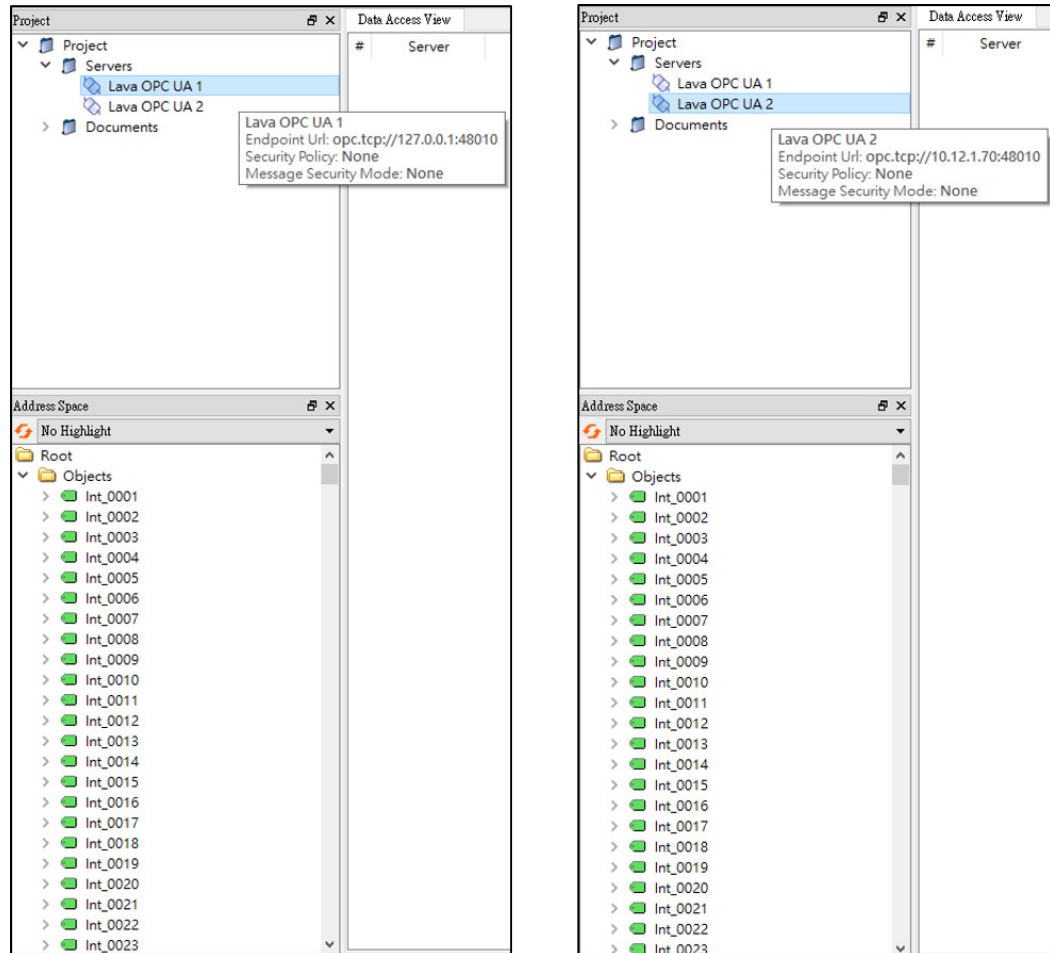


1. PubSub Setting: Change the configure file and server address
2. Default Parameter: Setup parameters

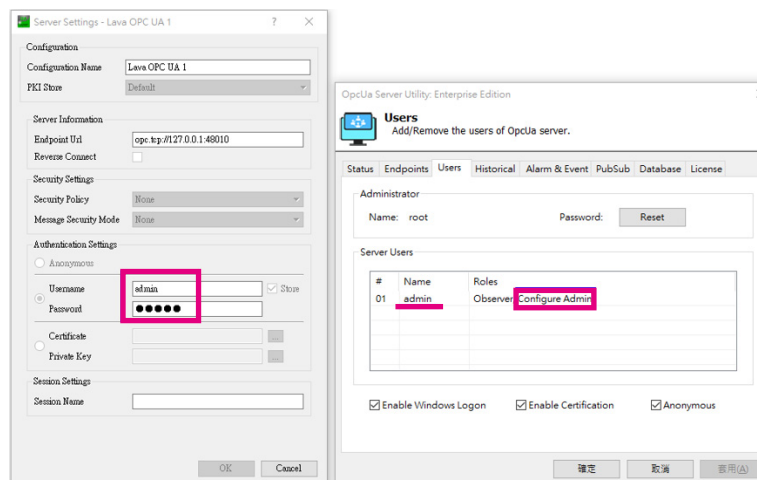
Example: Set up 2 OpcUa Server in 2 computers with the same local network.



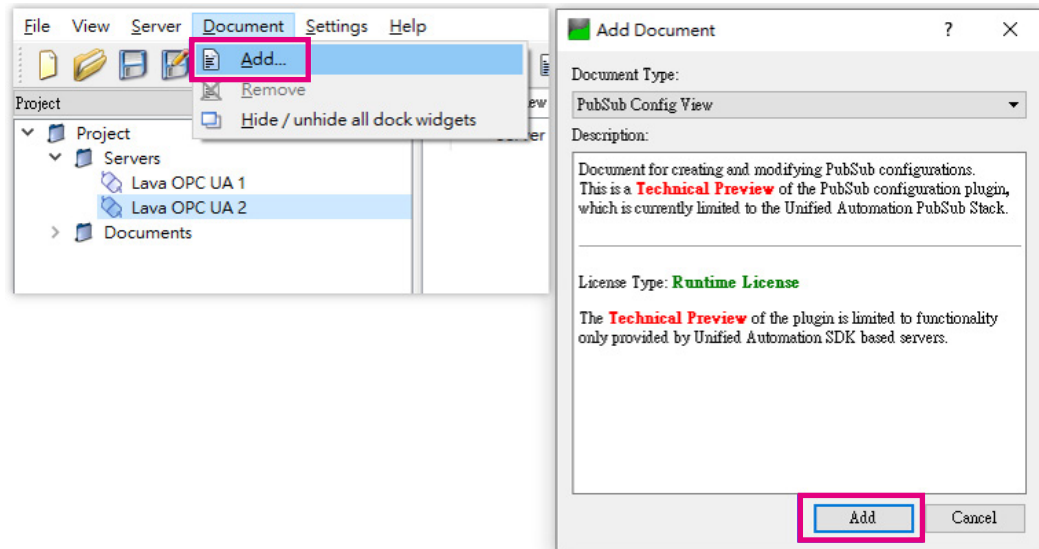
Step 1: Open the program "UaExpert" and connect to 2 OpcUa servers.



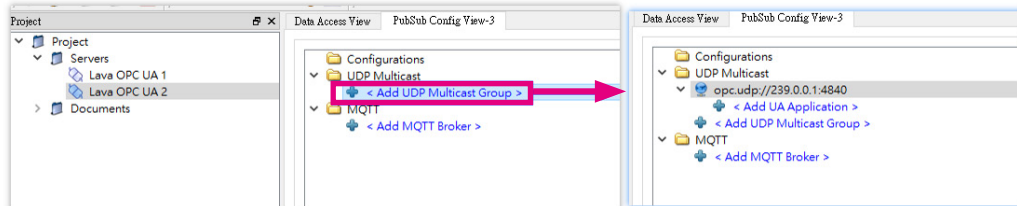
Notice! The operator should be "Configure Admin" to set Pub/Sub



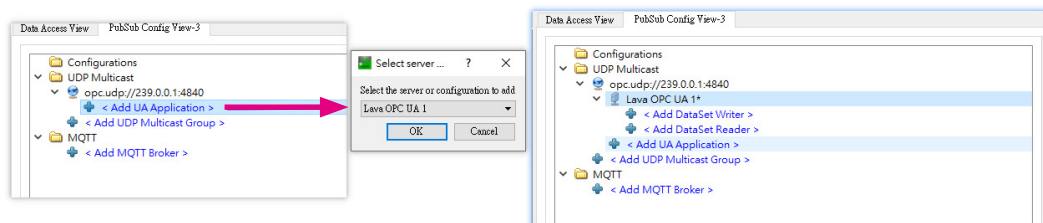
Step 2: “Document” -> “Add...”, Choose “PubSub Config View” document and press button “Add”



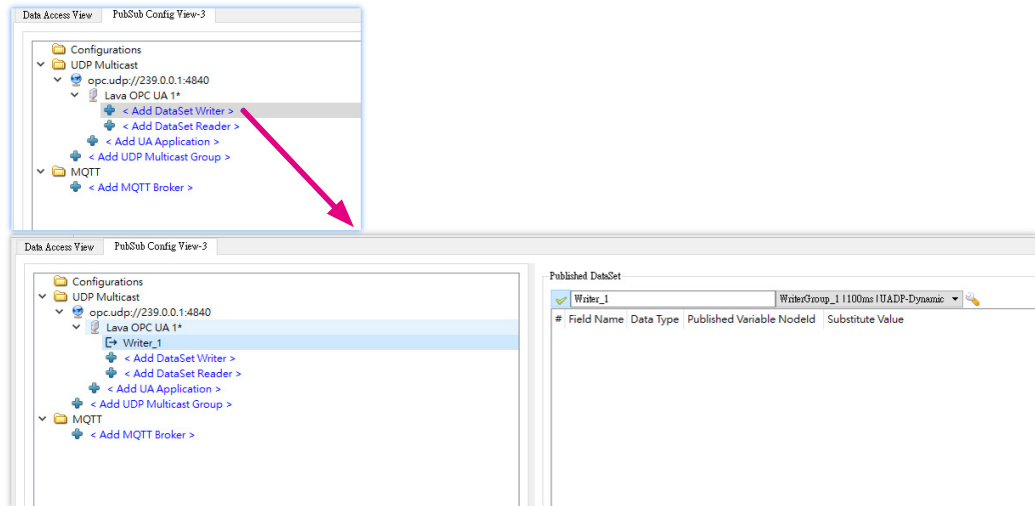
Step 3: Double click “Add UDP Multicast Group” and add a default group “opc.udp://239.0.0.1:4840”



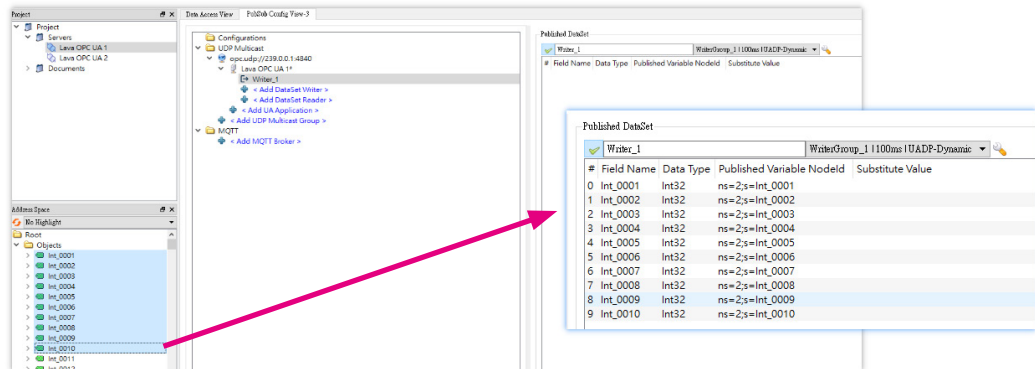
Step 4: Double click “Add UA Application” to choose “AIC OPC UA 1” (The first OpcUa server) and press button “OK”



