

Matrikon® Data Broker

Version 2.4.0

User Manual



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ABOUT THIS MANUAL

This manual describes the procedure to Install, License, Configure, and use Matrikon Data Broker.



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1.1 Document Revision History

Table 1 Document Revision History

Release	Date	Description
2.4.0	March 2025	Updated the document for bug fixes as listed in the Release Notes .
2.3.3	October 2024	Updated the document for bug fixes as listed in the Release Notes .
2.3.2	July 2024	Updated the document for bug fixes as listed in the Release Notes .
2.3.1	April 2024	Updated the document for bug fixes as listed in the Release Notes .
2.3	September 2023	Updated the document for bug fixes as listed in the Release Notes .
2.1.2	March 2023	Updated the document for bug fixes as listed in the Release Notes .
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1.4.4	November 2022	Updated the document for bug fixes as listed in the Release Notes .
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1.4.1	August 2021	Updated the document for bug fixes as listed in the Release Notes .
1.4	June 2021	Updated the document for new features as listed in the Release Notes .
1.3	February 2021	Updated the document for new features as listed in the Release Notes .
1.3 Beta	September 2020	Updated the document for new features as listed in the Release Notes .
1.2	July 2020	Updated the document for new features as listed in the Release Notes .
1.1	May 2020	Updated the document for new features as listed in the Release Notes .

Release	Date	Description
R100.1	December 2019	Updated the document for new features as listed in the Release Notes

1.2 Privacy Statement

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Please see the following link for the complete [Privacy Statement](#).

1.2.1 Patent

For an important patent notice, please visit: www.honpat.com

1.3 Intended Audience

System administrators, Engineers, and others who Install, License, Configure, and use Matrikon Data Broker can utilize this document to complete their tasks. It is expected that the users of this document are aware of OPC UA and its application. If you want to get information on OPC UA and its applications, read [Introduction to OPC UA](#).

1.4 Document Navigation

All entries in the Table of Contents, List of Figures, and List of Tables contain links to the appropriate bookmark in the document. Click the entry that takes you directly to the referred item.

Figure and Table references in the text also contain links. Click them to take you directly to the referred item.

In the sidebar of the document is a list of bookmarks. These correspond to the configured headings within the document.

1.5 Related Documents and Resources

This document contains information from the following resources:

- www.opcfoundation.org
- www.matrikonopc.com
- www.modbus.org

This document also refers to information found in these documents:

- Modbus Adapter User Manual
- Matrikon Data Broker Licensing Guide

1.6 Document Conventions

1.6.1 Terms and Abbreviations

Table 2 Terms and Abbreviations

Abbreviation	Description
AC	OPC UA Alarms and Conditions
AMQP	Advanced Message Queuing Protocol - an open source protocol for message-oriented middleware
API	Application Programming Interface
AWS	Amazon Web Services
CA	Certificate Authority - an entity that stores, signs, and issues digital certificates.
COM	Component Object Model - a Microsoft proprietary, object-oriented standard for building software components that can interact in the Windows environment.
CRL	Certificate Revocation List - a list of digital certificates revoked by the issuing CA before their expiration date.
DA	Data Access - an OPC specification. This can refer to either the OPC Classic Specification for Data Access or the OPC UA 10000-8 specification.
DCOM	Distributed COM - an extension of COM dealing with communication between COM components installed on different hosts.
DCS	Distributed Control System - a platform for the automated operation and control of a plant or industrial process.
DMZ	De-Militarized Zone - a protected buffer layer between two or more security zones in a process control network.
HA	Historical Access - OPC 10000-11 is the OPC UA specification for accessing archived data from a database application.
HDA	Historical Data Access - the OPC Classic specification for accessing archived data from a database application.
HMI	Human Machine Interface
MDB	Matrikon Data Broker
MQTT	Message Queuing Telemetry Transport - a lightweight publish/subscribe messaging transport ideal for connecting remote devices with a small code footprint and minimal network bandwidth.
MSI	Microsoft Software Installer
NAT	Network Address Translation
OPC	Open Platform Communication

Abbreviation	Description
OPCF	OPC Foundation - the non-profit organization responsible for the development and maintenance of the OPC Specifications
OPCUA	OPC Unified Architecture
PFS	Perfect Forward Secrecy - a security feature guaranteeing that session keys are not compromised even if private encryption keys are.
PKI	Public Key Infrastructure - a series of roles, functions, and applications for creating, exchanging, and validating cryptographic key pairs.
PLC	Programmable Logic Controller
RC	Reverse Connection - an OPC UA device allowing a server to initiate a connection.
RHEL	Red Hat Enterprise Linux
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
SDK	Software Development Kit
SHA	Secure Hash Algorithm
SMTP	Simple Mail Transport Protocol
SQL	Structured Query Language
TCP	Transmission Control Protocol
TLS	Transport Layer Security
UA	Refer to OPC UA
UDP	User Datagram Protocol
UI	User Interface
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
WSS	Web Services Security
XML	eXtensible Markup Language

INTRODUCTION TO MATRIKON DATA BROKER

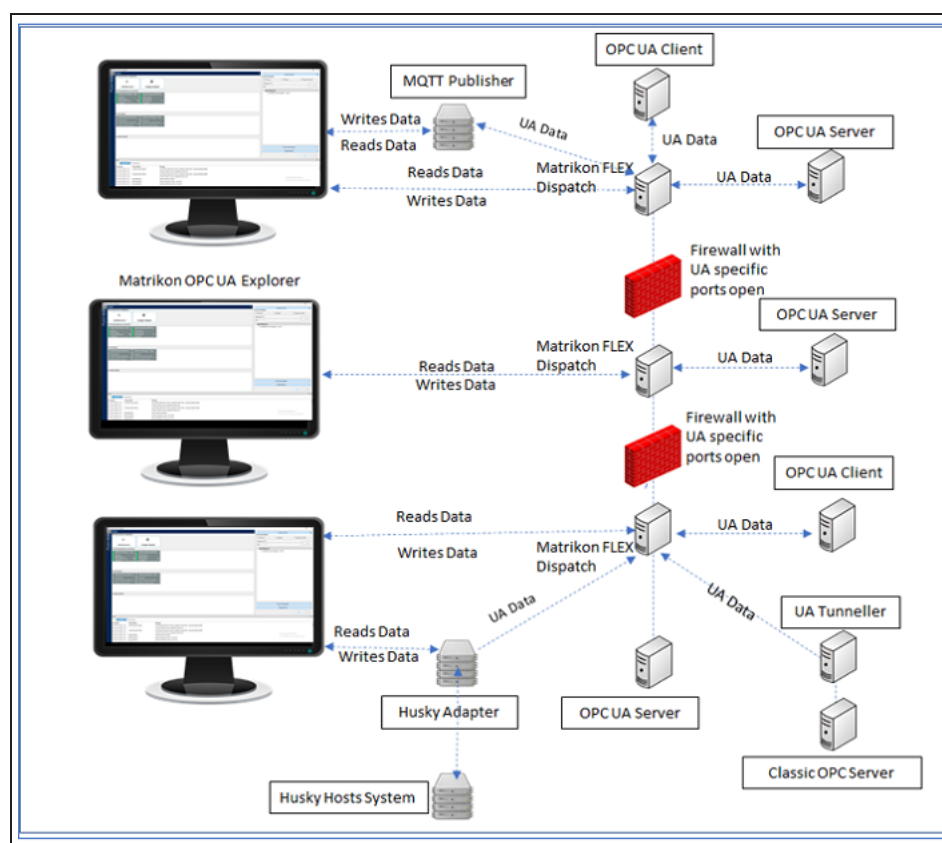
Matrikon Data Broker is based on the OPC UA standard. It provides secure, reliable, aggregated, and scalable connectivity between data sources and data consumers to meet both present and future industrial requirements.

Data Broker is used, but not limited to the following use cases:

- Honeywell-centric installations where one or more Data Broker instances collect process data from various sources and provide that data to a Honeywell system such as Cloud Historian Gateway or Enterprise Historian.
- Non-Honeywell-centric installations, where one or more Data Broker instances collect process data from the third-party OPC servers and distribute it to the third-party OPC UA clients.

2.1 Data Broker Solution Diagram

Figure 1 Data Broker Solution Diagram



2.1.1 Data Types

The Data Broker supports the following data type:

- **UA Data:** The Data Broker supports access to real-time OPC UA data as per OPC UA specification version 1.03 with certain parts introduced in version 1.04.

2.1.2 Users

The following are the typical users of Data Broker:

- **System Administrator:** A user responsible for installing, configuring, and maintaining Data Broker on a machine.
- **Control Engineer:** A user responsible for configuring connections to data sources and data consumers and synchronizing the data mappings with the physical plant.
- **Operator:** An entity that monitors and controls the live process. The Operator needs to read most of the data, write (change) some process parameters, and respond to alarms and scheduling. Operators typically do not change the control configuration.
- **Process Control System:** An application that reads plant data and adjusts it without a human operator.
- **Data Historian:** A software application that collects and stores the processed data.
- **Data Analysis Client:** A software application that collects data to analyze plant performance and make recommendations.

2.1.3 External System

The following external systems are shown in the above diagram:

- **Matrikon Data Broker:** Data Broker can be daisy-chained with other instances, allowing network data traversal through DMZs and firewalls.
- **OPC UA Server:** An external UA Server is aggregated (mapped) internally and provides its segment of the internal Address Space. This mapping is reproducible so that removing and adding the same instance of the server again re-creates the Address Space for connected UA Clients (NodeIds, namespace, etc.). Aggregator aggregates any number of connected UA Servers.
- **OPC UA Client:** An OPC UA Client connects to the Data Broker instance to collect data.
- **UA Tunneller:** [UA Tunneller](#) simplifies OPC UA migration by integrating OPC UA Clients and Servers with OPC Classic architecture.
- **OPC Classic Server:** Servers that use Classic OPC to transfer real-time data.
- **Matrikon Husky Adapter:** Matrikon Husky Adapter is an OPC UA Server that collects the data from Husky Hosts Injection molding systems and provides it to other OPC UA Clients through Matrikon Data Broker.
- **Matrikon Data Broker Modbus Adapter:** An OPC UA Server that collects data from a plant or Scada Modbus devices and provides it to other OPC UA Clients through Matrikon Data Broker.
- **Matrikon Data Broker MQTT Publisher:** MQTT Publisher collects the real-time data from Matrikon Data Broker or Alarms and Events data from OPC UA Alarms Server and publishes data to any of the on-prem MQTT Brokers or cloud-based MQTT Brokers like Azure IoT Hub or AWS IoT platform.

2.2 Introduction to Matrikon OPC UA Explorer

Matrikon OPC UA Explorer is a desktop-based OPC UA client application to view and modify the OPC UA data. Using the OPC UA Explorer, you can perform the following functions:

- Connect, view the address space, monitor the data, and write the data to an OPC UA-compliant server.
- Manage the Certificates of an OPC UA Server exposing certificate management functionality.
- Configure Matrikon Data Broker over a UA connection.
- Configure Matrikon Data Broker MQTT Publisher.
- Configure Matrikon Data Broker Adapters connected to MDB as data sources.
- Manage Licensing of Data Broker and its Adapters



Matrikon OPC UA Explorer is best viewed with a screen resolution of 1920*1080 pixels.

2.3 Key Features of Data Broker

The following are the key features of a Data Broker:

- **Data Connection and Aggregation:** The Data Broker can aggregate data from multiple OPC UA servers and then provide it to other systems such as DCS, SCADA, HMI, and so on with OPC UA client capabilities.
- **Network Traversal and Reverse Connection:** The Data Broker can transport data on the domain, across the domains, and even across the network De-Militarized Zones (DMZs) without modifying the existing firewall setup.
- **OPC UA Explorer:** This is an OPC UA Client application that can connect to OPC UA servers to view process data and can also be used to configure Data Broker instances. For an introduction to OPC UA Explorer, see [Introduction to Matrikon OPC UA Explorer](#).
- **Data Simulation:** The Data Broker has a simulated data source where you can test the UA client connections. You can add multiple simulation data sources for compatibility, reliability, and load testing.
- **Data Broker as a Container:** You can run Data Broker as a container in Linux or Windows-supported operating systems. The benefits of using **Data Broker as a container** are as follows:
 - Resource Effective containers do not require a separate operating system per application. Containers can share a single Operating system instance.
 - Enables you to run Data Broker securely in different environments such as local machines, physical and virtual servers, testing, and production environments.
 - In the event of an application crash, the other Data Broker containers within the same application keep running without any technical issues.
 - Swifter in terms of performance. You can easily create, start, stop, and delete the containers quickly.
 - You can add more Data Broker containers within a cluster and scale out, thus reducing the resource cost.
 - It is easy to append the updates, bug fixes, and new releases.

For more information on downloading Docker Containers and configuring, see the [Data Broker as Container](#) section.

- **Matrikon Data Broker Husky Adapter:** You can connect Matrikon Data Broker to *Matrikon Data Broker Husky Adapter*, which is available as an OPC UA Server to collect data from Husky Hosts Injection Molding systems. For more information on Matrikon Data Broker Husky Adapter, see *Matrikon Data Broker Husky Adapter User Manual* or contact the user Matrikon Account Manager.
- **Matrikon Data Broker Modbus Adapter:** You can connect Matrikon Data Broker to *Matrikon Data Broker Modbus Adapter*, which is available as an OPC UA Server to collect data from plant or Scada Modbus devices. For more information on Matrikon Data Broker Modbus Adapter, see *Matrikon Data Broker Modbus Adapter User Manual* or contact the user Matrikon Account Manager.
- **Matrikon Data Broker MQTT Publisher:** Using the Matrikon Data Broker MQTT Adapter, you can collect the real-time or Alarms and Events data from Matrikon Data Broker or OPC UA Servers and publish it to On-Prem MQTT Brokers like Eclipse Mosquitto or Cloud Brokers like Azure IoT Hub or AWS IoT Platform in OPC UA Pub/Sub format. For more information on MQTT Publisher, please look at *Matrikon Data Broker MQTT Publisher User Manual* or contact your Matrikon Account Manager.

3.1 System Requirements

Software Requirements

Table 3 Software Requirements

Software	Supported Version(s)
Windows Operating System	Client: Windows 11 64-bit, Windows 10 64-bit Server: Servers 2022, 2019, 2016, 2012 R2 (All 64-bit)
Linux Operating System	Red hat Linux 8.0, Centos 8.0, Ubuntu 18.04, 20.04, 22.04

Hardware Requirements

Table 4 Hardware Requirements

Hardware	Minimum Requirements
RAM	8 GB
CPU	4 Cores
Disk Space	1GB

3.1.1 Security Settings on Windows

It is highly recommended that the following security measures be taken. For your corporate guidelines, consult your local security or IT team.

1. Enable Data Execution Prevention (DEP). To enable DEP, follow these instructions or consult the Windows help online instructions for your specific version of Windows.
 - a. Tap the Windows key or Start button.
 - b. Type "Windows Security" and select the Windows Security app at the top of the search results.
 - c. Select App & browser control and then Exploit protection.
 - d. Find Data Execution Prevention in the System settings tab and enable it.
2. Enable Address Space Layout Randomization (ASLR). To enable ASLR, follow these instructions or consult the

Windows help online instructions for your specific version of Windows.

- a. Tap the Windows key or Start button.
- b. Type "Windows Security" and select the Windows Security app at the top of the search results.
- c. Select Force randomization from images (Mandatory ASLR) and enable it by default (if not already on).

3.2 Performance Considerations

3.2.1 Set Appropriate Timeouts/Defaults

Matrikon Data Broker comes with many default values to suit most scenarios. You review all defaults, especially timeouts and communication maximums of your application and its intended use.



Matrikon Data Broker takes a "secure by default" approach to default and secure communication. Understand the security ramifications before making a change in any default values.

3.2.2 Back-End Sensors

The Data Broker requests periodic updates of item values from its connected data sources. It does this for each item requested by an OPC UA. It is recommended that the resource allocation for the Data Broker is enough to handle a flood of values, events, and alarms to ensure successful transmission to the OPC UA client.

3.3 Security Considerations

This section describes the essential security considerations to help ensure that the Data Broker is as secure as possible. You cannot apply all considerations to your situation. Please decide the relevant considerations to follow and to what extent.

3.3.1 Secure Auxiliary files

Data Broker has auxiliary files such as configuration, cache, and log files. It is highly recommended that these files be stored in a protected folder on the host. It is recommended not to use the storage location as the certificate key store. Matrikon Data Broker locks the location of auxiliary files during installation, but your IT department can have additional policies.

3.3.2 Assign User Accounts with the least Privileges required

You can grant appropriate access (Read or Write) permissions to restrict access by malicious users and prevent accidental and unintended changes. There are four built-in users with various access rights for this purpose.

3.3.3 Enable Security for OPC UA Connections

Matrikon Data Broker meets the strict security requirements of the OPC UA specification. However, this is only achievable if security is enabled and used (the default is to have security enabled). It is strongly recommended to turn on the secure channel communication and select the 'None-None' security profile only if you are sure it is a project requirement. Having security enabled and not having the 'None-None' security profile means all OPC UA clients that connect to Data Broker must do so in a secure manner. To ensure that the type of security required matches your Data Broker configuration, check the available security profiles.

3.3.4 Change Initial Passwords

After installation, ensure you log in to the Data Broker and change the initial passwords so that malicious users cannot reconfigure or misuse the Data Broker. For the list of initial passwords, see [How to Configure Data Broker](#).

3.3.5 Secure the Certificate Key Store

Certificates are only as secure as the storage in which they are stored. Ensure you fully protect your certificate key store with your IT group's process requirement. It can include locking down access permissions to a file system and preventing the file system access from peripherals. Data Broker locks the certificate key store at installation time, but your IT department can have additional policies. See [Security in OPC UA](#).

3.3.6 Logging and Diagnostics

Data Brokers can produce logging and diagnostics information. It is recommended to configure the Data Broker to limit the amount of disk space used by diagnostics so that it is not accidentally exhausted. By default, in the Data Broker, the individual logs are limited to 10 megabytes (MB), and the entire log storage is limited to 100 megabytes (MB). Please make sure the log files are protected from any user who does not have access.

3.3.7 Monitor Certificate Chains

Make sure to monitor your certificates for the expiration and new revocation lists. Periodically check with the Master Certificate Authority for news and updates that need you to revoke and re-issue the certificates.

3.3.8 Run Data Broker with least Privilege

To protect the device from external access, ensure the Data Broker runs with the lowest user privileges possible. Running communication software with elevated privileges is not recommended.

3.3.9 Excessive User Authentication Attempts

This release introduces an enhancement to the Matrikon Data Broker server, improving the security of server data access by controlling false login attempts.

1. **Authentication Attempts:**

- The number of allowed authentication attempts per machine ranges from a minimum of 3 to a maximum of 10 attempts.

2. **Cooling Period:**

- If the maximum retry attempts are exceeded, a cooling period is activated, configurable between 2 to 60 minutes.
- This cooling period is applied per user per machine.

3. **Blocking Access:**

- If a user enters the wrong password for the configured number of attempts, the server will block access until the cooling period ends.
- After the cooling period, the user can attempt to access the server again.

4. **Login Attempts During Cooling Period:**

- If the same user tries to log in from a different client on the same machine with correct credentials during the cooling period, access will still be denied.
- Different users (with different usernames and passwords) can log in on the same machine during the cooling period.

5. Access from Different Machines:

- A user can access the Matrikon Data Broker server from another machine using the same username and correct password, even during the cooling period on the original machine.

6. Machine-Based Lock:

- Authentication attempts are locked based on the machine, not specific to the client or user.

Figure 2 Excessive Authentication Attempts

Maximum Login Attempts	3
Reattempt Login	120 seconds

Maximum Login Attempts and Reattempt Login are configurable under Server Settings screen.

This section describes how to install Data Broker. Data Broker is a package consisting of 'Data Broker' and 'Explorer' components.

Prerequisite: Read the section [Read Me Before Installation](#).



Currently, migration or upgrade from R100.1 to future versions is not supported. Uninstall the R100.1 versions of Explorer and Data Broker before installing the latest version.

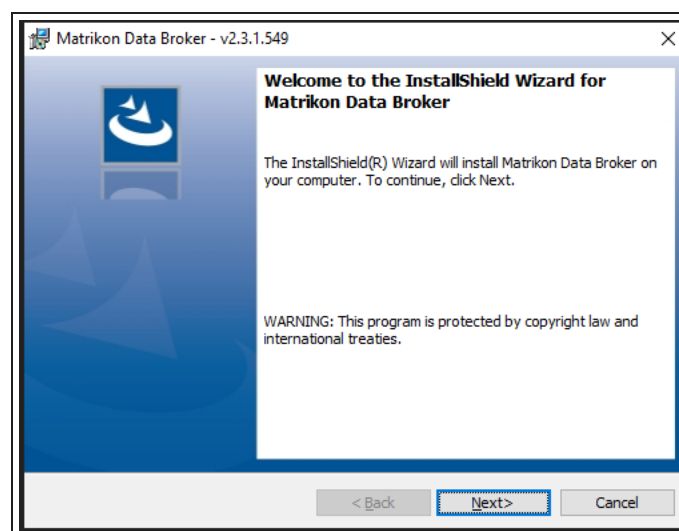
4.1 Install Matrikon Data Broker

4.1.1 Windows Operating System

To install Data Broker:

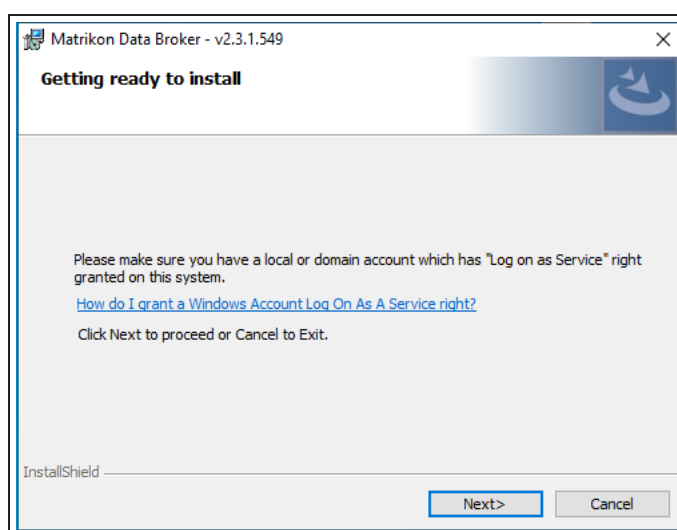
1. Go to the location where **Install Media** is placed.
2. Double-click **MatrikonData Broker.exe**. You should have administrative privileges or have access to an administrator account to install the software.
3. Please wait until **Matrikon Data Broker InstallShield Wizard** appears.

Figure 3 Matrikon Data Broker InstallShield Wizard



Ensure the user who installs Matrikon has access to a user account that is part of the local system's Administrator group. This is required because the installer creates a service, a firewall rule, and folders in protected file system areas only accessible to users with Administrator privileges. Please make sure you have a local or domain account which has "Log on as service" right granted on the system

Figure 4 Getting ready to install

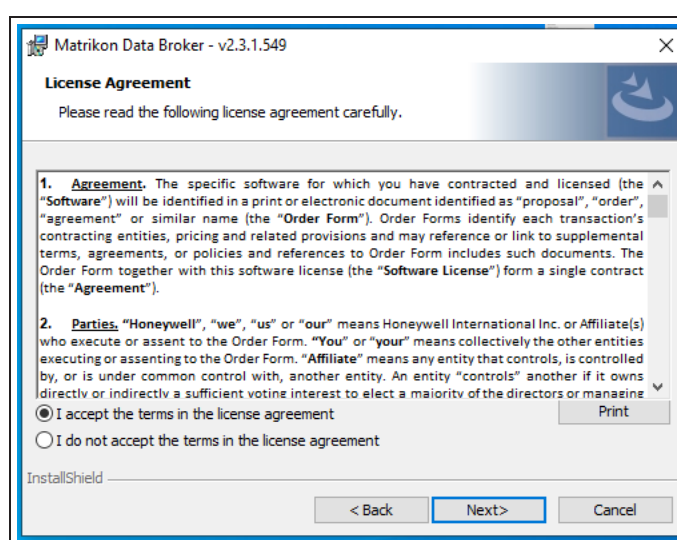


If you are installing on top of the R100.1 version of either Explorer or Data Broker, a prompt with an error message appears, and the Installer exits without continuing to the subsequent screens

4. In the Matrikon Data Broker InstallShield wizard screen, click **Next**.

The License Agreement screen appears.

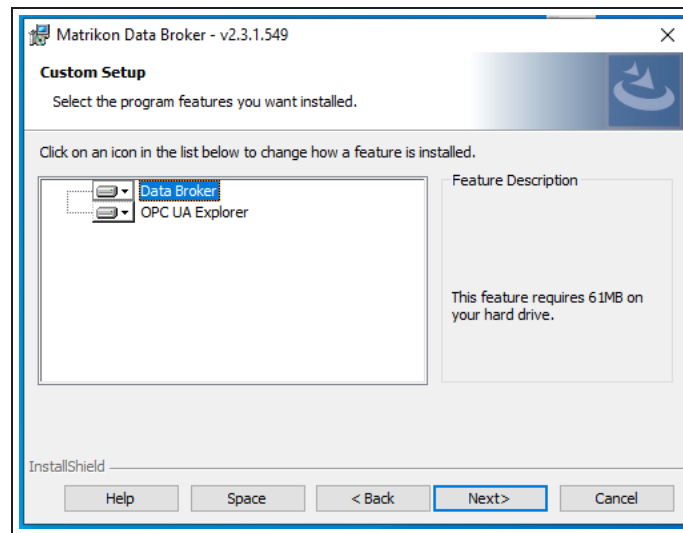
Figure 5 License Agreement



5. In the **License Agreement** screen, please read the terms in the Agreement carefully, select **I accept the terms in the license agreement**, and then click **Next**.

The **Custom Setup** screen appears. By default, **OPC UA Explorer** opts to be installed on this screen.

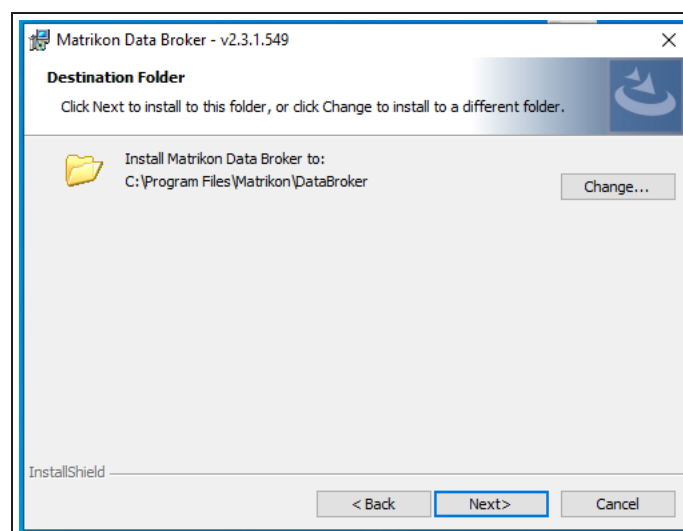
Figure 6 Custom Setup Screen



6. In the **Custom Setup** screen, click **Next**.

The **Destination Folder** setup screen appears.

Figure 7 Destination Folder Setup Screen



If you do not select the OPC UA Explorer component as part of the installation and if you want to install the OPC UA Explorer component separately, you can download the Matrikon OPC UA Explorer installer from <https://www.matrikonopc.com/opc-ua/products/opc-ua-explorer.aspx>.

If you would like more information, you can contact [Matrikon Support](#).

7. In the **Destination Folder** setup screen, select the path to install Data Broker and click **Next**. OPC UA Explorer also gets installed in the exact location.

The **Matrikon Data Broker Service Details** screen appears.

Figure 8 Matrikon Data Broker Service Details Screen

8. In the **Matrikon Data Broker Service Details** screen, perform the following steps:
 - a. In the **Instance Name** field, you can type the name of the instance that you want the service to identify as an instance. Only alphanumeric characters without space are allowed. The length of the instance name must be at most 32 characters.
 - b. In the **Port Number** field, type a valid Port Number that the OPC UA Server for the Data Broker to listen to. Good values are 2048 to 65535. Port numbers below 2048 are generally reserved for specific applications. The default port number is 55000.
 - c. In the **User Name** field, type a username in the following format:
 For local accounts: **.\<user name>**
 For domain users: **<Domain Name>\<user name>**
 - d. In the **Password** field, type the password for the account you specified.

Ensure the login user has "Log on as a service" privileges so that Data Broker can run as a service. See [Why Should I Have Logon as a Service Rights?](#) for more information.



As a security best practice, running any Windows service under an account with administrative privileges is not recommended. The Installer warns you if the account provided has administrative rights. You can see [Run Data Broker with the least privilege](#) if you want more information.

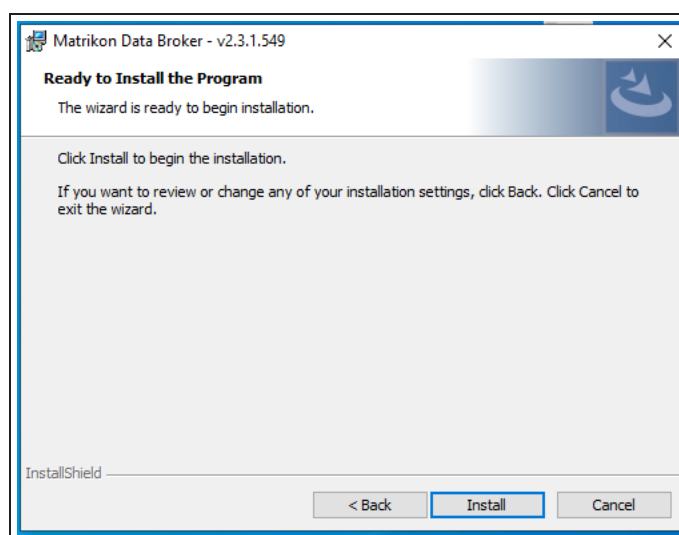


Use an account whose password does not use characters, =, +, &, ^, |, <, >, \.

9. Once you fill in the service details, click **Next**.

The **Ready to Install the Program** screen appears

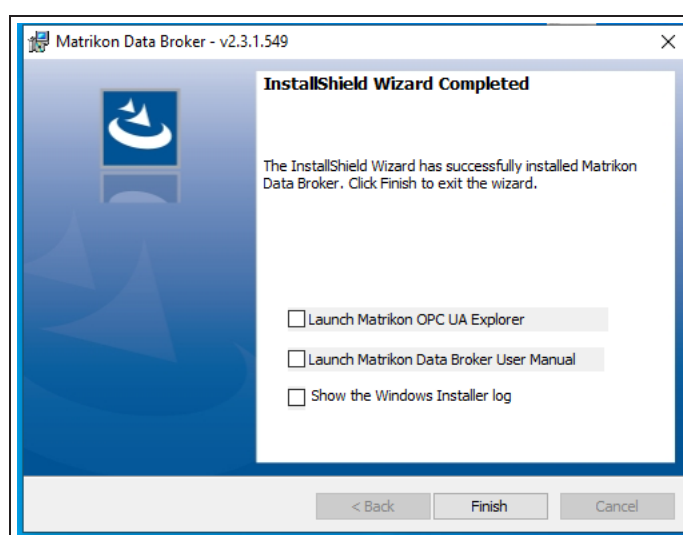
Figure 9 Ready to Install the Program Screen



10. Click **Install**, and the installation begins.

Once the installation is completed, the following screen appears.

Figure 10 Installation Completed Screen



11. To close the Installation Wizard, click **Finish**.



Matrikon Data Broker installer installs OPC Foundation supplied Local Discovery Server (LDS) to 1.04.413.498. For more explanation on how LDS installation is handled during Data Broker Installation, please look at [Installation and Post Installation Notes](#).

12. Once Matrikon Data Broker installation succeeds, the service starts automatically. To confirm if the Data Broker is registered and running, perform the following steps:

- a. Go to **Start > Run** and type **services. msc**, and then press **Enter**. The **Services** window appears with the list of all running services on your machine.
- b. See if the **Data Broker** service is listed in the format: "**Matrikon Data Broker -< Instance Name >**". The instance name is the same as you provided in the Service Details screen.
- c. If the service is **listed and running**, the Data Broker service is registered successfully.
- d. If the service is **listed but not running**, please restart the service. If the service fails to start, please contact [Matrikon Support](#) for further help.



If you are still waiting to see the Data Broker service in the services list or need help managing (starting or stopping) the service, contact [Matrikon Support](#) for further assistance.

4.1.2 Linux Operating System

Unlike the Windows operating system, where an installer package is provided, Explorer and Data Broker are provided each as an App Image for the Linux operating system. You must execute the App Image to use the Explorer or the Data Broker components. As part of the Data Broker, Linux media supplied contains the below App Images.

- **MatrikonDataBroker.AppImage** - App Image for Matrikon Data Broker component.
 - You also receive an additional file **upgradeMatrikonDataBroker.sh**, which helps migrate Data Broker App Images from earlier versions.
- **MatrikonOPCUAExplorer.AppImage** - App Image for Matrikon OPC UA Explorer.
- **MatrikonDataBroker_license_tool.AppImage** - App Image for Matrikon Data Broker Licensing utility.

You also receive the SHA256 hashes of all three App Image files. For security reasons, it is recommended to cross-compare the SHA256 hash signature of received files with the hashes provided to confirm the authenticity of the received files. If the SHA256 signatures do not match, contact [Matrikon Support](#) for further help.

This section explains the procedure to execute the respective App Images.

4.1.2.1 Install the Matrikon OPC UA Explorer App Image



Some Linux operating systems do not distribute OpenGL by default as part of the standard distribution. It is a required pre-requisite for Matrikon OPC UA Explorer AppImage. Install the OpenGL component by using the below command.

```
sudo apt-get install mesa-common-dev libgl1-mesa-dev libglu1-mesa-dev
```

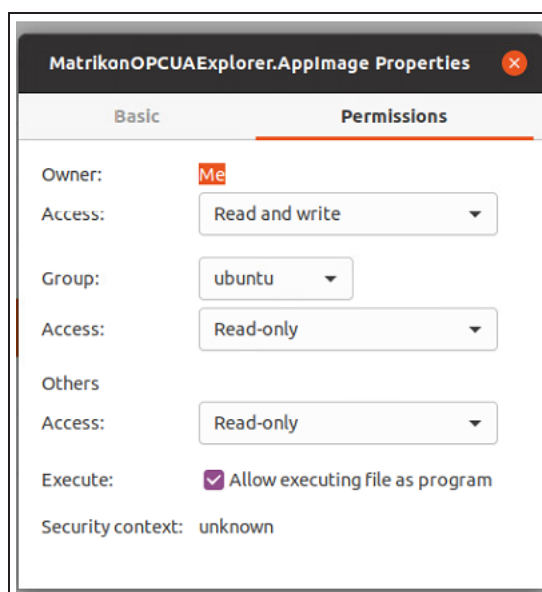


Some Ubuntu flavors, like Ubuntu Neon, do not have a zenity component available by default. You need to install this exclusively before proceeding ahead.

To execute the Explorer component (on supported Linux systems):

1. When you receive Explorer media, you receive an App Image file for Explorer named **MatrikonOPCUAExplorer.AppImage** and a SHA256 signature of that App Image in a text file.
2. Compare the SHA256 signature of the received App Image file with the one provided. If there is a mismatch, contact [Matrikon Support](#).
3. Move and save the **MatrikonOPCUAExplorer.AppImage** file into a folder named **ExplorerMedia** on your local machine.
4. When you copy the **MatrikonOPCUAExplorer.AppImage** file, based on the security profile of the logged-in user, the file cannot have the right to execute. Edit the file permissions to reflect as shown below. The **Execute** option should be enabled, and Access for Group and Others should at least be Read-Only.

Figure 11 Matrikon Permission Page

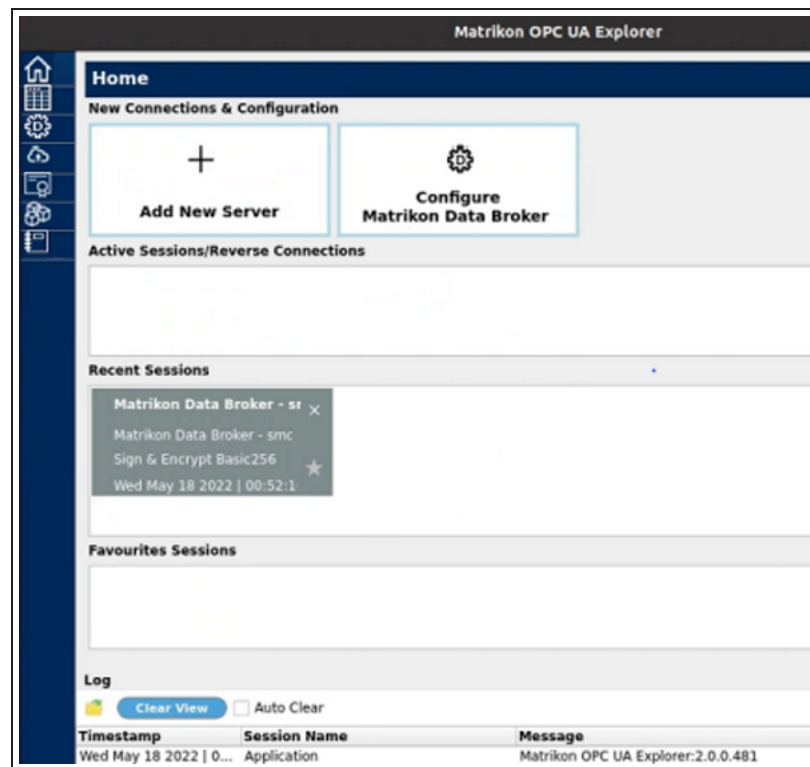


5. Open Terminal and Navigate to the path where the App Image file is stored, i.e., same as in Step 3 above. Execute the below command to launch Matrikon OPC UA Explorer.

```
sudo ./MatrikonOPCUAExplorer.AppImage
```

6. You get prompted with the **License Agreement** screen. Please read the terms in the License Agreement carefully, select **I accept the terms in the agreement**, and then click **Next**.
7. The Matrikon OPC UA Explorer window appears below when the App Image is executed.

Figure 12 Matrikon OPC UA Explorer Window



For information on how to use the Matrikon OPC UA Explorer, see [How to Use Matrikon OPC UA Explorer](#).

4.1.2.2 Install Matrikon Data Broker App Image

The Matrikon Data Broker component can be run as a service or application (daemon). However, it is recommended to run Data Broker as a service for running it in the background.

To register Data Broker as a service and create new instances, you must have the root/SUDO privileges on the system in which you are setting up the product.

Do not place MatrikonOPCUAExplorer.AppImage and DataBroker_license_tool.AppImage files in the same folder. When these App Images are executed, they create a PKI folder in the exact location where these App Images are available. Since the PKI folder name is the same for both App Images, they clash and lead to unintended behavior with the application.



Like what is required for Matrikon OPC UAExplorer AppImage, make sure MatrikonDataBroker.AppImage and DataBroker_license_tool.AppImage files must also Execute permission set and at least Read-Only permission to Group and Others.

Running the Data Broker App Image is a two-step process.

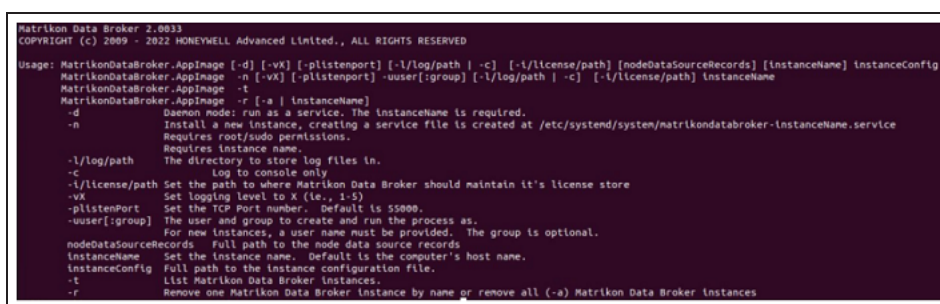
Step 1: Deploy the Data Broker App Image (like installing on Windows)

1. Copy the three App Images you received into a folder where you have Read and Write permissions, say **Media**.
2. To deploy the Data Broker App Image, open Terminal with sudo privilege and browse to the **Media** folder.
3. Type the command:

```
sudo ./MatrikonDataBroker.AppImage
```

4. Type the sudo password when prompted.
5. Once the sudo password is accepted, the **End User License Agreement** for Matrikon Data Broker appears.
6. Read the License Agreement carefully and type **yes** when prompted to accept the license agreement.
7. Once the deployment of Matrikon Data Broker is completed, the following screen with all the options for Matrikon Data Broker product (help) appears.