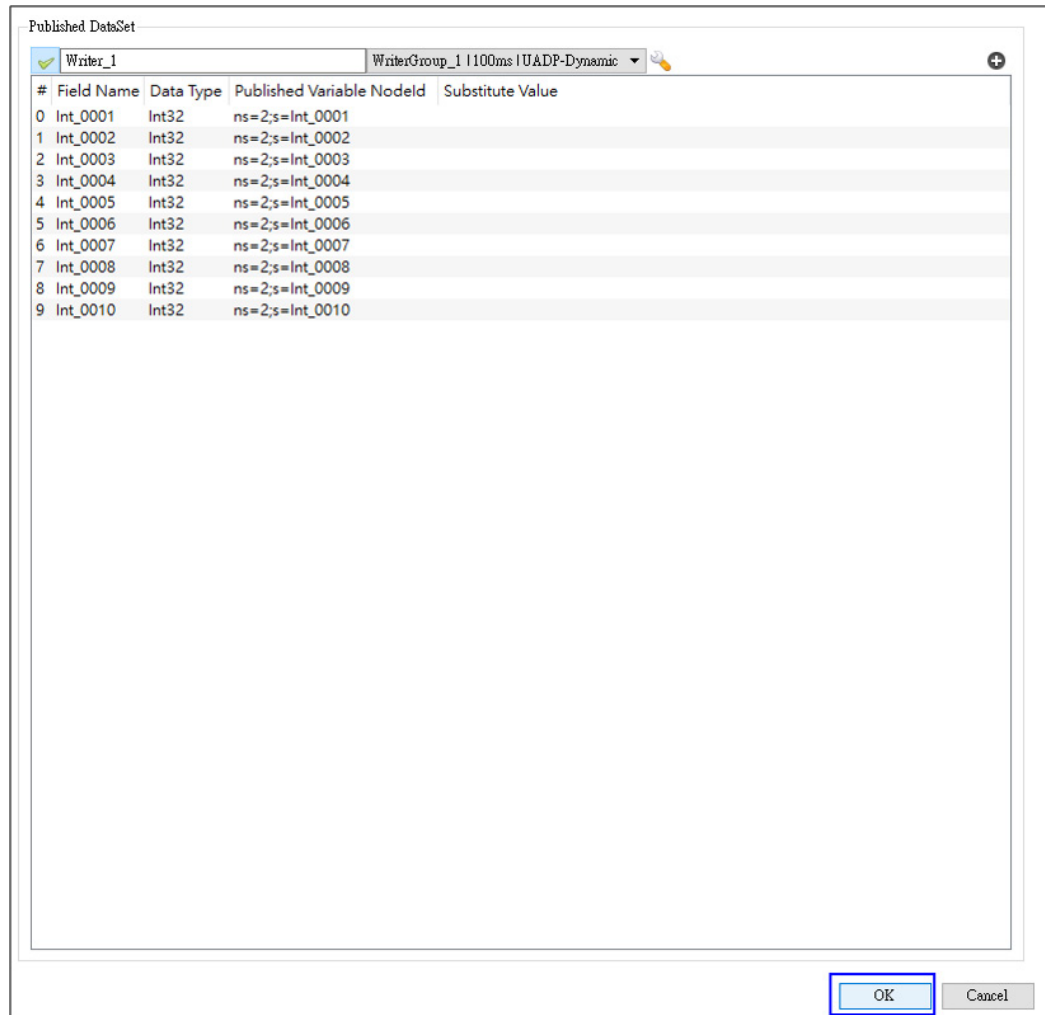
Step 5: Double click “Add DataSet Writer” to create a published dataset “Writer_1”



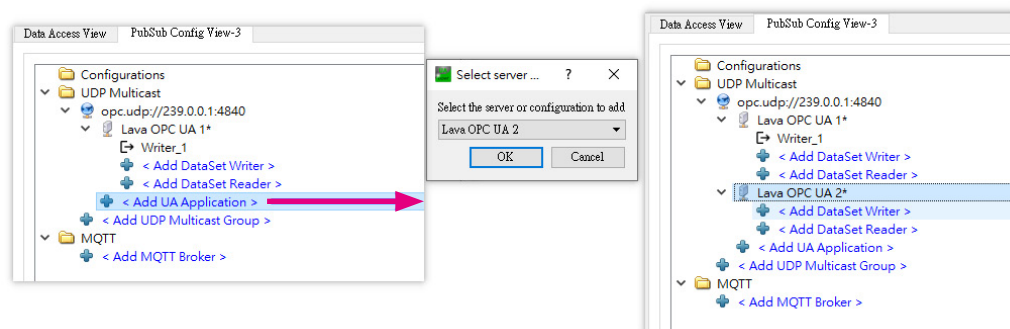
Step 6: Drag tags from “Address Space” and drop to Publish dataset



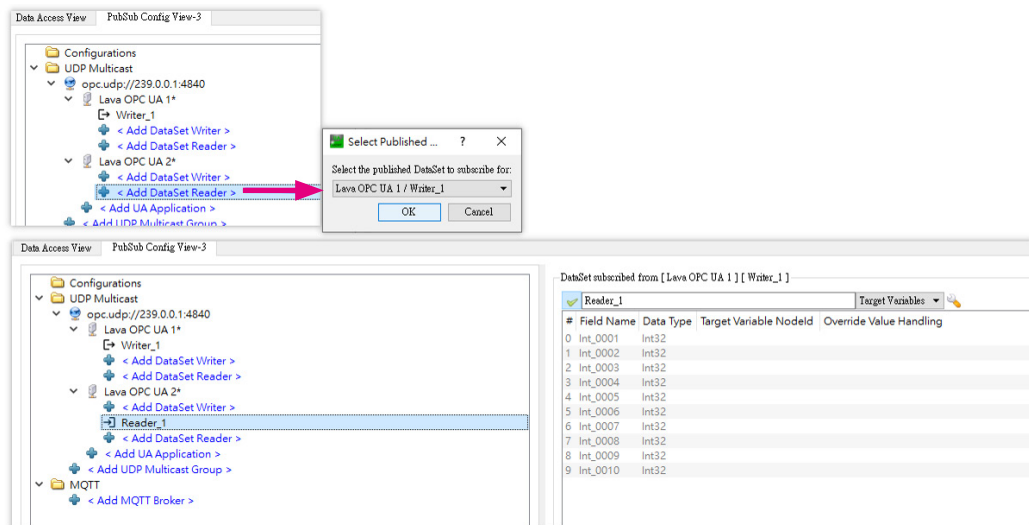
Step 7: Press button “OK” to apply the dataset setting



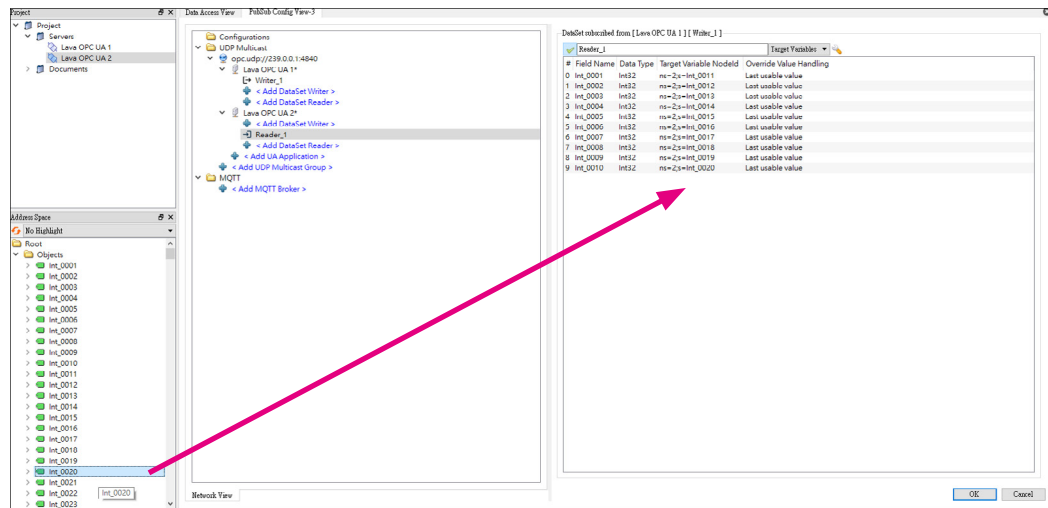
Step 8: Double click “Add UA Application” to choose “AIC OPC UA 2” (The first OpCua server) and press button “OK”



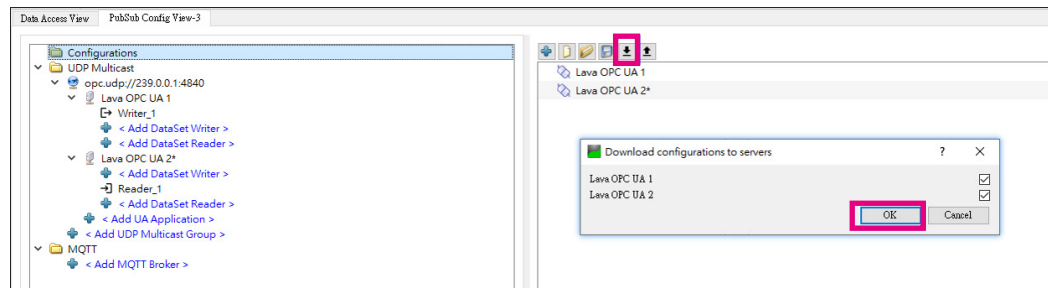
Step 9: Double click “Add DataSet Reader”, choose “AIC OPC UA 1 / Writer_1” to create a subscribed dataset



Step 10: Drag tags and drop to the rows of subscribed tags, and press button "OK"



Step 11: In folder "Configuration", press download button and press "OK" to download the configuration to 2 servers



Verification

Monitor data

Int_0001~Int_0010 from AIC OPC UA 1 (called **Zone1**)

and

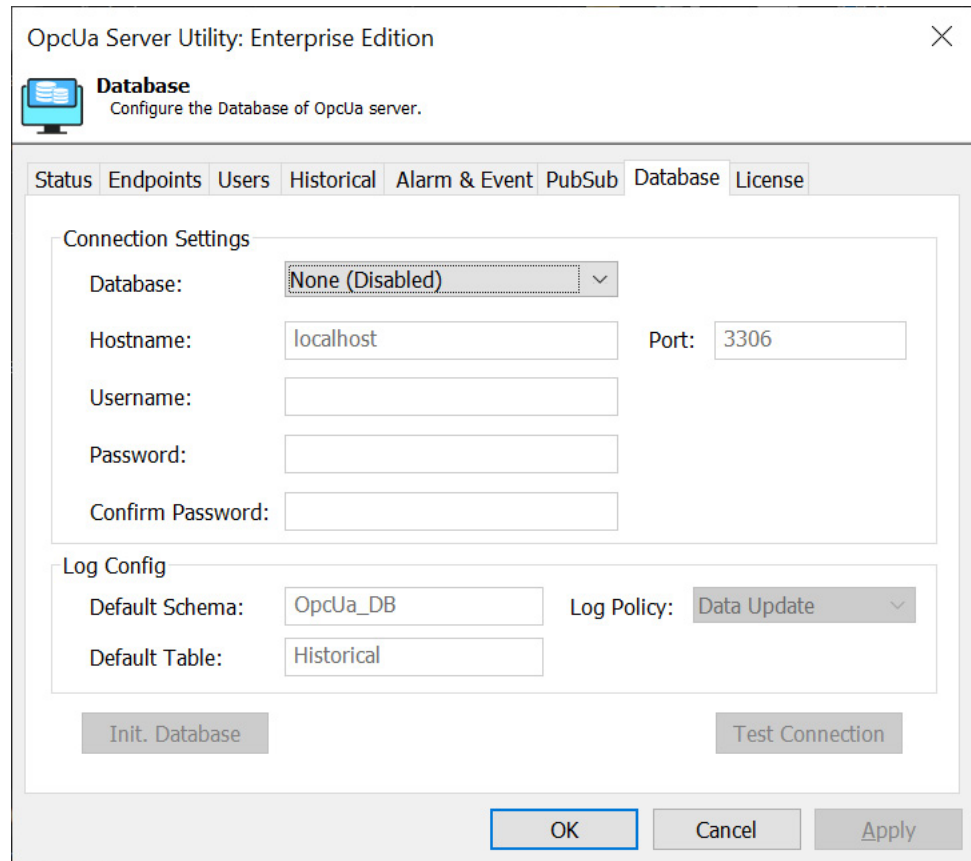
Int_0011~Int_0020 from AIC OPC UA 2 (called **Zone2**)

When data of **Zone 1** changes, the data from **Zone2** change, too

Data Access View		PubSub Config View-3						
#	Server	Node Id	Display Name	Value	Datatype	Source Timestamp	Server Timestamp	Statuscode
1	Lava OPC UA 1	NS2 String Int 0001	Int 0001	1	Int32	PM 02:43:57.790	PM 02:43:58.003	Good
2	Lava OPC UA 1	NS2 String Int 0002	Int 0002	2	Int32	PM 02:43:58.915	PM 02:43:59.030	Good
3	Lava OPC UA 1	NS2 String Int 0003	Int 0003	3	Int32	PM 02:43:59.617	PM 02:43:59.772	Good
4	Lava OPC UA 1	NS2 String Int 0004	Int 0004	4	Int32	PM 02:44:01.548	PM 02:44:01.771	Good
5	Lava OPC UA 1	NS2 String Int 0005	Int 0005	5	Int32	PM 02:44:02.056	PM 02:44:02.270	Good
6	Lava OPC UA 1	NS2 String Int 0006	Int 0006	6	Int32	PM 02:44:02.839	PM 02:44:03.027	Good
7	Lava OPC UA 1	NS2 String Int 0007	Int 0007	7	Int32	PM 02:44:03.522	PM 02:44:03.769	Good
8	Lava OPC UA 1	NS2 String Int 0008	Int 0008	8	Int32	PM 02:44:04.009	PM 02:44:04.032	Good
9	Lava OPC UA 1	NS2 String Int 0009	Int 0009	9	Int32	PM 02:44:04.672	PM 02:44:04.310	Good
10	Lava OPC UA 1	NS2 String Int 0010	Int 0010	10	Int32	PM 02:44:07.056	PM 02:44:07.065	Good
11	Lava OPC UA 2	NS2 String Int 0011	Int 0011	1	Int32	PM 02:43:58.877	PM 02:43:58.939	Good
12	Lava OPC UA 2	NS2 String Int 0012	Int 0012	2	Int32	PM 02:43:59.877	PM 02:43:59.939	Good
13	Lava OPC UA 2	NS2 String Int 0013	Int 0013	3	Int32	PM 02:44:00.864	PM 02:44:00.943	Good
14	Lava OPC UA 2	NS2 String Int 0014	Int 0014	4	Int32	PM 02:44:02.880	PM 02:44:02.942	Good
15	Lava OPC UA 2	NS2 String Int 0015	Int 0015	5	Int32	PM 02:44:02.880	PM 02:44:02.942	Good
16	Lava OPC UA 2	NS2 String Int 0016	Int 0016	6	Int32	PM 02:44:03.864	PM 02:44:03.942	Good
17	Lava OPC UA 2	NS2 String Int 0017	Int 0017	7	Int32	PM 02:44:04.879	PM 02:44:04.942	Good
18	Lava OPC UA 2	NS2 String Int 0018	Int 0018	8	Int32	PM 02:44:04.879	PM 02:44:04.942	Good
19	Lava OPC UA 2	NS2 String Int 0019	Int 0019	9	Int32	PM 02:44:05.879	PM 02:44:05.941	Good
20	Lava OPC UA 2	NS2 String Int 0020	Int 0020	10	Int32	PM 02:44:07.878	PM 02:44:07.941	Good

2.7 Database

The Database is used for storing historical, Alarm & Event data into database for other application use.

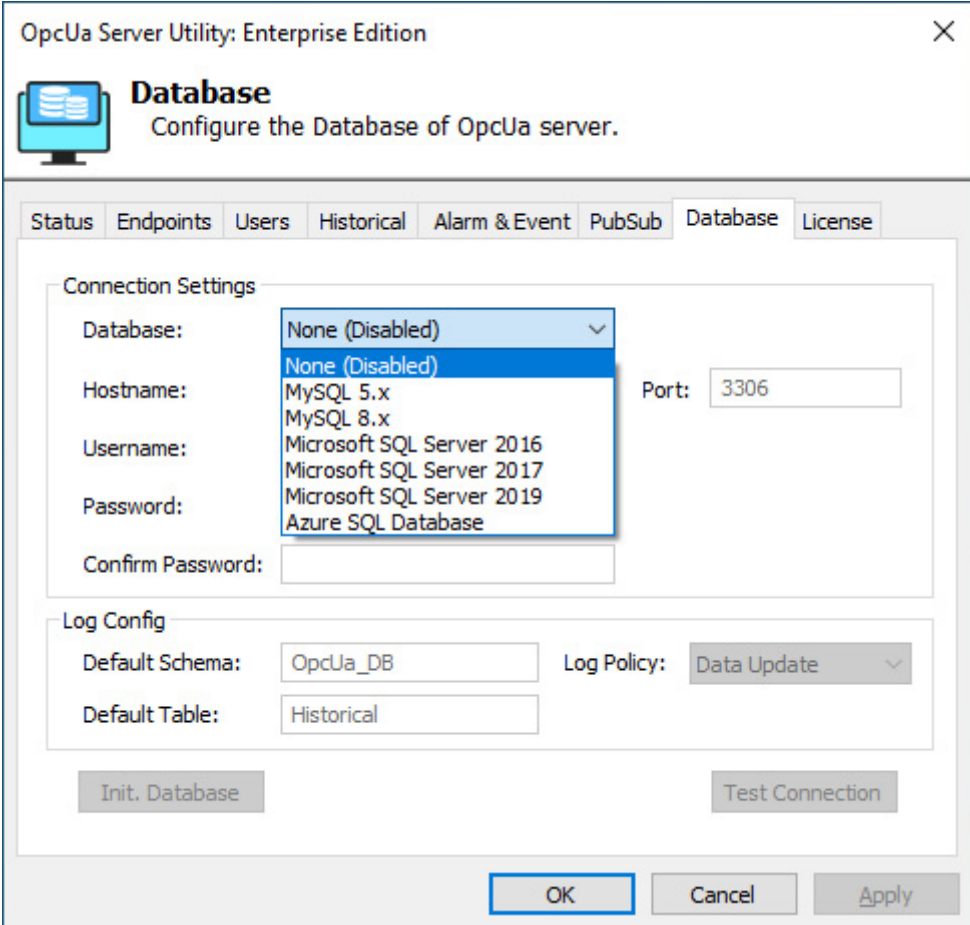


The screenshot shows the 'OpcUa Server Utility: Enterprise Edition' window with the 'Database' tab selected. The window title is 'OpcUa Server Utility: Enterprise Edition' and it has a close button (X) in the top right corner. Below the title bar, there is a 'Database' icon and the text 'Configure the Database of OpcUa server.' The main area contains several tabs: 'Status', 'Endpoints', 'Users', 'Historical', 'Alarm & Event', 'PubSub', 'Database', and 'License'. The 'Database' tab is active. It is divided into two sections: 'Connection Settings' and 'Log Config'. In the 'Connection Settings' section, there are fields for 'Database' (a dropdown menu showing 'None (Disabled)'), 'Hostname' (text box with 'localhost'), 'Port' (text box with '3306'), 'Username' (text box), 'Password' (text box), and 'Confirm Password' (text box). In the 'Log Config' section, there are fields for 'Default Schema' (text box with 'OpcUa_DB'), 'Default Table' (text box with 'Historical'), and 'Log Policy' (dropdown menu showing 'Data Update'). At the bottom of the window, there are three buttons: 'Init. Database', 'Test Connection', and a standard dialog box footer with 'OK', 'Cancel', and 'Apply' buttons.

We support My SQL 5.x, My SQL 8.x and Microsoft SQL Server 2016,2017,2019 & Azure SQL Database.

First step is to prepare the database, and then input Hostname, Port, User name and Password for accessing the database.

In Log Config, input the Dafault Schema and Default Table. these files are dependant on your design in database. For the Log Policy, we offer "Data Update" and "Sampling Rate."



OpcUa Server Utility: Enterprise Edition

Database
Configure the Database of OpcUa server.

Database

Connection Settings

Database: **None (Disabled)** (dropdown menu open showing: None (Disabled), MySQL 5.x, MySQL 8.x, Microsoft SQL Server 2016, Microsoft SQL Server 2017, Microsoft SQL Server 2019, Azure SQL Database)

Hostname:

Username:

Password:

Confirm Password:

Port:

Log Config

Default Schema:

Default Table:

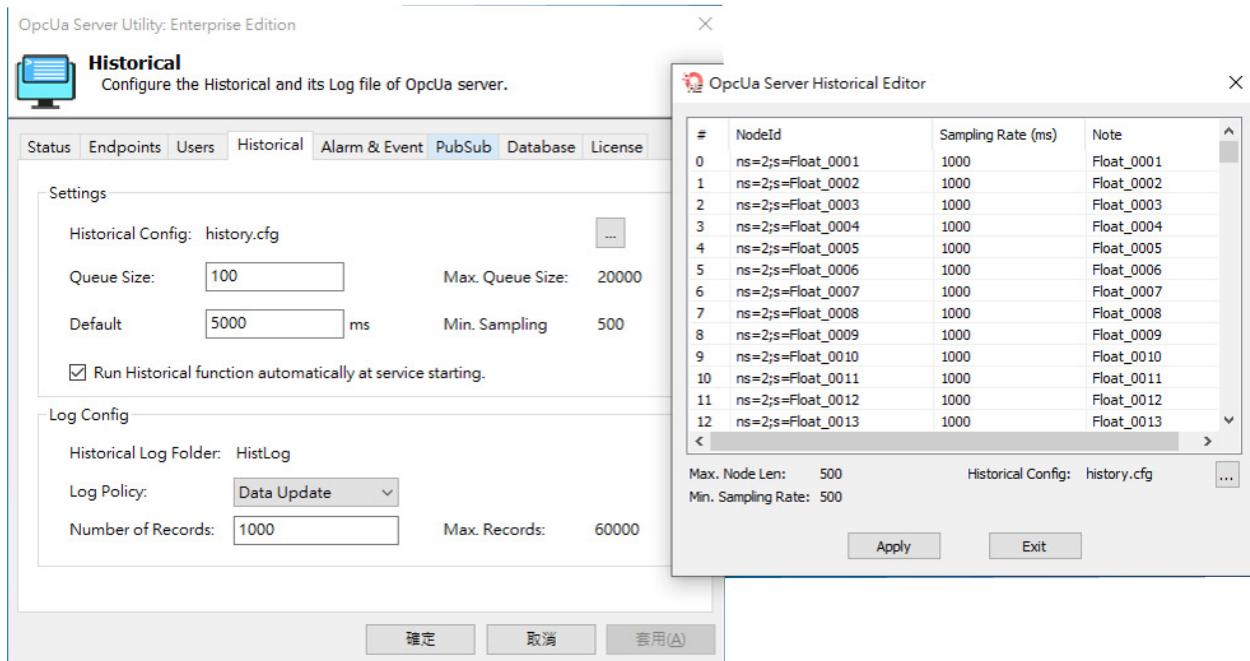
Log Policy: **Data Update** (dropdown menu)