Figure 13 Options for Matrikon Data Broker Product



This completes the deployment of the Matrikon Data Broker service.

You can type the command:

```
sudo ./MatrikonDataBroker.AppImage
```

to see this helpful information anytime.

Step 2: Register Data Broker as a service

1. To register Data Broker as a service, type the following command:

```
sudo ./MatrikonDataBroker.AppImage -n [-vX] [-plisternport] -uuser [:group] [-l/log/path]
[instanceName]
```

Ex: `sudo ./MatrikonDataBroker.AppImage -n -p58000 -uDemoUser DemoInstance`

See the following table for the description of the above example commands:

Table 5 Example Commands

Options	Description
-d	Optional: Daemon mode: run as a service. The InstanceName is required.
-n	Mandatory: Install a new instance, creating a service file. Service file is created at /etc/systemd/system/ matrikondatabroker- instanceName.Service.4
-l/log/path	Optional: The directory to store log files in a custom location.
-c	Optional: Log to console only.
-vX	Optional: Set logging level to X (between 1-5)
-plisternPort	Mandatory: Set the TCP Port number. The default value is 55000.
-uuser : group	Optional: The user group to create and run the process. For new instances, a username is mandatory, and a group is optional.
-i/license/path	Optional: Location where Data Broker should maintain its license files.
nodeDataSourceRecords	Optional: Full path to the node data source records. This is not to be used.
instanceName	Mandatory: Set an instance name. The default is the machine's hostname.
instanceConfig	Optional: Full path of the instance configuration file. This is not to be used.
-t	Lists Data Broker instances. <u>Example:</u> <pre>sudo ./MatrikonDataBroker.AppImage -t</pre>
-r	Removes one Data Broker instance by name. <u>Example:</u>

Options	Description
	<pre>sudo ./MatrikonDataBroker.AppImage -r DemoInstance</pre>
-a	Removes all Data Broker instances. Example: <pre>sudo ./MatrikonDataBroker.AppImage -r -a</pre>



You can later change the Log Level and Log Path location from Matrikon OPC UA Explorer through the [Data Broker Configuration-> Server Configuration](#) screen.

- If you receive the error “Failed to create the Licensing Environment,” as mentioned in the screenshot below, refer to Section “[Matrikon Data Broker AppImage fails to register as a service](#)” to proceed further.

Figure 14 Data Broker App Image fails to register as a service.

```
18.05.2022 14:36:36.417841 HCLL>>WARNING: "LicenseManagement.c":257 () Flexara
error code=1947205640, system code=1, message=[1,7e3,4,0[74100008,1,1202014d]]
Internal.. Code 1947205640
18.05.2022 14:36:36.418012 HCLL>>WARNING: "LicenseManagement.c":257 () Failed t
o create the licensing environment. Code 1947205640
18.05.2022 14:36:36.418061 License>>ERROR: "clic_license_t.cpp":1467 (UpdateLice
nsingEnvironment) Failed to get license environment from CLL.
18.05.2022 14:36:36.418098 License>>WARNING: "clic_license_t.cpp":156 (Initialis
e) Bad status of "BadUnexpectedError" encountered
18.05.2022 14:36:36.418134 LicenseFactory>>WARNING: "dispatch_license_factory_t
.cpp":92 (CreateLicense) Bad status of "BadUnexpectedError" encountered
18.05.2022 14:36:36.418170 ServerManager>>WARNING: "server_manager_t.cpp":1405
(ConfigureServer) Bad status of "BadUnexpectedError" encountered
18.05.2022 14:36:36.418209 ServerManager>>SYSTEM: "server_manager_t.cpp":4960 (
SetupServiceConfiguration) The Matrikon Data Broker instance not configured. Er
ror=0x80010000
Failed to configure the instance.
Instance Creation Failed. -8
```

- You see the message below when the Matrikon Data Broker as a service setup completes.

Figure 15 Matrikon Data Broker Service Completed Message

```
Registering Service:
Instance Name: DemoInstance
Exe path: /home/lakhan/Downloads/2.0/2.0/AppImage/AppImage/AppImage/MatrikonDataBroker.AppImage
port: 58000
Created symlink /etc/systemd/system/multi-user.target.wants/matrikondatabroker-DemoInstance.service → /etc/systemd/system/matrikondatabroker-DemoInstance.service.
Started matrikondatabroker-DemoInstance.service
```

- This completes the setup of setting up Matrikon Data Broker as a service.

Once the service is up and running, Matrikon Data Broker’s PKI folder and other dependent files are deployed in the following location: `/etc/Matrikon/DataBroker/<Instance Name>`

Example: `/etc/Matrikon/DataBroker/DemoInstance`

Also, by default, log files of Matrikon Data Broker are available at the following location:
`/var/log/MatrikonDataBroker/<Instance Name>`

Example: `/var/log/MatrikonDataBroker/DemoInstance`

You can also see the locations of PKI and Log files from Matrikon OPC UA Explorer's [Data Broker Configuration -> Server Configuration screen](#).

You can also start or stop the service anytime in the future by running the following commands:

```
Start: sudo systemctl start matrikondatabroker -<instancename>
Stop:  sudo systemctl stop matrikondatabroker -<instancename>
Restart: sudo systemctl restart matrikondatabroker -<instancename>
```

This completes the Matrikon Data Broker deployment. Now, you can connect to the instance using Matrikon OPC UA Explorer. For information on how to use the Matrikon OPC UA Explorer, see [How to Use Matrikon OPC UA Explorer](#).



Matrikon Data Broker is successfully set up as a service at this stage. Matrikon Data Broker service, when set up the first time, runs in a 2-hour grace period with all the functionalities. You need to apply for the licenses as detailed in the [Licensing Data Broker](#) section to this or any other instance of Matrikon Data Broker to use the full functionality of Data Broker uninterruptedly.

4.1.3 Data Broker as a Container

You can run the Data Broker as a Docker or a Podman container in the following Linux flavors: CentOS, RedHat Enterprise edition 8 or 9, and Ubuntu 18.04 LTS or later. You can also use the Data Broker as a Linux Docker container in the Windows operating system.



Data Broker as a container is based on Redhat Enterprise Linux Universal Base Image 9.

This section primarily explains how containers are set up in the Linux operating system. Similar steps can be used for setting up the container in Windows OS systems supporting containerization.

You can set and manage Data Broker containers using the Data Broker docker container image. For the Data Broker docker container image, you can contact [Matrikon Support](#).

This section is split into the following subsections:

- Set up the Data Broker
- Start, Stop, or Restart the Data Broker
- Manage PKI Certificate of Data Broker

4.1.3.1 Set up the Data Broker

Prerequisite: Ensure Docker or Podman is properly installed and set up in the machine.

You can set up the Data Broker container in your machine in which Docker or Podman is installed. While you set up the Data Broker container in your device, it requires admin privileges based on your system settings.

To set up the Data Broker container in the machine

1. Copy the **matrikondatabroker-rhelubi9-2.4.0.tgz** file and save it on your machine.
2. To load the image into docker, execute the following example command:

```
sudo docker load -i matrikondatabroker-rhelubi9-2.4.0.tgz
```

Ex: `sudo docker load -i matrikondatabroker-rhelubi9-2.4.0.tgz`

Create a bind volume path and provide the user permissions per the example commands below.

```
sudo mkdir -p /etc/Matrikon/DataBroker/MDBData
sudo chmod 777 -R /etc/Matrikon/DataBroker/MDBData
```

In general user must create a directory with the designated name and must use the same name while defining the path. It is also essential to provide read, write and execute permissions for the directory. MDBData is the directory user created, which will bind to the container volume. The name MDBData is specific to this instance. User has to provide read, write, execute permission to the folder.

3. To create the Data Broker in your local machine, execute the following example command:

```
sudo docker create --network host --name <CONTAINER NAME> --volume
/etc/Matrikon/DataBroker/MDBData:/mnt/matrikondatabroker -e DATABROKER_NAME=<NAME> -e DATABROKER_
PORT=<PORT> -e DATABROKER_SECURE=<SECURE> -e DATABROKER_LOG_TO_VOLUME=1 matrikondatabroker-
rhelubi9:2.4.0
```

Ex: `sudo docker create --network host --name MDBContainer --volume /etc/Matrikon/DataBroker/MDBData:/mnt/matrikondatabroker -e DATABROKER_NAME=MDB -e DATABROKER_PORT=52000 -e DATABROKER_SECURE=1 -e DATABROKER_LOG_TO_VOLUME=1 matrikondatabroker-rhelubi9:2.4.0`



The Data Broker as a container on Windows is in Beta. Windows support for Linux containers is still evolving, so you need to carefully consider using Data Broker as a container on the Windows system with the help of engineers with experience in using Linux containers on Windows OS.



To run a Linux docker container using the docker desktop edition on Windows, ensure you use the following command to create the Data Broker container and map the ports:

```
docker create --name <CONTAINER NAME> -p<LOCAL MACHINE PORT:CONTAINER PORT>
matrikondatabroker-rhelubi9-2.4.0
```



All parameters in the below table, starting with DATABROKER, are environment variables. They can be used with -e or -env options.



All the examples provided in the document are tested on Ubuntu. If you use other Linux distributions, you must adjust the commands accordingly.

The following are the descriptions of the above example command:

Table 6 Above Example command

Parameters	Description
--network host	The network mode you want to use here is the host.
--name <CONTAINER NAME>	<CONTAINER NAME> is the name of the Data Broker used while managing the container on the docker command line.
--volume <Custom Volume>:/mnt/matrikondatabroker/	<Custom Volume> is the location of the custom folder you have created to store the data of the MDB container. Make sure the folder has the correct permissions.
-e DATABROKER_NAME=<NAME>	<NAME> is the name of the Data Broker instance. Please make sure you assign a unique instance name—alpha-numeric string value.
-e DATABROKER_PORT=<PORT>	<PORT> is the port to which the Data Broker instance must listen. The default value is 55000.
-e DATABROKER_SECURE=<SECURE>	Once the container is created, the Data Broker configures. The default <SECURE> value is 1. DATABROKER_SECURE=1 enables the secure mode, and it restricts any untrusted connection.

Parameters	Description
	DATABROKER_SECURE=0 enables the NONE security policy and ANONYMOUS token type in addition to the existing tokens.
-e DATABROKER_LOG_TO_VOLUME=1	Setting this option pushes the container logs into the Volume created for the container.

The Data Broker container is created in your local machine.

Apart from these configuration options specific to Data Broker containers, you can control the resource usage of the container with other options, as applicable to your corporate standards. You can refer to the documentation below on options for resource (CPU, Memory) constraining.



https://docs.docker.com/config/containers/resource_constraints/

You can also limit # of processors (pids) the Data Broker container can take up by setting the pids limit. You can refer to the documentation below for more details.

<https://docs.docker.com/reference/cli/docker/container/run/#options>

4.1.3.2 Start/Stop/Restart Data Broker

Once the Data Broker starts running on your machine, you can start, stop, and restart the Data Broker container.

- To start the Data Broker:
 - Open the Terminal and execute the following command:

```
sudo docker start <CONTAINER NAME>.
```

The Data Broker container starts. Execute the docker container list command to verify if the Data Broker is running on your machine.

The list of all the containers is displayed as shown in the following image:

Figure 16 List of Containers

```
administrator@matrikon-ubuntu:~/Downloads$ docker images
REPOSITORY          TAG         IMAGE ID      CREATED      SIZE
matrikondatabroker-rhel  2.4.0      8d27ef990213  24 hours ago  395MB
```

- To stop the Data Broker container:

- Open the Terminal and execute the following command:

```
sudo docker stop <CONTAINER NAME>.
```

The Data Broker service stops.

3. Once you stop the container, you can restart the container using the following command:

```
sudo docker start <CONTAINER NAME>.
```

4.1.3.3 Manage PKI Certificate of Data Broker Container

Once you run the Data Broker container, a mapped volume is created inside the host machine in which the Data Broker container is running. For Ex: /etc/Matrikon/DataBroker/MDBData/ as per above mentioned Steps. Ensure you locate this bind volume location and copy the PKI certificate from the **Rejected** folder to the **Trusted** folder.

- Once you have located the mapped volume location, you can copy the PKI certificate from the **Rejected** folder and paste it into the **Trusted** folder.

4.1.4 Verifying matrikondatabroker-rhel-2.4.0.tgz(tarball) container file

Verifying matrikondatabroker-rhel-2.4.0.tgz(tarball) container file:

The following files are provided as part of the container image of the publisher

- matrikondatabroker-rhel-2.4.0.tgz
- matrikondatabroker-rhel-2.4.0.tgz.sha256
- matrikondatabroker-rhel-2.4.0.tgz.sha256.sig
- public_key.pem

Note: To verify a signed container, the user must have OpenSSL installed.

To verify the provided SHA file, please follow the below command:

Syntax: sha256sum -c \${EXAMPLE-DOCKERFILE}.tgz.sha256

Example: sha256sum -c matrikondatabroker-rhel-2.4.0.tgz.sha256

To verify the signature file using the public_key.pem, please follow the below command:

Note: **Syntax:** openssl dgst -sha256 -verify public_key.pem -signature \${EXAMPLE-DOCKERFILE}.tgz.sha256.sig \${EXAMPLE-DOCKERFILE}.tgz.sha256

Example: openssl dgst -sha256 -verify public_key.pem -signature matrikondatabroker-rhel-2.4.0.tgz.sha256.sig matrikondatabroker-rhel-2.4.0.tgz.sha256

4.2 Migrate from Earlier versions

Migration of Data Broker or Explorer is supported only from 1.1 and later product versions. If you are on the R100.1 version of Dispatch, Data Broker, or Explorer, the installer does not allow you to continue and stop you from proceeding ahead.

4.2.1 Windows

Prerequisite:

- Although the installer retains the PKI and Licenses folders of the Data Broker instance, it is safe to back up. You can find these folders in the following location:
<<Programdata>>\Matrikon\DataBroker\<<DataBrokerInstanceName>> location.
- For example- C:\Programdata\Matrikon\DataBroker\MDBNew\

Migration Procedure:



Before you start the Migration install of Data Broker, it is recommended to stop any of the running Matrikon Data Broker services from the services panel. Data Broker service, when stops, saves the Data Broker server configuration in a nodeset file, which takes considerable time. Stop the Data Broker services before the Migration Install.

To upgrade Data Broker:

1. You can go to the location where **Install Media** is placed.
2. Double-click **Matrikon Data Broker.exe**. Ensure you have administrative privileges to install the software or access an administrator account.

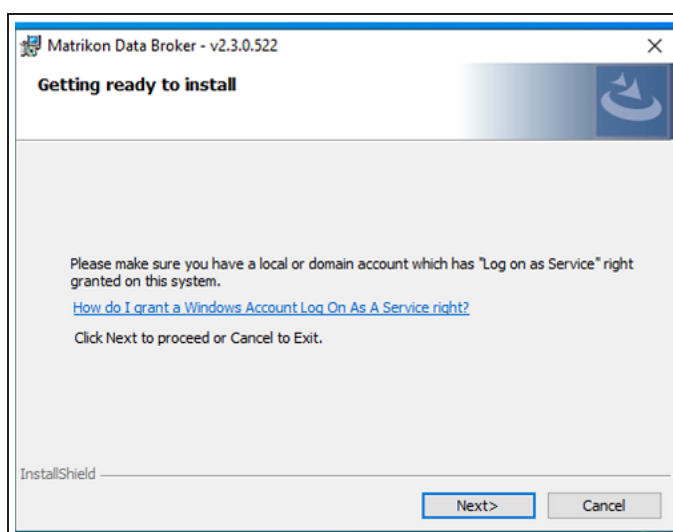
Wait until **Matrikon Data Broker InstallShield Wizard** appears.



If you are installing on top of R 100.1 versions of Explorer, Dispatch, or Data Broker, a prompt with an error message and Installer exits now without continuing to the subsequent screens.

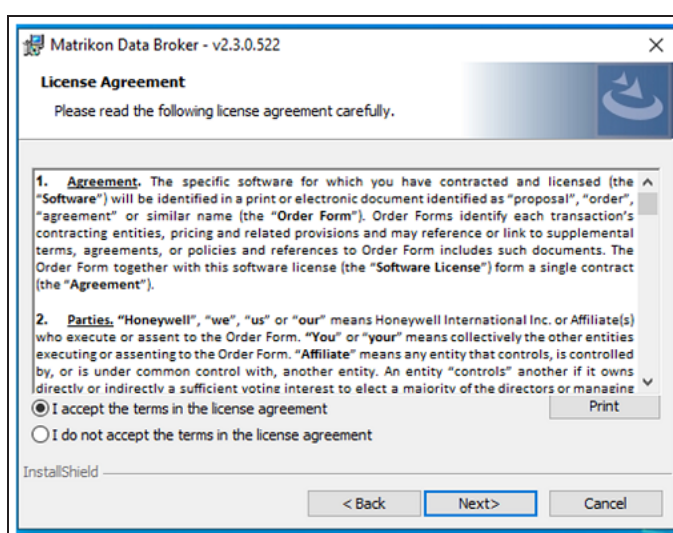
3. In the **Matrikon Data Broker InstallShield wizard** screen, click **Next**.

Figure 17 MDB InstallShield wizard screen



The **License Agreement** screen appears.

Figure 18 License Agreement screen appears.



4. In the **License Agreement** screen, please read the terms in the Agreement carefully, select **I accept the terms in the license agreement**, and then click **Next**.

The **Matrikon Data Broker Service Details** screen appears.

5. In the **Matrikon Data Broker Service Details** screen, you can type the password for the account you specified. All the fields except Password are auto-filled with the information from the previous installation, as shown below.



If you want to modify any of this information, ensure you uninstall the previous versions and do a fresh installation of the latest version. When this is done, ensure you verify any UA Clients connected to this Data Broker Server and re-establish all the connections and configurations.

Figure 19 Matrikon Data Broker Service Details

Matrikon Data Broker - v2.3.0.522

Data Broker Service Details
Provide User Credentials

Data Broker service will be installed to run as selected user

Instance Name :

Port Number :

User Name :

Domain\User Name

Password :

IMPORTANT:
The selected user must have "Log on as a service" right granted and the user information provided must be valid for Data Broker to be registered as a service.
Matrikon does not recommend Using a Personal user account or Administrator account. Either use an existing service account or create a new service account.
For local or workgroup service accounts, enter .\\<User Name>> in the User Name field. For domain users, enter <Domain Name>>\\<User Name>> in the User Name field.

InstallShield

< Back Next > Cancel

- Once you fill in the service details, click **Next**.

The **Ready to Install the Program** screen appears.

Figure 20 Ready to Install the Program Screen

Matrikon Data Broker - v2.3.0.522

Ready to Install the Program
The wizard is ready to begin installation.

Click Install to begin the installation.

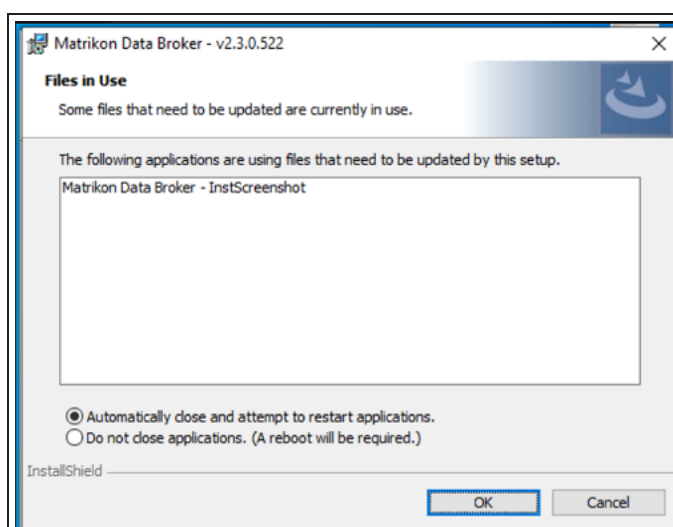
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.

InstallShield

< Back Install Cancel

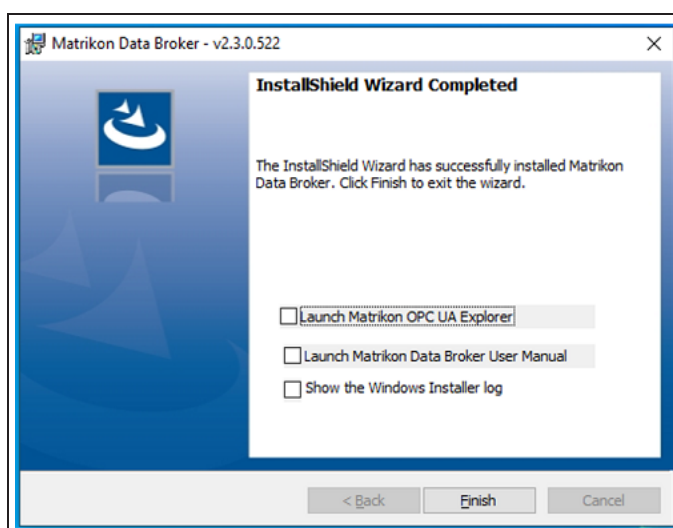
- Click **Install**, and installation begins. During this, if you are getting the below screen, go to Windows services.msc and stop the Matrikon Data Broker service. You can click **OK** to proceed further.

Figure 21 Files Currently in Use



8. Once the installation is completed, the following screen appears.

Figure 22 Installation Completed Wizard



9. To close the Installation Wizard, click **Finish**.



Matrikon Data Broker installer installs OPC Foundation supplied Local Discovery Server (LDS) V1.04.405.482. For more explanation on how LDS installation is handled during Data Broker Installation, please look at [Installation and Post Installation Notes](#).

Once Matrikon Data Broker installation succeeds, the service starts automatically.

1. Verify if the license status continues to show as licensed, if it was approved before, and if all Connections established prior are established correctly now. If you see any issue, copy the backed-up **PKI** and the contents of the **Licenses** folder and replace the newly created PKI and Licenses files.

This keeps the previously trusted certificates and the licenses active.

Migration Procedure for Minor Version (to 1.4.x):



Before you start the Migration install of Data Broker, it is recommended to stop any of the running Matrikon Data Broker services from the services panel. Data Broker service, when stops, saves the Data Broker server configuration in a nodeset file, which takes considerable time. Stop the Data Broker services before starting the Migration install.

4.2.2 Linux

Migration Procedure for versions before 1.4:

1. Stop the running Data Broker instances using the following command.

```
sudo systemctl stop databroker-<instancename>.
```

For example, **sudo systemctl stop databroker-DemoInstance.**

2. From <Install Media>, Copy the following new App Image files and overwrite or replace the existing App Image files:
 - MatrikonDataBroker.AppImage** - App Image for Matrikon Data Broker component
 - MatrikonOPCUAExplorer.AppImage** - App Image for Matrikon OPC UA Explorer
 - MatrikonDataBroker_license_tool.AppImage** - App Image for Matrikon Data Broker Licensing utility
3. Ensure all these files have appropriate permissions as explained in the below Note.
4. Double click **MatrikonOPCUAExplorer.AppImage** to launch the new version.



Some of the Linux operating systems are not distributing OpenGL by default as a part of the standard distribution. It is a pre-requisite for Matrikon OPC UA Explorer AppImage. Install the OpenGL component by using the below command (example for Ubuntu distribution).

```
sudo apt-get install mesa-common-dev libgl1-mesa-dev libglu1-mesa-dev
```

5. Copy below files into the **/etc/Matrikon//DataBroker/<<<MDB Instance Name>>>** folder

upgrade2_4.xml: Helps in migrating the App Image from 2.3 to 2.4 version of Data Broker

upgrade2_3.xml: Helps in migrating the App Image from 2.1 to 2.3 version of Data Broker

upgrade2_1.xml: Helps in migrating the App Image from 2.0 to 2.1 version of Data Broker

upgrade2_0.xml: Helps in migrating the App Image from 1.4/1.5 to 2.0 version of Data =Broker

upgrade1_5.xml: Helps in migrating the App Image from 1.4 to 1.5 version of Data Broker

upgrade1_4.xml: Helps in migrating the App Image from 1.3 to 1.4 version of Data Broker.

upgrade1_3.xml: Helps in migrating the App Image from 1.2 to 1.3 version of Data Broker.

6. Start the Data Broker instances using the following command.

```
sudo systemctl start databroker-<instancename>.
```

For example, **sudo systemctl start databroker-DemoInstance.**

So that you know - the upgrade has been done successfully.



Any files you copied into the Linux system cannot have required permissions like RO, RW, or Execute. So, ensure that after the files are copied, appropriate permissions are provided on the files. ".ApplImage" files need to Execute permissions also. Other files need at least Read-Only permission.

Migration Procedure from 1.4 to above:

Upgrade:

1. Navigate to <Install Media> location and open terminal.
2. Copy the **upgradeMatrikonDataBroker.sh**, file to the older version of the App Image location.
3. Execute this command to upgrade from the prior version to the newer version of Matrikon Data Broker v2.4:

```
sudo ./upgradeMatrikonDataBroker.sh [oldInstanceName] [upgradeAppImagePath]
```

[portNumber]

Parameter Info as below:

oldInstanceName - This instance name should be the same as the old instance name used in the prior version.

upgradeAppImagePath - This is the location of the new ApplImage. You must provide an Absolute Path for the new ApplImage(the full path beginning from '/').

portNumber - This should be the same as the old instance port number used in the prior version.

Example: `sudo ./upgradeMatrikonDataBroker.sh
MDBInstance/home/ubuntu/Documents/pkg/MatrikonDataBroker.ApplImage 50009`

Migration Procedure from 2.0 to above:

Upgrade:

1. You can just navigate to the location and open the terminal.
2. Copy the upgradeMatrikonDataBroker.sh, file to the older version of the App Image location.
3. Execute this command to upgrade from the prior version to the newer version of Matrikon Data Broker v2.4:

```
sudo ./upgradeMatrikonDataBroker.sh [oldInstanceName] [upgradeAppImagePath] [portNumber]
[isUpgrading2dot0]
```

Parameter Info as below:

oldInstanceName - This instance name should be the same as the old instance name used in the prior version.

upgradeAppImagePath - This is the location of the new AppImage. You must provide an Absolute Path for the new AppImage(the full path beginning from '/').

portNumber - This should be the same as the old instance port number used in the prior version.

isUpgrading2dot0 - This should be set to 1 if the old instance is 2.0 and above.

Example:

```
sudo ./upgradeMatrikonDataBroker.sh MDBInstance
/home/ubuntu/Documents/pkg/MatrikonDataBroker.AppImage 50009 1
```

When the service is set, the PKI folder and other dependent files of Matrikon Data Broker are deployed at the following location: /etc/Matrikon/DataBroker/<Instance Name>

Example: /etc/Matrikon/DataBroker/DemoInstance

Also, by default, log files of Matrikon Data Broker are available at the following location:

/var/log/MatrikonDataBroker/<Instance Name>

Example: /var/log/MatrikonDataBroker/DemoInstance

4.2.3 Container



Before migrating the Data Broker container, it is recommended to call the ApplyChanges method under **Root->Objects->Dispatch Configuration->Server Configuration** to save the configuration file with the updates. The Data Broker service stops and saves the server configuration in a nodeset that takes considerable time. Call **ApplyChanges** to save the Data Broker configuration before starting the migration process.

Previously installed versions of the Matrikon Data Broker are not supported as a container for direct migration to the newer versions of the container, especially concerning volumes. So, deploy a new container and manually map the volume from the old Data Broker container to the new one.

Follow the migration steps from older versions to the FLEXDispatch 1.4 container version as described below:

1. Note the **Dispatch Instance Name** and **Dispatch Port#** from the current running Dispatch instance.
2. Get the list of all containers in the current system by running the below command.

```
sudo docker container ls -a
```

3. Identify the Matrikon Data Broker container from the list, note the Container Name, and run the below command to stop that container.

```
sudo docker container stop <<Container Name>>
```

4. Identify the current Matrikon Data Broker container volume location by running the below command.

```
sudo docker inspect <<Container Name>> | grep volume
```

5. Take a backup of the current Matrikon Data Broker instance data folder to copy back in the later steps.
6. Make a note (or take a screenshot) of all the permissions of the `_data` folder from the original volume location.
7. Remove the current Matrikon Data Broker container by running the below command.

```
sudo docker container rm -f <<Container Name>>
```

8. Confirm that the container gets successfully deleted by looking for all the containers running in the system using the command below.

```
sudo docker container ls -a
```

9. Load the new Matrikon Data Broker R1.4.2 image by running the below command.

```
sudo docker load -i matrikonflexdispatch-rhelubi9:2.4.0.tgz
```

10. Create a new container using the command below.

```
sudo docker create --network host --name <CONTAINER NAME> -e
DISPATCH_NAME=<NAME> -e DISPATCH_PORT=<PORT> -e
DISPATCH_SECURE=<SECURE> matrikonflexdispatch-rhelubi9:2.4.0
```

11. Necessary: In the above command, the options are selected according to the guidelines below. If you change the DISPATCH_NAME or DISPATCH_PORT to new values, then existing configurations do not work, and all configurations should be re-done.
 - Container Name (--name) can be New or the same as before.
 - DISPATCH_NAME must be the same instance name as before, as noted in Step 1.
 - DISPATCH_PORT must be the same as before and noted in Step 1.
12. Get the volume location created with the new container using the command below.

```
sudo docker inspect <<Container Name>> | grep volume
```

13. Delete the _data folder from this volume location and copy the backed up _data to this volume location.
14. Necessary: Change the permissions on the _data folder in the new volume location to the same as in the original _data folder from step#5 using CHOWN and CHMOD commands. Please note (or take a screenshot of) of permissions and ownership in Step 6 above.
15. Start the newly created container using the command below.

```
sudo docker container start <<Container Name>>
```

16. By running the command below, you can confirm that the container is running fine after 60 seconds.

```
sudo docker container ls -a
```

17. If the result of the above command shows the new container is exited and not started, try another attempt to start again. If it still doesn't work, then please contact the [Matrikon Support](#) team.

Follow the migration steps from the older version 2.0 to the DataBroker 2.4 container version as described below:

1. Note the Dispatch Instance Name and Dispatch Port# from the current running Dispatch instance.
2. Get the list of all containers in the current system by running the below command.

```
sudo docker container ls -a
```

3. Identify the Flex Dispatch container from the list, note the Container Name, and run the below command to stop that container.

```
sudo docker container stop <<Container Name>
```

4. Create a backup folder with the name MDB_Backup.

```
sudo mkdir -p /home/MDB_Backup
```

5. Please backup the previous version MDB folder and put it into MBD_Backup.

Execute the below commands:

```
sudo cp -fpr /etc/Matrikon/DataBroker/MDB240/* /home/MDB_Backup/
```

6. Remove the current Flex Dispatch container by running the below command.

```
sudo docker container rm -f <<Container Name>>
```

7. Confirm that the container gets successfully deleted by looking for all the containers running in the system using the command below.

```
sudo docker container ls -a
```

8. Now, you can go to the directory where the new MDB docker image(tgz file) is located and load the new Matrikon Data Broker R2.3.1 image by running the below command.

```
sudo docker load -i matrikondatabroker-rhelubi9-2.4.0.tgz
```

After loading this image, copy the loaded image name for future use. (**matrikondatabroker-rhelubi9:2.4.0**)

9. Create a bind volume path and provide the user permissions as per the below-mentioned commands

```
sudo chmod 777 -R /etc/Matrikon/DataBroker/MDB240
```

```
sudo mkdir -p /etc/Matrikon/DataBroker/MDB240
```

10. Create a new container using the command below.

```
sudo docker create --network host --name MDBContainer --volume  
/etc/Matrikon/DataBroker/MDB240:/mnt/matrikondatabroker -e DATABROKER_NAME=MDB -e DATABROKER_  
PORT=52000 -e DATABROKER_SECURE=1 -e DATABROKER_LOG_TO_VOLUME=1 <<Image_Name>>
```

Necessary : In the above command, the options are selected according to the guidelines below. If you change the DATABROKER_NAME or DATABROKER_PORT to new values, then existing configurations do not work, and all configurations should be re-done.

- Image_Name (copied from point 8) ex: **matrikondatabroker-rhelubi9:2.4.0**
- Container Name (--name) can be New or the same as before
- DATABROKER_NAME must be the same instance name as it was before and noted in Step 1
- DATABROKER_PORT must be the same as before and noted in Step 1

11. Start a new docker container.

```
sudo docker container start <<Container Name>>
```

12. Check if it starts using the below command.

```
sudo docker container ls -a
```

13. Stop the container.

```
sudo docker container stop <<Container Name>>
```

14. Execute the list of commands below to restore the data.

```
cd /etc/Matrikon/DataBroker/MDB240
```

```
sudo rm -rf pki Licenses Logs dispatch_base_nodeset.xml
```

```
sudo cp -fpr /home/MDB_Backup/* .
```

15. Start the newly created container using the command below.

```
sudo docker container start <<Container Name>>
```

16. By running the command below, you can confirm that the container is running fine after 60 seconds.

```
sudo docker container ls -a
```

17. If the result of the above command shows the new container is exited and not started, try another attempt to start again. If it still doesn't work, then please contact the [Matrikon Support](#) team.

HOW TO USE MATRIKON OPC UA EXPLORER

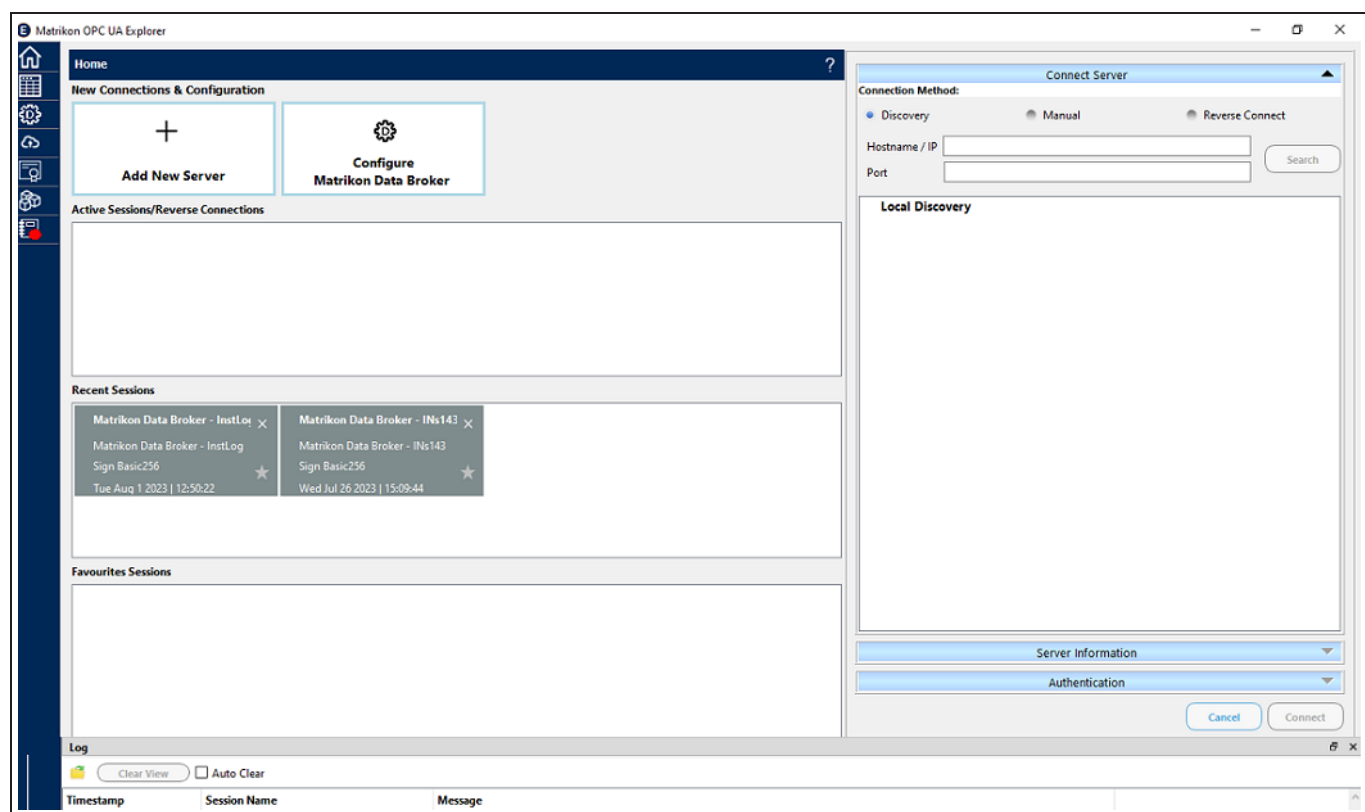
5.1 Launch Explorer

To launch Explorer:

1. Open the **Explorer** application from **Start>Matrikon** or double-click the desktop shortcut icon.

The **Explorer** application window opens.

Figure 23 Explorer Application Window



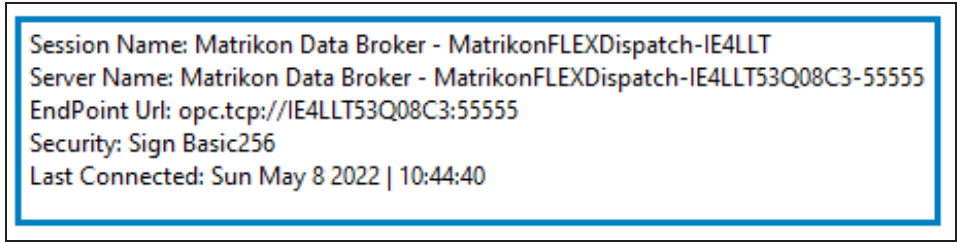
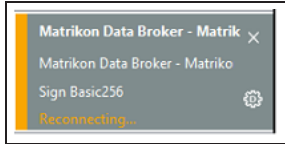
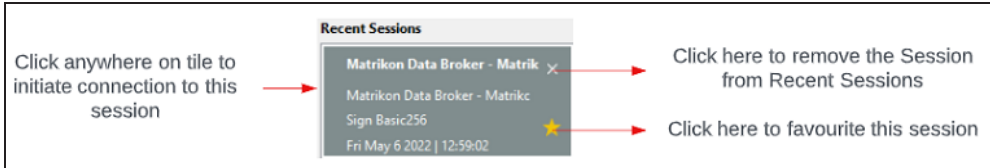
You can see [The Main Window](#) to understand the explorer screen or UI.