Init. Database

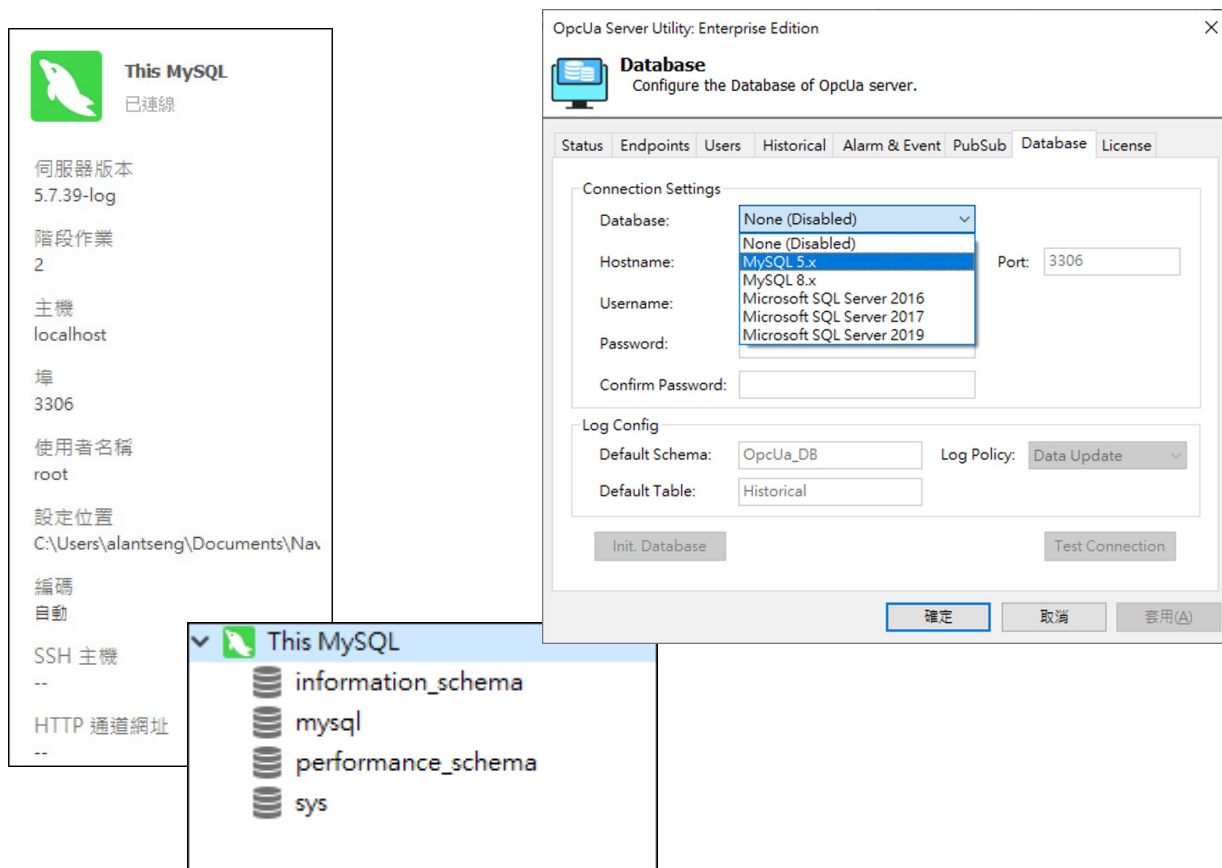
Test Connection

OK Cancel Apply

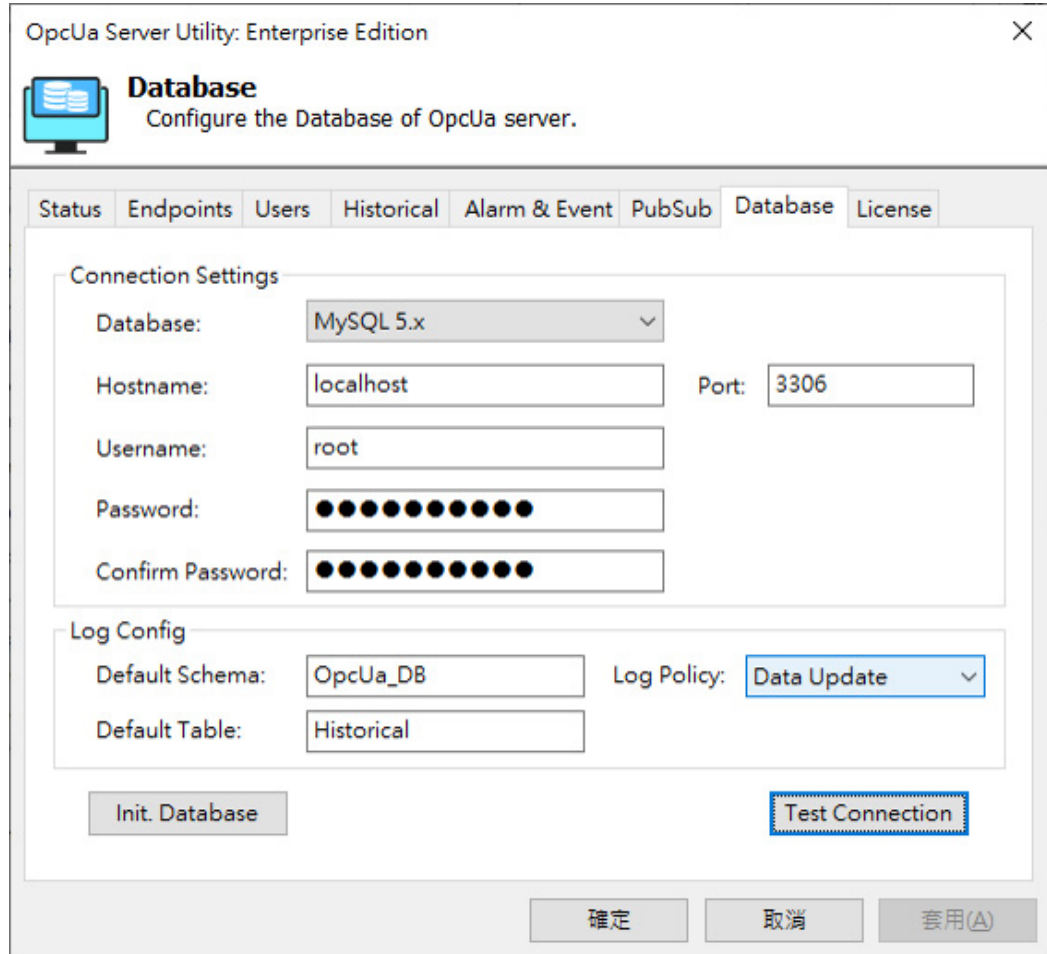
Example 1: Set a historical configuration and save to MySQL Database.



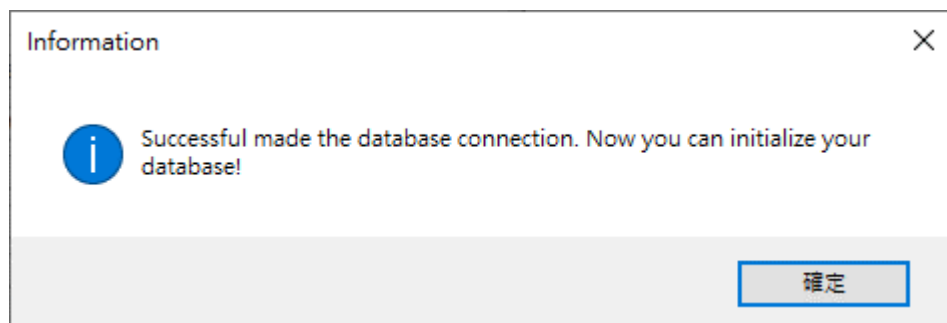
Step 1: MySQL version: 5.7.39 (choose Database as "MySQL 5.x").



Step 2: Set login information (Hostname, Username, Port, Password and confirm it) then click button “Test Connection.”



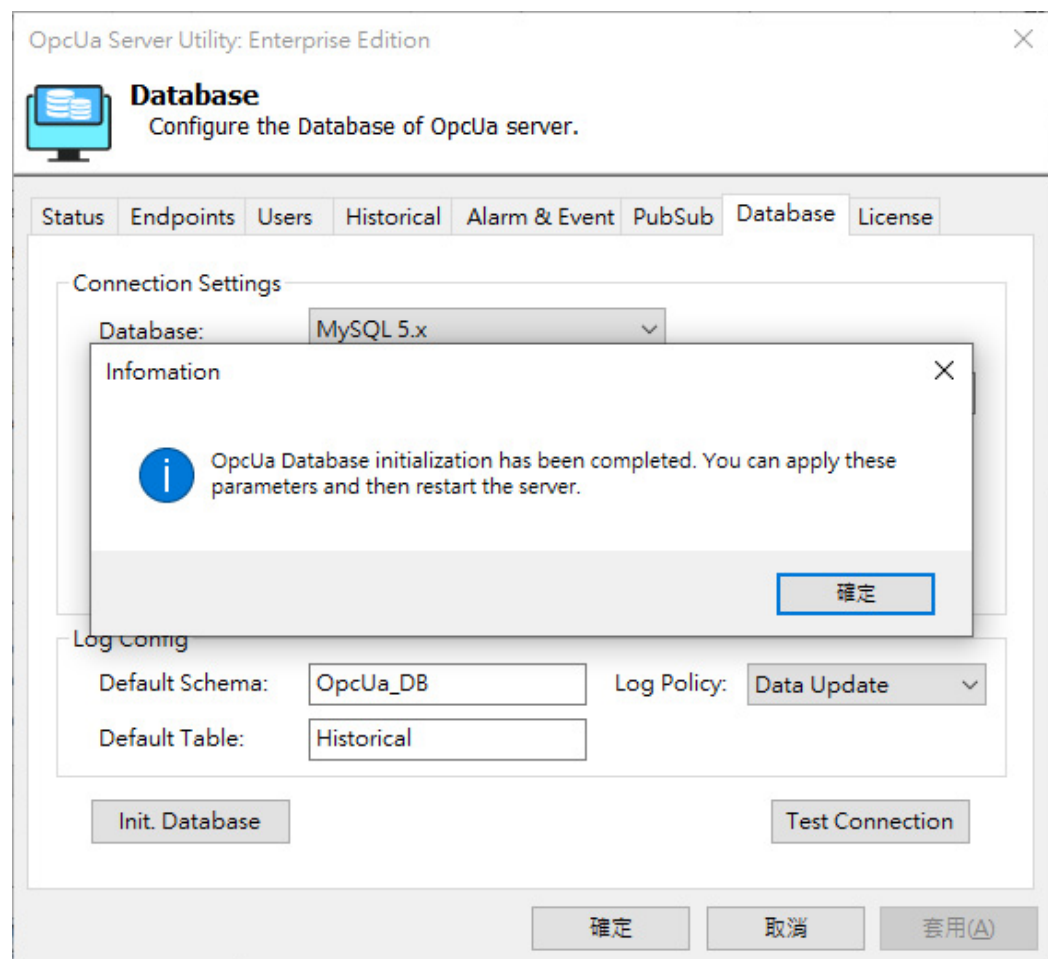
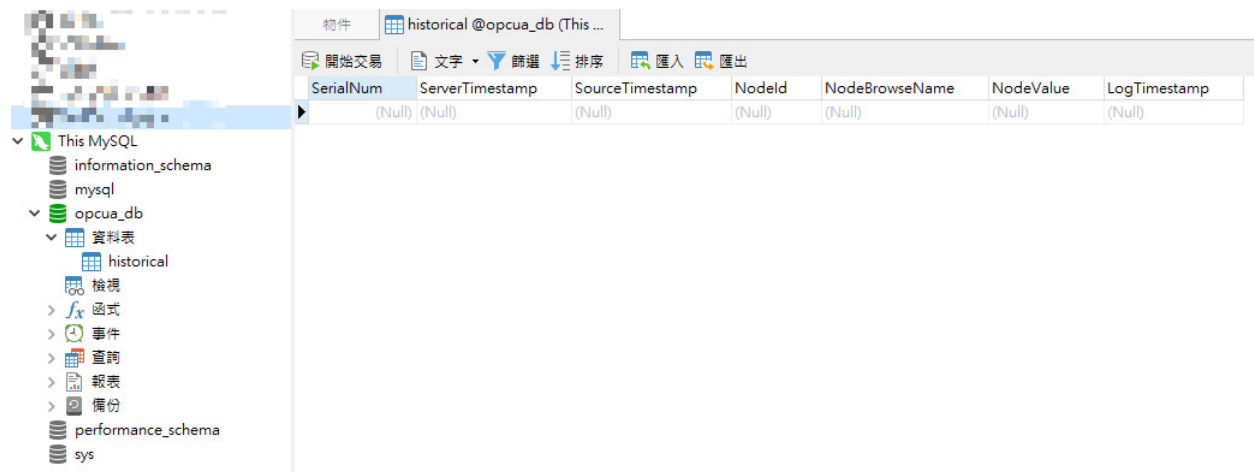
The screenshot shows the "OpcUa Server Utility: Enterprise Edition" window with the "Database" tab selected. The window title is "OpcUa Server Utility: Enterprise Edition" and it has a close button (X) in the top right corner. Below the title bar, there is a "Database" icon and the text "Configure the Database of OpcUa server." The main area contains several tabs: "Status", "Endpoints", "Users", "Historical", "Alarm & Event", "PubSub", "Database", and "License". The "Database" tab is active. Under "Connection Settings", there are fields for "Database" (MySQL 5.x), "Hostname" (localhost), "Port" (3306), "Username" (root), "Password" (masked with dots), and "Confirm Password" (masked with dots). Under "Log Config", there are fields for "Default Schema" (OpcUa_DB), "Default Table" (Historical), and "Log Policy" (Data Update). At the bottom of the configuration area, there are buttons for "Init. Database" and "Test Connection". At the very bottom of the window, there are three buttons: "確定" (OK), "取消" (Cancel), and "套用(A)" (Apply).



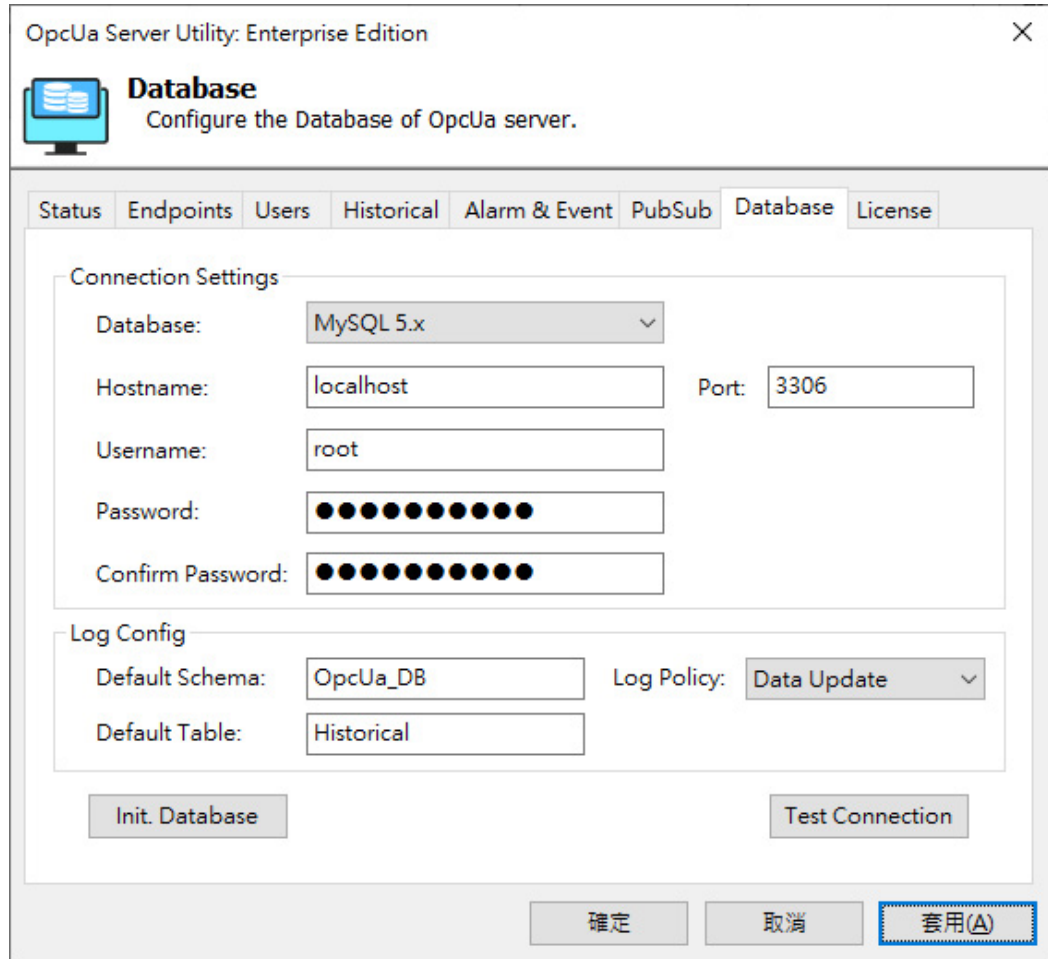
The screenshot shows an "Information" dialog box with a close button (X) in the top right corner. It contains an information icon (i) and the text: "Successful made the database connection. Now you can initialize your database!". At the bottom right, there is a button labeled "確定" (OK).

Step 3: Click button “Init. Database” and check the initialization completed message.

A new schema “opcua_db” and a new table “historical” are shown in the db server.



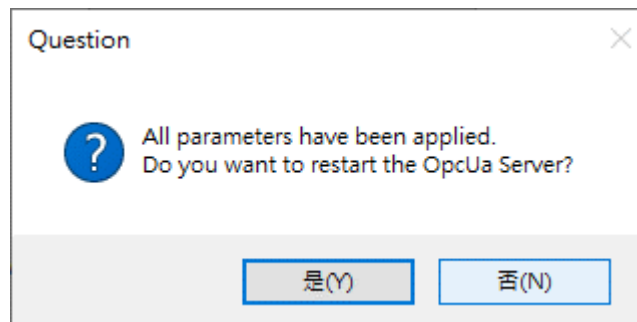
Step 4: Click "Apply" and restart the OpcUa server.



The screenshot shows the "OpcUa Server Utility: Enterprise Edition" window with the "Database" tab selected. The window title is "OpcUa Server Utility: Enterprise Edition" and the subtitle is "Database Configure the Database of OpcUa server." The window contains several tabs: Status, Endpoints, Users, Historical, Alarm & Event, PubSub, Database, and License. The "Database" tab is active, showing the following configuration fields:

- Connection Settings:**
 - Database: MySQL 5.x (dropdown)
 - Hostname: localhost (text box)
 - Port: 3306 (text box)
 - Username: root (text box)
 - Password: [masked with dots] (password box)
 - Confirm Password: [masked with dots] (password box)
- Log Config:**
 - Default Schema: OpcUa_DB (text box)
 - Log Policy: Data Update (dropdown)
 - Default Table: Historical (text box)

At the bottom of the configuration area, there are two buttons: "Init. Database" and "Test Connection". At the very bottom of the window, there are three buttons: "確定" (OK), "取消" (Cancel), and "套用(A)" (Apply).



The screenshot shows a "Question" dialog box with a question mark icon. The text inside the dialog box reads: "All parameters have been applied. Do you want to restart the OpcUa Server?". At the bottom of the dialog box, there are two buttons: "是(Y)" (Yes) and "否(N)" (No).

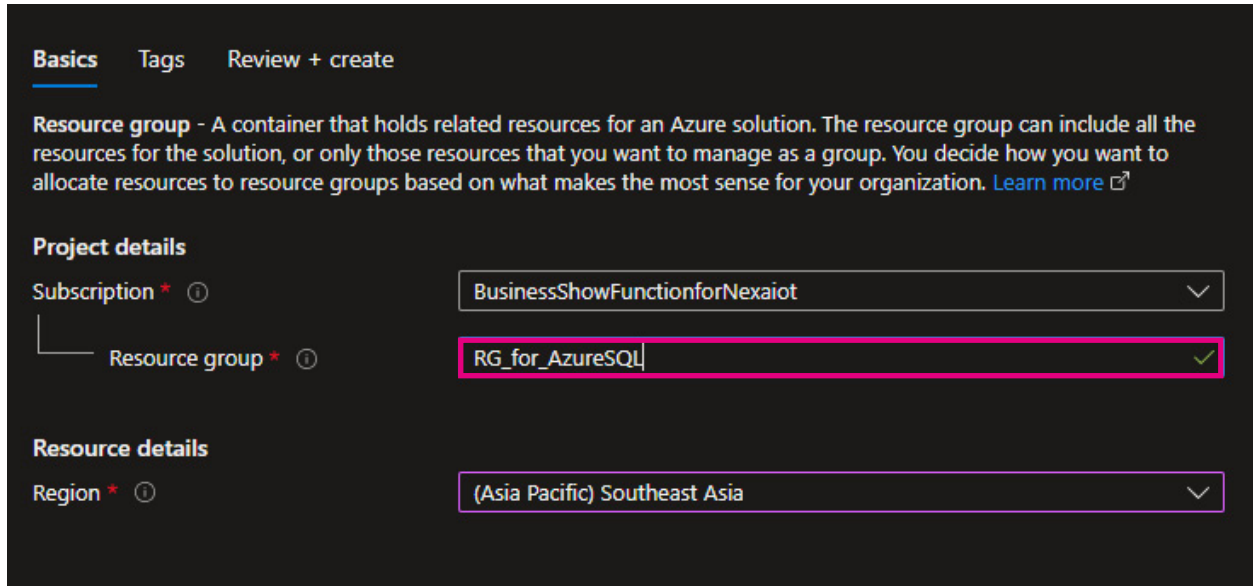
Step 5: The changed information are recorded in the table.

SerialNum	ServerTimestamp	SourceTimestamp	NodeId	NodeBrowseName	NodeValue	LogTimestamp
1	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0001	Float_0001	0	2022-08-03 09:10:46
2	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0002	Float_0002	0	2022-08-03 09:10:46
3	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0003	Float_0003	0	2022-08-03 09:10:46
4	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0004	Float_0004	0	2022-08-03 09:10:46
5	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0005	Float_0005	0	2022-08-03 09:10:46
6	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0006	Float_0006	0	2022-08-03 09:10:46
7	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0007	Float_0007	0	2022-08-03 09:10:46
8	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0008	Float_0008	0	2022-08-03 09:10:46
9	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0009	Float_0009	0	2022-08-03 09:10:46
10	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0010	Float_0010	0	2022-08-03 09:10:46
11	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0011	Float_0011	0	2022-08-03 09:10:46
12	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0012	Float_0012	0	2022-08-03 09:10:46
13	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0013	Float_0013	0	2022-08-03 09:10:46
14	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0014	Float_0014	0	2022-08-03 09:10:46
15	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0015	Float_0015	0	2022-08-03 09:10:46
16	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0016	Float_0016	0	2022-08-03 09:10:46
17	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0017	Float_0017	0	2022-08-03 09:10:46
18	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0018	Float_0018	0	2022-08-03 09:10:46
19	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0019	Float_0019	0	2022-08-03 09:10:46
20	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0020	Float_0020	0	2022-08-03 09:10:46
21	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0021	Float_0021	0	2022-08-03 09:10:46
22	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0022	Float_0022	0	2022-08-03 09:10:46
23	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0023	Float_0023	0	2022-08-03 09:10:46
24	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0024	Float_0024	0	2022-08-03 09:10:46
25	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0025	Float_0025	0	2022-08-03 09:10:46
26	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0026	Float_0026	0	2022-08-03 09:10:46
27	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0027	Float_0027	0	2022-08-03 09:10:46
28	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0028	Float_0028	0	2022-08-03 09:10:46
29	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0029	Float_0029	0	2022-08-03 09:10:46
30	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0030	Float_0030	0	2022-08-03 09:10:46
31	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0031	Float_0031	0	2022-08-03 09:10:46
32	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0032	Float_0032	0	2022-08-03 09:10:46
33	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0033	Float_0033	0	2022-08-03 09:10:46
34	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0034	Float_0034	0	2022-08-03 09:10:46
35	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0035	Float_0035	0	2022-08-03 09:10:46
36	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0036	Float_0036	0	2022-08-03 09:10:46
37	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0037	Float_0037	0	2022-08-03 09:10:46
38	2022-08-03 09:10:40	2022-08-03 09:10:40	ns=2;s=Float_0038	Float_0038	0	2022-08-03 09:10:46

SerialNum	ServerTimestamp	SourceTimestamp	Nodeld	NodeBrowseName	NodeValue	LogTimestamp
3945	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0461	Float_0461	4.61e+07	2022-08-03 09:49:19
3946	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0462	Float_0462	4.62e+07	2022-08-03 09:49:19
3947	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0463	Float_0463	4.63e+07	2022-08-03 09:49:19
3948	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0464	Float_0464	4.64e+07	2022-08-03 09:49:19
3949	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0465	Float_0465	4.65e+07	2022-08-03 09:49:19
3950	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0466	Float_0466	4.66e+07	2022-08-03 09:49:19
3951	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0467	Float_0467	4.67e+07	2022-08-03 09:49:19
3952	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0468	Float_0468	4.68e+07	2022-08-03 09:49:19
3953	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0469	Float_0469	4.69e+07	2022-08-03 09:49:19
3954	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0470	Float_0470	4.7e+07	2022-08-03 09:49:19
3955	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0471	Float_0471	4.71e+07	2022-08-03 09:49:19
3956	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0472	Float_0472	4.72e+07	2022-08-03 09:49:19
3957	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0473	Float_0473	4.73e+07	2022-08-03 09:49:19
3958	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0474	Float_0474	4.74e+07	2022-08-03 09:49:19
3959	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0475	Float_0475	4.75e+07	2022-08-03 09:49:19
3960	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0476	Float_0476	4.76e+07	2022-08-03 09:49:19
3961	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0477	Float_0477	4.77e+07	2022-08-03 09:49:19
3962	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0478	Float_0478	4.78e+07	2022-08-03 09:49:19
3963	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0479	Float_0479	4.79e+07	2022-08-03 09:49:19
3964	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0480	Float_0480	4.8e+07	2022-08-03 09:49:19
3965	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0481	Float_0481	4.81e+07	2022-08-03 09:49:19
3966	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0482	Float_0482	4.82e+07	2022-08-03 09:49:19
3967	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0483	Float_0483	4.83e+07	2022-08-03 09:49:19
3968	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0484	Float_0484	4.84e+07	2022-08-03 09:49:19
3969	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0485	Float_0485	4.85e+07	2022-08-03 09:49:19
3970	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0486	Float_0486	4.86e+07	2022-08-03 09:49:19
3971	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0487	Float_0487	4.87e+07	2022-08-03 09:49:19
3972	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0488	Float_0488	4.88e+07	2022-08-03 09:49:19
3973	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0489	Float_0489	4.89e+07	2022-08-03 09:49:19
3974	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0490	Float_0490	4.9e+07	2022-08-03 09:49:19
3975	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0491	Float_0491	4.91e+07	2022-08-03 09:49:19
3976	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0492	Float_0492	4.92e+07	2022-08-03 09:49:19
3977	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0493	Float_0493	4.93e+07	2022-08-03 09:49:19
3978	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0494	Float_0494	4.94e+07	2022-08-03 09:49:19
3979	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0495	Float_0495	4.95e+07	2022-08-03 09:49:19
3980	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0496	Float_0496	4.96e+07	2022-08-03 09:49:19
3981	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0497	Float_0497	4.97e+07	2022-08-03 09:49:19
3982	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0498	Float_0498	4.98e+07	2022-08-03 09:49:19
3983	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0499	Float_0499	4.99e+07	2022-08-03 09:49:19
3984	2022-08-03 09:49:13	2022-08-03 09:49:13	ns=2;s=Float_0500	Float_0500	5e+07	2022-08-03 09:49:19
3985	2022-08-03 10:00:22	2022-08-03 10:00:22	ns=2;s=Float_0500	Float_0500	4.13174e+06	2022-08-03 10:00:29
3986	2022-08-03 10:03:35	2022-08-03 10:03:35	ns=2;s=Float_0500	Float_0500	1.23457e+08	2022-08-03 10:03:40

Example 2: Set up an Azure SQL Database.