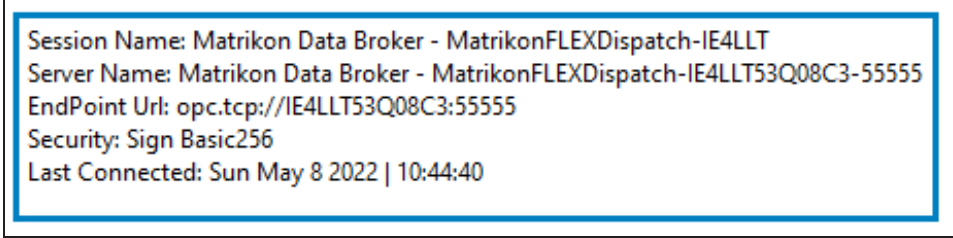
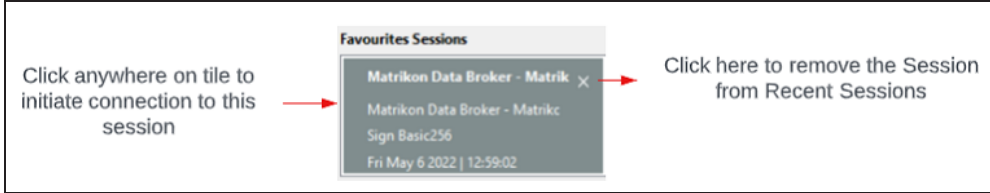
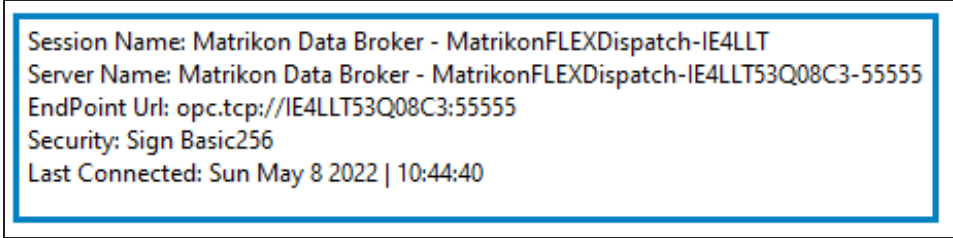
5.1.1 The Main Window

The interface uses the following fields or icons:

Table 7 Main Window

Fields /Icons	Description
	Click this to go to the Home screen of the Matrikon® OPC UA Explorer.
	Click this to go to the Data Views screen. For more information on the Data Views screen, see How to View Data .
	Click this to go to the Configure Matrikon Data Broker screen. For more information on configuring Matrikon Data Broker, see Configuring and Securing Matrikon Data Broker for the First Time .
	Click this to open the Matrikon Data Broker MQTT Publisher Configuration screen to configure the MQTT Publisher. For more information, see the Matrikon Data Broker MQTT Publisher User Manual.
	Click this to open the Certificate Management screen. You can manually trust all the rejected certificates of the newly added connections to Matrikon Data Broker. For more information, see How to Trust Rejected Certificates .
	Click this to open the Data Modeling screen. For more information on the Data Modeling screen, see Data Modeling .
	Click this to view the activity log. When the log window is hidden, and there are new log details, the icon changes to  .
	Click this to open this User's manual at any point in time.
Add New Server	Click this to connect to a server. For more information on connecting to a server, see How to Connect to a Server . Suppose a server is in your Recent Sessions or Favorite Sessions list. In that case, you can quickly reconnect to the previous session by clicking on the tile to populate the last session details in the Connect Server screen.
Configure Matrikon Data Broker	Click this to go to the Configure Matrikon Data Broker screen, where you can configure all the connected sessions of Matrikon Data Broker.
Device Registration	Click this to register your Matrikon Data Broker MQTT Publisher to Forge IoT Platform. For more information, see <i>Matrikon Data Broker MQTT Publisher User Manual</i> .
Active sessions	Displays the connected sessions as tiles.

Fields /Icons	Description
	The Active Sessions tile section shows: • Session Name in the first row • Server Name in the second row (RC) in case of a reverse connection • Endpoint security options selected in the third row • Connection status in the last row. When you hover over the tile, the details of the connected session are displayed as shown in the following image:  When you restart the service or if the service attempts to reconnect, the connection status bar turns orange, as shown in the following image: 
Recent Sessions	Displays the recently connected sessions as tiles.  This Recent Sessions tile section shows: • Session Name in the first row • Server Name in the second row (RC) in case of a reverse connection • Endpoint security options selected in the third row • The time when the session was established last time. When you hover over the tile, the details of the recent session are displayed as shown in the following image:

Fields /Icons	Description
	 Session Name: Matrikon Data Broker - MatrikonFLEXDispatch-IE4LLT Server Name: Matrikon Data Broker - MatrikonFLEXDispatch-IE4LLT53Q08C3-55555 EndPoint Url: opc.tcp://IE4LLT53Q08C3:55555 Security: Sign Basic256 Last Connected: Sun May 8 2022 10:44:40
Favorite Sessions	Displays the sessions that were marked as favorites as tiles.  Click anywhere on tile to initiate connection to this session → Click here to remove the Session from Recent Sessions → This Favorite Sessions tile section shows: • Session Name in the first row • Server Name in the second row (RC) in case of a reverse connection • Endpoint security options selected in the third row • The time when the session was established last time before it was added to Favorite sessions When you hover over the tile, the details of the favorite session are displayed as shown in the following image:  Session Name: Matrikon Data Broker - MatrikonFLEXDispatch-IE4LLT Server Name: Matrikon Data Broker - MatrikonFLEXDispatch-IE4LLT53Q08C3-55555 EndPoint Url: opc.tcp://IE4LLT53Q08C3:55555 Security: Sign Basic256 Last Connected: Sun May 8 2022 10:44:40
Log	This logs your actions and their results. For detailed log information, you can go to the following folder and see the log files: For Windows Operating System AppData\Local\Matrikon\OPCUAExplorer\uaclientlogs\<Log File.txt> For the Linux Operating System Home\.Matrikon\OPCUAExplorer\uaclientlogs\<Log File.txt>
Clear View	Click this to clear the log results.
Auto Clear	If this check box is selected, UA Explorer automatically keeps the latest 500 log lines and deletes the rest.

Fields /Icons	Description
	Click this to view the folder where the OPC UA Explorer log files are saved.
	Click this to maximize and view the log details.
	Click this to close the log details.

5.2 Connecting to Matrikon Data Broker Server

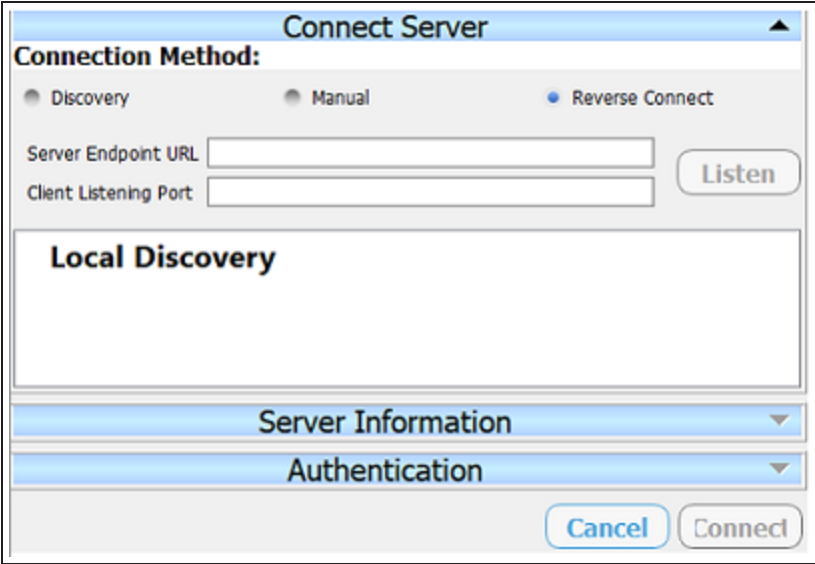
1. Open the **Explorer** application from **Start > Matrikon** or double-click the desktop shortcut icon.
The **Explorer** application window opens.

2. On the home screen, click 

In the right pane, the **Connect Server** section appears.

All the OPC UA servers registered with the Local Discovery Server (LDS) running on the system are displayed. If you do not see a UA Server, verify whether the LDS services are running. Contact your OPC UA Server vendor for any issues.

Figure 24 Connecting to Server



There are three ways to connect to the server:

Discovery: You can search for an existing server by typing its hostname, IP address, and port number.

Manual: You can manually type the server URL.

Reverse Connect: You add the server details from which you want to initiate a reverse connection. This enables Matrikon UA Explorer to accept reverse connections from the server that you add.

3. For Discovery:

- a. In the **Hostname / IP** field, type the hostname or IP address of the server.
- b. In the **Port** field, type the opc.tcp server port number.

-OR-

For Manual:

- a. In the **URL** field, type the server URL in the following format: **opc.tcp://<hostname or IP address>:<port number>**.

For example, **opc.tcp://192.1.55.75:56000**, OR **opc.tcp://win2012R2:51000**.

-OR-

For Reverse Connection:

- a. In the **Server Endpoint URL** field, type the server details from which you want to initiate reverse connection in the following format: **opc.tcp://<hostname or IP address>:<port number>**. For example, **opc.tcp://192.1.22.12:48010**, OR **opc.tcp://win2012R2:48010**.
- b. In the **Client Listening Port** field, type the port number to which the server must reverse connect.

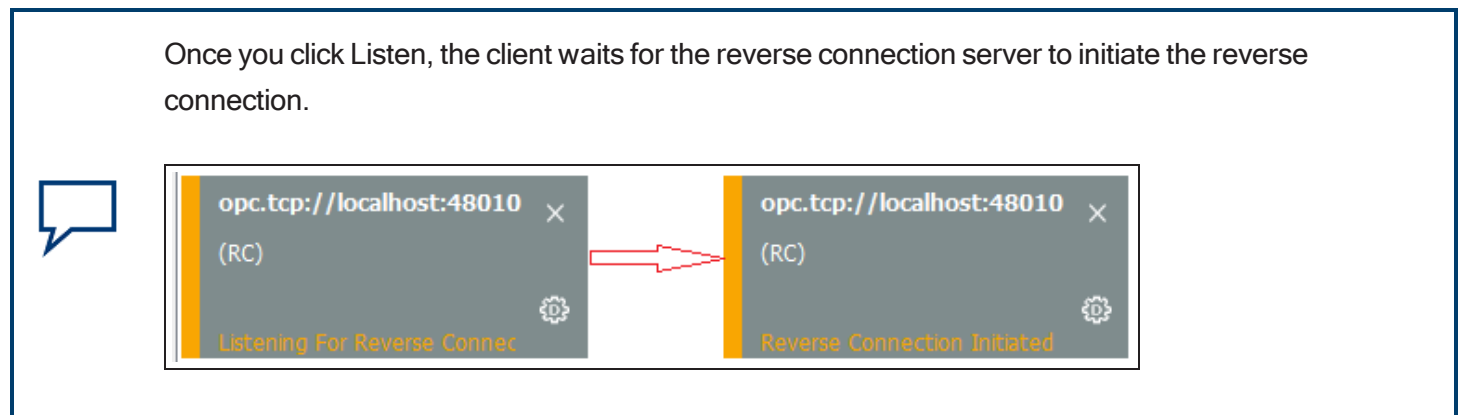
4. Click **Search**.

The server details are fetched and displayed in the right-side panel.

-OR-

In case of a reverse connection, click **Listen**.

An **Active Session** tile is created with the connection status.

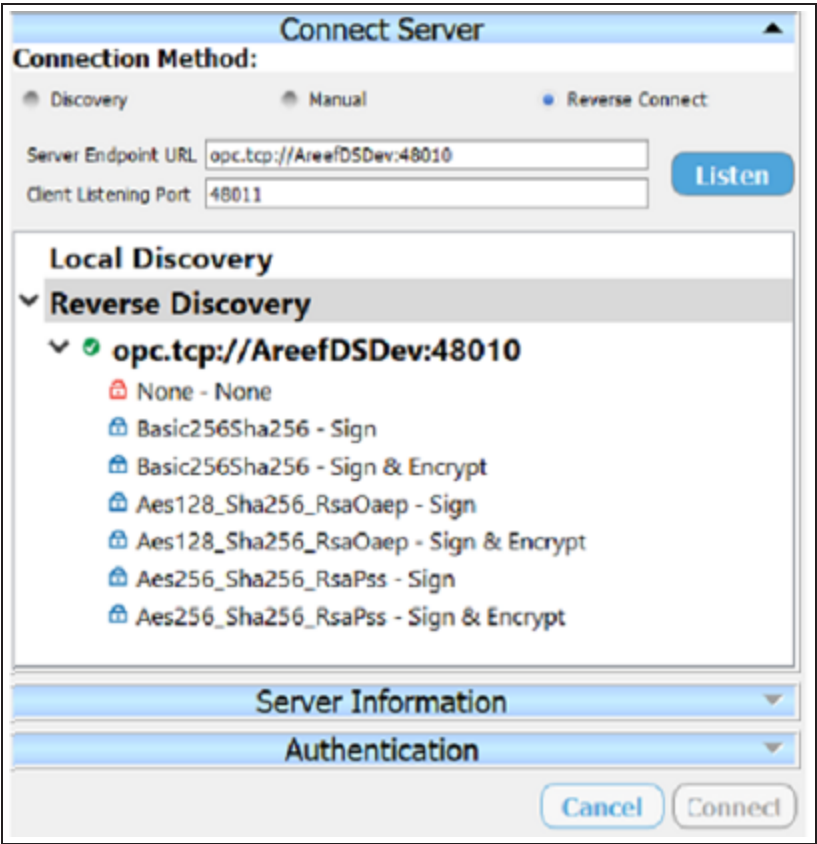


- Once the reverse connection is successful, double-click the tile.

The server details are fetched and displayed in the right-side panel.

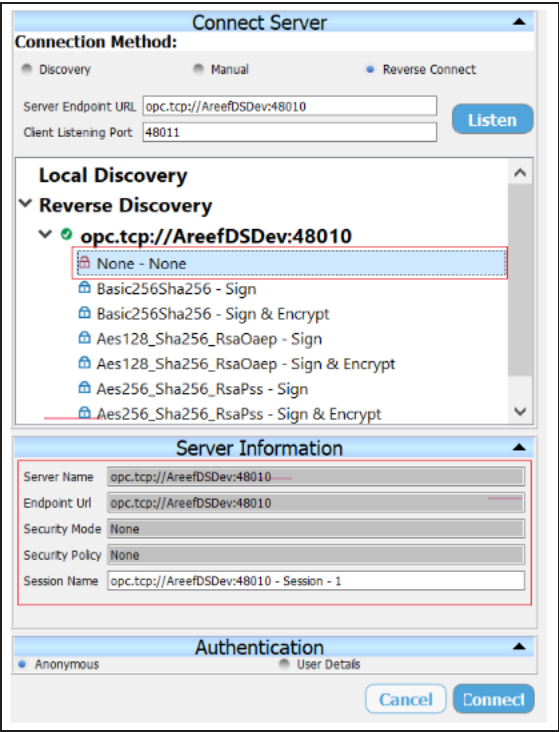
5. Expand server. All the supported Endpoints and associated security policies configured in the server are displayed.

Figure 25 Supported Endpoints and Associated Security Policies Configured



6. You can select a [security policy](#) you prefer to use for the session.
Based on the selection, the server information appears in the below section.

Figure 26 Server Information



7. In the Server Information section, provide a unique Server Alias Name.

8. Choose the authentication setting from the **Authentication section** to connect to the server.

There are two ways to authenticate:

- Anonymous: Select this to make an unknown connection to the server, as mentioned in step 7 - Server Information.
- User Details: Select this to connect using the UserName and Password.

9. Click **Connect**.

Once the server connection is established, it takes you to the **Data View** screen, where you can view data.

-OR-

To cancel the connection process, click **Cancel**.

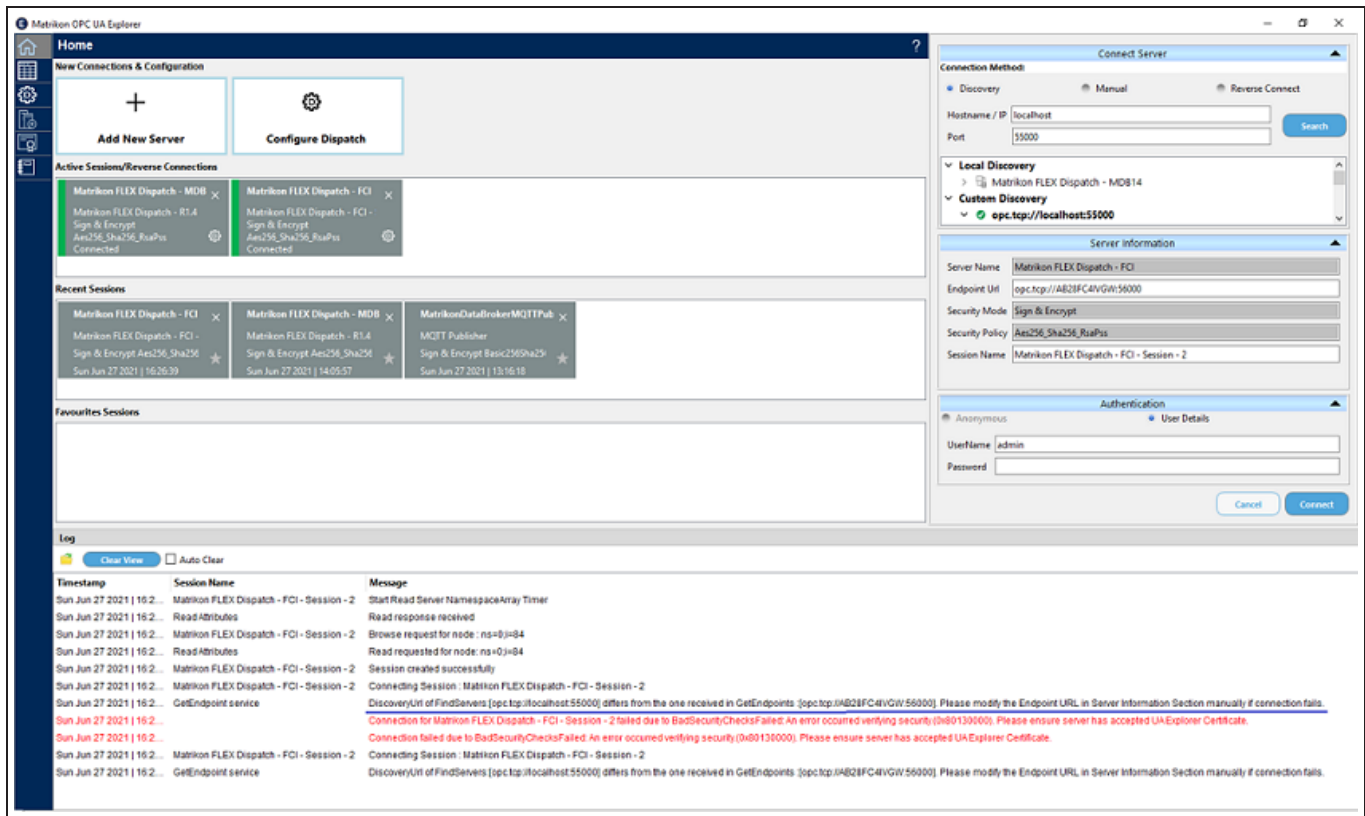
Once you connect to a server, you can add items and view data; see [How to View Data](#).



Sometimes, the OPC UA servers connected through Matrikon OPC UA Explorer present an alternate server URL when the UA Server is discovered versus the endpoints presented when one of the endpoints is selected. A couple of scenarios when it can happen are shown below:

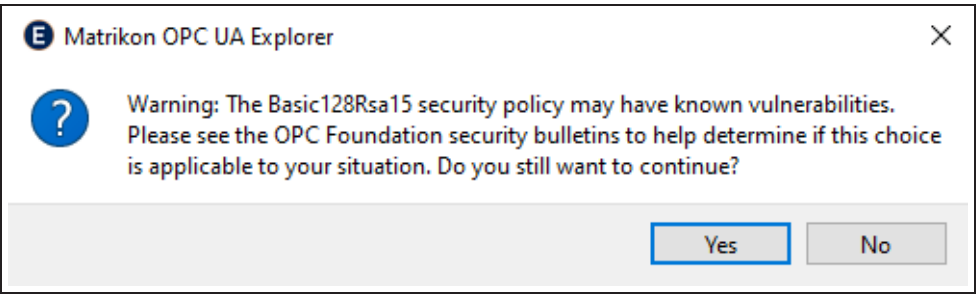
- Suppose the OPC UA Server is behind a NAT network. In this scenario, you discover the UA Server with a specific IP Address. Still, the OPA UA Server can return a different IP Address or Host Name in the discovered endpoints.
- If there is a port mapping used while deploying the OPC UA Server (like Matrikon Data Broker) containers, the port# used to discover the OPC UA Server can be different than the Port# (sometimes even the hostname or IP address) presented by the OPC UA Server's endpoints.
- In these scenarios, OPC UA Explorer allows you to change the selected end point's URL in the Server Information section to continue connecting to this OPC UA Server, as shown in the picture below.

Figure 27 Matrikon OPC UA Explorer



A warning message will be shown for vulnerable Security Policies:

While connecting to the MDB server, you may encounter the following warning pop-up if you select deprecated security policies such as Basic128Rsa : "Warning: The Basic128Rsa15 security policy may have known vulnerabilities." It is advisable to refer to the OPC Foundation Security Bulletins for detailed information on these vulnerabilities. If continuing with the Basic128Rsa15 policy is acceptable, click Yes to proceed.



5.3 How to View Data

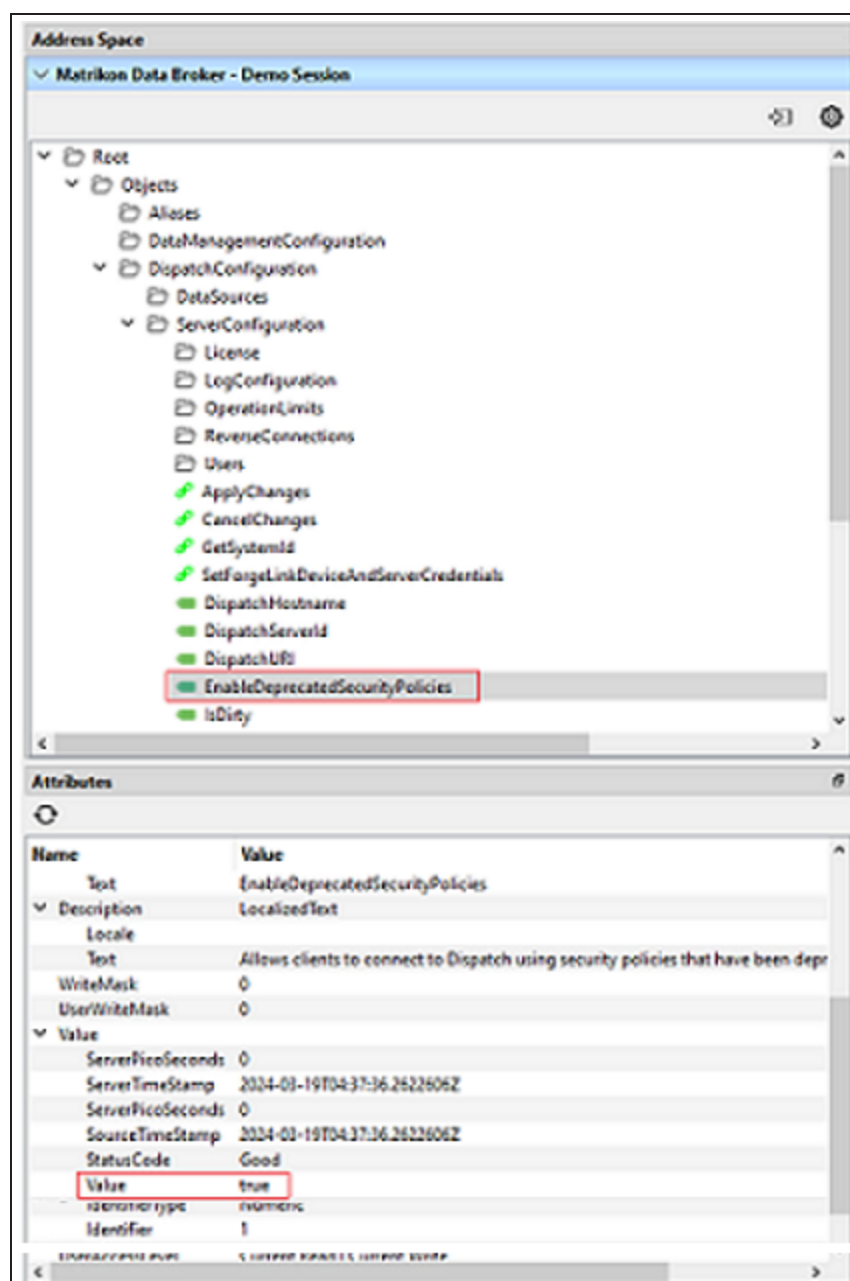
You can view tag values using the Data Views screen. The upper right-hand pane shows the OPC UA server's Address Space (for more information, see [Address Space](#)).

As seen in the figure below, containers appear as folders. , nodes with values appear as dark green tags , and executable functions (methods) appear as light green chain links .

- The Main server folder is always called Root.
- Data always appears in the Objects folder.
- You can double-click on a folder to expand it into sub-folders and objects.

When you select an object in the Address Space pane, its attributes appear in the Attributes pane. To change the value of a Writeable object, see the image below and modify the value attribute.

Figure 28 Attribute Pane



- Address Space pane items can be selected by performing the following:

- Click Select
 - Shift+ click to select several items in order.
 - Ctrl+ click to change an item from non-selected to selected or selected to non-selected.
- UA Explorer creates a blank Data View screen. You can select one or more variable nodes  and drag them into a Data View to monitor the value in real-time.
 - For nodes with nodeclass type as a method, you can browse, read, and execute the method calls from the server; for more information on method calls, see [Method Call Using Explorer](#).
 - You can organize values in multiple data views by using the Add Data View to add new views and dragging them into the appropriate view.

Double-click the window title to dock the Attribute window. It can also be dragged and placed side-by-side in a tabbed view next to the Address Space Window. You can also export the address space to your local into .csv format; for more information, see [Export Address Space](#).

Figure 29 Address Space Window

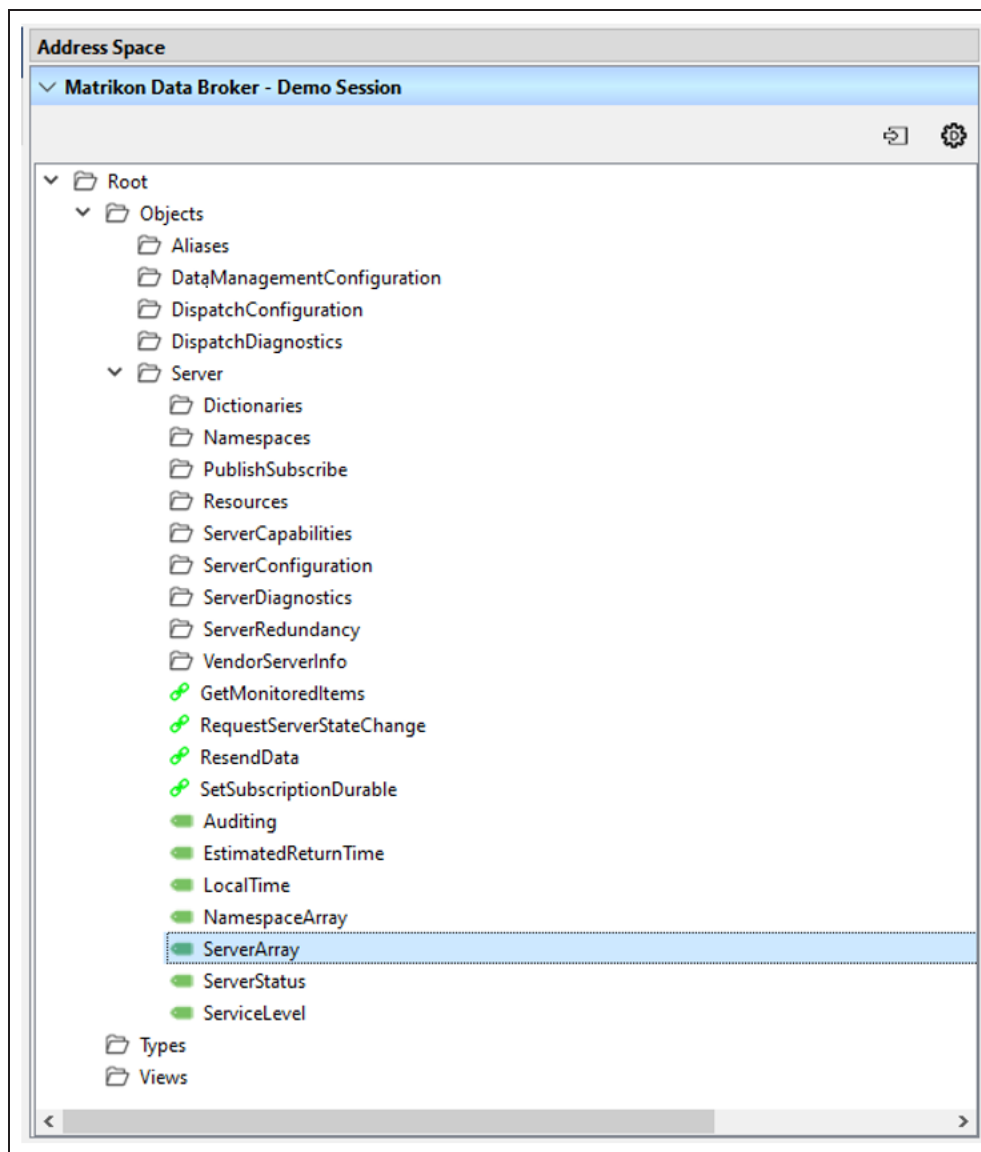
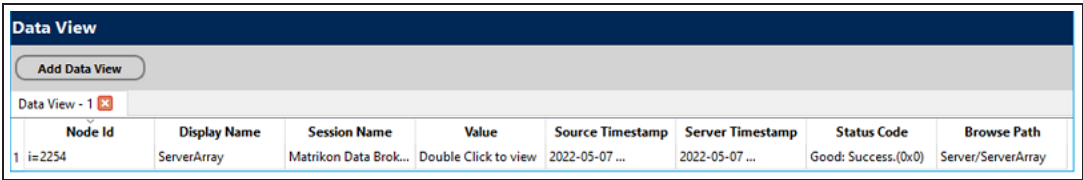


Figure 30 Data View



The following parameters appear in the form of the table:

Table 8 Parameters

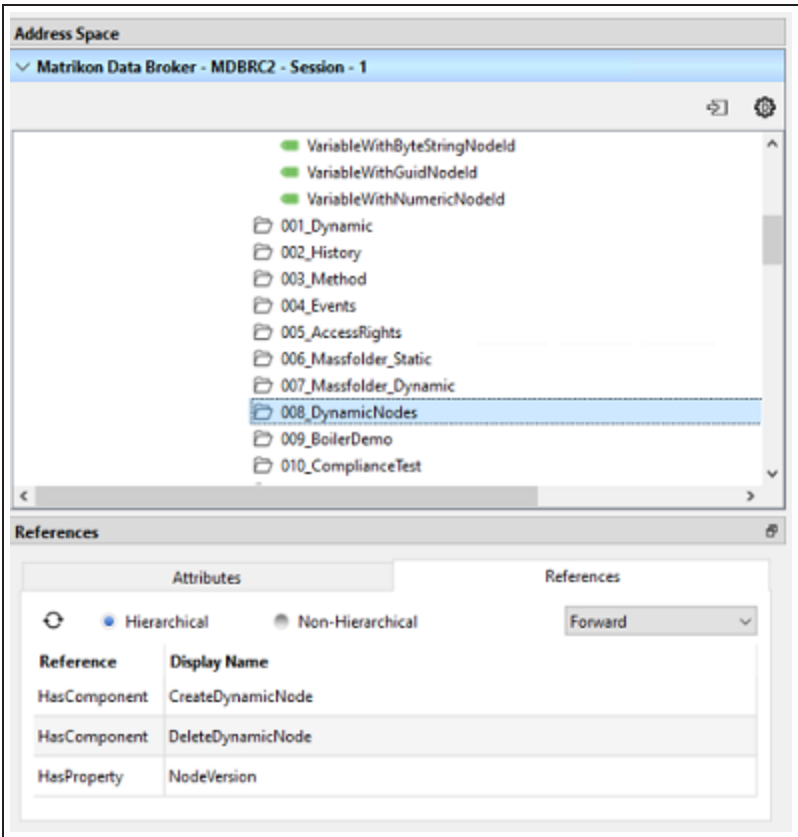
Column	Description
Node ID	Object node ID.
Display Name	Object name.
Session Name	The name of the session that is collecting the data added.
Value	The data value.
Source Timestamp	The UTC date or time recorded in the source, in YYYY.MM.DD HH:MM:SS:sss format.
Server Timestamp	The UTC date or time of the selected data in the server, in YYYY.MM.DD HH:MM:SS:sss format.
Status Code	The status code of the selected monitored item indicates whether the item is retrieved successfully or not.
	Click this icon to go to the Subscription settings for this data view. For more information on how to edit subscriptions, see Edit Subscriptions .

Reference Window:

The references window display the references of the node which is currently selected in the Address Space Window.

- **Hierarchical and Non-Hierarchical** References: Displays both hierarchical and non-hierarchical references for the selected node, providing a comprehensive view of the node’s relationships and connections.

Figure 31 Attributes Space



5.3.1 Edit Data Values for Monitored Item in the Data View Screen

While you monitor the real-time nodes in the Data Views screen, you can also edit the data value of a single row in the Data View grid. You must have administrator or operator user rights to write data values. The status of the edit operation and the reason for any error are logged in the Explorer log window and log files. Currently, the Custom types are not supported.

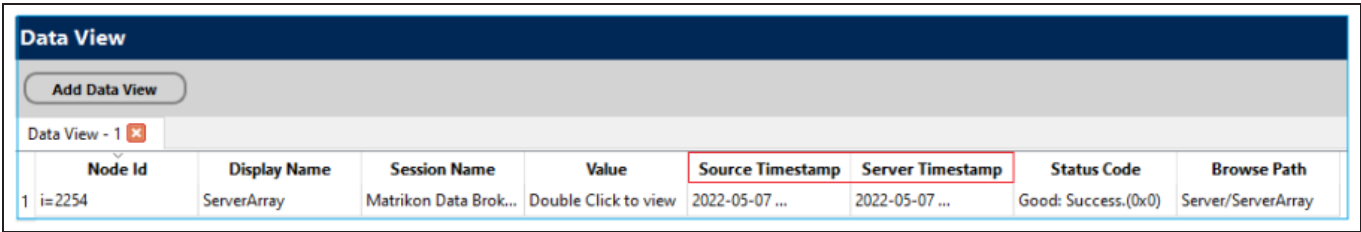
To write the data value:

- 1. In the **Data View** grid, below the **Value** column, double-click the value to edit.
The value field becomes editable.

- 2. Enter the new value.

The new value gets updated. The changes are logged in the Explorer log.

Figure 32 Data View



5.3.2 Edit Subscriptions and Monitored Items

This section describes how to edit settings for subscriptions and monitored items. This section covers the following topics:

- Edit Subscriptions
- Edit Monitored Items

5.3.2.1 Edit Subscriptions

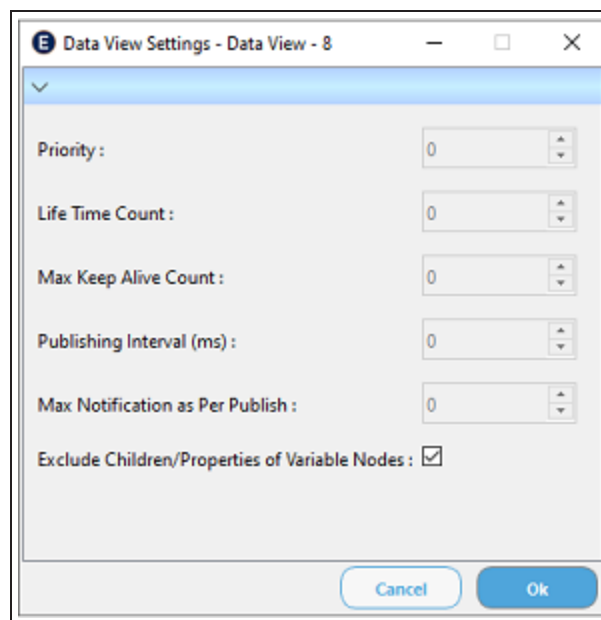
You can edit the settings for [Subscriptions](#) using the View Settings option in the Data Views screen.

To edit the subscription settings:

1. In the **Data Views** screen, click .

The **Data View Settings** window appears.

Figure 33 Data View Settings Window



2. Edit the required subscription parameters.

The following subscription parameters are available:

Table 9 Subscription Parameter

Parameters	Description
Priority	Data polling priority.
Life Time Count	If this number of Publish Intervals passes without a Publish Request, the subscription is removed from the server.
Max Keep-Alive Count	If no new data changes have occurred in many publishing intervals; the server sends a notification that the subscription is still alive.
Publishing Interval (ms)	You can define how often the server checks the data source for data updates. A typical value is 1000 milliseconds (1 second). This value represents how often Matrikon Data Broker sends data to the UA Client.
Max Notification as Per Publish	This sets the maximum number of data changes the server sends to UA Explorer per Publish. A value of zero means that there is no limit.
Exclude Children/Properties of Variable Nodes	User can exclude child properties from parent variable nodes.

- To save the changes, click **Save and Apply**.

-OR-

To cancel the changes and close the Subscription Settings window, click Cancel.

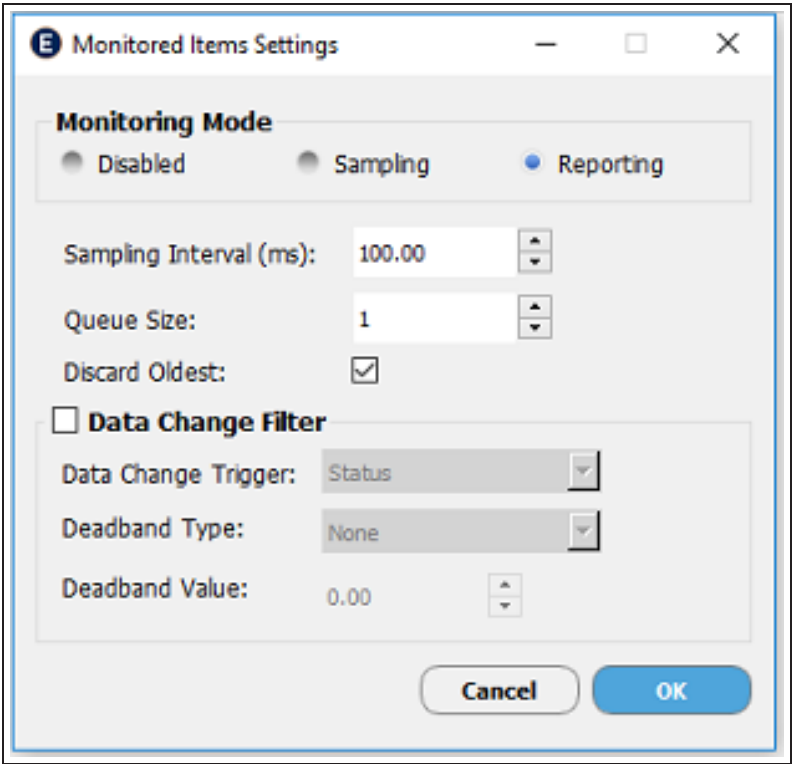
5.3.2.2 Edit Monitored Items

You can edit settings for monitored items in the Data Views screen.

To edit a monitored item Setting:

1. In the **Data Views** screen, right-click a single or multiple data rows and select **Monitored Item Settings**.
The **Monitored Item Settings** window appears.

Figure 34 Monitored Item Settings Window



2. Edit the required monitored item variables.
The following monitored item variables are available:

Table 10 Monitor Variable Items

Parameters	Description
Monitored Mode	The status of the monitored item. • Disabled: Select this radio button to disable sampling. • Sampling: Select this radio button to sample the data source without notifying the Client. The data source does not report any new data to any subscription. • Reporting: Select this radio button to sample the data source and notify the Client.
Sampling Interval (ms)	 If you want to store all the samples, you must set a QueueSize by using the following formula: $(\text{Publish Interval}) \div (\text{Sampling Interval})$. For example, This determines how often the UA server polls the data source for changes.

Parameters	Description
	If the Publishing Interval is 1000 milliseconds (1 second) and the Sampling Interval is 1000 milliseconds (1 second), then the Queue size is equal to $1000 / 1000 = 1$
Queue Size	This determines how many values can be queued to be transmitted during the next Publish. A size of zero is equivalent to a queue size of one.
Discard Oldest	This option controls what happens when the server's sampling queue overflows. If this option is selected, the older data is discarded. Otherwise, the new data gets discarded (lost). This option does not affect how Explorer displays data in the Data View.
Data Change Filter	Select this check box to filter the data changes to be reported to a subscription based on filter conditions: Data Change Trigger: Criteria to report Data change to a subscription. Available options are Status, Status/Value, and Status/Value/Timestamp. Deadband Type: Applicable only when Value is chosen in the Data Change Trigger option. You can select the type of dead band you want to use for the values to trigger for a sample to be reported to a subscription. Options available are Absolute and Percent. Deadband Value: Amount of dead band are considered based on the Deadband Type option. The maximum value allowed is 99999.99

3. To save the changes, click **OK**.

-OR-

4. Click **Cancel** to cancel the changes and close the **Monitored Item Settings** window.

You can see Subscriptions and Monitored Items if you want more information.