Step 1: Create a Resource Group.



Basics Tags Review + create

Resource group - A container that holds related resources for an Azure solution. The resource group can include all the resources for the solution, or only those resources that you want to manage as a group. You decide how you want to allocate resources to resource groups based on what makes the most sense for your organization. [Learn more](#)

Project details

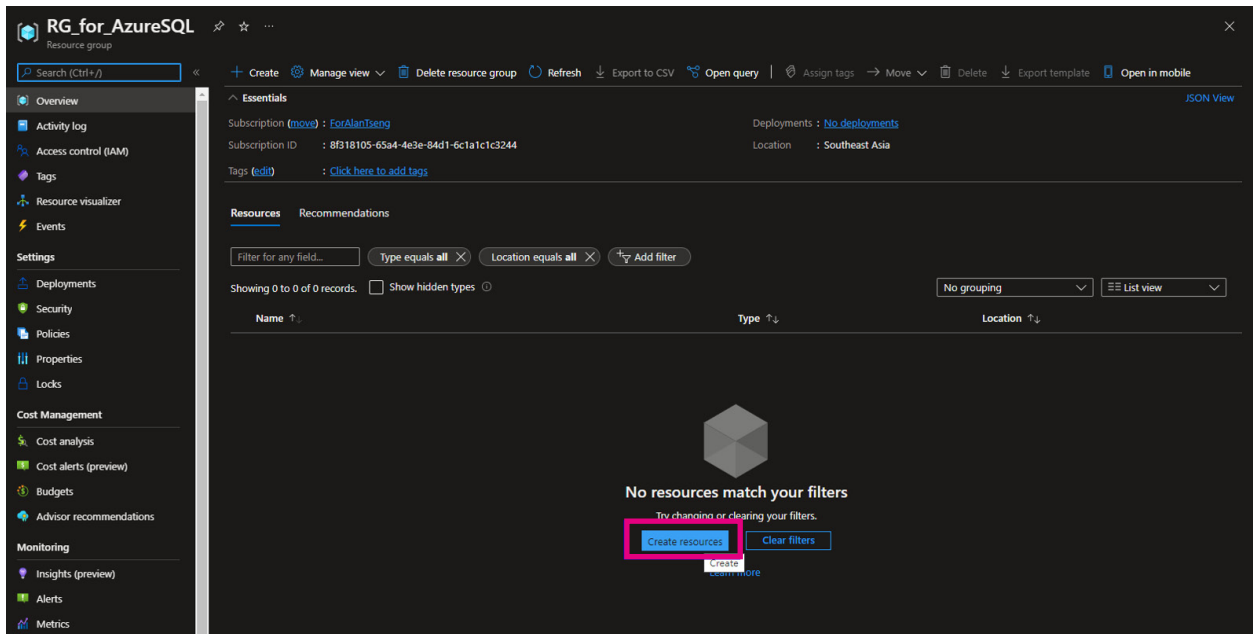
Subscription * ⓘ BusinessShowFunctionforNexaiot

Resource group * ⓘ RG_for_AzureSQL

Resource details

Region * ⓘ (Asia Pacific) Southeast Asia

Step 2: Press "Create resources"



RG_for_AzureSQL Resource group

Search (Ctrl+/)

+ Create Manage view Delete resource group Refresh Export to CSV Open query Assign tags Move Delete Export template Open in mobile

Essentials

Subscription (move) : ForAlanTseng Deployments : No deployments

Subscription ID : 8f318105-6544-4e3e-84d1-6c1a1c1c3244 Location : Southeast Asia

Tags (edit) : Click here to add tags

Resources Recommendations

Filter for any field... Type equals all Location equals all Add filter

Showing 0 to 0 of 0 records. Show hidden types No grouping List view

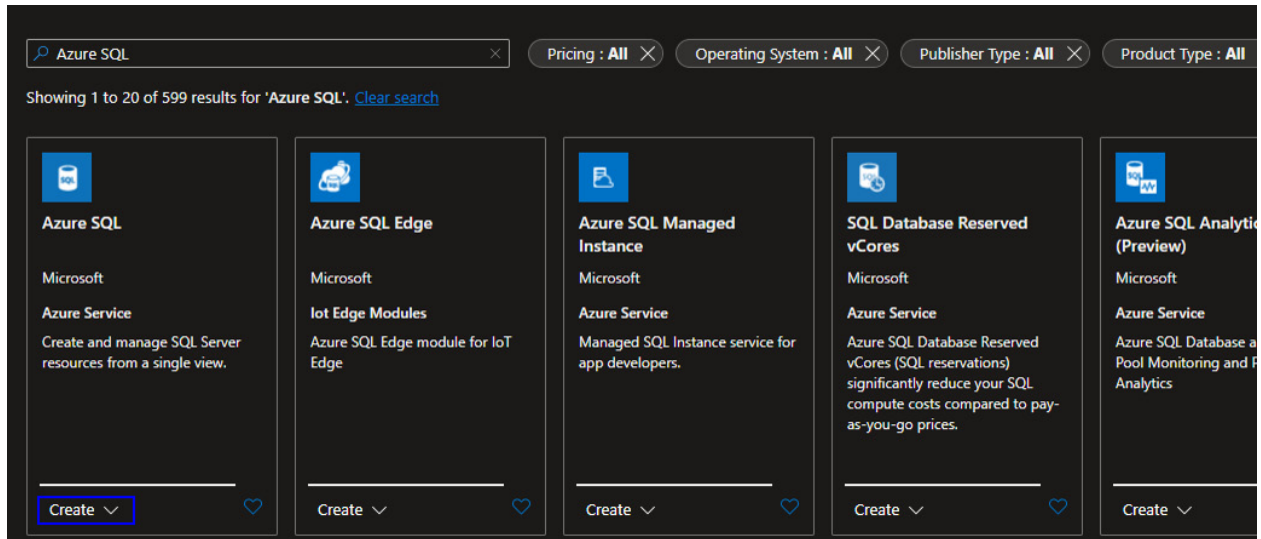
Name ↑ Type ↑↓ Location ↑↓

No resources match your filters.

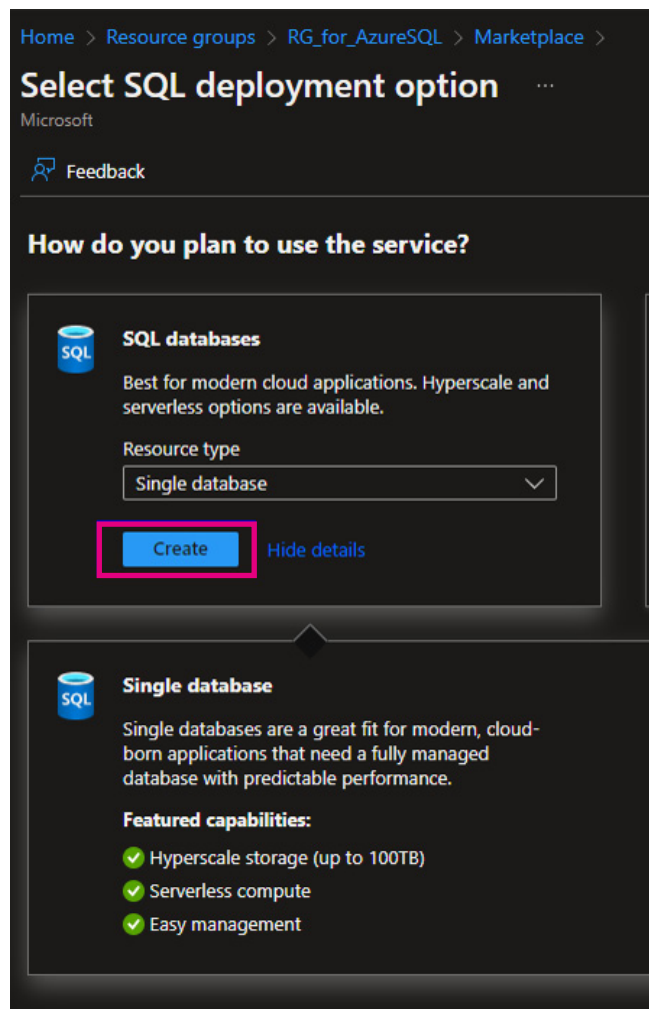
Try changing or clearing your filters.

Create resources Clear filters

Step 3: Select "Azure SQL"



Step 4: Create a Single database.



Step 5: Create a server if there is no one.

Home > Resource groups > RG_for_AzureSQL > Marketplace > Select SQL deployment option >

Create SQL Database

Microsoft

i Did you know that new users in Azure can create a free Azure SQL Database and use it for 12 months using Azure free account? [Learn more](#)

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ

Resource group * ⓘ [Create new](#)

Database details

Enter required settings for this database, including picking a logical server and configuring the compute and storage resources

Database name *

Server * ⓘ [Create new](#)

Want to use SQL elastic pool? ⓘ Yes No

Step 6: Define the server name, user name (admin login), and password.

Create SQL Database Server

Microsoft

Server details

Enter required settings for this server, including providing a name and location. This server will be created in the same subscription and resource group as your database.

Server name * ✓
.database.windows.net

Location * ✓

Authentication

Select your preferred authentication methods for accessing this server. Create a server admin login and password to access your server with SQL authentication, select only Azure AD authentication [Learn more](#) using an existing Azure AD user, group, or application as Azure AD admin [Learn more](#), or select both SQL and Azure AD authentication.

Authentication method

- Use SQL authentication
- Use only Azure Active Directory (Azure AD) authentication
- Use both SQL and Azure AD authentication


Server admin login * ✓

Password * ✓


Confirm password * ✓


Step 7: Choose "Public endpoint" in the Networking tab. Then "Review + create" to create this database.

Basics **Networking** Security Additional settings Tags Review + create

Configure network access and connectivity for your server. The configuration selected below will apply to the selected server 'opcua-db-server2' and all databases it manages. [Learn more](#) 

Network connectivity

Choose an option for configuring connectivity to your server via public endpoint or private endpoint. Choosing no access creates with defaults and you can configure connection method after server creation. [Learn more](#) 


Connectivity method * 

No access

Public endpoint

Private endpoint

Firewall rules


Setting 'Allow Azure services and resources to access this server' to Yes allows communications from all resources inside the Azure boundary, that may or may not be part of your subscription. [Learn more](#) 


Setting 'Add current client IP address' to Yes will add an entry for your client IP address to the server firewall.

Allow Azure services and resources to access this server *

Add current client IP address *

Connection policy

Configure how clients communicate with your SQL database server. [Learn more](#) 

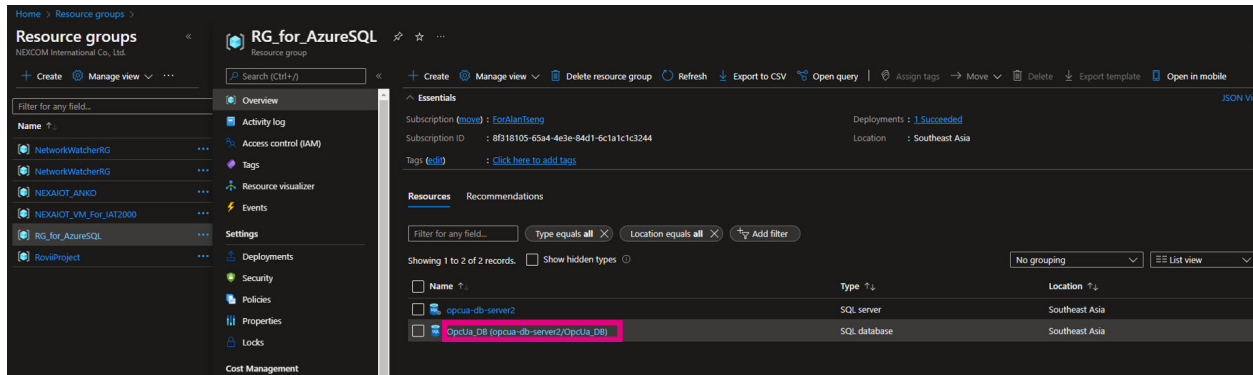
Connection policy 

Default - Uses Redirect policy for all client connections originating inside of Azure and Proxy for all client connections originating outside Azure

Proxy - All connections are proxied via the Azure SQL Database gateways

Redirect - Clients establish connections directly to the node hosting the database

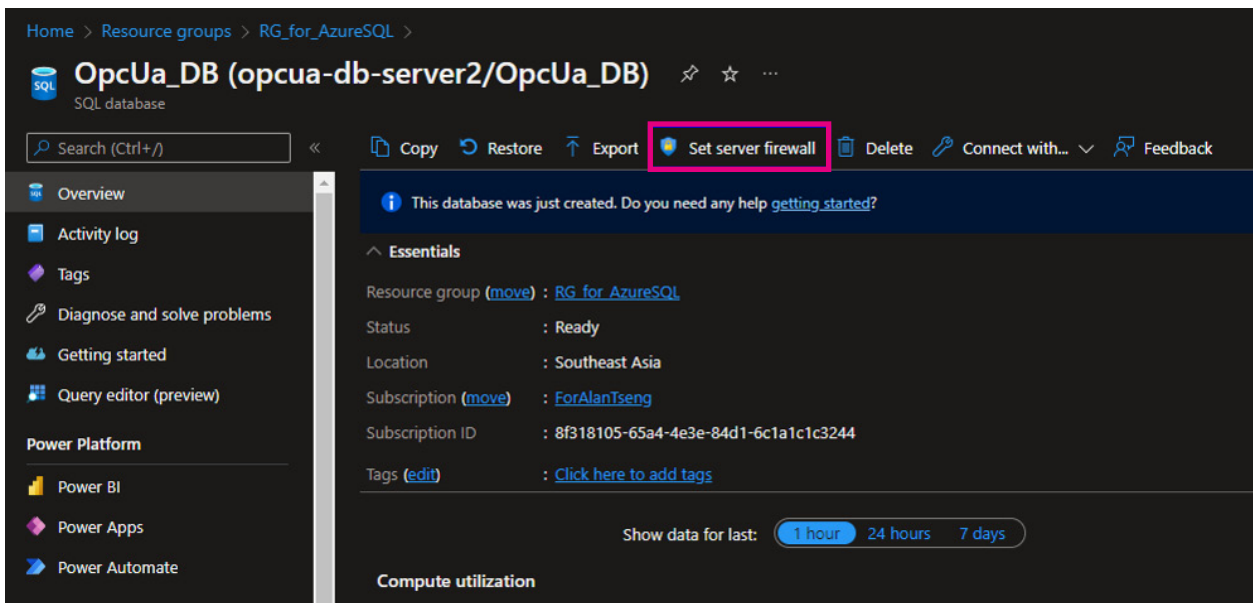
Step 8: Check the database in your resource group and click it



The screenshot shows the Azure portal interface for a resource group named 'RG_for_AzureSQL'. The left sidebar contains a navigation menu with options like Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Events, Settings, Deployments, Security, Policies, Properties, Locks, and Cost Management. The main content area displays the 'Essentials' section for the resource group, including Subscription (ForAlanTseng), Subscription ID (8f318105-65a4-4e3e-84d1-6c1a1c1c3244), and Location (Southeast Asia). Below this, the 'Resources' section is visible, showing a table of resources. The table has columns for Name, Type, and Location. The resource 'OpcUa_DB (opcu-db-server2/OpcUa_DB)' is highlighted with a pink box.

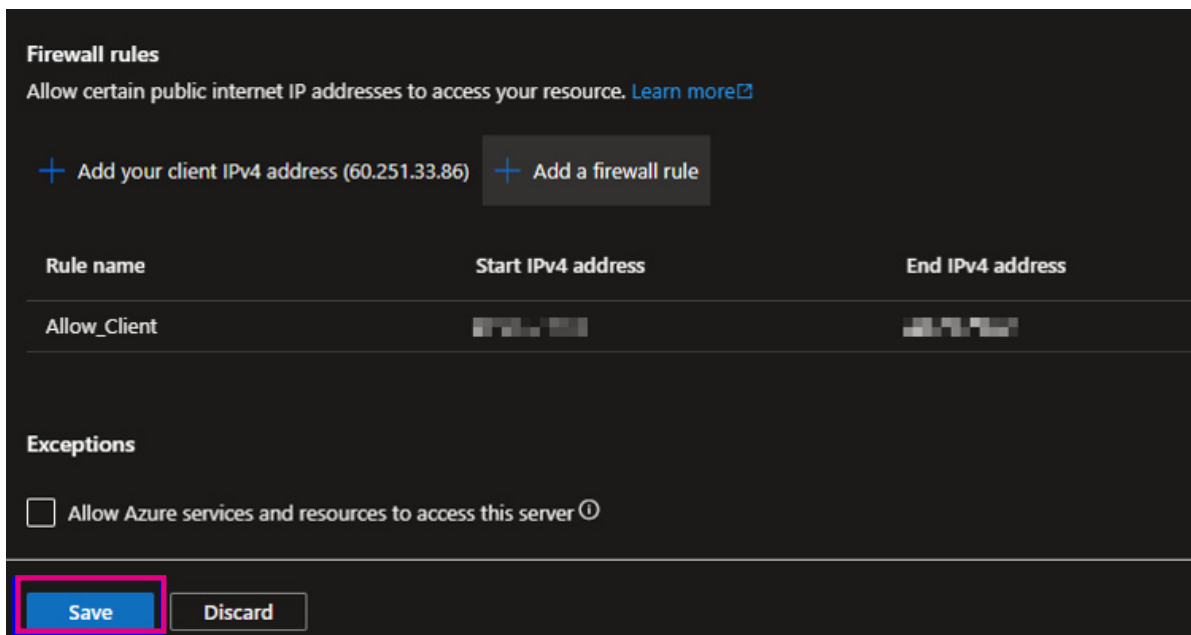
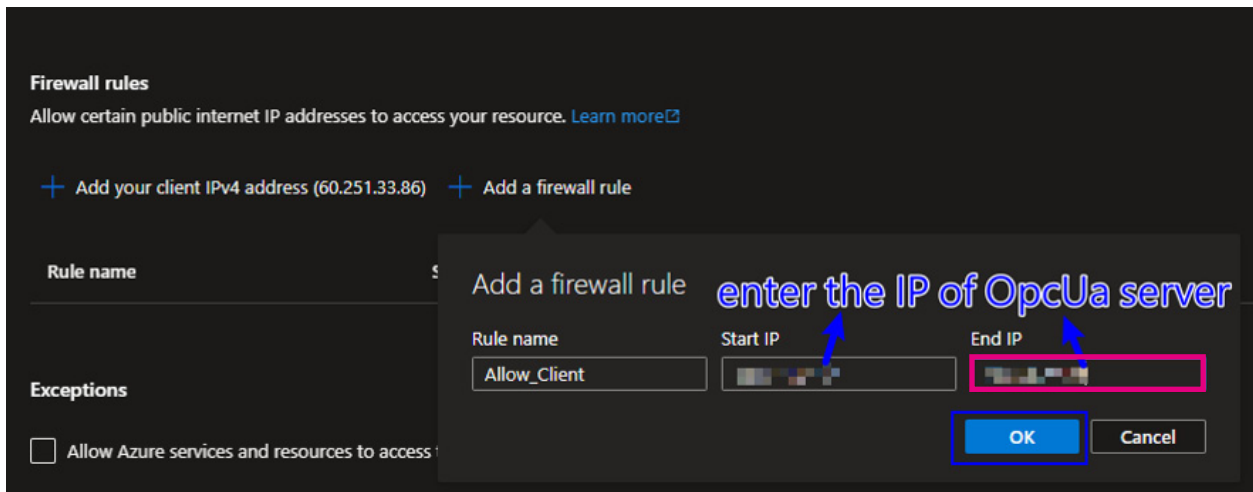
Name	Type	Location
opcu-db-server2	SQL server	Southeast Asia
OpcUa_DB (opcu-db-server2/OpcUa_DB)	SQL database	Southeast Asia

Step 9: Set the firewall



The screenshot shows the Azure portal interface for the 'OpcUa_DB (opcu-db-server2/OpcUa_DB)' resource. The left sidebar contains a navigation menu with options like Overview, Activity log, Tags, Diagnose and solve problems, Getting started, Query editor (preview), Power Platform, Power BI, Power Apps, and Power Automate. The main content area displays the 'Essentials' section for the resource, including Resource group (RG_for_AzureSQL), Status (Ready), Location (Southeast Asia), Subscription (ForAlanTseng), Subscription ID (8f318105-65a4-4e3e-84d1-6c1a1c1c3244), and Tags. The 'Set server firewall' button is highlighted with a pink box.

Step 10: Add a firewall rule, enter the IP of OpcUa server to allow it to connect to Azure SQL. Then press the "Save" button.



Step 11: Refer to "Connection strings", check the information and type them to Database configuration of OpcUa Server.

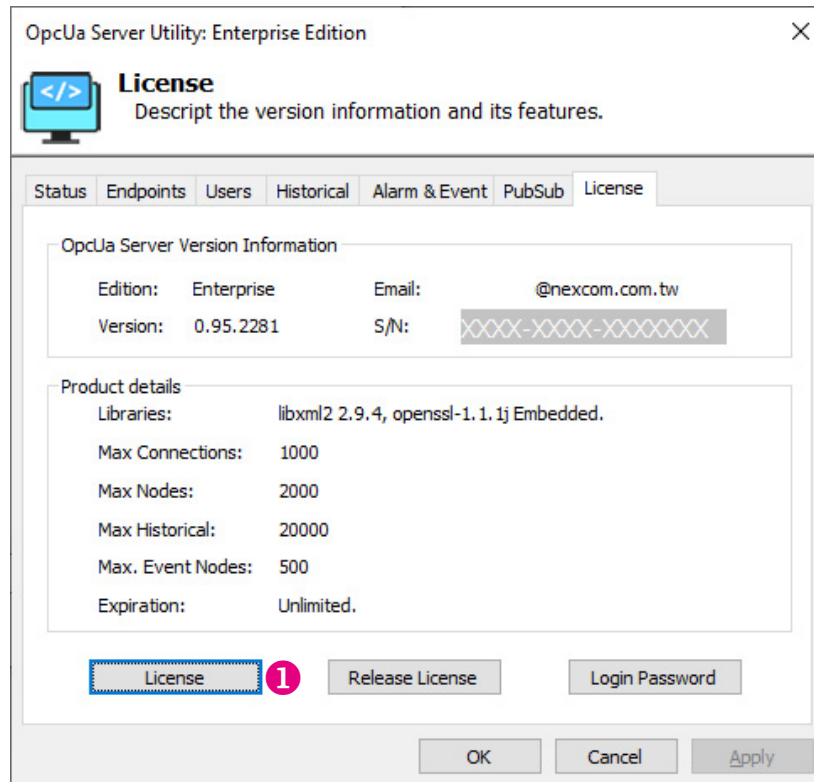
The image shows a multi-step configuration process for the OpcUa Server database. At the top, the 'OpcUa_DB (opcua-db-server2/OpcUa_DB) | Connection strings' window displays an ADO.NET connection string: `Server=opcua-db-server2.database.windows.net,1433;Initial Catalog=OpcUa_DB;Persist Security Info=False;User ID=opcua_admin;Password={your_password};MultipleActiveResultSets=True`. Labels with arrows identify 'opcua-db-server2.database.windows.net' as the Hostname, '1433' as the Port, 'OpcUa_DB' as the Default Schema, and 'opcua_admin' as the Username.

Below this, the 'NexUa Server Utility: Enterprise Edition' 'Database' configuration window is shown. It has tabs for Status, Endpoints, Users, Historical, Alarm & Event, PubSub, Database, and License. The 'Database' tab is active, showing 'Connection Settings' with a dropdown for 'Database' set to 'Azure SQL Database'. The 'Hostname' field contains 'opcua-db-server2.database.windows.net', 'Port' is '1433', 'Username' is 'opcua_admin', and 'Password' is masked. The 'Log Config' section shows 'Default Schema' as 'OpcUa_DB' and 'Default Table' as 'Historical'. 'Init. Database' and 'Test Connection' buttons are visible at the bottom.

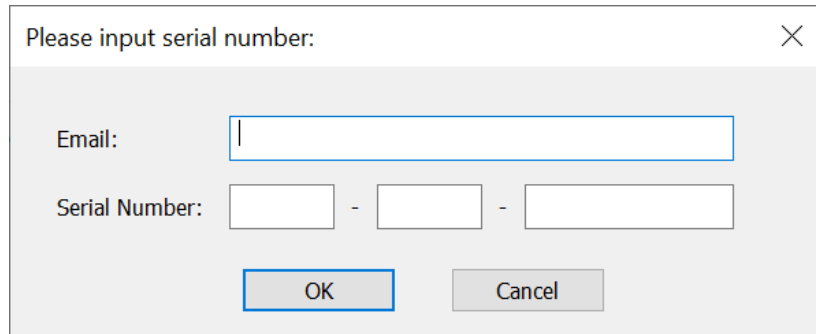
An 'Information' dialog box at the bottom left displays a message: 'Successful made the database connection. Now you can initialize your database!' with a '確定' (OK) button.