5.3.3 Export Address Space

You can export address space in .csv format and save it on your local machine.

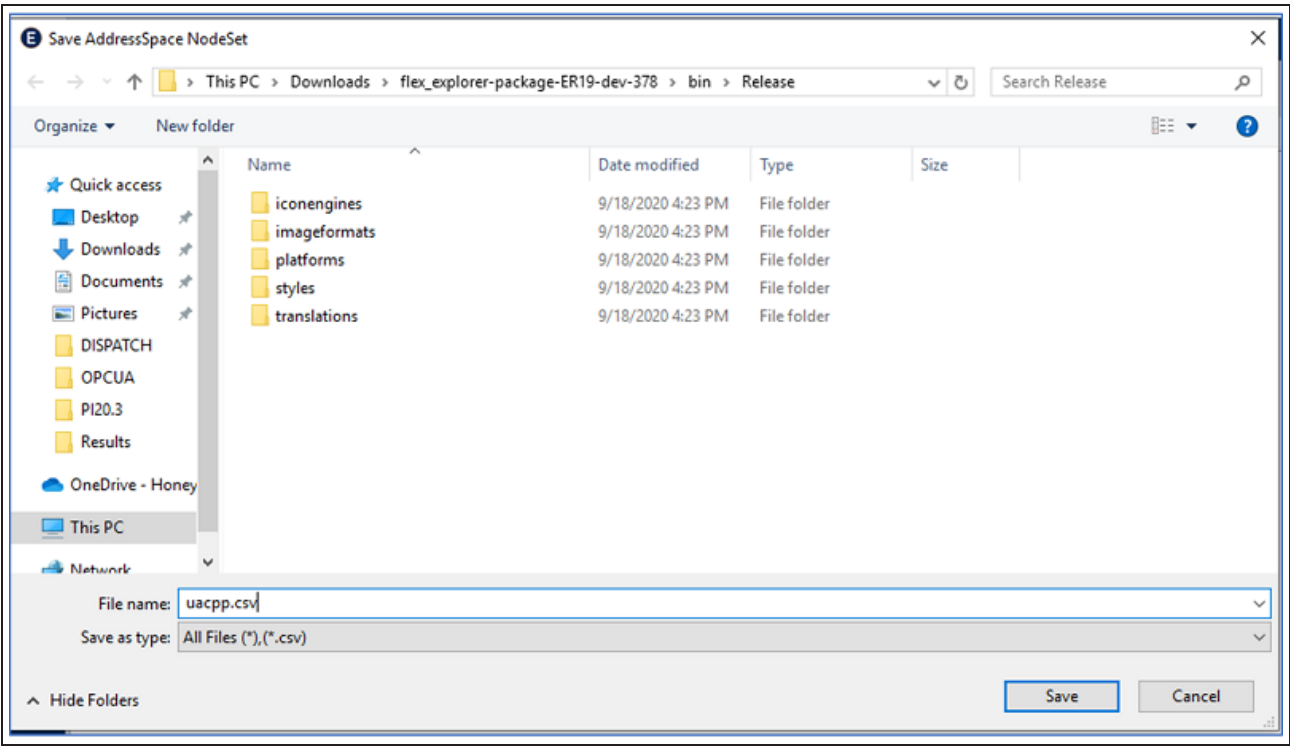
To export address space:

1. Open the Explorer application and connect to a Matrikon Data Broker.

2. From the **Address Space** pane, select the root folder or any node and then click .

The **Save AddressSpace NodeSet** window appears.

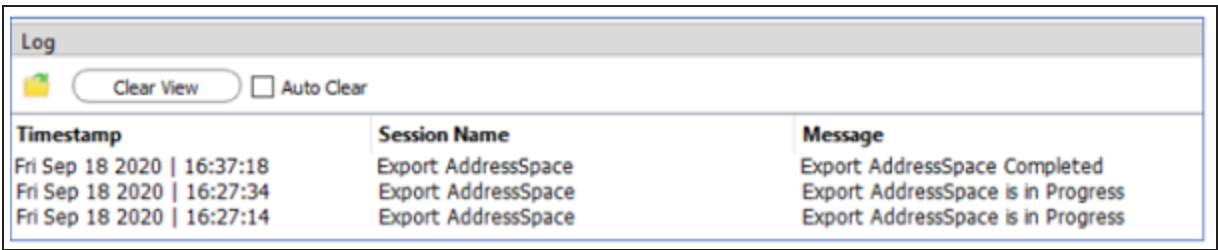
Figure 35 Save AddressSpace NodeSet Window



3. Type a File Name in the <XYZ.csv> format and click **Save**.

The export process begins. You can see the process status in the **Log** pane.

Figure 36 Log Pane



The exported sheet looks like the following image:

Figure 37 Exported Excel Sheet

Nodeid	Expanded Nodeid	NamespaceIndex	Nodeid IdentifierType	Nodeid Identifier	Node Class	Browse Name	Description	DataType	DataType NamespaceIndex	ValueRank
i=2254	NSU=http://opcfoundation.org/UA/;i=2254	0	Numeric	2254	Variable	ServerArray		i=12	0	1
i=2256	NSU=http://opcfoundation.org/UA/;i=2256	0	Numeric	2256	Variable	ServerStatus		i=862	0	-1
ns=2;s=Demo	NSU=http://opcfoundation.org/UA/;ns=2;s=Demo	2	String	Demo.Sim	Variable	SimulationSpeed		i=7	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_1	Variable	TemperatureSetPoint		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_1	Variable	Humidity		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_2	Variable	TemperatureSetPoint		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_2	Variable	Humidity		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_3	Variable	TemperatureSetPoint		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_3	Variable	Humidity		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_4	Variable	TemperatureSetPoint		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_4	Variable	Humidity		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_5	Variable	TemperatureSetPoint		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_5	Variable	Humidity		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_6	Variable	TemperatureSetPoint		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_6	Variable	Humidity		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_7	Variable	TemperatureSetPoint		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_7	Variable	Humidity		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_8	Variable	TemperatureSetPoint		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_8	Variable	Humidity		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_9	Variable	TemperatureSetPoint		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_9	Variable	Humidity		i=11	0	-1
ns=3;s=Air NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	NSU=urn:ietf:params:opcuat:UA/;ns=3;s=Air	3	String	AirConditioner_10	Variable	TemperatureSetPoint		i=11	0	-1

The following table lists the parameters in the exported sheet:

Table 11 Parameters in the exported sheet

Parameters	Description
Nodeid	Example: i=2254
Expanded Nodeid	Example: NSU=http://opcfoundation.org/UA/;i=2254
Nodeid NamespaceIndex	Example: 3
Nodeid IdentifierType	Example: String
Nodeid Identifier	Example: AirConditioner_1. TemperatureSetPoint
Node Class	Example: Variable
Browse Name	Example: Humidity
Description	Example: Holds sample data to test aggregates as described in OPC UA Specification Part 13.
DataType	Example: i=862
DataType NamespaceIndex	Example: 1
DataType IdentifierType	Example: Numeric
DataType Identifier	Example: 862
ValueRank	Example: -1

Parameters	Description
BrowsePath	Example:Root/Objects/Demo/007_Massfolder_Dynamic/Variable0039

When you export the address space of PHD Server using Matrikon Data Broker, and if it takes more time to export, try to connect Explorer directly to a wrapper. If you want more information, you can see [Exporting Address Space of PHD Server Using Matrikon Data Broker Takes More Time](#).

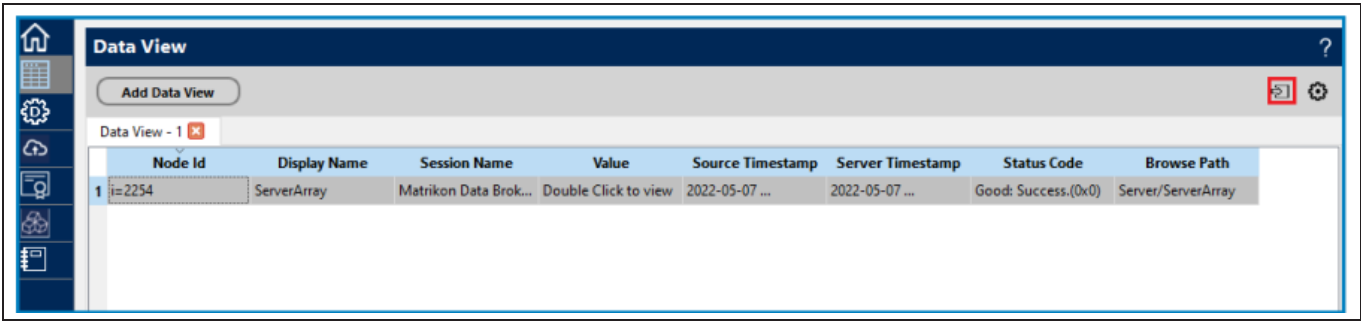
5.3.4 Export Monitored Items from Data View Grid

You can export the monitored item from the Data View Grid in .csv format and save it on your local machine.

To export the monitored items:

- 1. Open the Explorer application and connect to a Matrikon Data Broker.
- 2. In the **Data View screen**, add the required data you want to monitor and export.

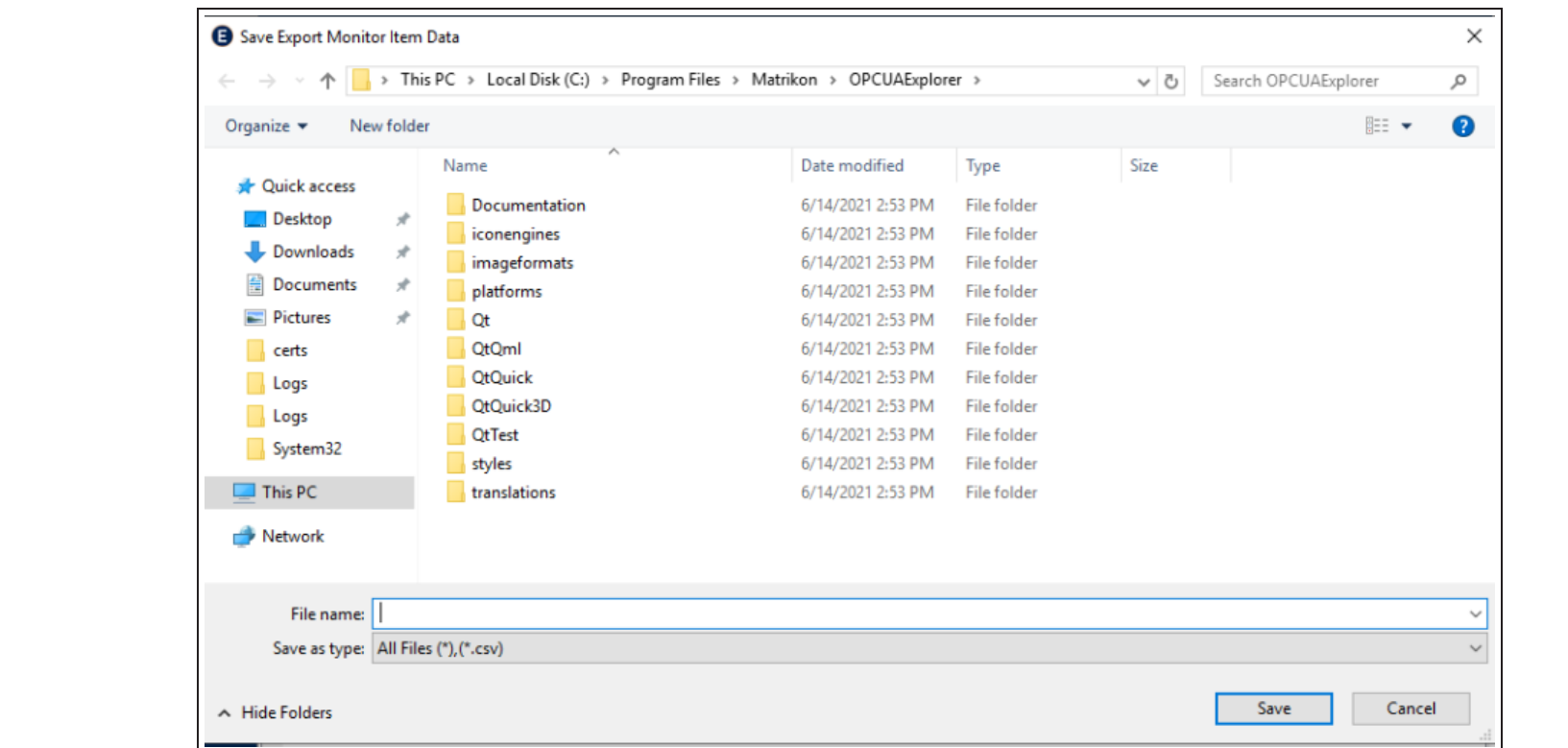
Figure 38 Data View Screen



- 3. On the top-right corner, click .

The **Save** Export Monitored Item Data window appears.

Figure 39 Save Export Monitored Item Data Window



4. Type a File Name in the <XYZ.csv> format and click **Save**.

The export process begins. You can see the process status in the **Log** pane.

The exported sheet looks like the following image:

Figure 40 Exported Excel Sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Nodeid	Expanded Nodeid	Nodeid id	Nodeid id	NodeClass	browseName	Descriptive	Data Type	Data Type	Data Type	Data Type	Value	Rank	Value	Source	Tin	Server	Tin	Status	Code	
2	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0000	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
3	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0001	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
4	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0002	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
5	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0003	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
6	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0004	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
7	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0005	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
8	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0006	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
9	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0007	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
10	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0008	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
11	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0009	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
12	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0010	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
13	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0011	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
14	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0012	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
15	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0013	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
16	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0014	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
17	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0015	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
18	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0016	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
19	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0017	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
20	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0018	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
21	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0019	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
22	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0020	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							
23	ns-2is-De NSU-http	2 String	Demo.Me	Variable	Variable0021	0:UInt32	0 Numeric	7	-1	2258544	39:04.0	39:04.0	Good: Success	(0x0)							

The following table lists the parameters in the exported sheet:

Table 12 Parameters in the exported sheet

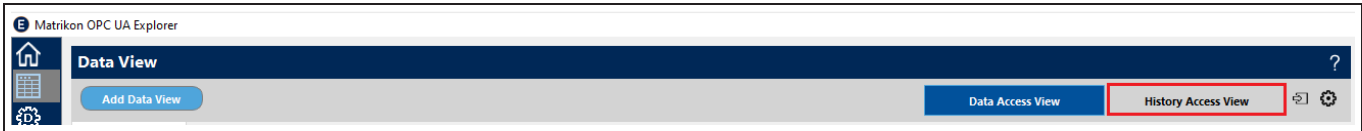
Parameters	Description
NodeId	Example: i=2254
Expanded NodeId	Example: NSU=http://opcfoundation.org/UA/i=2254
NodeId Namespaceindex	Example: 3
NodeId IdentifierType	Example: String
NodeId Identifier	Example: AirConditioner_1. TemperatureSetPoint
Node Class	Example: Variable
Browse Name	Example: Variable00014
Description	Example: Holds sample data to test aggregates as described in OPC UA Specification Part 13.
DataType	Example: 0: UInt862
DataType NamespaceIndex	Example: 1
DataType IdentifierType	Example: Numeric
DataType Identifier	Example: 862
ValueRank	Example: -1
Value	Example: 225844
Source Timestamp	Example: 39:04:0
Server Timestamp	Example: 39:04:0
Status Code	Example: Good: Success (0X0)

5.3.5 History Access View

Users can now connect to OPC UA Historians from OPC UA Explorer and view the data from these Historians. To view the data from Historians, follow the below steps:

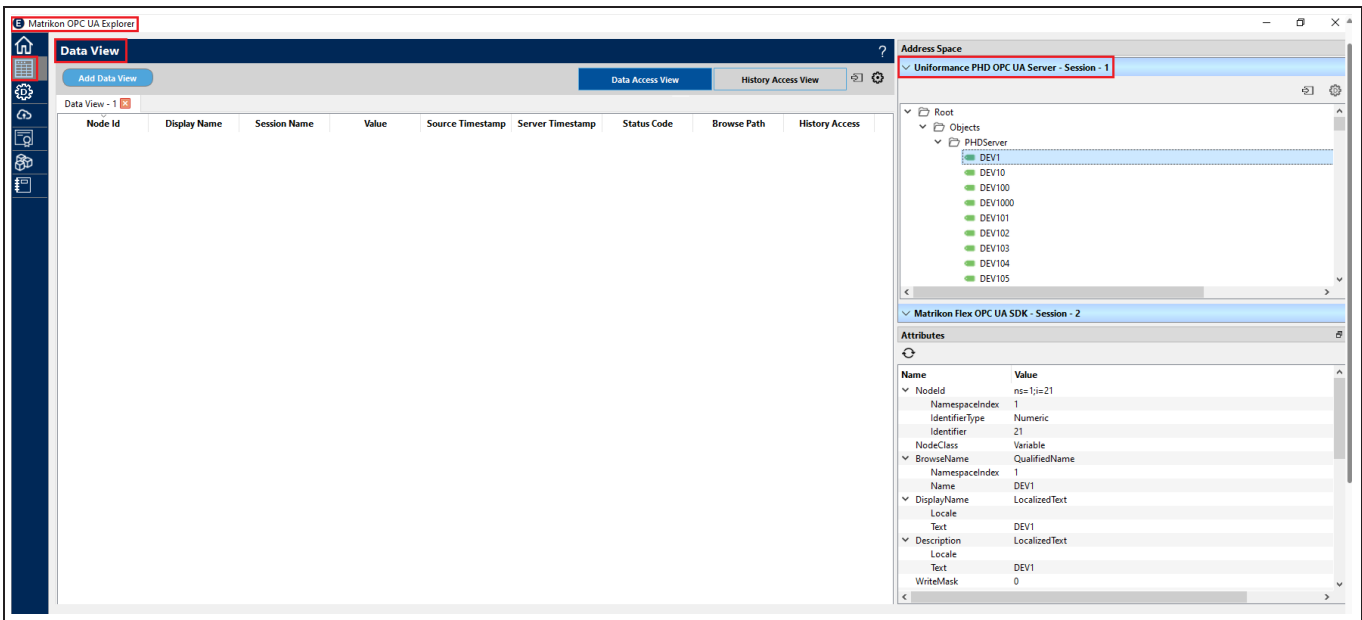
- 1. A new screen for viewing the data from Historians, **History Access View** is added to the **Data View** window of the Explorer.

Figure 41 History Access View



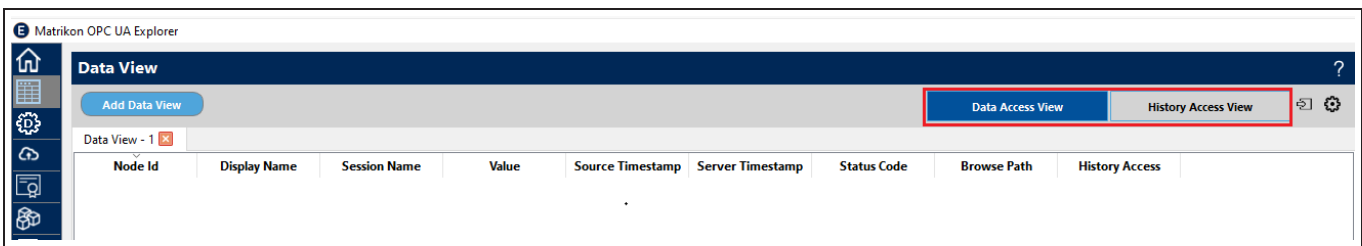
- 2. Connect **Matrikon OPC UA Explorer** with any historian server (for example **PHD server** etc.). The **Data View** screen would appear. For more details, refer to how to connect [Matrikon OPC UA Explorer](#).

Figure 42 Matrikon OPC UA Explorer



3. Switch to **History Access View** from the default Data Access View by clicking the **History Access View** button.

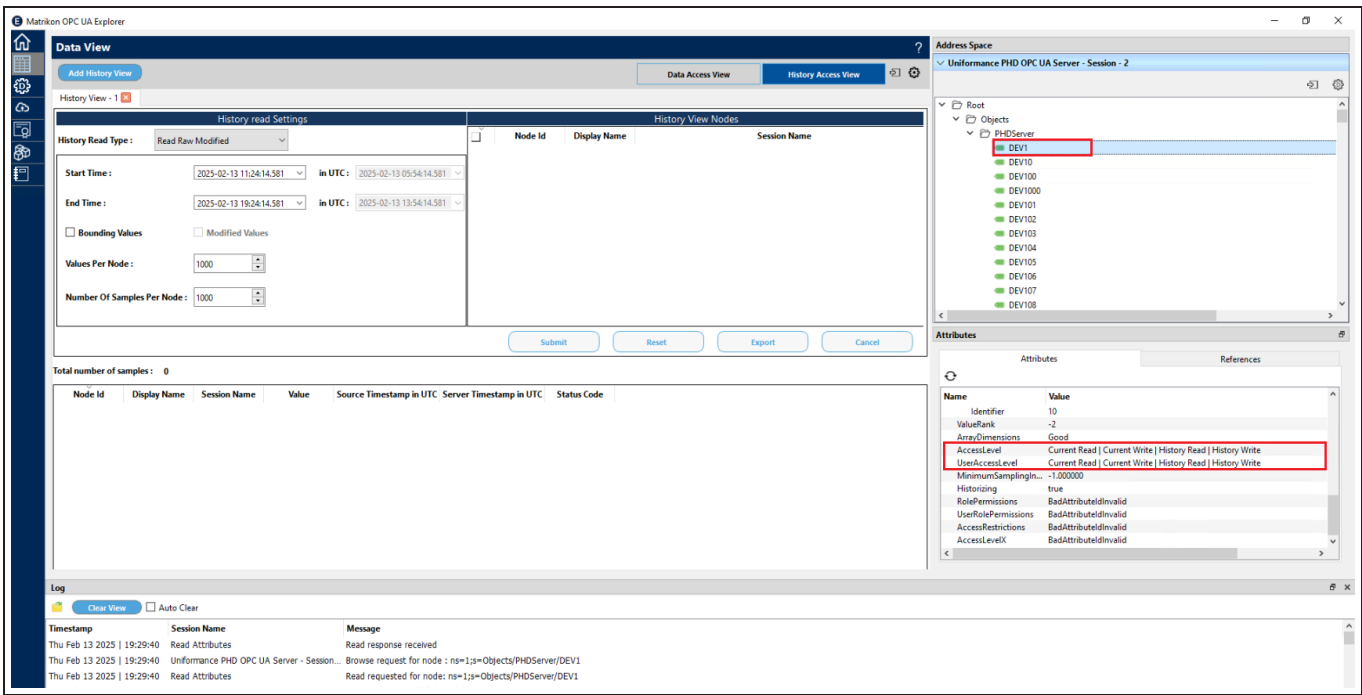
Figure 43 Data Access View and History Access View



4. To access historical data, a node must have "History Read" permission. To verify this in Matrikon OPC UA Explorer:
- a. **Connect to your OPC UA server.**
 - b. **Browse the Address Space** to locate the node.
 - c. **Select the node** to view its attributes.
 - d. **Verify that the Access Level** field within the Attributes section includes at least "**History Read**."

These steps help you confirm the necessary permissions for accessing historical data.

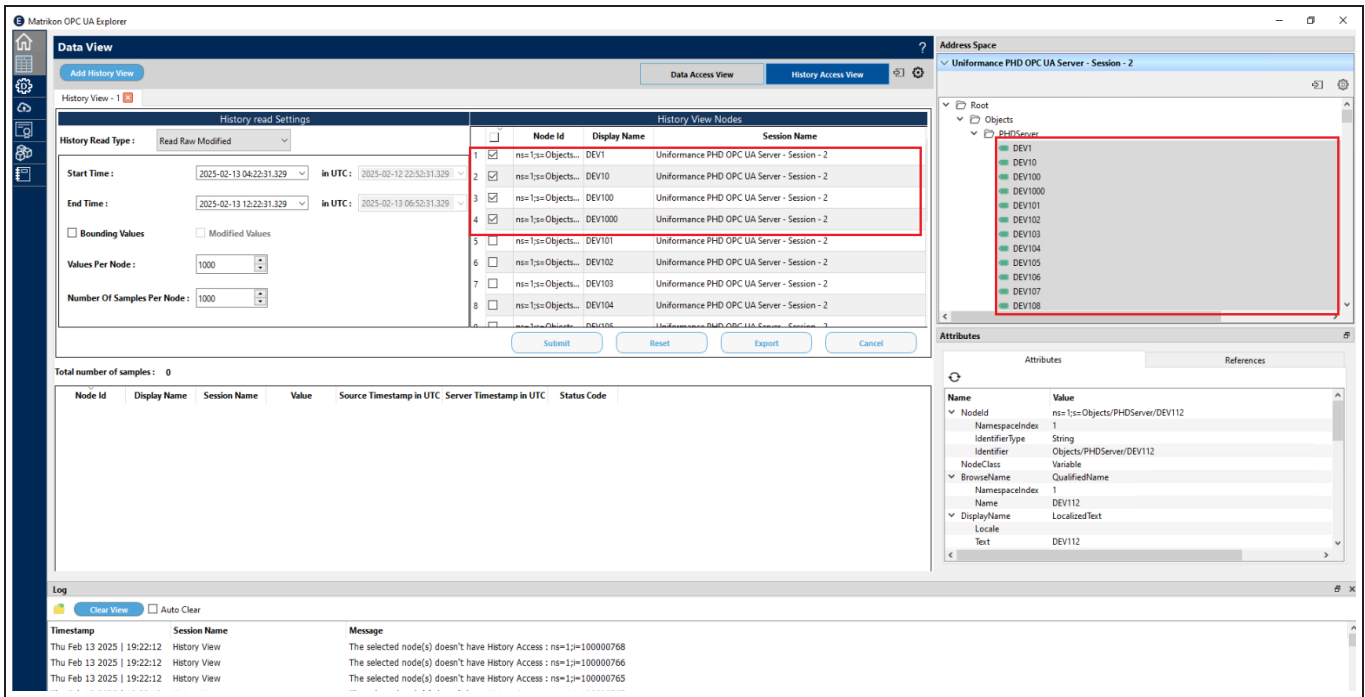
Figure 44 Attributes



5. Desired node(s) whose historical data needs to be accessed should be added to the History View Section in the History Access View Page. This can be done by using any of the following methods:

- 1. Drag and drop a folder or multiple selected nodes into the History View section.

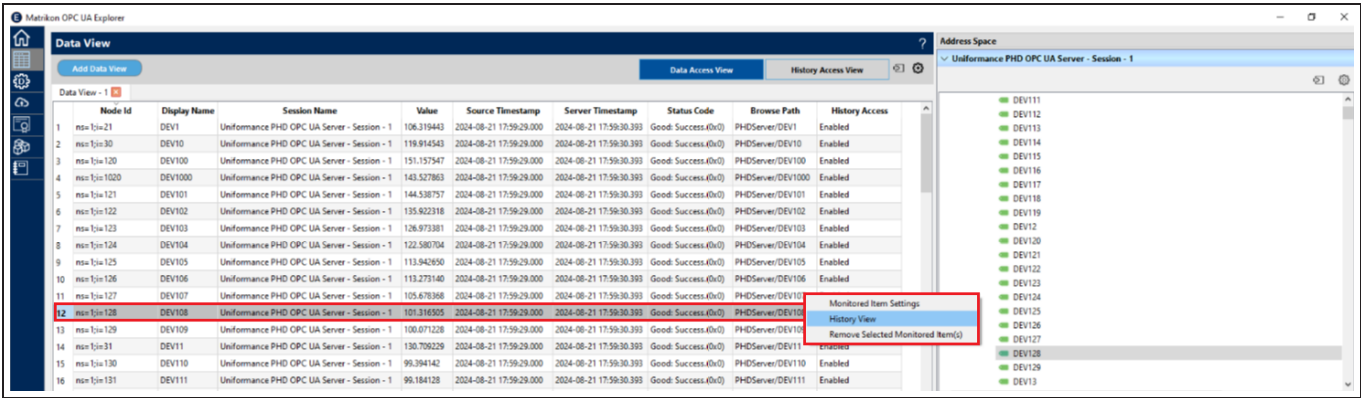
Figure 45 History Access View



- 2. Context Menu from Data Access View:

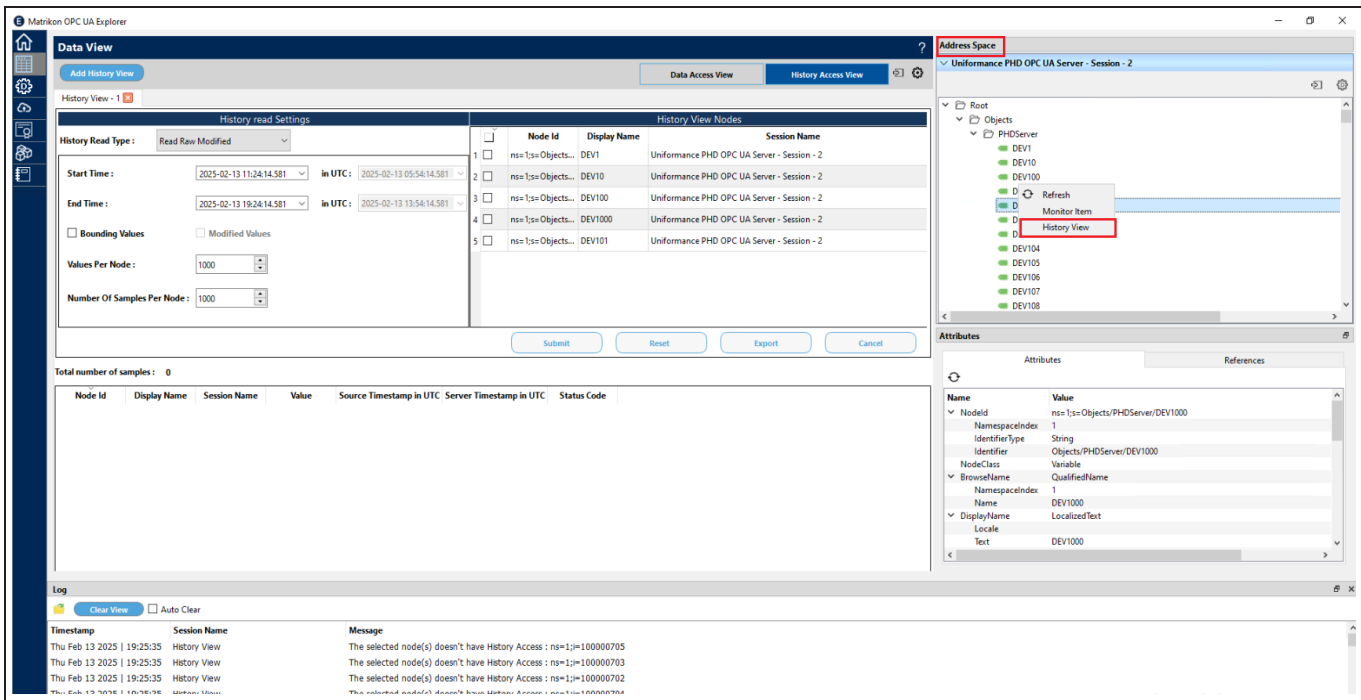
1. Right-click on an item that has History Access enabled.
2. Select the "History View" option from the context menu. This method is applicable when a node is subscribed to the Data Access View page.

Figure 46 Data Access View



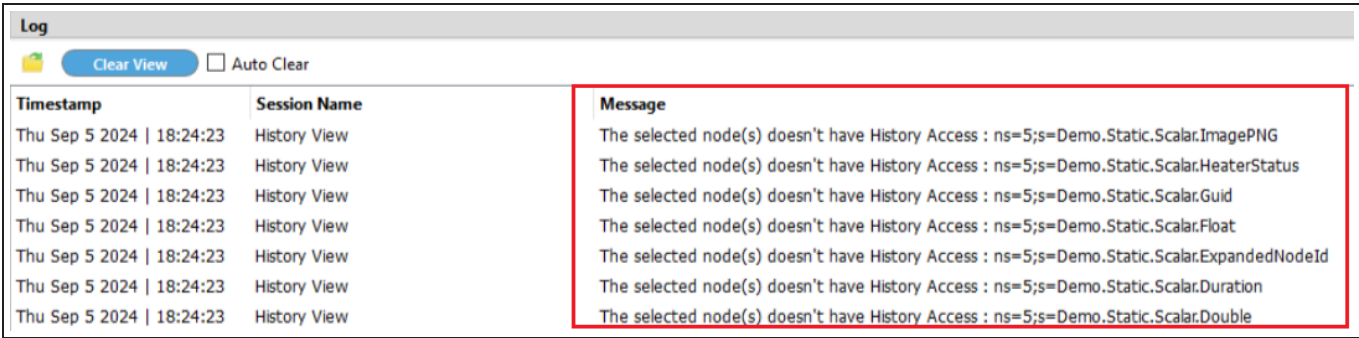
3. Context Menu from Address Space:
1. Right-click on a node within the Address Space.
2. Select the "History View" option from the context menu.

Figure 47 Address Space



6. A log message is displayed if the desired node(s) doesn't have "History Read" permission.

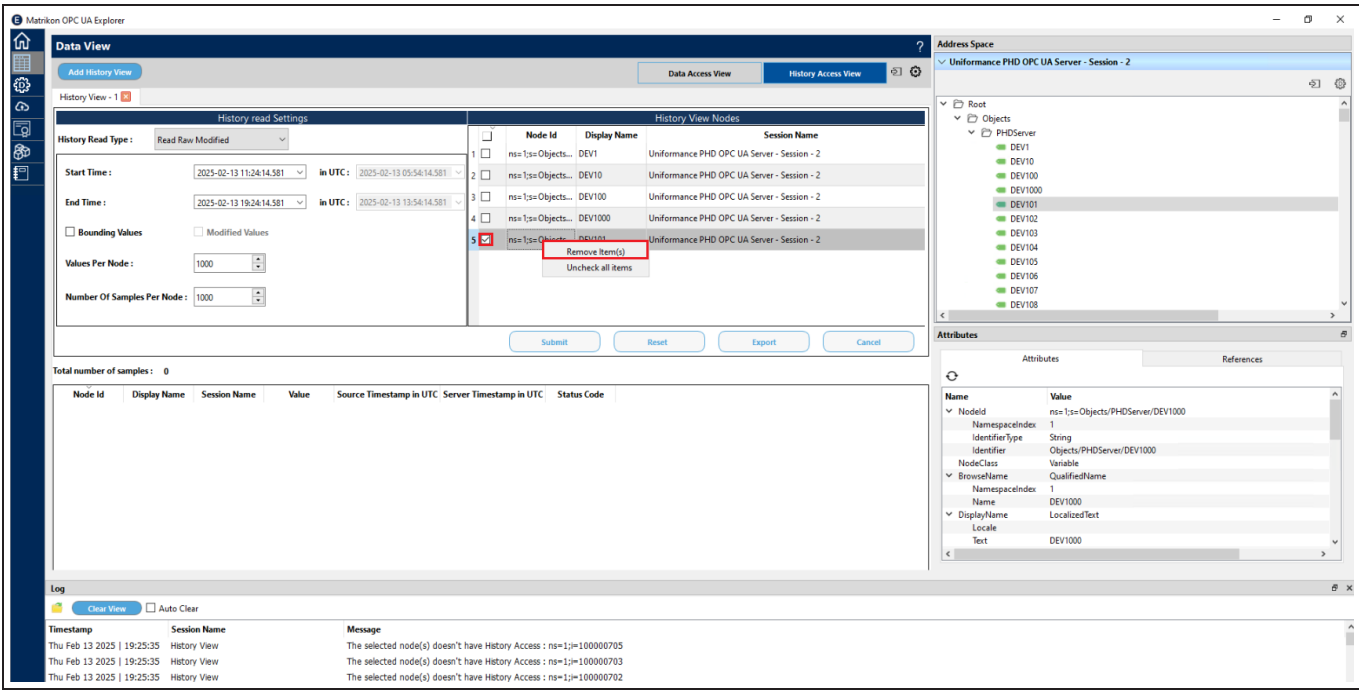
Figure 48 Log window



7. Selecting nodes for History Request

- Node(s) whose History Data needs to be accessed can be chosen in **History View Nodes** by selecting them using the checkbox.
- Nodes can be removed by applying the **Remove item(s)** option from the context menu of the **History View Nodes** section on the selected nodes.
- Deselection of nodes can be done by using **Uncheck all items** option from the context menu of **History View Nodes** section.
- Please note that only **maximum of 20 Nodes** can be selected to proceed with the History Request and select all button will select maximum 20 nodes.
- Maximum of 500 nodes can be added in the **History View Nodes** section per History View tab.

Figure 49 Remove item and uncheck all items



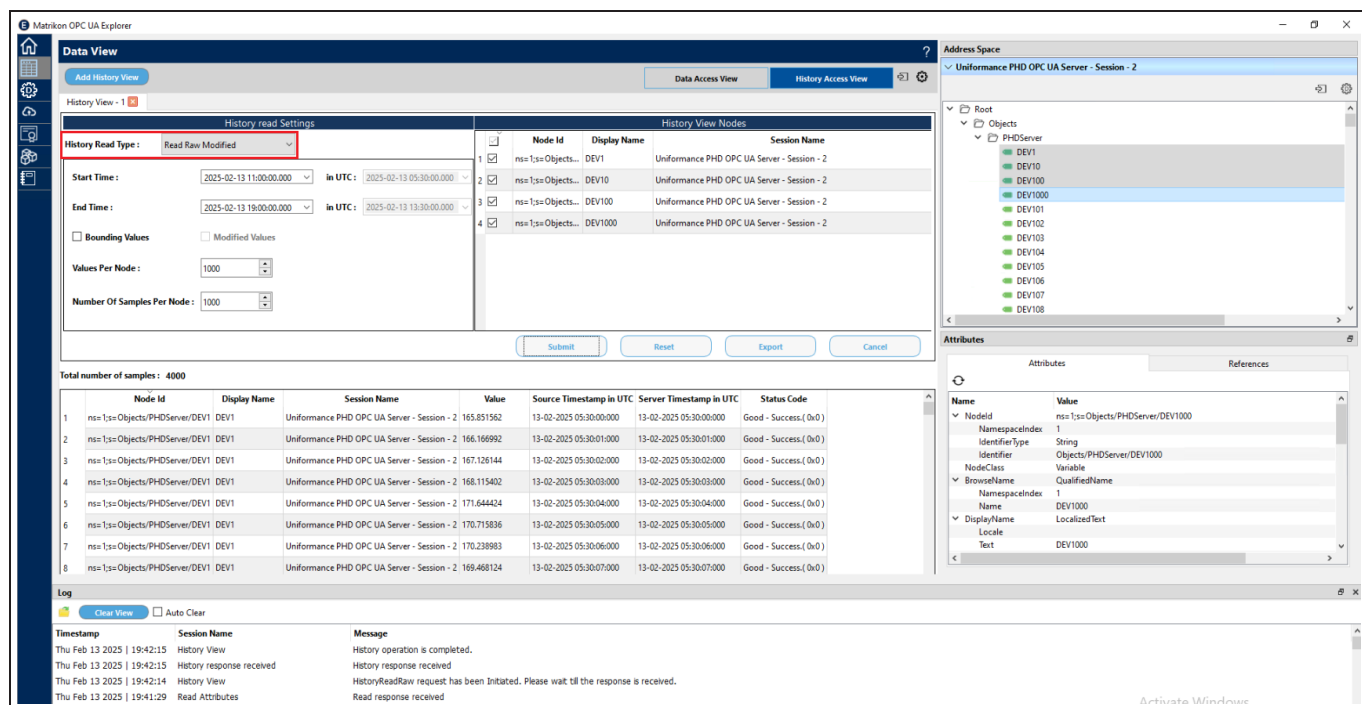
8. Edit **History Read Setting** by selecting any of the following **History Read Type(s)** and then click **Submit** button to request the History data for the selected nodes. When the response is received from the server, all the history samples of the requested node(s) are displayed in the samples section.

- a. **Read Raw Modified**: Retrieves raw historical data.
- b. **Read Processed**: Retrieves processed historical data based on specific aggregate functions.
- c. **Read At Time**: Retrieves historical data at specific timestamps.