2.8 License

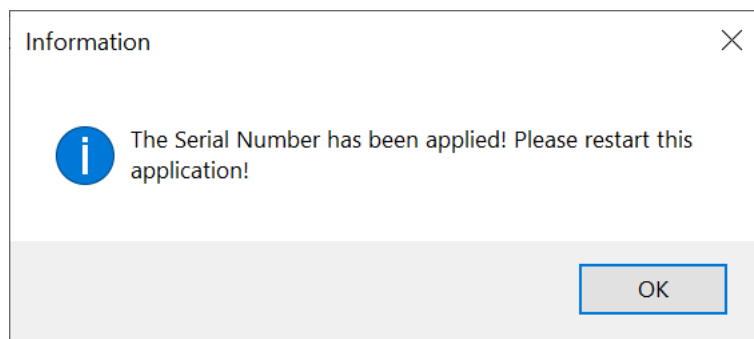
The License page displays the **AIC OpcUa Server Version Information** and the **Product details**. Also, this page allows you to register the product key.



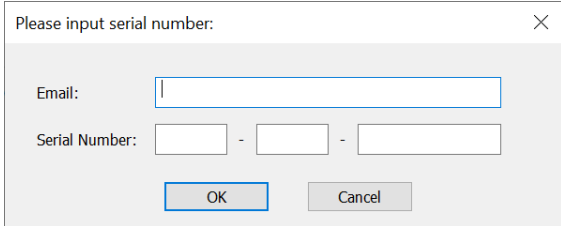
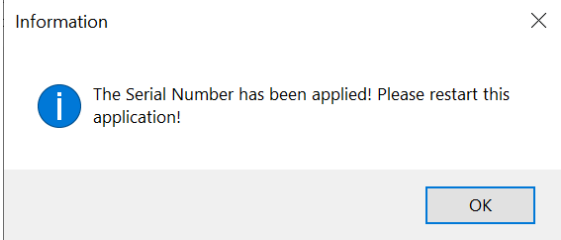
Please enter a valid license Email and SN



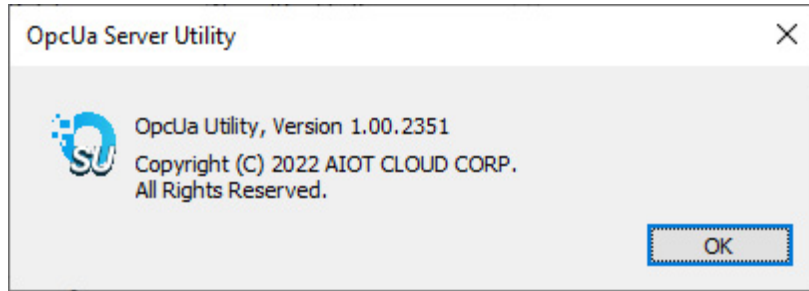
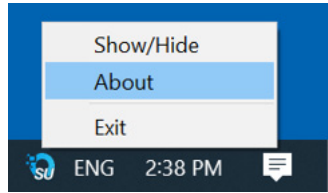
A dialog box titled "Please input serial number:" with a close button (X) in the top right corner. It contains two input fields: "Email:" followed by a single-line text box, and "Serial Number:" followed by three separate text boxes separated by hyphens. At the bottom, there are two buttons: "OK" and "Cancel".



An "Information" dialog box with a close button (X) in the top right corner. It features a blue information icon (i) on the left and the text "The Serial Number has been applied! Please restart this application!" on the right. A single "OK" button is located at the bottom right of the dialog.

Item	Name	Description
1	License	<p>Click License and enter your software key in the respective fields. Click OK when done.</p>  
2	Release License	Click it to release the license key on the current device, then you can use the license key in the other device.

2.9 About

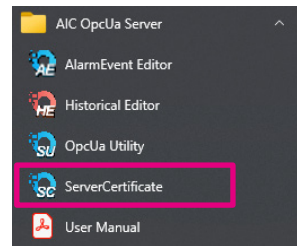


CHAPTER 3: ADVANCED FUNCTIONS

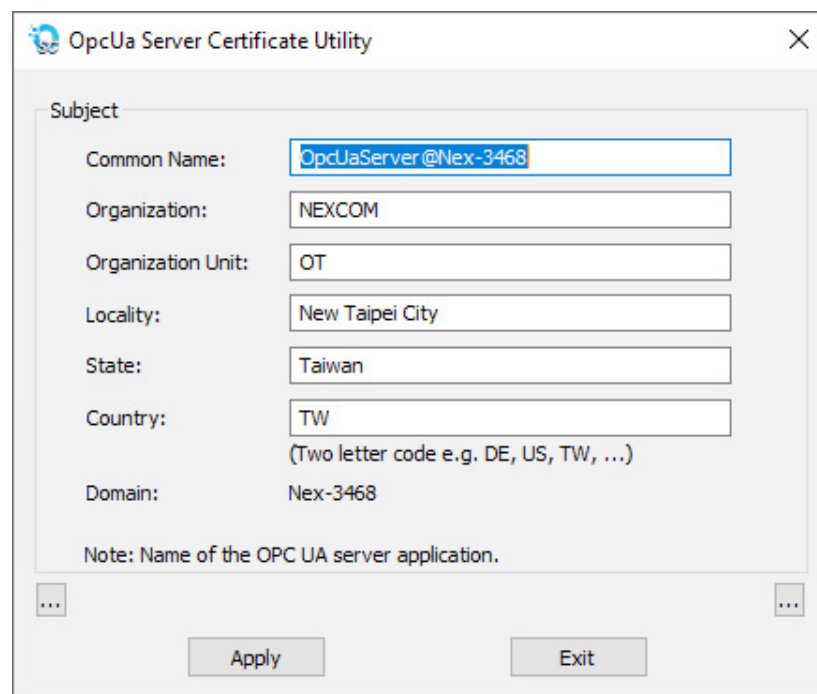
3.1 Update the Server Certificate

The OpcUa Server Certificate Utility can help you to manage the OPC UA Server Certificate. You can create your own Server Certificate or load the default value. Also, you can select a new Server Certificate using this utility.

1. Click on the icon or **Server Certificate** to launch the Server Certificate.



2. The GUI of Server Certificate will be displayed on the screen.



Subject

Common Name:

Organization:

Organization Unit:

Locality:

State:

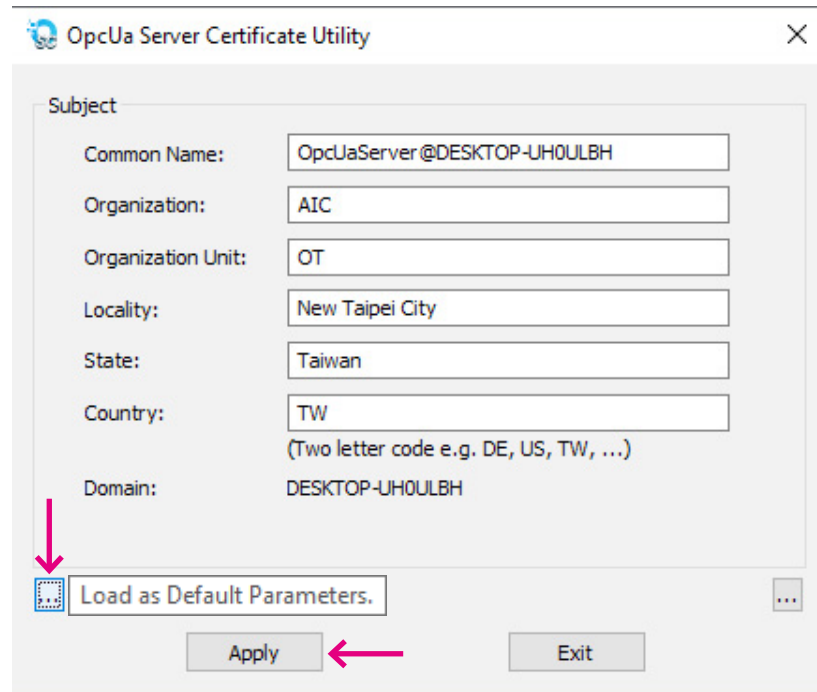
Country:
(Two letter code e.g. DE, US, TW, ...)

Domain:

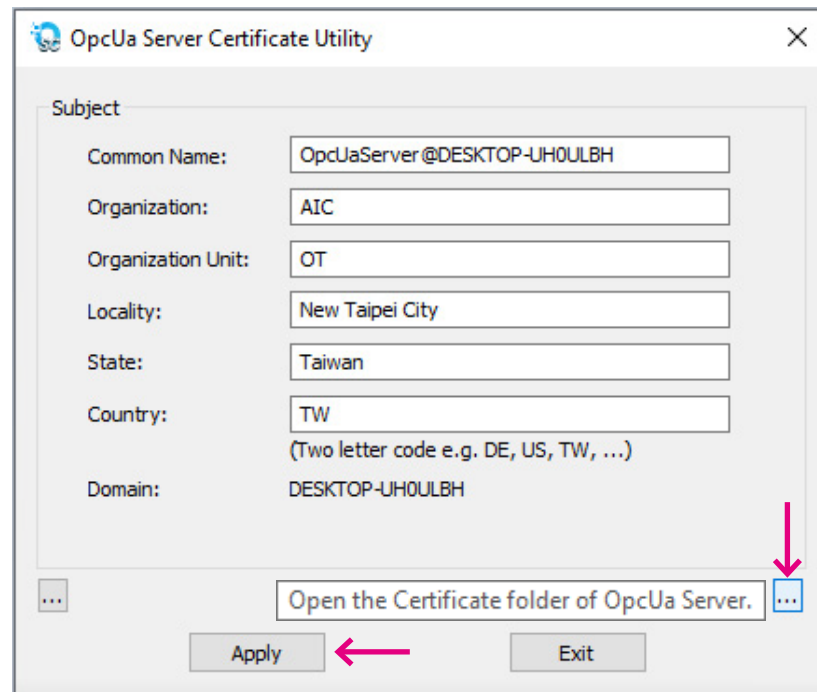
Note: Name of the OPC UA server application.

Apply Exit

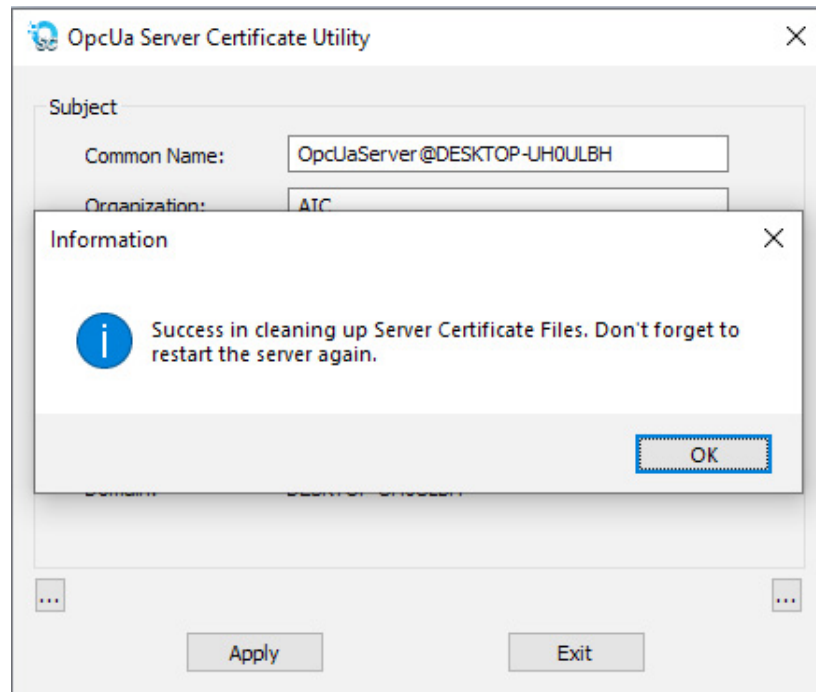
3. To load the default certificate, click on the bottom left corner as indicated below and then click Apply button.



4. To load a preferred certificate, click on the bottom right corner as indicated below and then click Apply button.



5. Make sure to restart the server once you have pressed the Apply button.



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