5.3.5.1 Read Raw Modified

Select **Read Raw Modified** from Read Type dropdown. Update **Start Time**, **End Time**, **Bounding Values**, **Values per node** and number of samples per node and click the **Submit** button to request the History data to the server. When the response is received from the server, all the history samples of the requested node(s) are displayed in the samples section.

Figure 50 History Read Raw Modified Samples



History Read Raw Modified Settings:

1. Select Read Type as **Read Raw Modified**.
2. **Start Time** and **End Time** would specify the start and end date in local system time zone format (Example: YYYY/MM/DD HH:MM:SS:zzz).
3. **Bounding Values** are the values that are associated with the starting and ending time of a processing interval specified when reading from the historian. Bounding Values may be required to determine the starting and ending values when requesting raw data over a time range. If a raw data value exists at the start or end point, it is considered the bounding value even though it is part of the data request. If no raw data value exists at the start or end point, then the Server will determine the boundary value, which may require data from a data point outside of the requested range.
4. **Modified Values**: Disabled, not supported as of now.
5. **Values per node**: It is the number of samples of one node per response. The maximum limit per request for a node is 20000.

6. **Number of Samples per Nodes:** This will specify the number of samples to display per node in sample section grid view. (All the data in the provided time range has a limit set between 0 to 20000, with a default value of 1000).
7. **History View Nodes** window to select the nodes for History Request.
8. **Submit** button to submit the History Request on the server.
9. The **Reset** button restores the History Read Settings to their default configuration. By default, the **End Time** is set to the current system time, while the **Start Time** is automatically set to 8 hours earlier than the End Time. You can adjust both the Start Date and End Date to match your specifications as needed.
10. **Cancel** button to stop all ongoing history operation in all the **History View**
11. The samples section displays details of the samples received in the History Response. This includes information such as **Node ID**, **Display Name**, **Session Name**, **Value**, **Source Timestamp**, **Server Timestamp**, and **Status Code**.

5.3.5.2 Read Processed

Select **Read Processed** from Read Type dropdown. Update **Start Time**, **End Time**, **Aggregate type**, **Aggregate Configuration**, **Processing Interval** and **Number of samples per node** and click the **Submit** button to request the History data to the server. When the response is received from the server, all the history samples of the requested node(s) are displayed in the samples section.

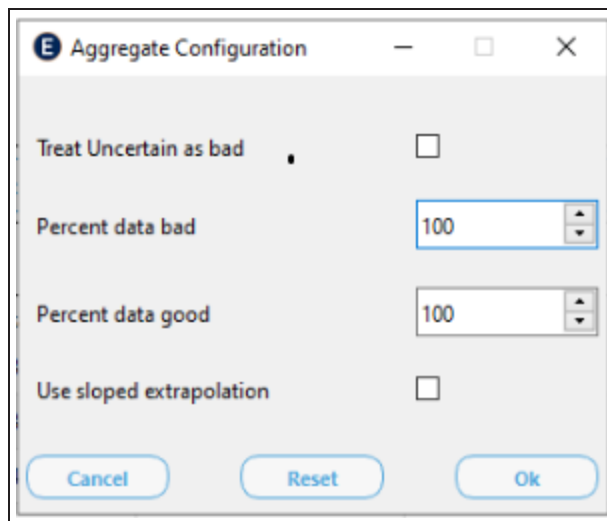
Figure 51 History Read Processed Samples

The screenshot displays the Matrikon OPC UA Explorer application. The 'History View' tab is active, showing the 'History read Settings' panel. The 'History Read Type' is set to 'Read Processed'. The 'Start Time' is 2025-02-13 11:00:00.000 and the 'End Time' is 2025-02-13 19:00:00.000. The 'Aggregate Type' is 'Interpolative' and the 'Processing Interval' is 1000 milliseconds. The 'Number Of Samples Per Node' is 1000. The 'History View Nodes' table lists four nodes: DEV1, DEV10, DEV100, and DEV1000. The 'Submit' button is highlighted. Below the settings, a table displays the total number of samples (4000) and a list of 8 samples with columns for Node ID, Display Name, Session Name, Value, Source Timestamp in UTC, Server Timestamp in UTC, and Status Code. The 'Log' panel at the bottom shows the history operation completion and the request initiation.

	Node ID	Display Name	Session Name	Value	Source Timestamp in UTC	Server Timestamp in UTC	Status Code
1	ns=1;ns=Objects/PHDServer/DEV1	DEV1	Uniformance PHD OPC UA Server - Session - 2	165.851562	13-02-2025 05:30:00.000	13-02-2025 05:30:00.000	(0x400)
2	ns=1;ns=Objects/PHDServer/DEV1	DEV1	Uniformance PHD OPC UA Server - Session - 2	166.166992	13-02-2025 05:30:01.000	13-02-2025 05:30:01.000	(0x400)
3	ns=1;ns=Objects/PHDServer/DEV1	DEV1	Uniformance PHD OPC UA Server - Session - 2	167.126144	13-02-2025 05:30:02.000	13-02-2025 05:30:02.000	(0x400)
4	ns=1;ns=Objects/PHDServer/DEV1	DEV1	Uniformance PHD OPC UA Server - Session - 2	168.115402	13-02-2025 05:30:03.000	13-02-2025 05:30:03.000	(0x400)
5	ns=1;ns=Objects/PHDServer/DEV1	DEV1	Uniformance PHD OPC UA Server - Session - 2	171.644424	13-02-2025 05:30:04.000	13-02-2025 05:30:04.000	(0x400)
6	ns=1;ns=Objects/PHDServer/DEV1	DEV1	Uniformance PHD OPC UA Server - Session - 2	170.715836	13-02-2025 05:30:05.000	13-02-2025 05:30:05.000	(0x400)
7	ns=1;ns=Objects/PHDServer/DEV1	DEV1	Uniformance PHD OPC UA Server - Session - 2	170.238983	13-02-2025 05:30:06.000	13-02-2025 05:30:06.000	(0x400)
8	ns=1;ns=Objects/PHDServer/DEV1	DEV1	Uniformance PHD OPC UA Server - Session - 2	169.468124	13-02-2025 05:30:07.000	13-02-2025 05:30:07.000	(0x400)

History Read Processed Settings:

1. Select **Read Type** as **Read Processed**.
2. **Start Time** and **End Time** would specify the start and end date in local system time zone format (Example: YYYY/MM/DD HH:MM:SS:zzz).
3. **Aggregate Type** indicates the list of Aggregates to be used when retrieving the processed history. These details will be retrieved from UA server capabilities.
4. Select the required **Aggregate Configuration** from the below option.

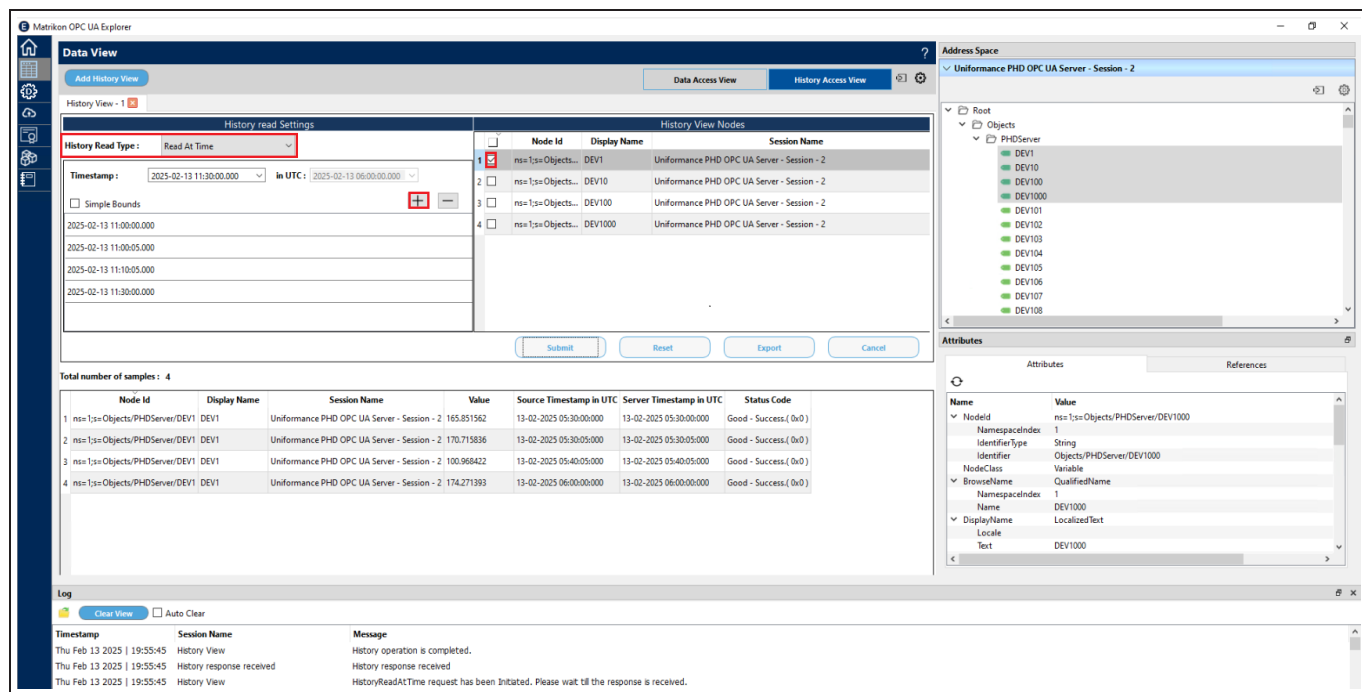


5. **Processing Interval** refer to Interval between returned Aggregate values. The value 0 indicates that there is no ProcessingInterval defined.
6. **Number of Samples per Nodes:** This will specify the number of samples to display per node in sample section grid view. (All the data in the provided time range has a limit set between 0 to 20000, with a default value of 1000).
7. **History View Nodes** window to select the nodes for History Request.
8. **Submit** button to submit the History Request on the server.
9. The **Reset** button restores the History Read Settings to their default configuration. By default, the **End Time** is set to the current system time, while the **Start Time** is automatically set to 8 hours earlier than the End Time. You can adjust both the Start Date and End Date to match your specifications as needed.
10. **Cancel** button to stop all ongoing history operation in all the **History View**
11. The samples section displays details of the samples received in the History Response. This includes information such as **Node ID**, **Display Name**, **Session Name**, **Value**, **Source Timestamp**, **Server Timestamp**, and **Status Code**.

5.3.5.3 Read At Time

Select **Read At Time** from Read Type dropdown. Update Timestamp and Simple Bounds click the **Submit** button to request the History data to the server. When the response is received from the server, all the history samples of the requested node (s) are displayed in the samples section.

Figure 52 History Read At Time Samples



History Read At Time Settings:

1. Select **Read Type** as **Read At Time**.
2. **Timestamp** define the specific timestamps for which values are to be read. Click on + button to add multiple timestamps.
3. Use **Simple Bounds** to determine the value at the specific timestamp.
4. **History View Nodes** window to select the nodes for History Request.
5. **Submit** button to submit the History Request on the server.
6. The **Reset** button restores the History Read Settings to their default configuration. By default, the **Timestamp** is set to the current system time. You can adjust timestamp to match your specifications as needed.
7. **Cancel** button to stop all ongoing history operation in all the **History View**
8. The samples section displays details of the samples received in the History Response. This includes information such as **Node ID**, **Display Name**, **Session Name**, **Value**, **Source Time Stamp**, **Server Time Stamp**, and **Status Code**.

5.3.5.4 Sorting in History Access View Grids

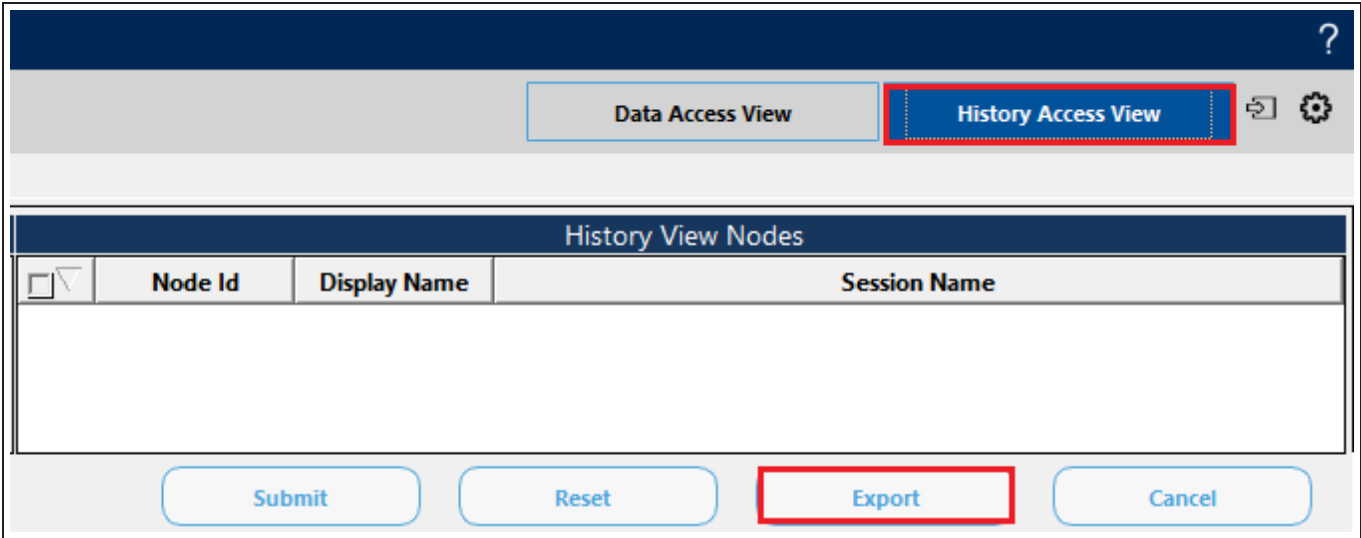
The History Access View grid page enhances the user experience by incorporating sorting functionality. This feature allows users to organize and view historical data.

On the grid view page, users can sort the data by clicking on the header of the desired column such as Node ID, Display Name, Session Name, Value, Source Time Stamp, Server Time Stamp, and status code in both History Sample view and History View node grids.

5.3.5.5 Export History Data

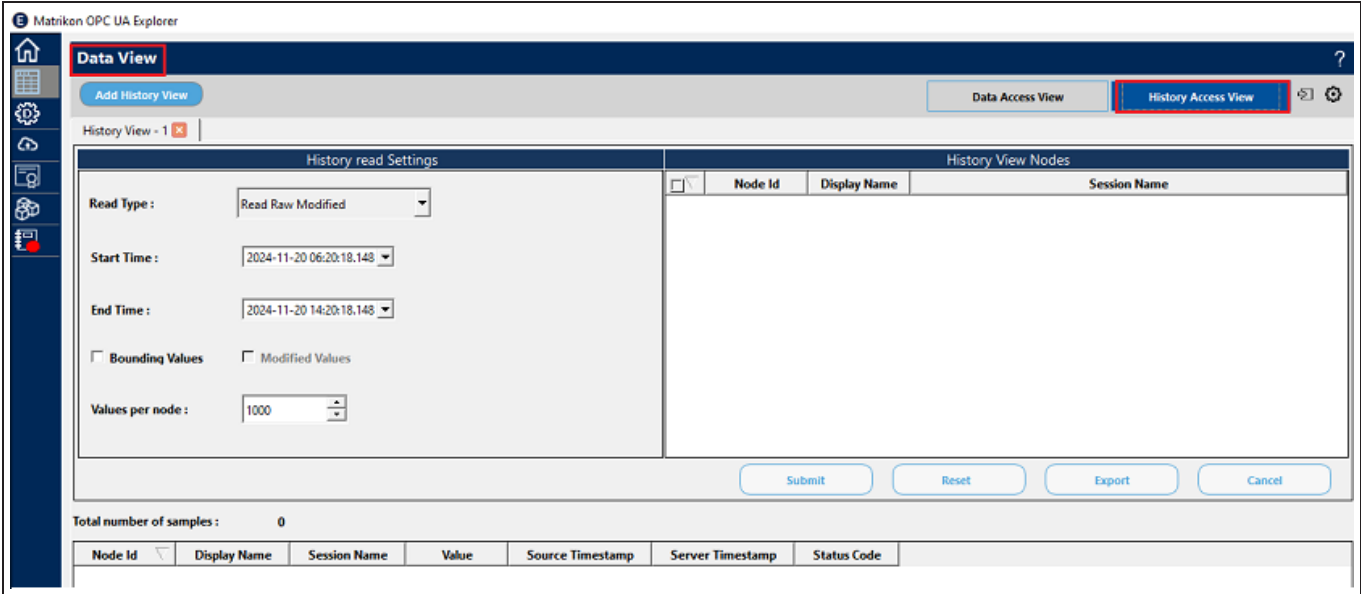
- 1. Export button is added to the **HistoryAccess View** window of the Explorer.

Figure 53 History Access View



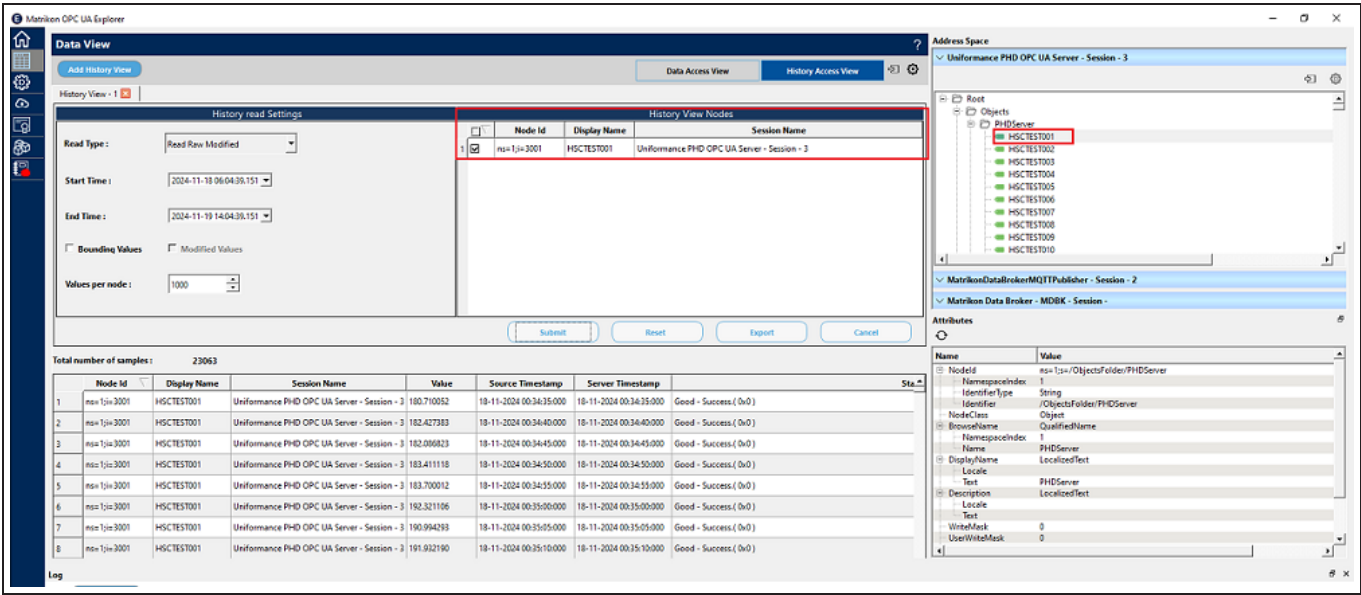
- 2. Navigate to Matrikon OPC UA Explorer. Connect **Matrikon OPC UA Explorer** with OPC UA Historian server (for example **PHD server** etc.). For more details, refer to how to connect Matrikon [OPC UA Explorer](#) .
- 3. **Data View** screen would appear. Click on **History Access View** tab.

Figure 54 Data View



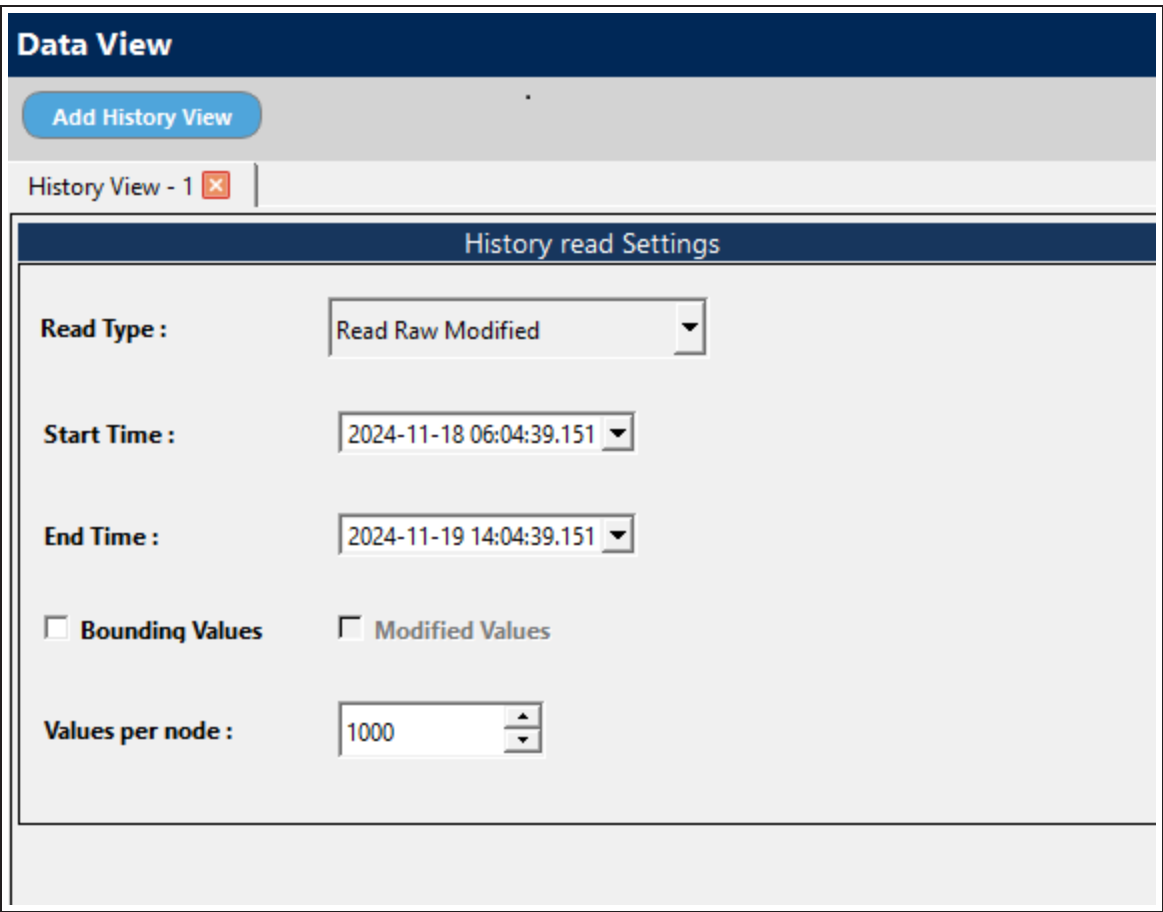
- 4. Drag and drop selected nodes into the History View Nodes section.

Figure 55 History View Nodes



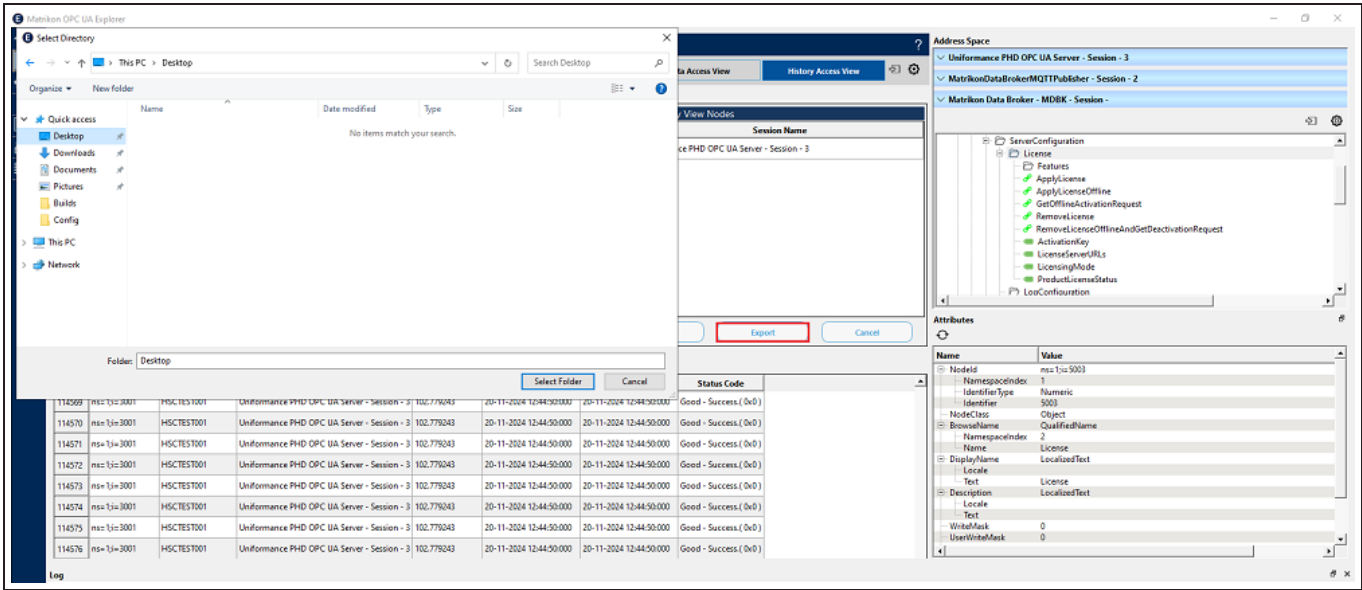
5. Configure History Read Settings. For more details on the History Request parameters please refer section [History Access View](#).

Figure 56 History Read Settings



6. After receiving the overall samples for the requested duration click Export button, window would appear to select the desired location where data would be exported in a csv file.

Figure 57 Export



7. Once the operation is completed, the history data received is stored in CSV file(s) at selected location.
8. The exported files naming convention can be used to understand the information about the contents. For example: ns_1_s_Objects_PHDServer_DEV101_03-11-2024_13_24_to_13-11-2024_21_24.csv file would be having the data for node ns_1_s_Objects_PHDServer_DEV101 for the date starting from 03-11-2024 time 13:24 to date 13-11-2024 time 21:24. If the data exceeds decided maximum sample size in one file that means if sample count exceeds 300K then new file would be created with the same naming convention appending the sequence number _1, _2... and so on.

Figure 58 Export file

1	Expanded NodeId	Display Name	Session Name	Value	Source Timestamp	Server Timestamp	Status Code
2	NSU=urn:UniformancePHDOpcUaServer;s=Objects/PHDServer/DEV102	DEV102	Uniformance PHD OPC UA Server - Session - 2	159.943985	20-11-2024 01:08:17:000	20-11-2024 01:08:17:000	Good - Success.(0x0)
3	NSU=urn:UniformancePHDOpcUaServer;s=Objects/PHDServer/DEV102	DEV102	Uniformance PHD OPC UA Server - Session - 2	160.399963	20-11-2024 01:08:18:000	20-11-2024 01:08:18:000	Good - Success.(0x0)
4	NSU=urn:UniformancePHDOpcUaServer;s=Objects/PHDServer/DEV102	DEV102	Uniformance PHD OPC UA Server - Session - 2	160.562668	20-11-2024 01:08:19:000	20-11-2024 01:08:19:000	Good - Success.(0x0)
5	NSU=urn:UniformancePHDOpcUaServer;s=Objects/PHDServer/DEV102	DEV102	Uniformance PHD OPC UA Server - Session - 2	159.082489	20-11-2024 01:08:20:000	20-11-2024 01:08:20:000	Good - Success.(0x0)
6	NSU=urn:UniformancePHDOpcUaServer;s=Objects/PHDServer/DEV102	DEV102	Uniformance PHD OPC UA Server - Session - 2	162.748184	20-11-2024 01:08:21:000	20-11-2024 01:08:21:000	Good - Success.(0x0)
7	NSU=urn:UniformancePHDOpcUaServer;s=Objects/PHDServer/DEV102	DEV102	Uniformance PHD OPC UA Server - Session - 2	157.60614	20-11-2024 01:08:22:000	20-11-2024 01:08:22:000	Good - Success.(0x0)
8	NSU=urn:UniformancePHDOpcUaServer;s=Objects/PHDServer/DEV102	DEV102	Uniformance PHD OPC UA Server - Session - 2	161.420151	20-11-2024 01:08:23:000	20-11-2024 01:08:23:000	Good - Success.(0x0)

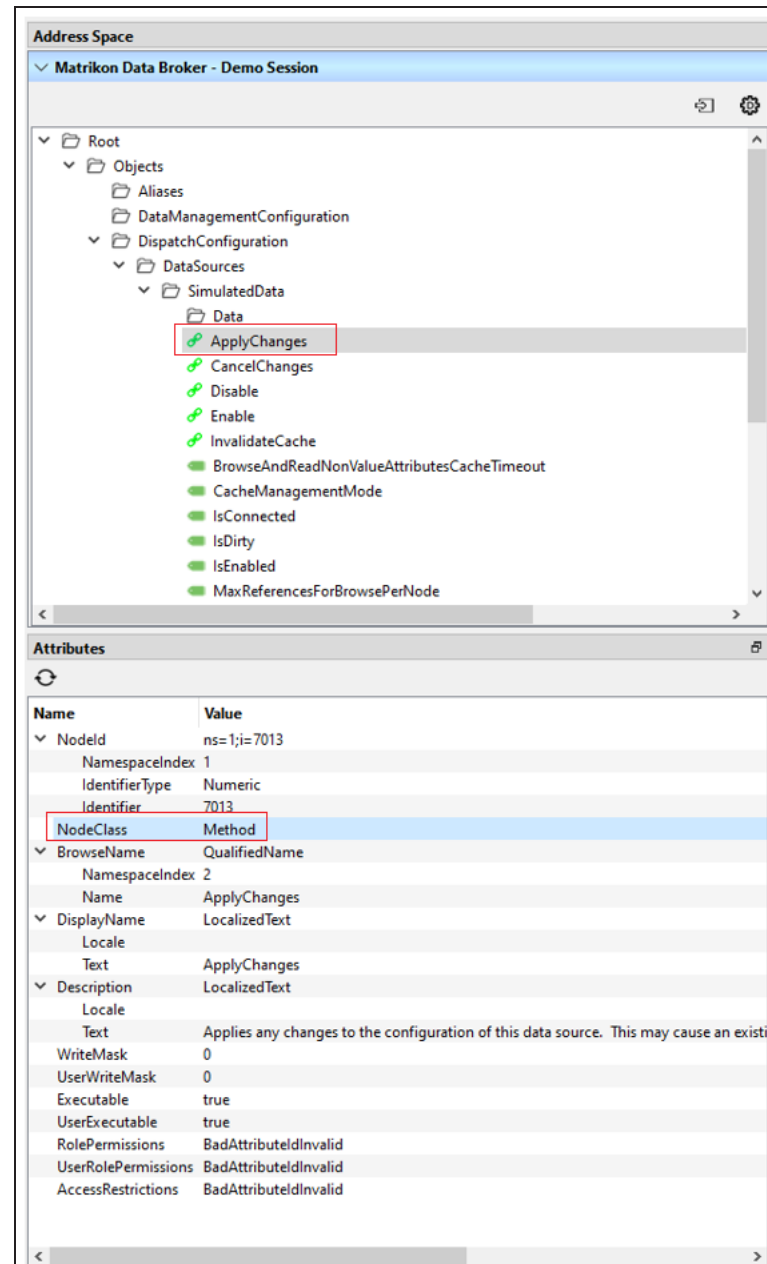
5.4 Method Call using Explorer

In Explorer, you can use the method calling option to execute the changes on the server side. You can browse, read, and perform the method calls from a server for nodes with Nodeclasstype as a method.

To make a method call:

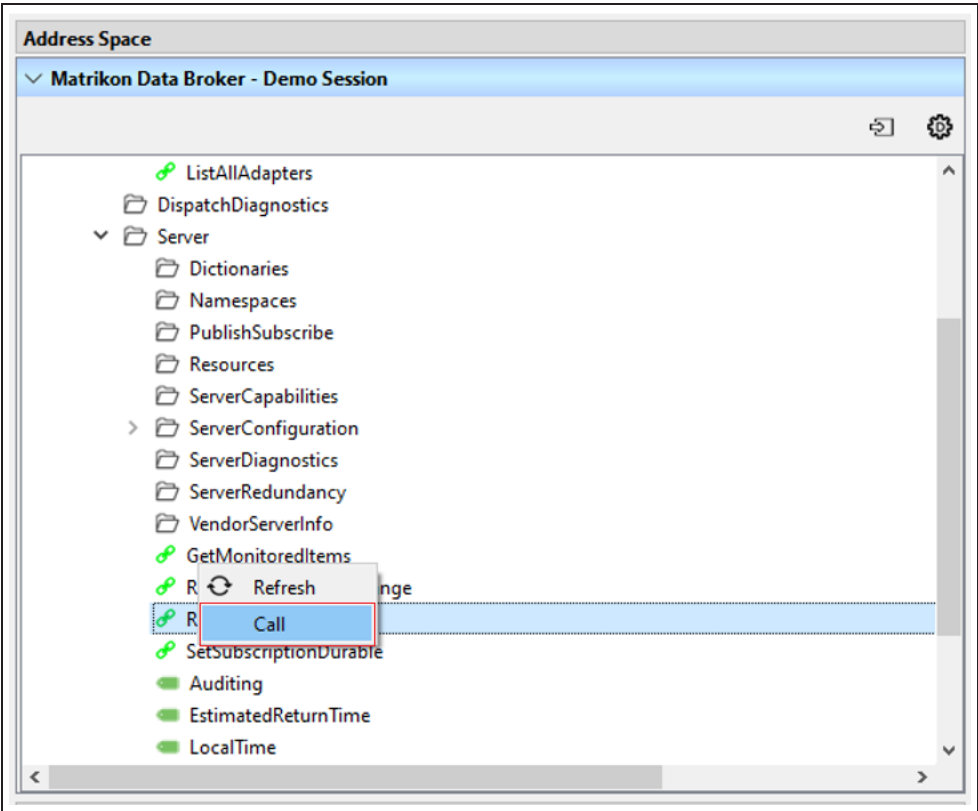
1. Identify a method nodeclass:
2. In the Address Space pane, click the executable functions (methods) that appear as light green chain links .

Figure 59 Address Space Pane



3. In the **Attributes** section, check if the **NodeClass** is a **Method**.
4. Right-click the executable function and click **Call**.
A dialog box appears.

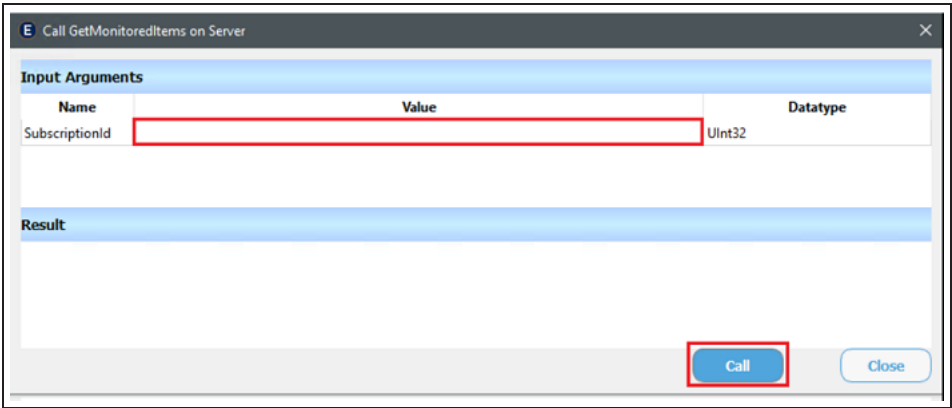
Figure 60 Call Dialog Box



5. Type the **Value** for the **Input Arguments** and click **Call**. For your reference, the supported value format is displayed below the **Datatype** column.

The changes are updated. The result is displayed below the **Result** tab, and the status is displayed below the **Status** tab and in the Log.

Figure 61 Status Tab



5.4.1 Limitations of Method Call pass through in Matrikon Data Broker

Methods with Input or Output arguments using user-defined data types exposed via legacy Data Type Dictionaries (deprecated) are not supported. Only Method arguments exposed via DataTypeDefinition attributes are supported in Matrikon Data Broker.

5.4.2 Limitations of Method Call in Explorer

The OPC Foundation-Defined basic scalar data types are the only ones supported in Explorer as Input or Output arguments in the current model. Other data types, Array data types, and Custom types are not supported by Method calls as an input or output argument.

5.5 Configure and Secure Matrikon Data Broker for the First Time

This section provides quick references and recommendations for configuring and securing Matrikon Data Broker after installation.

Table 13 Securing Matrikon Data Broker after Installation

Action	Reference
Connecting for the first time	- See the following sections: How to Launch Matrikon OPC UA Explorer and How to Connect to a Server. - To successfully connect Matrikon OPC UA Explorer with Matrikon Data Broker, Matrikon Data Broker must be configured to trust the application certificate provided by OPC UA Explorer. To do that, perform any one of the following: Attempt to connect to Matrikon Data Broker using user credentials as admin and initial password. Once you connect, the BadSecurityChecksFailed error message appears in the OPC UA Explorer log window. To resolve this, see Steps to trust the rejected certificate. -OR- For Windows Operating System - Manually copy the explorer certificates from <AppData>\Local\Matrikon\OPCUAExplorer\pki\DefaultApplicationGroup\own\certs and paste them in <ProgramData>\Matrikon\DataBroker\ <Matrikon Data Broker Instance Name>\pki\DefaultApplicationGroup\trusted\certs. For the Linux Operating System - Manually copy the Explorer Client certificates from <Media>/ /pki/DefaultApplicationGroup/own/certs and paste them in /etc/Matrikon/DataBroker/<Matrikon Data Broker Instance Name>/pki/DefaultApplicationGroup/trusted/certs. Attempt to connect again.  Trusting a certificate must be done every time a new client connection is attempted using a security Policy with a different algorithm (SHA256 vs non-SHA256).
Secure the Matrikon Data Broker Instance	Decide on the secured passwords and which users are to be enabled. For more information, see How to Manage User Accounts.

Action	Reference
Configuring Matrikon Data Broker	• See Matrikon Data Broker Configuration.

5.6 How to Configure Matrikon Data Broker

You can use Matrikon OPC UA Explorer to configure a connected Matrikon Data Broker server.

1. To configure Matrikon Data Broker, the following user accounts are predefined in Matrikon Data Broker:
 - **Admin:** Connect as the admin user to be able to configure all available options as well as change user account passwords. The initial password is blank.

 If you are connecting to Matrikon Data Broker for the first time, you must log in as an Admin user and change the initial password to make it more secure.

- **Guest:** Guest users have Read permissions only on Matrikon Data Broker Diagnostics information. They cannot modify any data values or configure Matrikon Data Broker. Set the password while enabling the user.
- **Operator:** Operator users have Read and Write permissions on data values, including aggregated data sources. They cannot configure Matrikon Data Broker. Set the password while enabling the user.
- **Anonymous:** The Anonymous user account is disabled by default. For more information on enabling anonymous user access, see [Enabling Anonymous User Access](#). They have the same access permissions as Guest users. There is no Password required for this account.

2. To connect to a server, you can see [How to Connect to a Server](#).

5.6.1 Navigating to Matrikon Data Broker Configuration Screen

To configure a connected Matrikon Data Broker, click the Configure Matrikon Data Broker button on the home screen or click

 on the left pane in the Active Sessions tile or the Address Space pane shown in the following images:

Figure 62 Configure Matrikon Data Broker Button

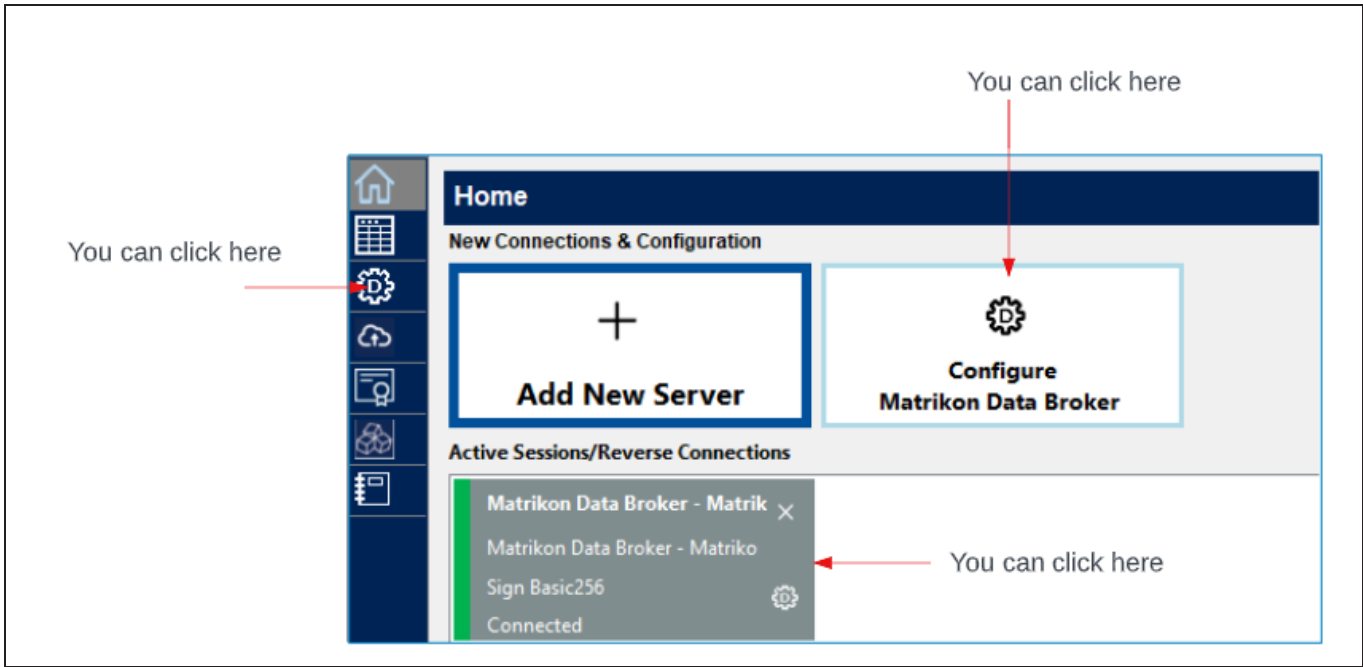
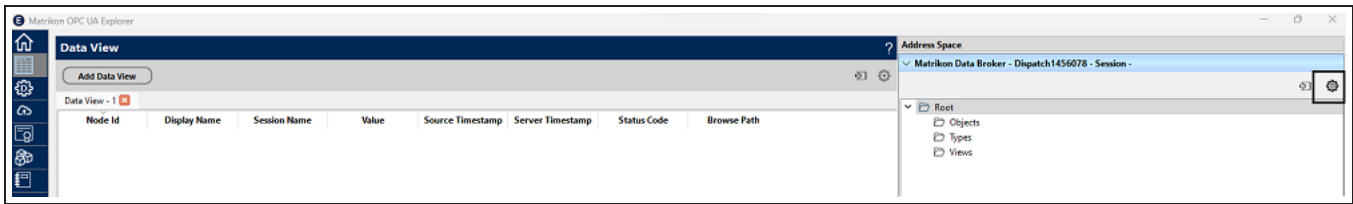
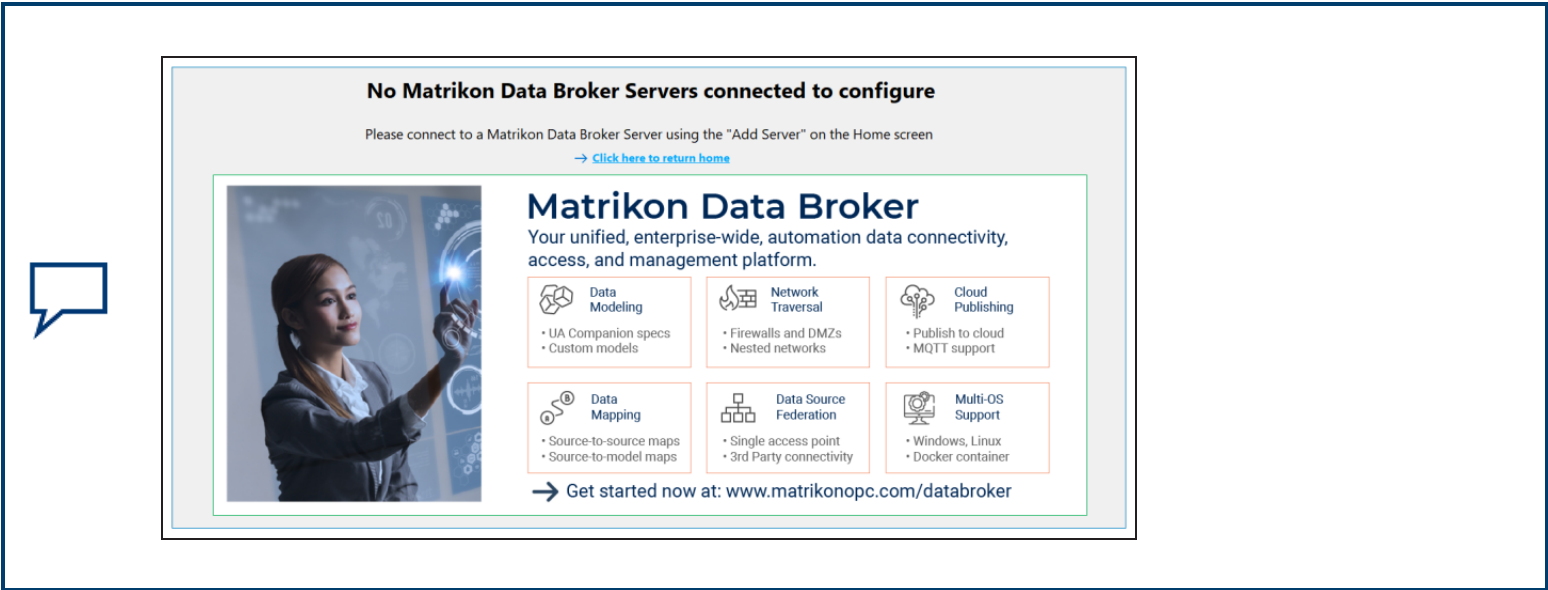


Figure 63 Data View



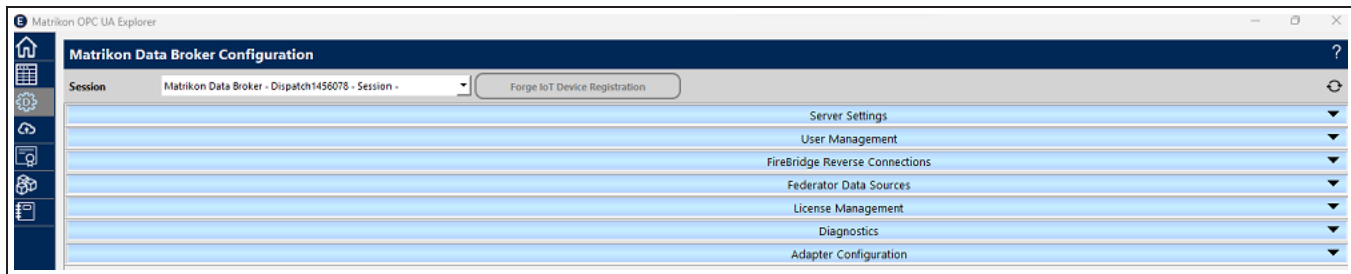
5.7 Matrikon Data Broker Configuration

If you are not connected to any Matrikon Data Broker session, the following screen appears:



Once you connect to a Matrikon Data Broker server, click  and the Matrikon Data Broker Configuration screen appears.

Figure 64 Matrikon Data Broker Configuration Screen



When there is more than one Matrikon Data Broker session connected, from the Session selection box at the top of the screen, you can select the Matrikon Data Broker session that needs to be configured.

The Matrikon Data Broker Configuration screen has the following panes:

Table 14 Matrikon Data Broker configuration panes

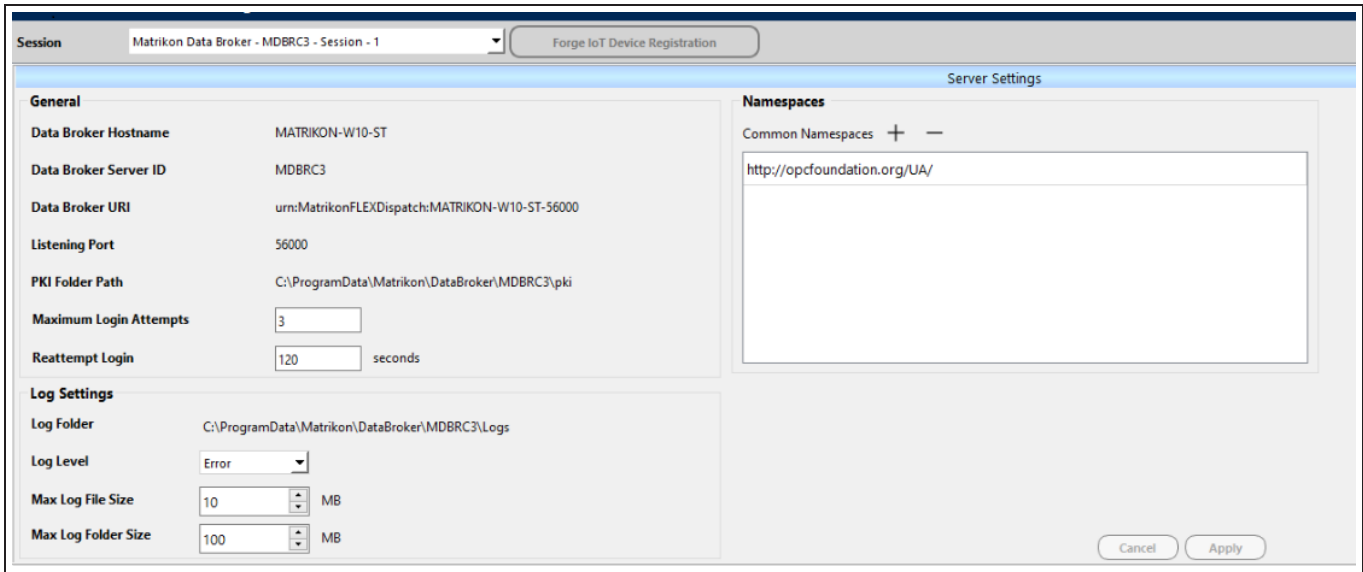
Panes	Description
How to Configure Matrikon Data Broker Server	Basic Matrikon Data Broker instance parameters.
Matrikon Data Broker User Management	Allows you to modify users and manage passwords.  When you configure Matrikon Data Broker for the first time, it is highly recommended that you change the initial passwords to more secure passwords.
Matrikon Data Broker FireBridge Reverse Connections	Allows you to create, modify, and delete reverse connections to allow remote UA Clients to communicate with this Matrikon Data Broker instance in Reverse Connect.  For a FireBridge connection to be successful, the UA Client must also have reverse connection functionality enabled and listen to the specified port.
Matrikon Data Broker Federator Data Sources	Allows you to add data sources (simulated data and UA servers).
Matrikon Data Broker License Management	Allows you to activate or deactivate Node locked license.
Matrikon Data Broker Diagnostics	Allows you to view Matrikon Data Broker performance and licensing information.

Panes	Description
Driver Configuration	Allows you to configure Drivers or Adapters created for Matrikon Data Broker. Ex: Matrikon Data Broker Husky Adapter.

5.7.1 How to Configure Matrikon Data Broker Server Parameters

The Matrikon Data Broker Server pane allows you to configure Matrikon Data Broker server parameters.

Figure 65 Configure Matrikon Data Broker Server Parameters



This pane has the following configuration sections:

Table 15 Configuration sections

Sections	Description
General	You can configure the following general parameters of Matrikon Data Broker: • Matrikon Data Broker Hostname: Name of the server's host computer. Matrikon Data Broker uses this hostname as part of its application certificate. • Matrikon Data Broker Server ID: Server name as configured during the installation. • Matrikon Data Broker URI: The Application URI is claimed by the Matrikon Data Broker application certificate. • Listening Port: The port on which Matrikon Data Broker UA Server listens for UA client connections. • PKI Folder Path: The folder where the PKI certificate store is located on the Matrikon Data Broker server host computer. • Maximum Login Attempts: User can login maximum 3 attempts. • Reattempt Login: User can Reattempt Login after 120 Seconds.
Namespaces	Allows you to add or remove namespace URIs of the common namespaces. When a namespace is

Sections	Description
	registered in this field, and multiple data sources share the same namespace for types, Matrikon Data Broker references the types to a single common namespace instead of creating a data source-specific namespace for each data source. This helps in improving the performance of the application.
Log Settings	Allows you to configure Matrikon Data Broker server logging: • Log Folder: The log file folder. The default log locations are as follows: For Windows Operating System <Program Data>/Matrikon/DataBroker/<Matrikon Data Broker Instance Name>/logs For the Linux Operating System /var/log/MatrikonFlexDispatch/<Matrikon Data Broker Instance Name>/logs Log Level: Indicates the number of information logged. The possible values are: • Information: Displays detailed information about the operations. This is the highest level of log, so it records all transactions. • Trace: Information meant for Matrikon developers and support to identify any problems. • Debug: Information meant for Matrikon developers and support to identify any problems. • Warning: Displayed when an issue is found that leads to an error. There is no impact on the current operation. • Error: Displayed when an issue is found during the execution of a function or method. There is no impact on the current operation. This is the default level of the log setting. • Critical: Displayed when an issue is found that needs to stop the current operation. Recommended value unless instructed by Matrikon support. • Max log File Size: The maximum log file size in Megabytes (MB). The default value is 10 MB. A new log file is created when the log size size reaches the defined size value. • Max log Folder Size: The maximum total size of all files in the folder, in Megabytes (MB). The default value is 100 MB. If the defined value exceeds, the oldest files are overwritten.



- Applying a change to this item causes Matrikon Data Broker to close all connections and restart to effect the change.
- This item forms part of the certificate used to authenticate Matrikon Data Broker to other OPC UA applications. Changing this value renders Matrikon Data Broker's application certificate invalid; other OPC UA clients and servers do not accept it. If you would like more information, you can see the [Application Certificate](#).

It is recommended to keep these options the same.

5.7.2 How to Manage Matrikon Data Broker User Accounts

The Matrikon Data Broker User Management pane allows you to manage user accounts on the Matrikon Data Broker server.

Figure 66 Matrikon Data Broker User Management Pane

User Management				
User Name	Description	Security Role	Password	Enabled
1 admin		Administrator	Change Password	☒
2 Anonymous		Guest	Change Password	☐
3 guest		Guest	Change Password	☒
4 operator		Operator	Change Password	☒



- When configuring Matrikon Data Broker, you must change all the default passwords.
- Admin users can never be disabled.
- No password can be set for Anonymous users.



The Anonymous user controls access for connections using the Anonymous token type and is disabled by default. The Anonymous user must be enabled to allow an Anonymous token-type connection, and the "Enable Deprecated Security Policies" option must be enabled. For more information, see [Enabling Deprecated Security Policies](#)

This pane has the following configuration parameters:

Table 16 Configuration Parameters

Column	Description
User Name	Name of the user account. This is a non-editable field.
Description (Optional)	A description of the user of the account.
Security Role	What security level does this user have. This is a non-editable field.
Password	Click the Change Password button to reset the user's password.
Enabled	Use this check box to enable or disable user accounts. If this checkbox is not selected, the user cannot log in to Matrikon Data Broker. For admin users, this check box is always selected and disabled.

5.7.3 How to Configure Reverse Connections with Matrikon Data Broker

The Matrikon Data Broker FireBridge Reverse Connections pane allows you to configure Reverse connections; the OPC UA server in Matrikon Data Broker establishes a connection to an OPC UA client. A Reverse Connection is where the UA server initiates the TCP/IP connection to the UA client, and the UA client takes control of the connection. It is useful when a firewall or network translation service would otherwise prevent the UA client from initiating the TCP/IP connection to the UA server. You can use the Matrikon Data Broker FireBridge Reverse Connections feature to connect to any OPC UA Client or Server that supports Reverse Connections. The Matrikon Data Broker FireBridge Reverse Connections New connections can be added using the + icon. Adding a Reverse Connection to this section enables the Matrikon Data Broker UA server to connect to the configured UA client endpoint URL.



For a FireBridge connection to be successful, the UA Client must also have Reverse Connection functionality enabled. For more information on enabling the Matrikon Data Broker UA Client to accept a FireBridge connection, see [Matrikon Data Broker Federator Data Sources](#)

This pane has the following configuration parameters:

Figure 67 Broker FireBridge Reverse Connections New Connections

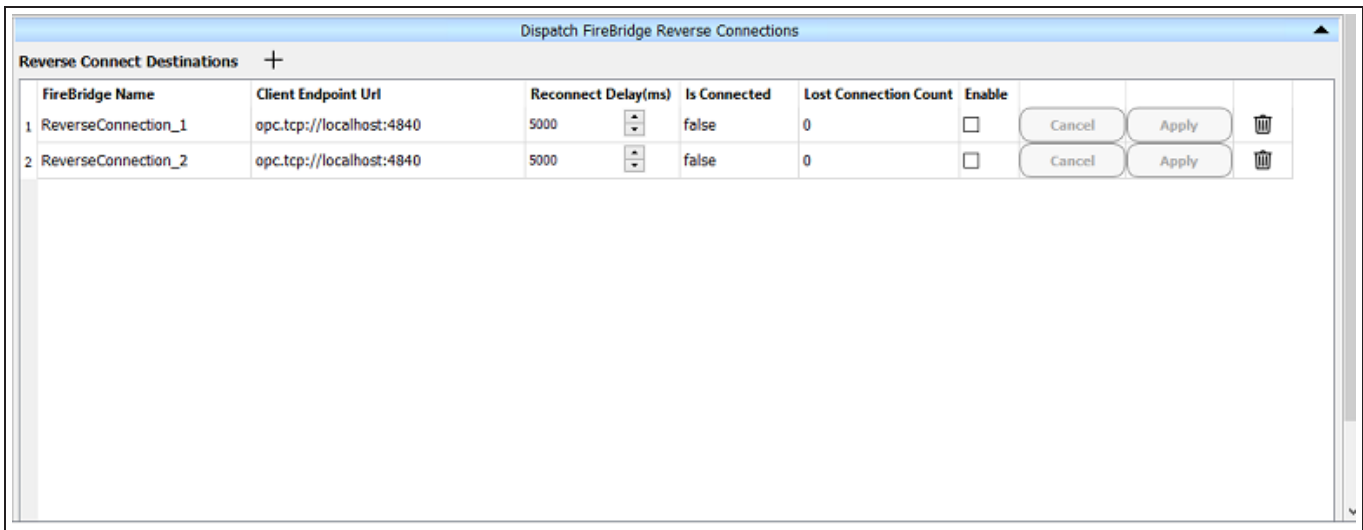


Table 17 Configuration Parameters

Column	Description
FireBridge Name	A user-friendly, convenient name for the connection. To edit, double-click the name.
Client Endpoint Uri	The OPC UA client's Reverse Connection URL. To edit, double-click the URL. Expected format of URL is <code>opc.tcp://<hostname or IP address>:<port number></code> For example, <code>opc.tcp://192.168.55.75:56000</code> , OR <code>opc.tcp://win2012R2:51000</code>
Reconnect	The time interval in milliseconds (ms) for the Matrikon Data Broker service to reconnect with the client

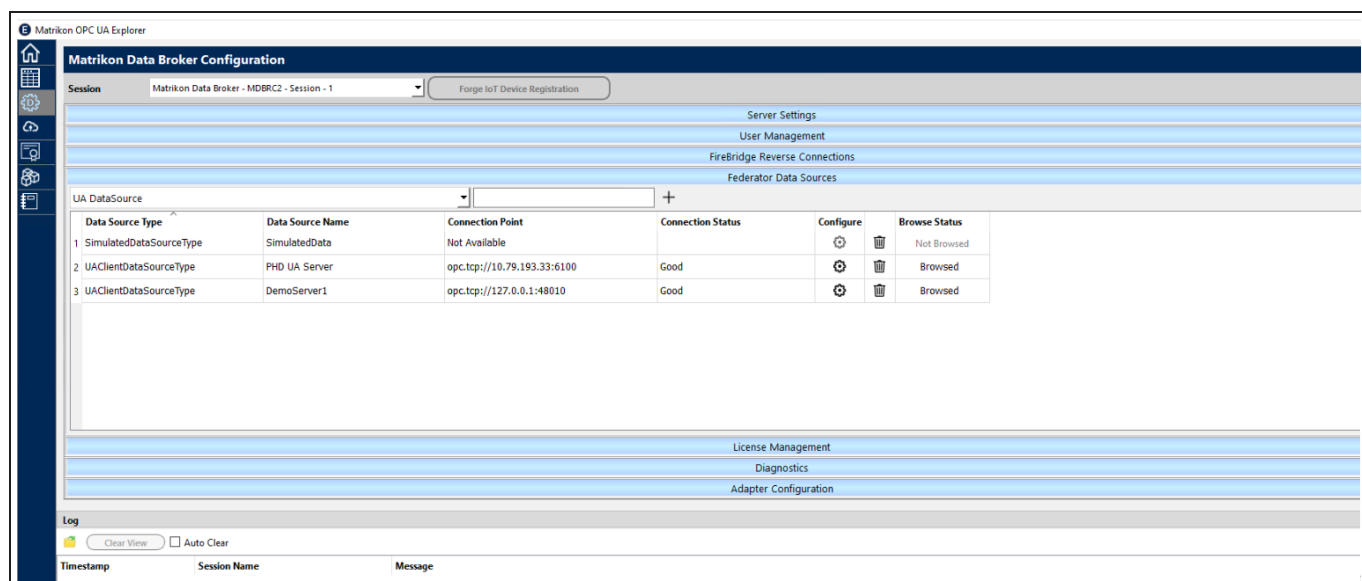
Column	Description
Delay(ms)	when the connection is not established. The default value is 5000 ms (5 seconds).
Is Connected	The status of the reverse connection with the configured UA client URL. The value is True when connected and False when not connected. This is a non-editable field.
Lost Connection Count	The number of times the Matrikon Data Broker UA server cannot establish a reverse connection with the configured UA client connection URL. This is a non-editable field.
Enable (check box)	Select this check box to enable the Matrikon Data Broker UA server to attempt reverse connection with the configured UA client connection URL.
Apply (button)	Click this to save the Matrikon Data Broker UA server configuration changes. When you click Apply, the Matrikon Data Broker UA server triggers the connection to the UA client on the specified URL.
Cancel (button)	Click this to revert the Matrikon Data Broker UA server configuration changes.
	Click this to delete the reverse connection.

5.7.4 How to Add and Configure Data Sources

The Matrikon Data Broker, Federator Data Sources pane allows you to add new or configure the existing data sources for Matrikon Data Broker. Data sources are the UA Servers from which Matrikon Data Broker aggregates data and represents data as a single UA Server to other UA Clients. This simplifies a UA Client to get data from multiple UA Servers through a single UA Server.

The following image shows the data sources:

Figure 68 Add and Configure Data Sources



To add a new data source.

1. Select the data source type from the drop-down menu. There are two types of data sources, as described in the table below.
2. Type a user-friendly name of the data source in the blank text box beside the type.
3. Click +.

A new row is created and displayed, as shown in the image above.

Table 18 New Data Source

Column	Descriptions
Data Source Type	Data source type: • UaClient DataSource: Data source connection that connects to a UA server. • Simulation DataSource: Built-in UA data source in Matrikon Data Broker with simulated UA data for testing and validation.
Data Source Name	A user-friendly name of the UA data source you provided while adding a data source.
Connection Point	The endpoint URL of the OPC UA server. The supported URL format is opc.tcp://<hostname or IP address>:<port number> For example, opc.tcp://192.168.55.75:56000 , OR opc.tcp://win2012R2:51000
Connection Status	Displays the connection status.
Configure	Click  to open additional connection parameters and enable or disable the UA data source connection. This option is always disabled for Simulation data sources.
Browse Sync Status	Displays the status of the "Browse sync operation."

- To configure the data source type, click 

The Matrikon Data Broker UA Data Source Configuration window appears.

Figure 69 Matrikon Data Broker UA Data Source Configuration Window

UA Data Source
Name : PHD UA Server 2
Connection Status : BadNotConnected
Browse

Connections **Advanced Settings**

☒ Discovery ☐ Manual ☐ Reverse Connect Data Source with Remote UA Server

Hostname / IP Port Find Servers

End Points

Reverse Connect
Listening TCP Port
Server Uri

Connection Point
Endpoint Url
Security Policy
Security Mode

User Token
☒ Anonymous
☐ User Details
Username
Password

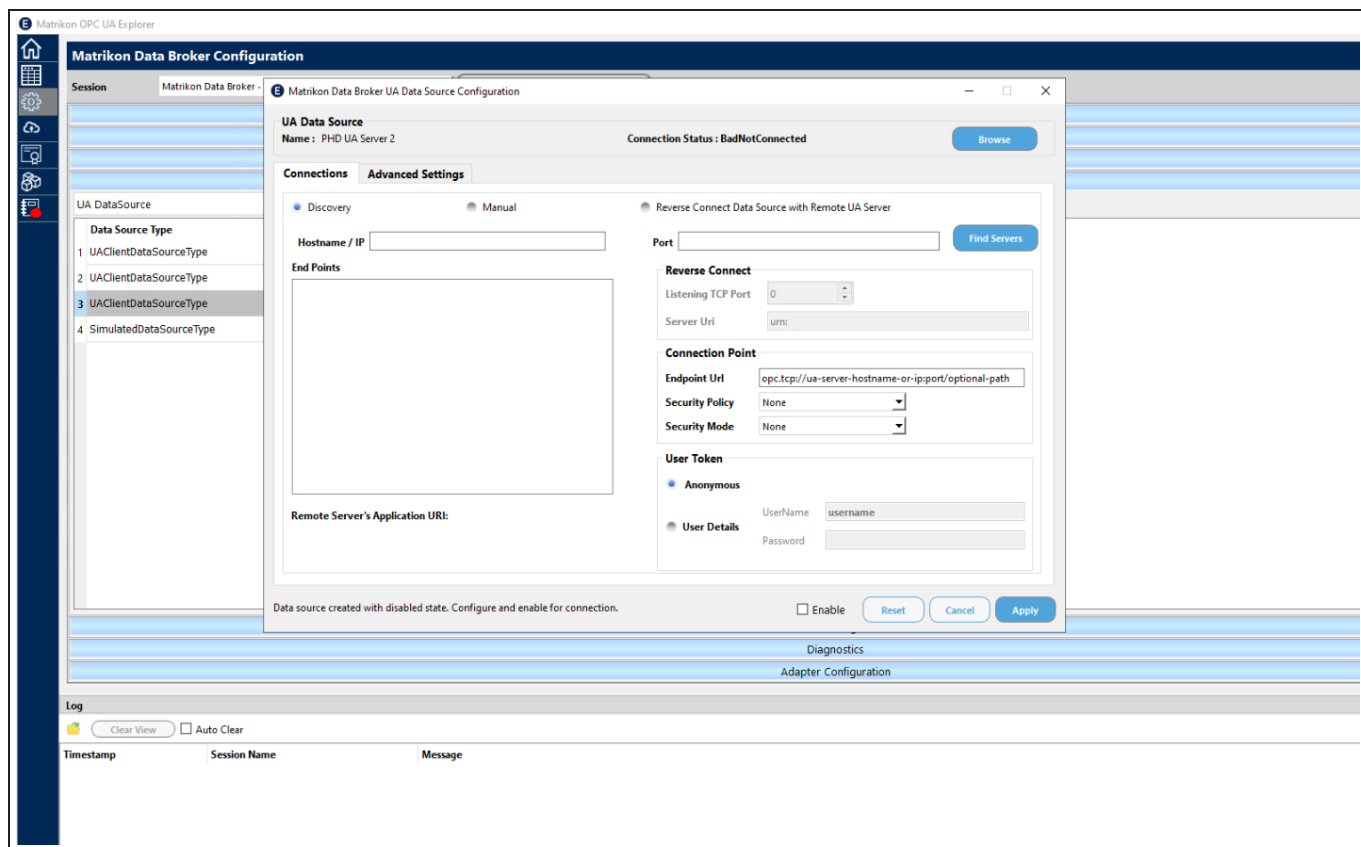
Remote Server's Application URI:

Data source created with disabled state. Configure and enable for connection.

☐ Enable

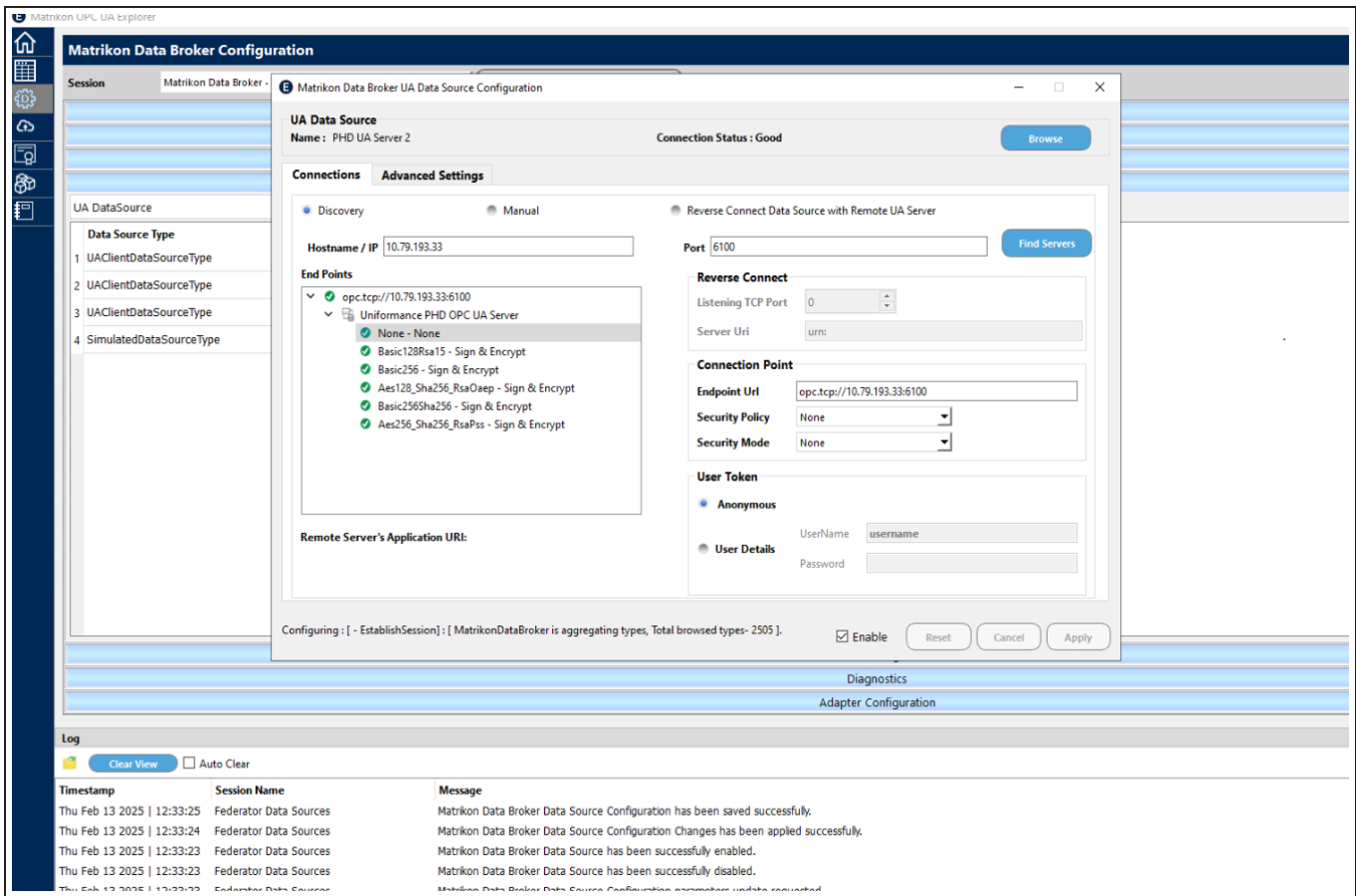
Click the **Close**  icon to close the window.

Figure 70 Matrikon Data Broker UA Data Source Configuration Window



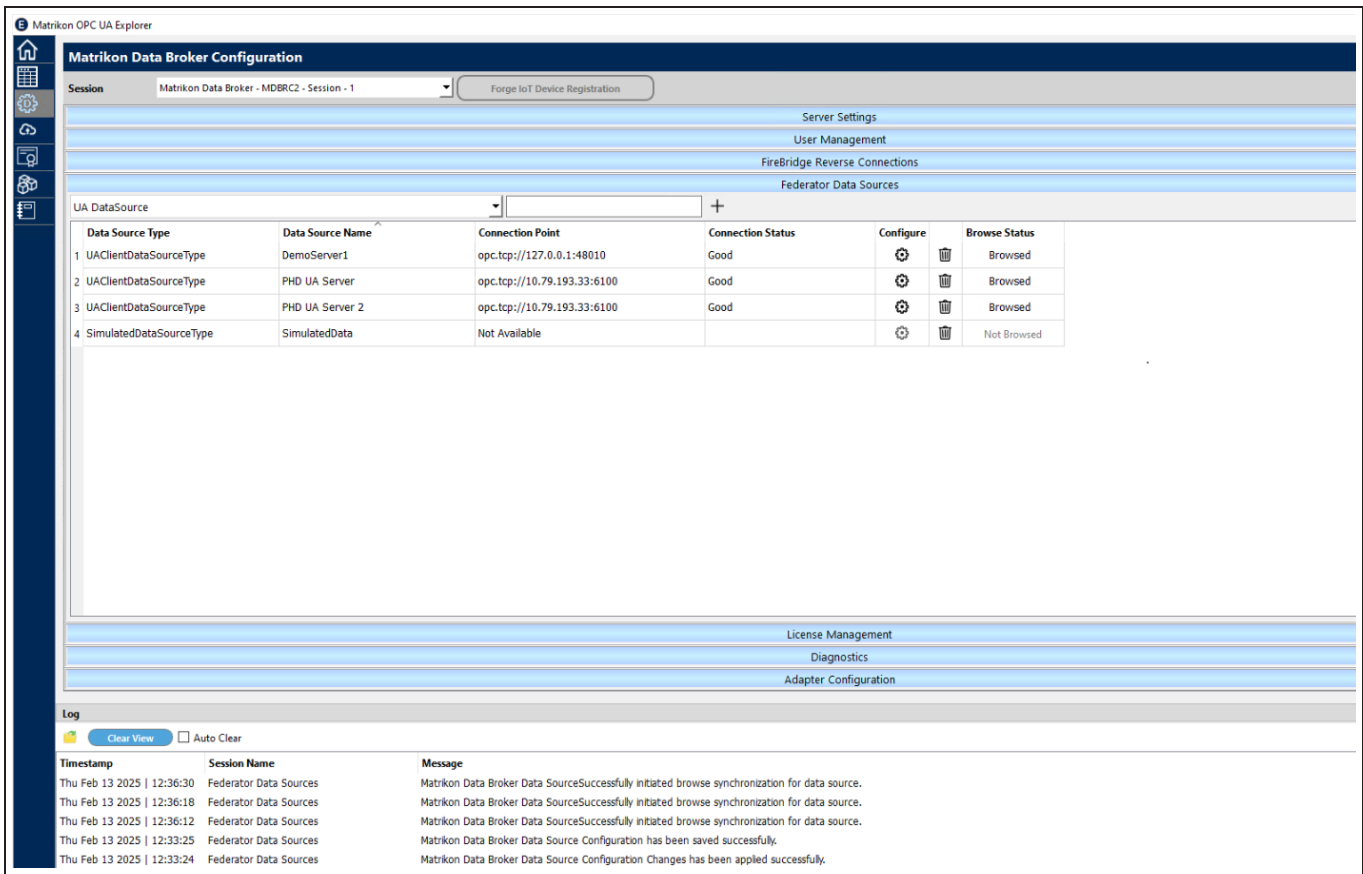
1. Type the port number in the **Port** text box.
2. Under the Connection Point section, type the endpoint url in the **Endpoint Url** text box.
3. Click the **Enable** check box and click **Apply**.

Figure 71 Matrikon Data Broker UA Data Source Configuration Window



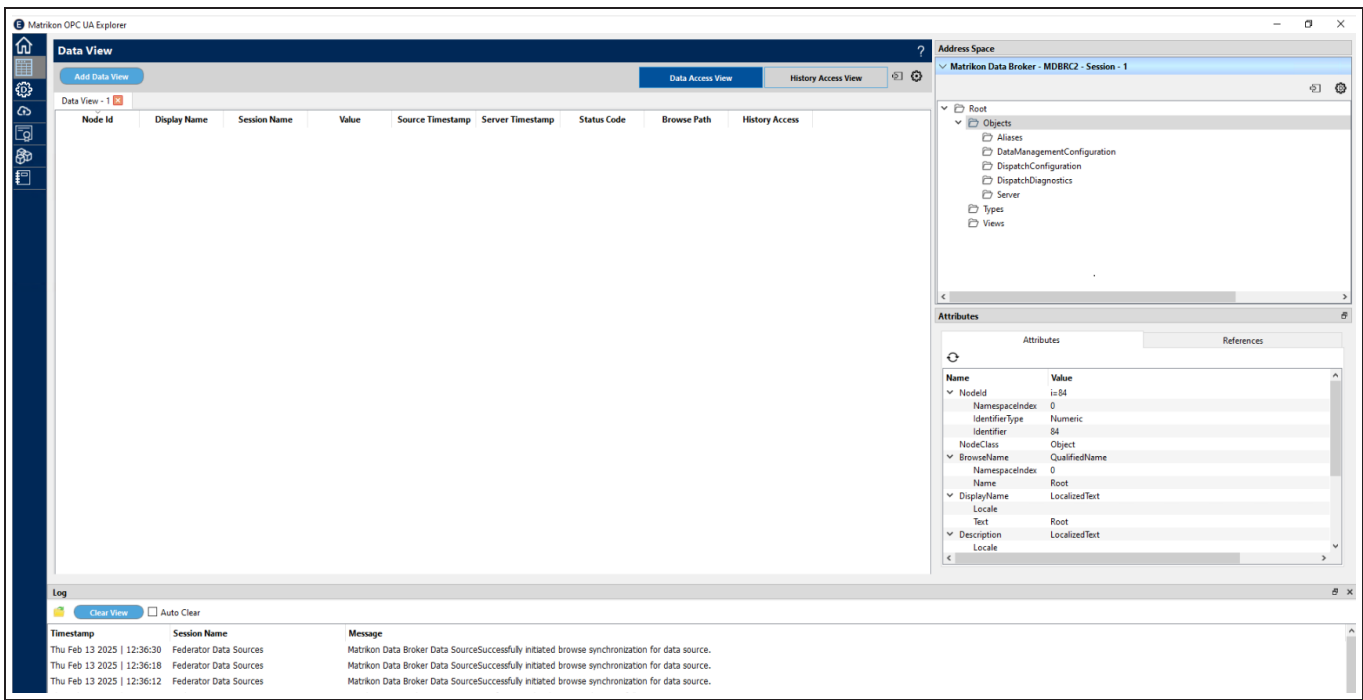
The aggregation happens, followed by the browse sync operation in the logs until browse sync is not completed; we can see the log “Browse sync in progress for the Data Source name and its node Id”. The above image shows the browse sync operation progress after every 20 seconds.

Figure 72 Matrikon Data Broker UA Data Source Configuration Window



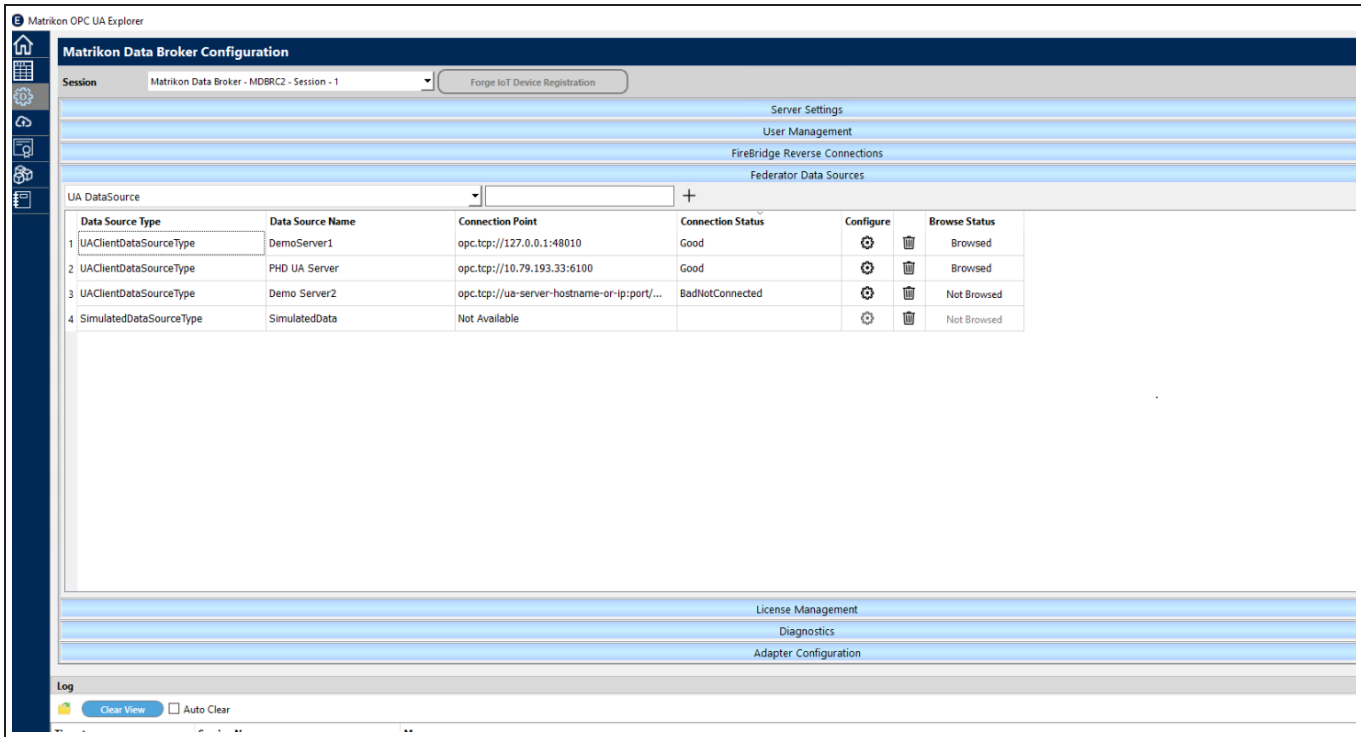
The above image shows the **logs** for the Data Sources for which browse sync is in progress. Also, the logs stop if we move to some other page or if the browse sync is completed.

Figure 73 Browse Sync Operation



The above image shows no log messages once we switch to any other page. Once the Data Source Type is created successfully, the **Browse Status** displays as **browsed** for the particular **Data Source Type**.

Figure 74 Browse Sync Status Success



- If the browse sync operation fails, the user can trigger the process manually by pressing the **Browse** button on the **Configure Widget**.
 - You can check the operation logs and status till the browse sync operation is in progress by selecting the **Click for Status** column of the DS user.
- Once the operation is successful, the text displays **Browsed** in the column.

After the immediate aggregation, the browse sync operation happens when a DS is enabled, and changes are applied.

You can configure the following tabs:

5.7.4.1 Connections Tab

The connections tab has the following parameters:

Table 19 Connection Tab

Sections	Description
Discovery	Select this to create a connection by specifying the UA server's hostname, IP address, and port number. Type the hostname, IP address, and port number in the text boxes and click Find Servers. Matrikon Data Broker finds the UA servers on the specified URL. The results are listed in the End Points tree view. Do not use LDS for Discovery here. You need to enter the End Point URL of the actual end UA Server.
Manual	Select this option to specify the connection URL manually (opc.tcp://<hostname or IP address>:<port number>). Type in the URL and then click Find Servers. Matrikon Data Broker finds the UA servers on

Sections	Description
	the specified URL. The results are listed in the End Points tree view.
End Points	Displays the connection endpoints as provided by the remote UA server.
Remote Server Application URI	The URI of the external server. This is a read-only parameter that Matrikon Data Broker uses to ensure that it continuously connects to the same server every time it reconnects.
Reverse Connect Data Source with Remote UA Server	Select this to configure the UA data source to listen for reverse connections as a UA client. When selected, all fields except the Reverse Connect, Security Policy, and Security Mode are disabled.  When configuring a daisy-chain connection, use operator credentials to avoid privilege escalation.
Reverse Connect	Listening TCP Port: The UA data source waits on this port for the UA server to initiate the connection. UA data source listens on the TCP port for incoming connections. Server URI: The URI of the UA server must reverse connect to this UA data source. Only that UA server associated with this URI can connect to this UA data source.
Connection Point	End Point URL: This section specifies the End Point URL of the remote UA server. This field is disabled when Reverse Connect is selected. The supported URL format is opc.tcp://<hostname or IP address>:<port number> For example, opc.tcp://192.168.55.75:56000, OR opc.tcp://win2012R2:51000 Security Policy: List of available security policies from the remote UA server. You can just select the desired security policy that needs to be used for data encryption on this connection. Security Mode: List of available security modes from the remote UA server. You can just select the desired security mode that needs to be used to secure this connection. Dynamic Population of Security Policies and Modes The MDB Federator Data Source Configuration window now features an enhancement for better management of security policies. When configuring data sources, only the supported security policies and modes will be automatically listed in the Connection point dropdown menu, ensuring a streamlined and accurate setup process.
User Token	Authentication method used for connections. The following authentication types are available: Anonymous: The UA Data source attempts to connect to the UA server as an anonymous user. A Bad User Access Denied error appears if the remote UA server does not allow anonymous connections. User Details: The UA Data source attempts to connect to the UA server using the user credentials. A Bad User Access Denied error appears if the remote UA server does not authenticate the user.



Some earlier-generation OPC UA Servers only support an earlier version of the OPC UA specification (OPC UA 1.02 or before). Explorer and Matrikon Data Broker can have trouble connecting to them in any mode other than a secure mode because of changes in how security is defined and implemented.



1. You can configure as many Data sources as allowed by your licensing. When you reach the limit of your license, you cannot enable additional data sources, although you can add or configure them.
2. When adding multiple data sources, please keep a tab on the number of nodes or items on the end OPC UA Server. If each of the end OPC UA servers has a vast number of nodes, then the performance of the Matrikon Data Broker product can be impacted when many such data sources are aggregated.

Sometimes, the OPC UA Server you are adding as a Data source can present different Discovery URLs when searching for a server vs when a presented endpoint is selected. Some other times, the server can not be able to return any endpoints when searching for it with a known discovery URL. There are two ways to overcome this problem:

1. Add the mapping of the IP Address and Host Name of the OPC UA Server in the "c:\windows\system32\drivers\etc\hosts" file on Windows.
2. You can also enter the complete server discovery URL directly under the **Connection Point** section, select the appropriate Security Policy and Security Mode, and then try to establish the connection.

5.7.4.2 Advanced Settings Tab

The Advanced Settings tab has the following parameters:

Table 20 Advance Setting Tab

Sections	Description
Memory and Performance	Max Reference for Browse per Node: Sets the limit for this UA data source to browse the number of references per node in the external UA server. Ranges between 0-999999. The default is 20000.
	 When configuring the daisy-chained architecture of Matrikon Data Broker, ensure that the value is increased to a sufficiently higher number to avoid any operational issues. Depending on the levels of servers in the daisy chain, you must manually adjust the number to ensure the browse operation works satisfactorily. Monitored Item Processing Latency: The time-frequency in milliseconds at which the UA data source executes all operations on the monitored items. The lower the number, the faster the execution rate of these operations. Ranges between 0-9999.

Sections	Description
	The default is 100 milliseconds (0.1 seconds).
Cache Management	Browse and Read Non-Value Attributes Cache Timeout: UA data source forwards - Browse, Read, and Write requests to the remote UA server when the timeout limit expires on every node. This parameter works only when the Cache Management Mode is set to Time mode. Ranges between 0-99999999. The default is 60 seconds. A value of -1 is allowed to set the timeout to 5 years. If this value is too low, then after every cache timeout period, when you expand a node in the address space in UA Explorer, a browse request is sent to the end OPC UA Server. If that UA Server has a huge #of nodes or is a flat structure, it can impact the load time of the expanded node. If this value is set to a higher value, the expansion of nodes in Address Space does not call the end OPC UA Server to get the list of nodes, but it gets it from the already built cache. However, if there are changes in the address space, like the addition of new nodes or any nodes are deleted, those are not retrieved when you expand the node. In this case, you must re-browse that data source in the Data Broker configuration screen's Data Source Configuration section. At this time, the address space gets refreshed with updated address space at the end of the OPC UA Server.
Locale IDs	Contains list of locales for localization texts as supported by the external server. This empty list is used only when the external server supports non-English localization. The expected values are in the following format: • fr-Fr (French-France) • de-De (German-Germany)  Matrikon Data Broker does not validate these values. Ensure you type an accurate Locale ID defined by the UA Server you are connecting to.
Timeout Settings	Secured Channel Lifetime in seconds: The time limit for Matrikon Data Broker to renew the secured channel connection with the external server. Ranges between 0-9999999. The default is 86400 seconds (24 hours). Transport Layer Connect Timeouts in seconds: The TCP connection request times out if no response is received from the external server within the time limit set in seconds. Ranges from 0-9999999. The default is 5 seconds. Default Request Timeout in milliseconds: The time limit for Matrikon Data Broker to wait for a response from the external server after the connection is established. After reaching the time limit, Matrikon Data Broker stops waiting for an answer and sends fresh requests to the external server. Ranges from 0-9999999.

Sections	Description
	The default is 60000 milliseconds (60 seconds). Session Timeout in seconds: The time limit for Matrikon Data Broker to consider the session idle and timed out if no operations are performed after connecting to the external server. After reaching the time limit, Matrikon Data Broker closes the session and disconnects from the external server. Ranges from 0-999999. The default is 1200 seconds (20 minutes).
Certificate Validate Options	Check Revocation Status Offline: Check the box to set the revocation status offline. If selected, the validator looks for a CRL in the Certificate Store where the CA Certificate is found. Validation fails if a CRL is not found. This option is specified for Issuer Certificates and used when validating Certificates issued by that Issuer. By default, check box will be enabled. Suppress Revocation Status Unknown: Check the box to ignore errors if the issuer's revocation list cannot be found.  At least Check Revocation Status Offline and Suppress Revocation Status Unknown option must be selected using a third-party CA-issued certificate. By default, check box will be disabled. Suppress Certificate Expired: Check the box to enable Matrikon Data Broker to connect to the external server even if the certificate provided by the external server is expired. When selected, Matrikon Data Broker overrides the certificate expiry and attempts to connect to the external server. By default, check box will be disabled. Suppress URI Mismatch: Check the box to suppress the validation of the URI mismatch as mentioned in the certificate with that of the URI of the external server. When checked, Matrikon Data Broker allows the connections to the external server, even when the URI from the certificate and GetEndpoints response do not match. By default, check box will be enabled. Suppress Hostname Invalid: Check the box to suppress the validation of the hostname (system name of the external server) mismatch as mentioned in the certificate with the hostname mentioned in the URL of the external server. When selected, Matrikon Data Broker allows the connections to the external server, even when the hostnames do not match. By default, check box will be enabled.
Enable	Check box enables or disables the connection with the external server. The default is False, which means the connection to the external server is not allowed. When selected, Matrikon Data Broker attempts to connect to the external server using the Endpoint URL provided in the Connection Point

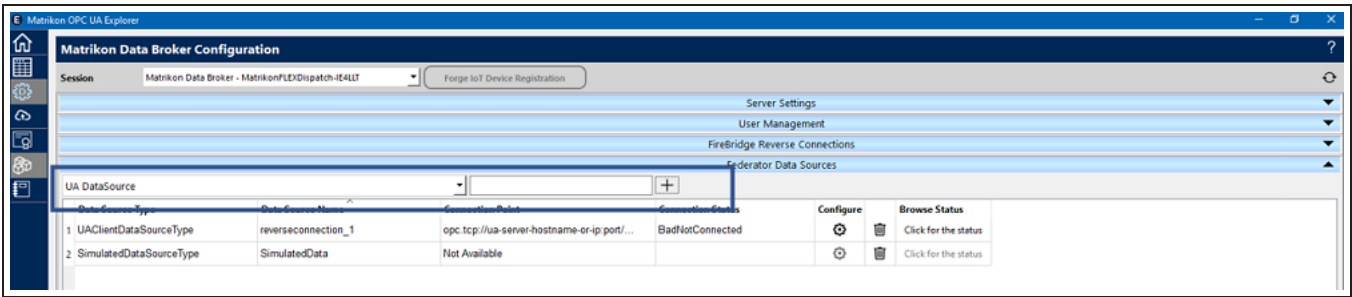
Sections	Description
	settings below the Connections tab.

5.7.5 How to Add a Data Source using Reverse Connect

To add a data source using Reverse Connect, follow the below steps:

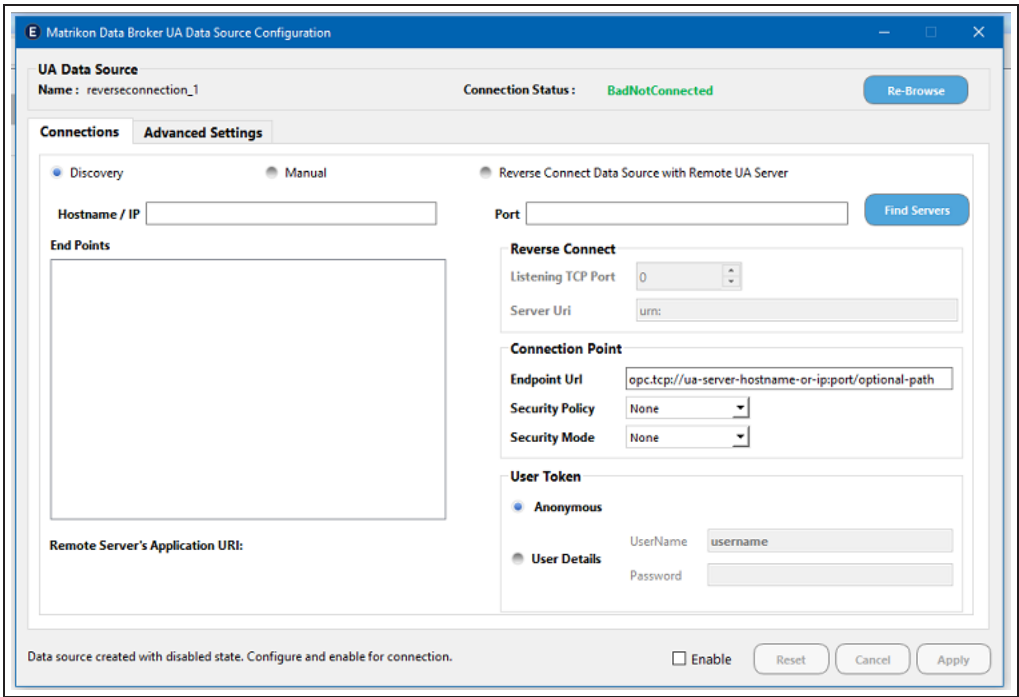
- 1. Connect to Matrikon Data Broker OPC UA Server using Matrikon OPC UA Explorer.
- 2. To navigate to the Data Broker configuration screen, click  and navigate to the **Federator Data Sources** pane.
- 3. Select the “**UA DataSource**” data source type from the drop-down menu. Type a user-friendly name of the data source in the blank textbox beside the type. Click .

Figure 75 Reverse Connect screen



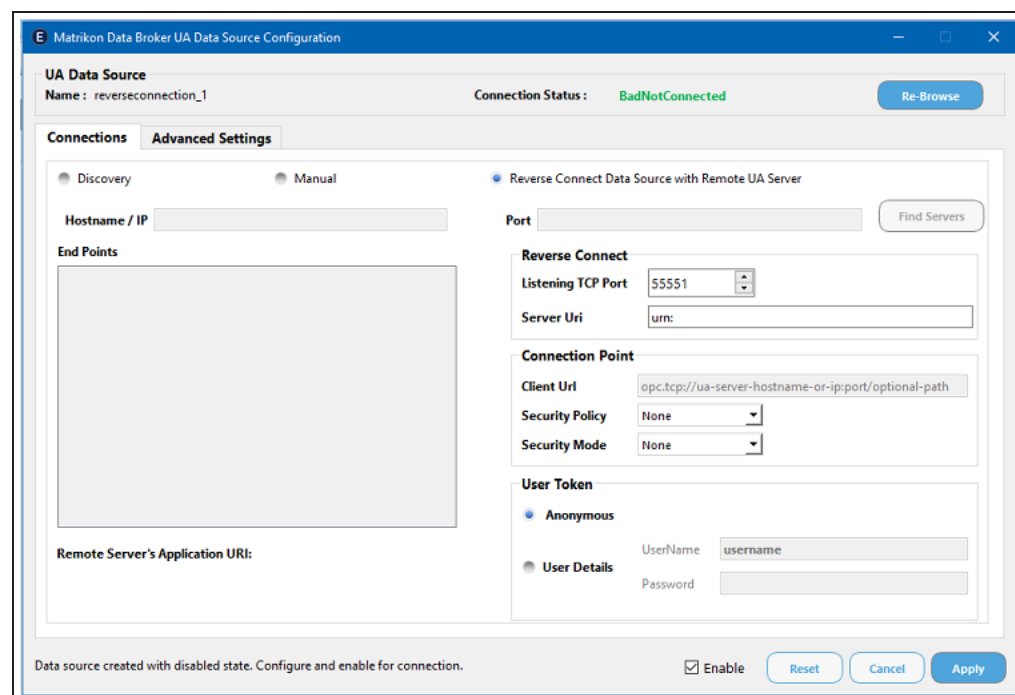
- 4. Click the Configure icon  for the added Data Source (i.e., reverseconnection_1 as created above)) and the following window appears to configure the Data Source:

Figure 76 Matrikon Data Broker UA Data Source Configuration



5. Choose the “**Reverse Connect Data Source with Remote UA Server**” Radio button to set up Reverse Connection, then the following fields get enabled, which needs to be filled to successfully set up the configuration.
 - a. **Listening TCP port:** Enter the same port number configured as the Client Endpoint URL in the “FireBridge Reverse Connection”. UA data source waits on this port for the UA server to initiate connection. UA data source listens on the TCP port for incoming connections.
 - b. Choose **Security Policy** and **Security Mode** from the dropdown lists as supported and configured by the Data Broker session.
 - c. Choose “**User Details**” from the User Token and provide the same username and password as configured for the Data Broker session.
6. Check the “**Enable**” button and click “**Apply**”.

Figure 77 UA Data Source screen - Reverse Connect



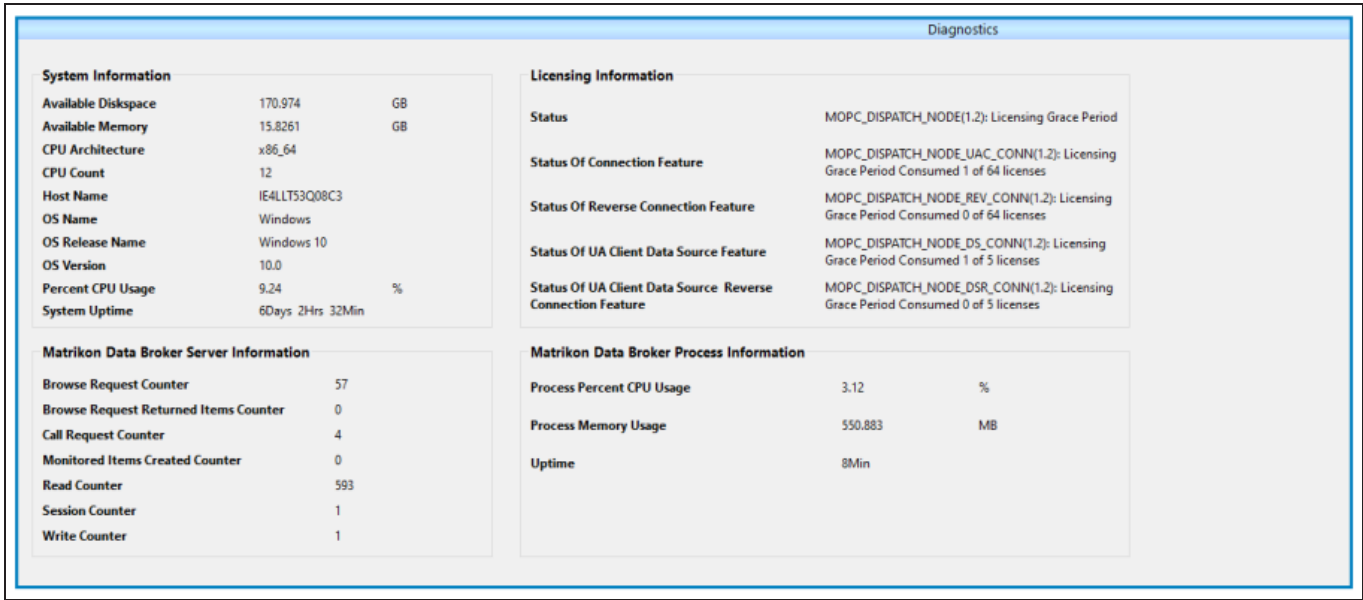
7. The DataSource now waits for Reverse Connection to initiate from the server, and the following message appears in the bottom left corner of the Configuration Screen.
Configuring: [Waiting for reverse connection. Make sure the external server initiates connection].
8. Once the server initiates the connection, it asks to trust the certificates, and “**BadSecurityChecksFailed**” is displayed in the Configuration Window, as seen below.
Configuring: [- ReverseConnect] : SecurityError[- BadSecurityChecksFailed] : [Connection blocked. Make sure certificates are trusted, and the correct security policy is selected. Optionally, validation fields can be modified to suppress errors,]. Matrikon Data Broker is retrying the connection on reverseconnection_1.
9. Upon receiving the “**BadSecurityChecksFailed**” error, Trust the Data Broker’s Reverse Connection Data Source certificate on the other machine where Reverse Connection Destination is configured. i.e., On Reverse Connection Destination machine move the rejected certificate from
 C:\ProgramData\Matrikon\DataBroker\pki\DefaultApplicationGroup\rejected\certs to a trusted location, i.e.,
 C:\ProgramData\Matrikon\DataBroker\pki\DefaultApplicationGroup\trusted\certs For more information on configuring Reverse Connection Destination, please refer Section “[Configure Reverse Connection](#)”.

10. Once the Data Broker certificate is trusted on the Reverse Connection Destination machine, the Data Source Configuration Window error changes to “**BadCertificateUntrusted,**” as seen below. This means the certification must also be accepted on the Data Source machine.
- Configuring: [- ReverseConnect]: SecurityError[- BadCertificateUntrusted] : [Connection blocked. Make sure certificates are trusted, and the correct security policy is selected. Optionally, validation fields can be modified to suppress errors,]. Matrikon Data Broker is retrying the connection on reverseconnection_1.*
11. On the Data Source machine, move the rejected certificate from
C:\ProgramData\Matrikon\DataBroker\pki\DefaultApplicationGroup\rejected\certs to a trusted location, i.e.,
C:\ProgramData\Matrikon\DataBroker\pki\DefaultApplicationGroup\trusted\certs.
12. Now, the namespace and types of aggregation starts, and the message changes, as shown below. This step can take a few minutes depending on how many Data Sources and types are configured in the first machine.
- Configuring: [- EstablishSession]: [MatrikonDataBroker aggregates namespaces and types].*
13. After some time, the connection gets successful. You can now see the Connection Status as ‘Good’.

5.7.6 Viewing the Matrikon Data Broker Diagnostics

A read-only section that provides information about Matrikon Data Broker and the system hosting Matrikon Data Broker Service. This section also provides information about the licenses applied to the Matrikon Data Broker session you are connected to.

Figure 78 Matrikon Data Broker Diagnostics



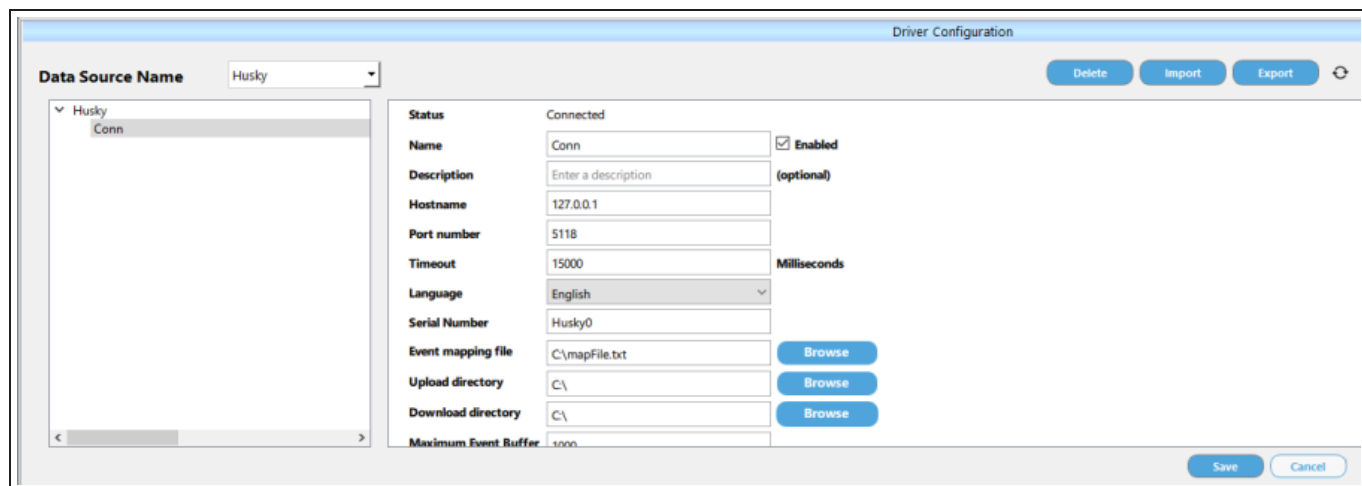
5.7.7 Configuring Drivers or Adapters for Matrikon Data Broker

The Driver Configuration pane allows you to add new or configure the existing drivers or adapters for Matrikon Data Broker, for example, Matrikon Data Broker Husky Adapter.



Having the Matrikon Data Broker instance is mandatory, and the Husky feature gets the license through Matrikon Data Broker. It can get the data from Husky Hosts systems seamlessly.

Figure 79 Configuring Drivers or Adapters for Matrikon Data Broker



In this pane, you can do the following:

- Create a new Husky adapter connection.
- Edit an existing Husky adapter connection.
- Remove the Husky adapter connection.
- Import and Export Husky host configuration.

For more information about the configuration of Husky Adapter, see the *Matrikon Data Broker Husky Adapter User Guide*.

Like the Husky Adapter, to configure any other Adapter of MDB, refer to the respective Adapter User Manual. For example, for the Modbus adapter, refer to the *Matrikon Data Broker Modbus Adapter User Manual*.

5.7.8 Managing Data Broker Server Namespace Array

An enhancement has been implemented in MDB to make namespace indices static. This addresses common issues such as changes in namespace indices or Node IDs. The problem typically occurs when adding, deleting, or modifying data sources, especially after restarting MDB services or the system. This feature provides users with the flexibility to control the namespace indices.

With this feature, users can:

- Any data source deleted from the Federator Data Source will be marked as "Empty" in the Namespace Index array.

Figure 80 Array Index

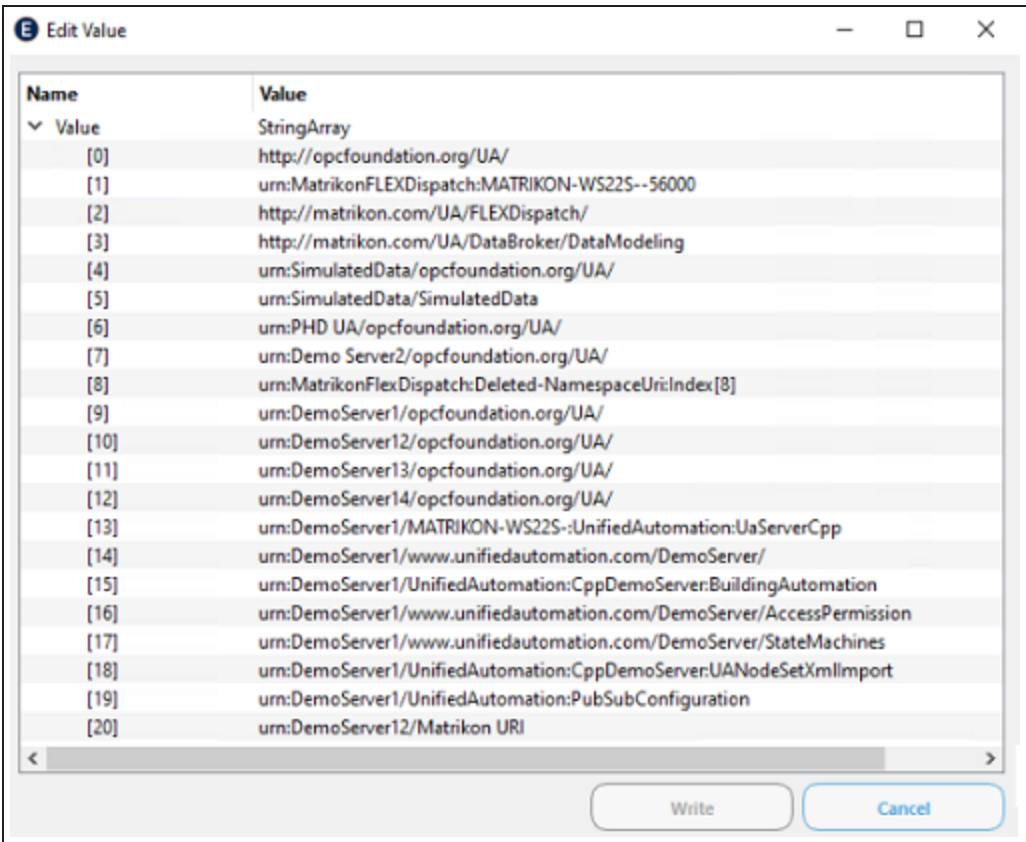
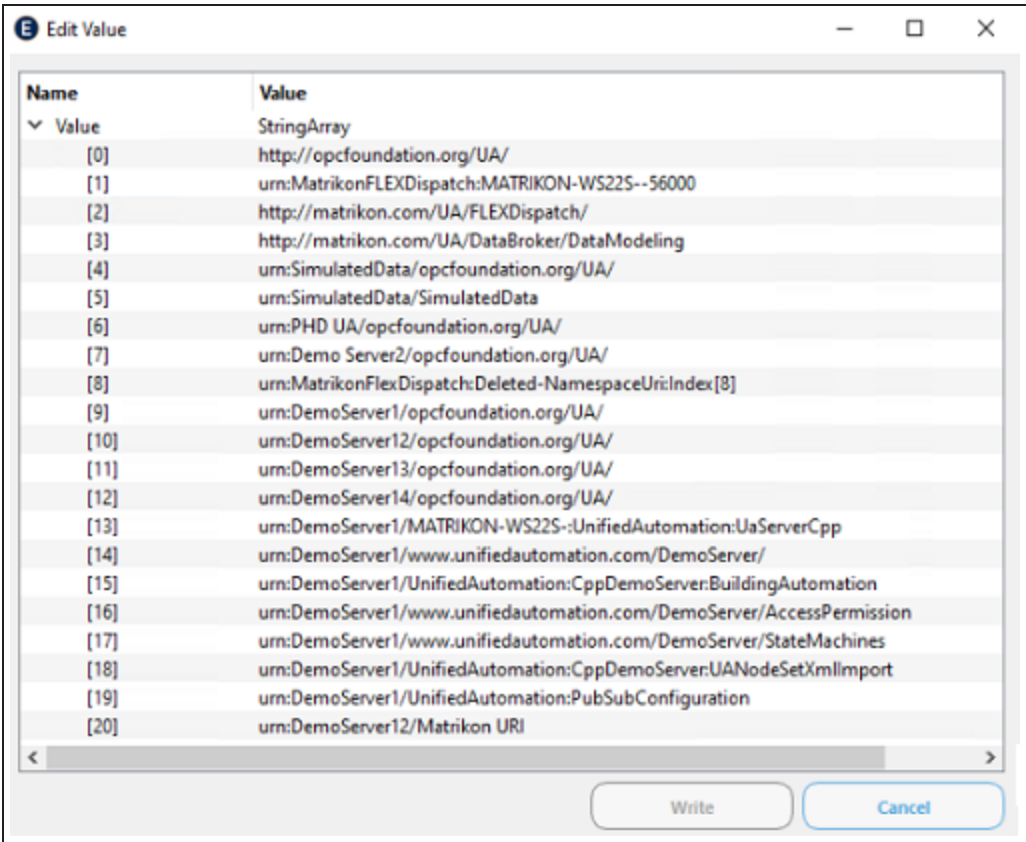
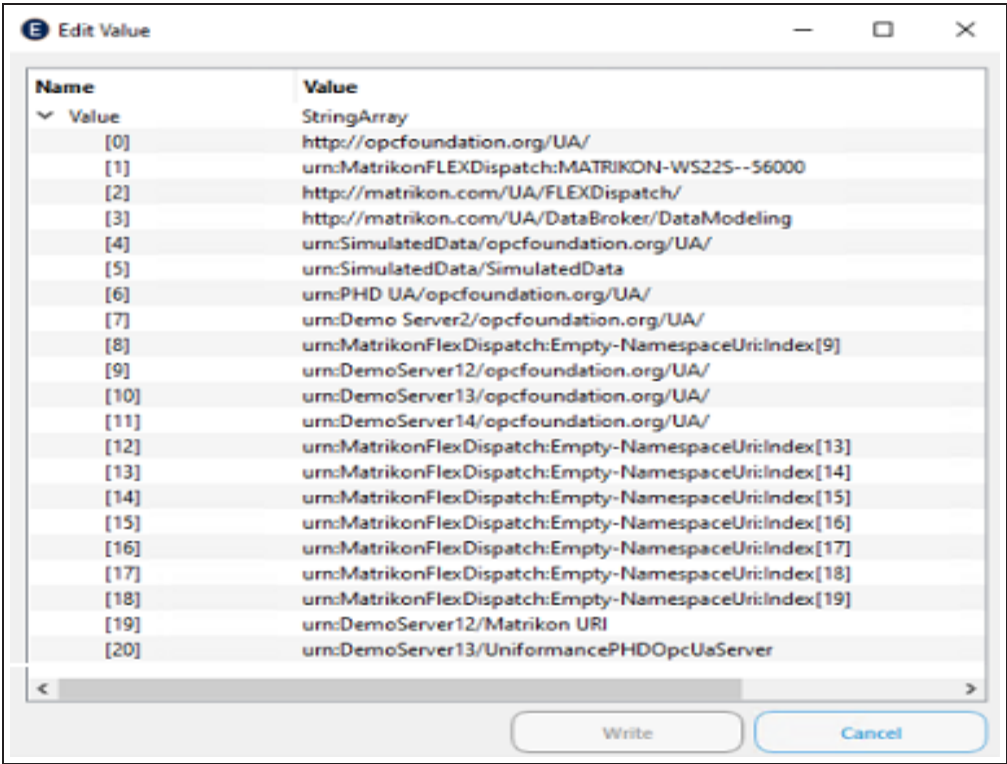


Figure 81 Array Index



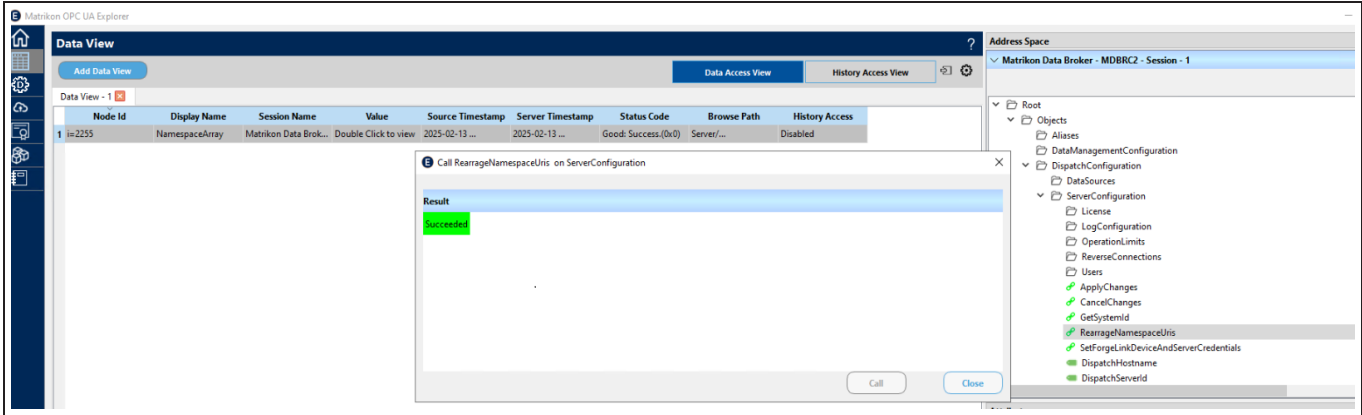
- Newly added data sources will be appended to the end of the Namespace Index array. This design ensures that existing indices remain undisturbed, allowing for seamless integration of new data sources.

Figure 82 Array Index Value



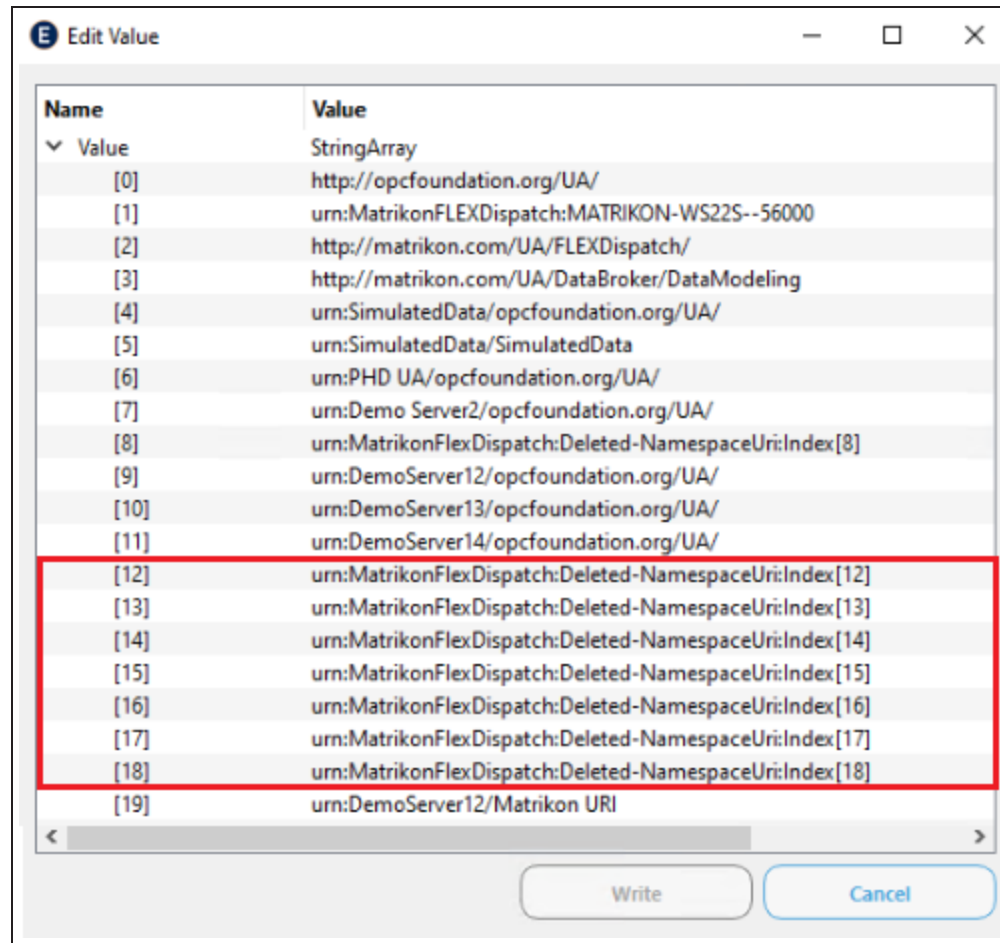
- A new method, `RearrangeNamespaceUris`, has been introduced. Located at the specified directory.

Figure 83 Method



- Above method call allows users to delete the indices marked as "Empty". Indices will be marked as Deleted. These indices will then be permanently removed upon the next restart of the MDB service.

Figure 84 Deleted Array Index



- The control to delete the "Empty" namespace array index is completely in the hands of the user via the `RearrangeNamespaceUris` method.
- Deleting an "Empty" namespace array index may lead to the reshuffling of namespace indices.

5.8 Configuring Matrikon Data Broker MQTT Publisher

Matrikon Data Broker MQTT Publisher is used to collect data from Matrikon Data Broker OPC UA Server and publish the data to on-prem MQTT Brokers like Eclipse Mosquitto or cloud-based brokers like Azure IoT Hub or Forge IoT Platform.

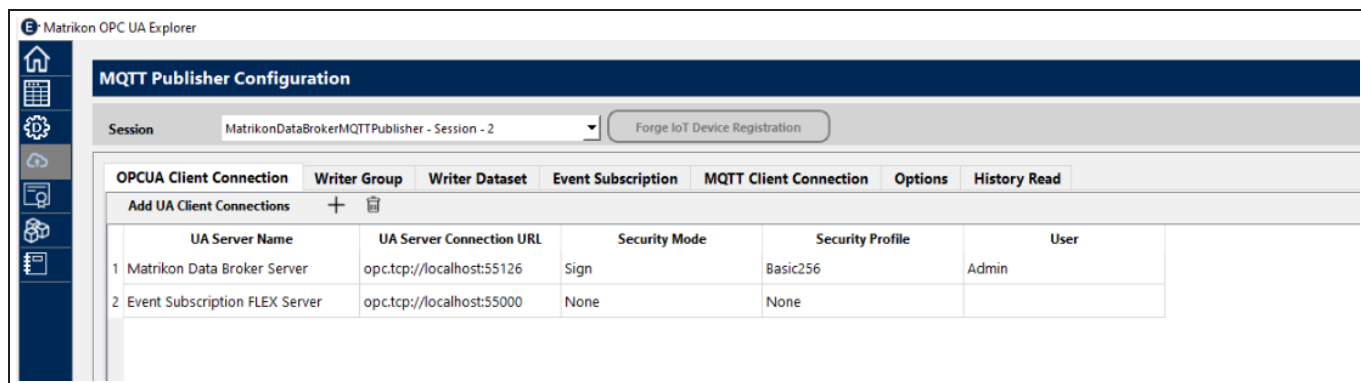
You can configure Matrikon Data Broker MQTT Publisher using the below steps.

1. Connect to Matrikon Data Broker MQTT Publisher OPC UA Server from Matrikon OPC UA Explorer.



2. Once the connection to MQTT Publisher's UA Server is established, click on  icon on the left menu of the screen.
3. You get directed to the below screen where you can configure MQTT Publisher.

Figure 85 Configuring Matrikon Data Broker MQTT Publisher



To configure MQTT Publisher, you need to configure the following:

- Establishing connection to local or remote Matrikon Data Broker OPC UA Server in **OPC UA Client Connection** screen.
- **Writer Group** in the `writergroups.json` file: The writer group determines how the data sets are used to publish AMQP messages to the required platform. You need to manually edit this file as per the format provided.
- **Writer Dataset** in the `datasets.json` file: The writer dataset describes the nodes or tags collected from Matrikon Data Broker and published.
- **Event Subscription** in `opcuaeventsubscriptions.json` file describes the event nodes or tags collected from any Event Server and published.
- **MQTT Client Connection** screen: You can establish connections to different cloud platforms like Forge IoT (only for containers), Azure IoT, or on-prem MQTT Brokers.
- **Options**: You can configure the optional configuration settings through the Options tab.
- **History Read**: This option will allow user to perform on-demand History read for any configured OPC UA HA Servers.

For more details on the configuration of MQTT Publisher, see *Matrikon Data Broker MQTT Publisher User Manual*.

5.9 How to Trust the Rejected Certificates

The OPC UA protocol is designed with security in mind and relies on X.509 certificates to ensure that only trusted applications communicate with each other. The X.509 standard uses Public Key Infrastructure (PKI) and asymmetric encryption. This means that each application must have a private key that is never shared and a public key that is shared. A connection is completed once the client and server are satisfied. For more information on certificate management, see [Certificate Management](#).

5.9.1 Trust the Rejected Certificates in Matrikon Data Broker

If you are an admin user and have the certificate of UA Explorer, you are trusted by Matrikon Data Broker already. You can use Explorer to trust the rejected certificates of the newly added data source or any new UA Client connecting to Matrikon Data Broker.

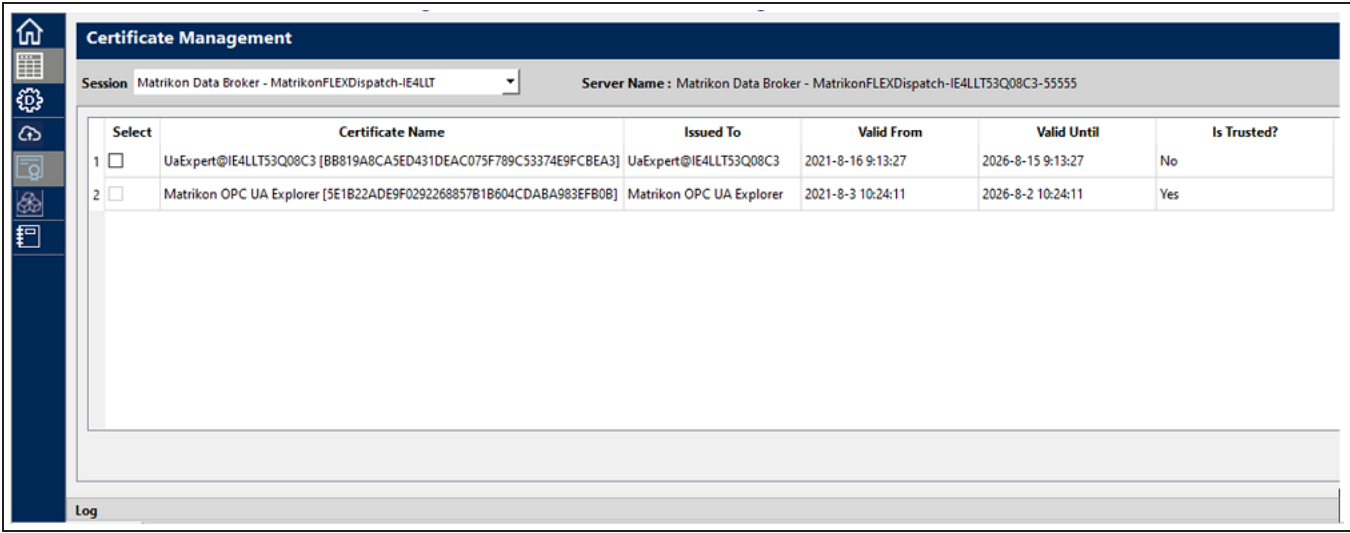
The Certificate Management screen is used to trust a single certificate or select multiple certificates. This screen shows the trusted and the rejected certificates from the Matrikon Data Broker PKI folder. Details of the certificates can also be viewed in the **Certificate Details** window.

To trust the certificates,

1. Open Explorer and connect to the Matrikon Data Broker server using the admin account.

2. On the left pane, click . The **Certificate Management** screen appears.

Figure 86 Certificate Management Screen



3. Select the required Matrikon Data Broker session from the Session drop-down for which you need to trust the certificate.
4. To trust the certificate (s), below the **Select** column, select the check box beside the certificate.
5. Click **Accept**.

The selected untrusted certificates are copied to the trusted folder.



The Certificate Management screen functions effectively only if you have admin privilege and have connected to Matrikon Data Broker using Sign and Encrypt security mode.



For other OPC UA Server, Certificate Management screen functionality works only if (i) Certificate Management methods are implemented and (ii) You are connecting to that OPC UA Server with the right security profile as expected by that OPC UA Server. Contact the OPC UA Server vendor to clarify the Certificate Management implementation in the UA Server.

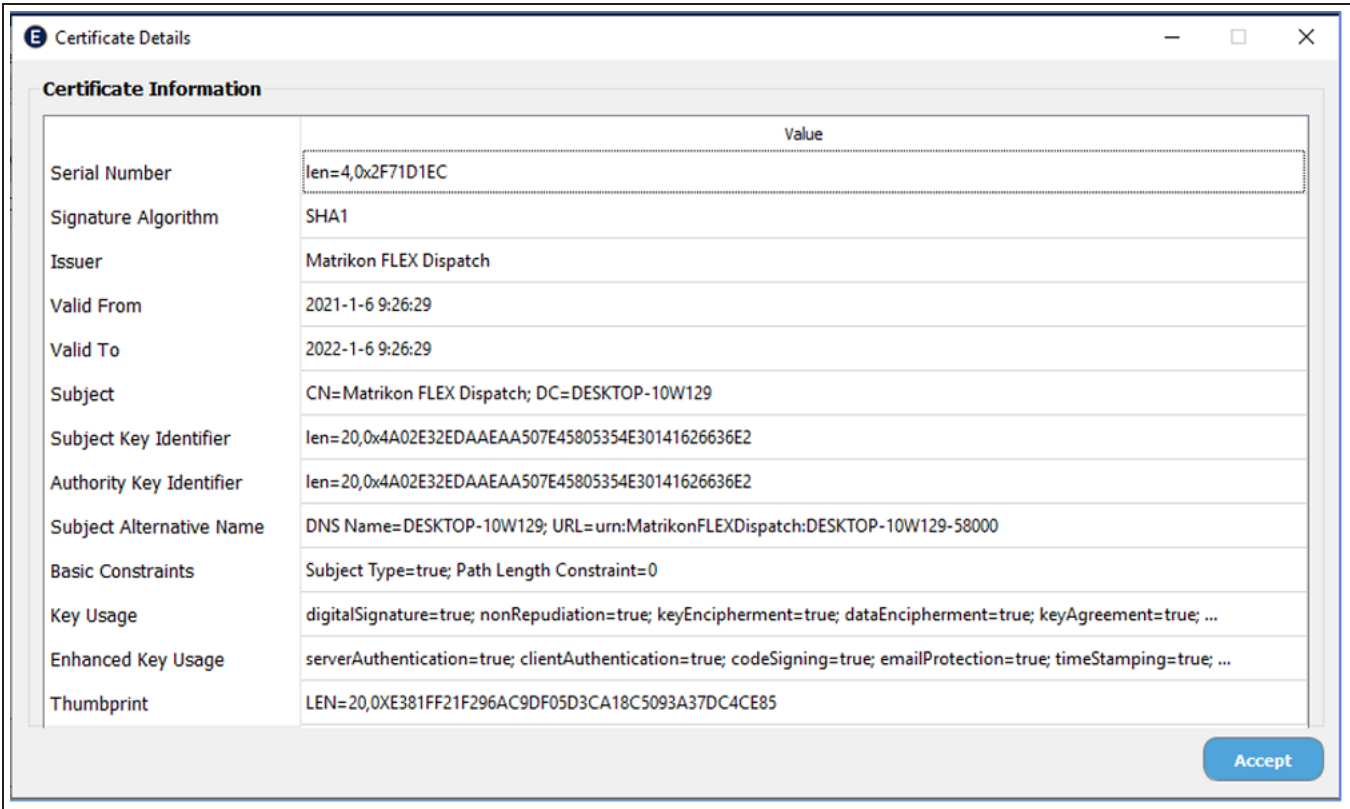
5.9.2 Viewing Certificate Details

You can view the details of the trusted and the rejected certificates from the Explorer.

To view the details,

1. In the **Certificate Management** screen, double-click the certificate for which you want to view the details.
The **Certificate Details** window appears.

Figure 87 Certificate Details Window



2. If you trust the selected certificate, Click **Accept**.
The rejected certificate is trusted by copying it into a trusted folder.

5.9.3 Trust the Rejected Certificates in Matrikon Data Broker for the First Time

You get a BadSecurityChecksFailed error message in the logs while attempting to connect to Matrikon Data Broker from Explorer for the first time. Because Matrikon Data Broker does not trust your UA Client's certificate to serve the connection. For the first-time connection to Matrikon Data Broker, you manually move the certificate from the rejected folder to the trusted folder.

To trust the rejected certificates for the first time, follow the below steps:

Windows Operating System

1. Log in as a user with administrative rights on this computer.
2. Browse <ProgramData>\Matrikon\DataBroker\<Matrikon Data Broker Instance Name>\pki\DefaultApplicationGroup\rejected\certs folder.
3. Locate and select the rejected certificate.
4. Move the rejected certificate to the <ProgramData>\Matrikon\DataBroker\< Matrikon Data Broker Instance Name>\pki\DefaultApplicationGroup\trusted\certs folder.
5. Connect again.

Linux Operating System

1. Log in as a user with root permission on this computer.
2. Browse **/etc/Matrikon/DataBroker/< Matrikon Data Broker Instance Name>/pki/rejected/certs** folder.
3. Locate and select the rejected certificate.
4. Move the rejected certificate to the **/etc/Matrikon/DataBroker/< Matrikon Data Broker Instance Name>/pki/trusted/certs** folder.
5. Connect again.

Matrikon Data Broker

See the section Manage PKI Certificate of Matrikon Data Broker Container for details on managing the certificates for Matrikon Data Broker running as a container. You must follow these steps to trust the certificates for the first-time connection.

If the problem continues, please contact [Matrikon Support](#).

LICENSING DATA BROKER

This chapter explains the supported licensing methods and the procedure to activate the license of Matrikon Data Broker. On starting Matrikon Data Broker for the first time, it runs for 120 minutes as a grace period. You must activate the license key provided during this grace period while purchasing Matrikon Data Broker. Upon successful activation, Matrikon Data Broker continues running until the activated license expires.

Matrikon Data Broker uses different features for licensing purposes. Each feature caters to varying functionalities of Matrikon Data Broker. You can purchase them based on your requirements.

The following table lists the available features and their description:

Table 21 Licensing Data Broker

Feature	Description
No. of Matrikon Data Broker Instances	Number of Matrikon Data Broker instances. • Every Matrikon Data Broker instance/service consumes one license from this feature. • Whenever the Matrikon Data Broker instance service is stopped, this feature count is reduced.
No. of UA Servers Matrikon Data Broker can connect.	Number of Data sources to connect. • Every OPC UA Server, Matrikon Data Broker that connects to as a Data Source in Enabled mode consumes one license from this feature. • Whenever the connected or enabled Data source is disabled or deleted/removed, this feature count is reduced.
The number of UA Clients that can connect with Matrikon Data Broker UA Server	Number of UA Clients that can connect to Data Broker UA Server. • Every OPC UA Client connecting to the Matrikon Data Broker instance/service consumes one license from this feature. • This feature count is reduced when the connected UA Client disconnects from the Matrikon Data Broker service. • This is not a licensed feature.
No. Clients can connect with Matrikon Data Broker UA Server using Reverse Connection	Number of Matrikon Data Broker Reverse connections. • Every OPC UA Client connects to Matrikon Data Broker instance/service in Reverse Connect. • Mode and enabled consume one license from this feature.

Feature	Description
	- Whenever the Reverse connection is deleted, removed, or disabled, this feature count is reduced. - This is not a licensed feature.
No. of UA Servers, the Matrikon Data Broker can connect with Reverse Connection	Number of Data sources you can connect in Reverse Connect. - Every single OPC UA Server, Matrikon Data Broker that was connecting to as a Data Source in Reverse Connect and enabled consumes one license from this feature. - Whenever the data source in Reverse Connect is disabled or deleted, this feature count is reduced. - This is not a licensed feature.  The feature of Reverse Connect Data sources and a license from the number of data sources feature are consumed for every data source connected in Reverse Connect.
Matrikon Data Broker Husky Driver	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker Husky Driver". This feature is a True or False type, which allows the Husky Adapter functionality when enabled or is available.
Matrikon Data Broker Data Management	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker Data Management". This feature is a True or False type, which allows the Data Management functionality when enabled or is available.
Matrikon Data Broker Modbus Adapter	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker Modbus Adapter". This feature is a True or False type; the Modbus Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker Modbus Devices	Number of Modbus devices that can be configured in the Modbus adapter.
Matrikon Data Broker Modbus Slave	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker Modbus Slave". This feature is a True or False type, which, when enabled or is available, the Slave functionality in Modbus Adapter is allowed.
Matrikon Data Broker MQTT Publisher	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker MQTT Publisher".

Feature	Description
	This feature is a True or False type, which, when enabled or is available, the MQTT Publisher component of Matrikon Data Broker is allowed to publish data to MQTT On-Prem or Cloud Brokers.
Matrikon Data Broker Ethernet IP Adapter	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker Ethernet/IP Adapter". This feature is a True or False type; the Ethernet IP Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker Profinet Adapter	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker Profinet Adapter". This feature is a True or False type; the Profinet Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker Siemens Adapter	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker Siemens Adapter". This feature is a True or False type; the Siemens Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker SDK Adapter	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker Adapter SDK Examples". This feature is a True or False type; the SDK Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker OPC to UA Adapter	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker OPC to UA Adapter". This feature is a True or False type; the OPC to UA Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker OPC to UA Plus Adapter	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker OPC to UA Adapter" with additional controls. This feature is a True or False type; the OPC to UA Plus Adapter functionality is allowed when enabled or is available.



Now, in Data Broker, features “No. of UA Servers Matrikon Data Broker can connect using reverse Connect”, “No. of UA Clients can connect with Matrikon Data Broker UA Server”, and “No. of Clients can connect with Matrikon Data Broker UA Server using Reverse Connection” are provided at no additional cost. To avail of other features, customers can purchase as per their needs.

For more information on how licensing works, see [How License Activation/ Deactivation Works](#)

6.1 Modes of Licensing Matrikon Data Broker

The following are the supported modes of licensing:

- [Node locked Licensing](#): You can license the Matrikon Data Broker installed in a machine (Physical or Virtual) and then map the license to that machine. This can be used in supported Windows and Linux operating systems.
- [Licensing Using a Local License Server](#): Every installation does not need a node-locked license or instance of the Data Broker. Instead, the license is activated on the license server running in the same network as Data Broker systems. In the License Server mode, the Data Broker borrows a license from the License server to execute its functionalities, and Windows system is set up with a License Server component on the same network where systems (Physical, Virtual, or Container based) Matrikon Data Broker Instances are running. When the Matrikon Data Broker product is configured to run in this mode, the Matrikon Data Broker instance service is started, wherein various features are required, and the application borrows the features from the Local License Server. When the Matrikon Data Broker instance service is stopped, all borrowed features are returned to the local license server. Also, Matrikon Data Broker checks for the usage of a feature every 60 sec. If any feature is not in use, the feature license is returned to the pool and is borrowed again when needed.



You can use this Mode of licensing for Windows, Linux, or even the Container-based installations of Matrikon Data Broker.



Although a required feature is borrowed from a local license server when needed or on startup, the Data Broker instance again borrows required licenses from the local license server at every 60-second interval. Suppose the Data Broker instance fails to borrow every 60 seconds for network failure or other reasons. The feature is retrieved back in the license server for usage by other Data Broker instances and features. Now, the Data Broker cannot borrow from the License server and go to the unlicensed mode for that feature.



Redundant license servers are not supported for the current release of Matrikon Data Broker.

6.2 Modes of Applying/Removing License

The following are the two modes of applying or removing a license to or from the Matrikon Data Broker:

- **Online Activation and Removal**: You can use this Mode of licensing on the machine where the Matrikon Data Broker product is running and connected to the internet so that the Data Broker can reach the globally hosted Matrikon license server. If you are running the Matrikon Data Broker product on a machine behind a secured firewall and cannot connect to the internet, do not use this Mode of licensing.
- **Offline Activation and Removal**: You can use this Mode of licensing on the computer where the Matrikon Data Broker product is running and does not have internet access. Using Matrikon OPC UA Explorer or Matrikon Data Broker licensing utility, you need to generate a license request file and send that file to an automated e-mail box. You get a response with a file from the Automated e-mail box. You can use the received file in Matrikon OPC UA Explorer or

Matrikon Data Broker licensing utility and activate the license on that Matrikon Data Broker instance.



For Offline license activation and removal of licenses, you need to send an e-mail to matrikon-license-request@matrikonopc.com and receive a response from Matrkon-License-Response@matrikonopc.com .

6.3 Node Locked Licensing Using Matrikon OPC UA Explorer

When you purchase a license for Matrikon Data Broker, you are provided with an activation key and instructions with several activations possible (to the extent of your purchase) using the activation key.



Keep your Activation Key readily available before you start the licensing process if you do not have the Activation Key, STOP and contact your Matrikon Account Manager.

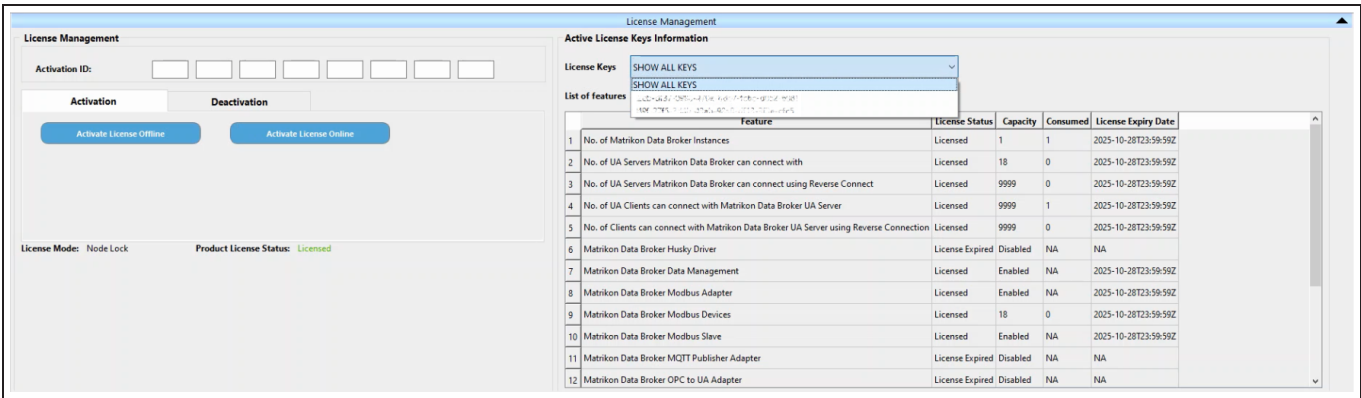
Node locked licenses for Data Broker can be activated using Matrikon OPC UA Explorer. The activation can be done both in Online Mode and Offline Mode. Detailed steps for these different modes are explained below.

Enhanced functionality of Node locked mode licensing now keeps track of all the licensing keys and their associated features along with consolidated feature details as before. Now users can access all their activation keys, enhancing ease of use. This ensures that users are always aware of the features they have access to based on their license, streamlining their experience. This improves user awareness regarding license management, allowing for proactive actions like removal and re-activation of a particular license to avoid service interruptions due to expired licenses.

Below are the steps to get key information separately:

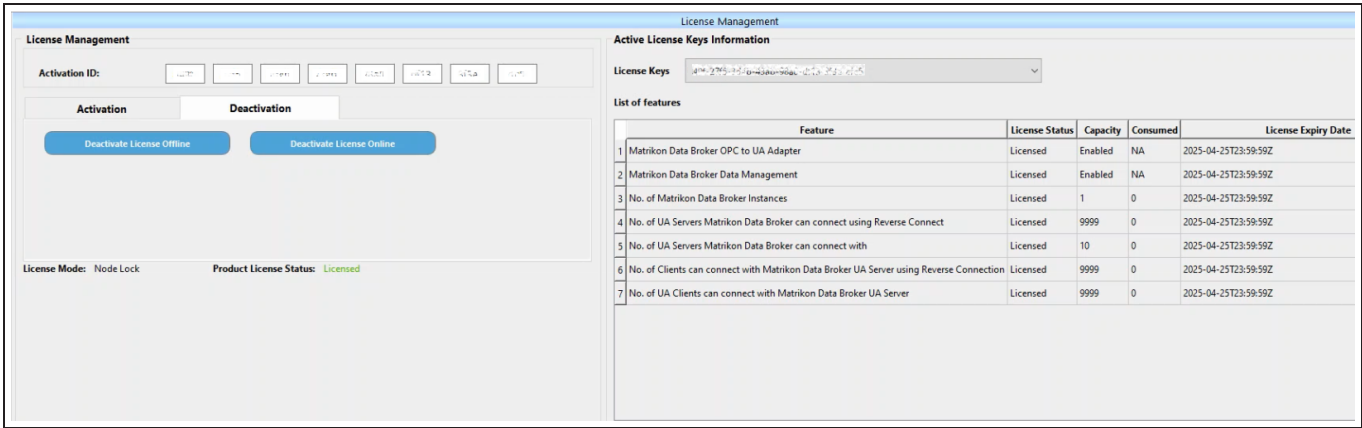
- 1. Copy the license key, paste it into the Activation ID box and activate the license. Please find more details on how to activate a license in sections [6.3.2](#) and [6.3.3](#). Users can find information about the license key in the List of features.

Figure 88 Activation license key



- 2. If the user wants to deactivate any of the License, the relevant License Key should be selected from the dropdown. Please refer [6.6.1](#) and [6.6.2](#) for more details.

Figure 89 Deactivation license key

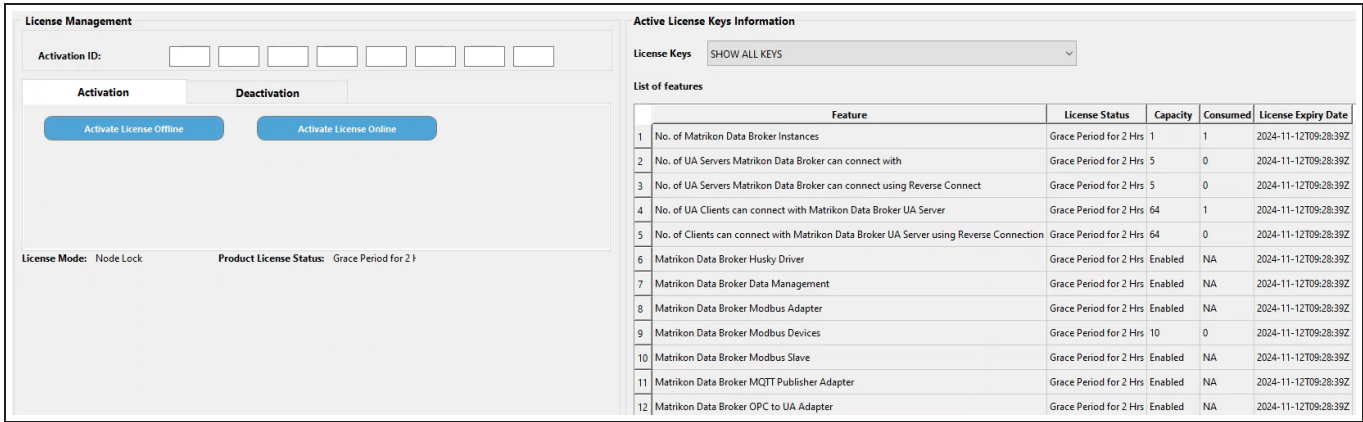


If the user wants to extend the license key expiry, the user has to request the Flexra licensing server first and then reactivate the same key by following the steps in sections [6.3.2](#) and [6.3.3](#). Deactivation is not required to be performed.

6.3.1 Data Broker License Management in Explorer

In the Data Broker Configuration screen, you can go to the Data Broker License Management section and activate or remove node locked license. The Data Broker License Management screen is displayed as shown in the following image:

Figure 90 Data Broker License Management

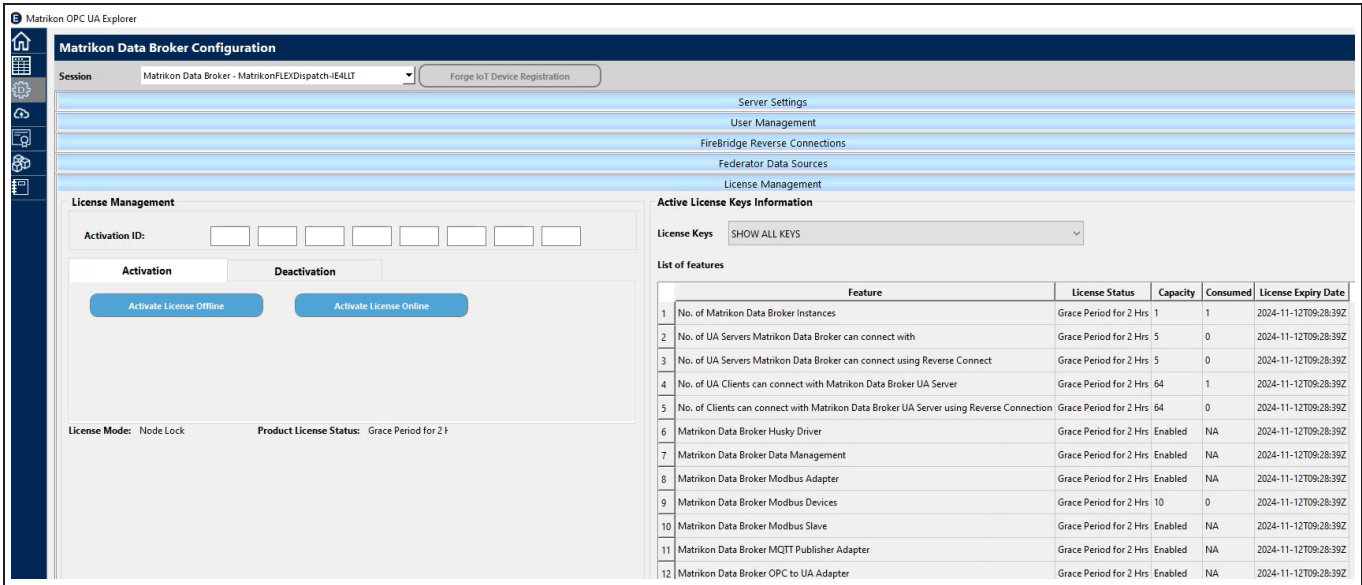


6.3.2 Activating Node Locked License in Online Mode

Once you receive the license key from the Matrikon team, activate the license in online mode:

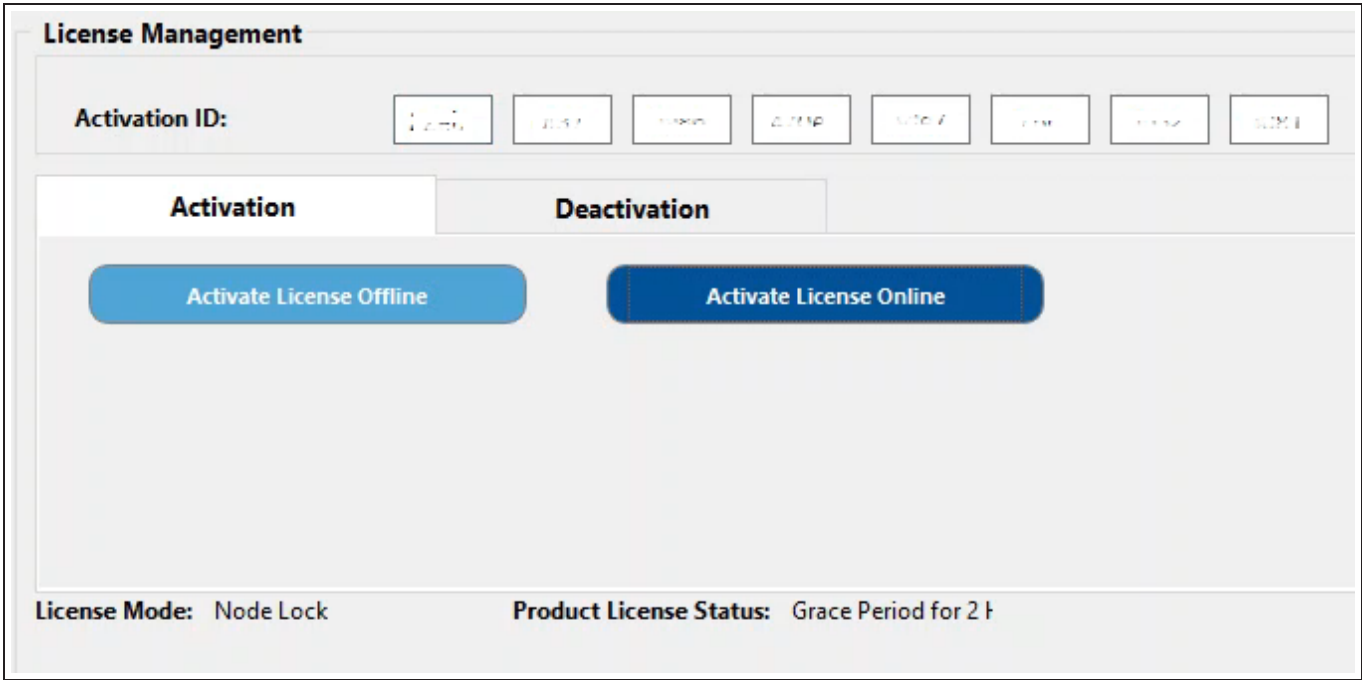
1. Open **Matrikon OPC UA Explorer** and connect to a Data Broker service.
 2. Go to the **Data Broker Configuration** screen and expand the **Data Broker License Management** tab.
- The **Data Broker License Management** screen appears.

Figure 91 License Management



3. In the **Activation ID** box, enter the Activation Key provided to you.
4. Click **Activate License Online**.

Figure 92 Activate License Online



5. The license is activated.

You can see the license details in the table on the screen after a few seconds when you refresh that section by collapsing and expanding or using the refresh icon on the top right corner of the screen. If you still do not see the updated license status, try to reconnect to the Data Broker session. If the problem persists even after this, contact [Matrikon Support](#).

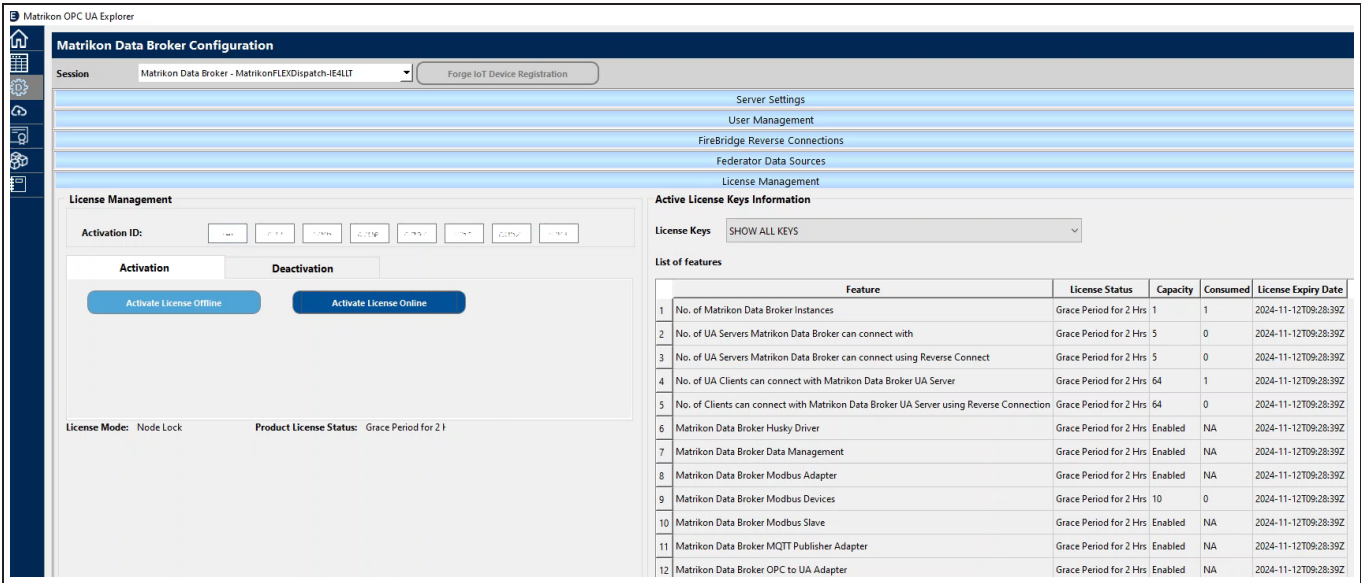
6.3.3 Activating Node Locked License in Offline Mode

You can activate the license in 3 steps:

Step 1 Generating Request File

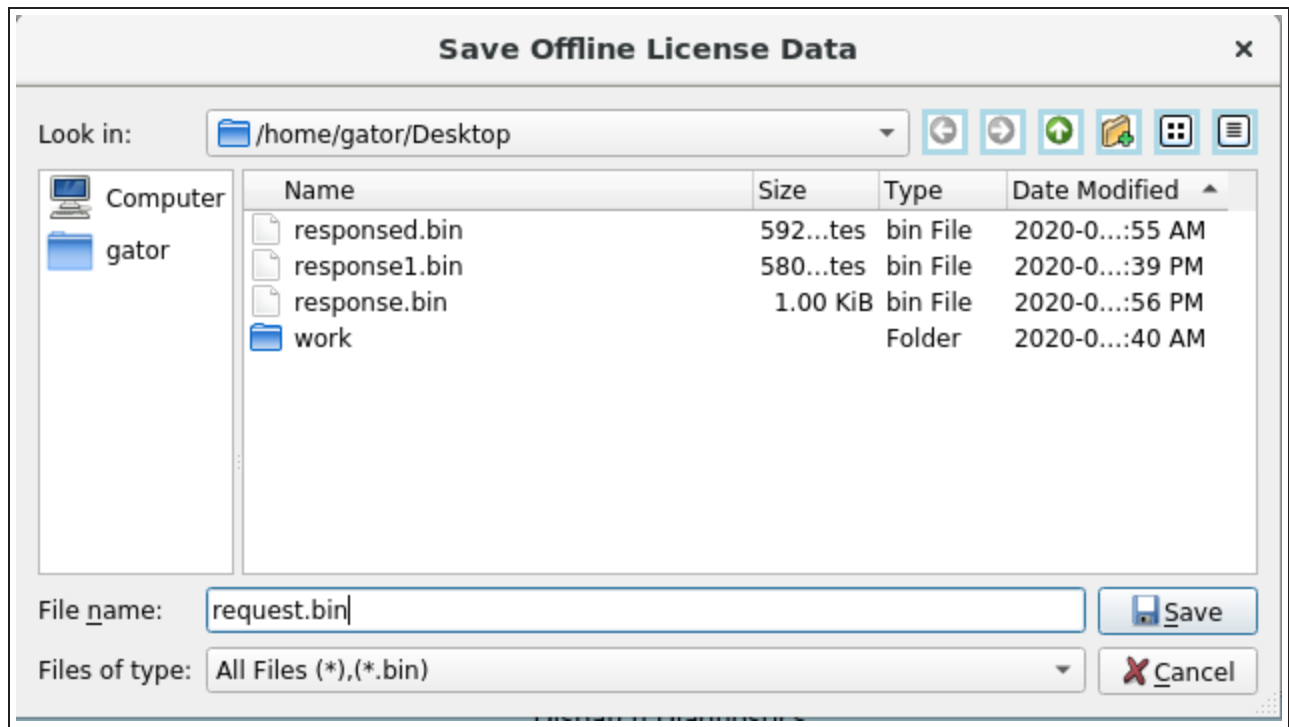
- 1. Launch the Data Broker License Management screen.
- 2. In the **Activation ID** box, enter the Activation Key provided to you.
- 3. Click **Activate License Offline**.
- 4. Click **Generate Request File**.

Figure 93 License Management



A file browser window appears.

Figure 94 File Browser Window



- 5. Select the preferred location, type a name, and save the request .bin file.

Step 2: Requesting a License File from the License Server Through E-mail.

- 1. Send the request .bin file to matrikon-license-request@matrikonopc.com.

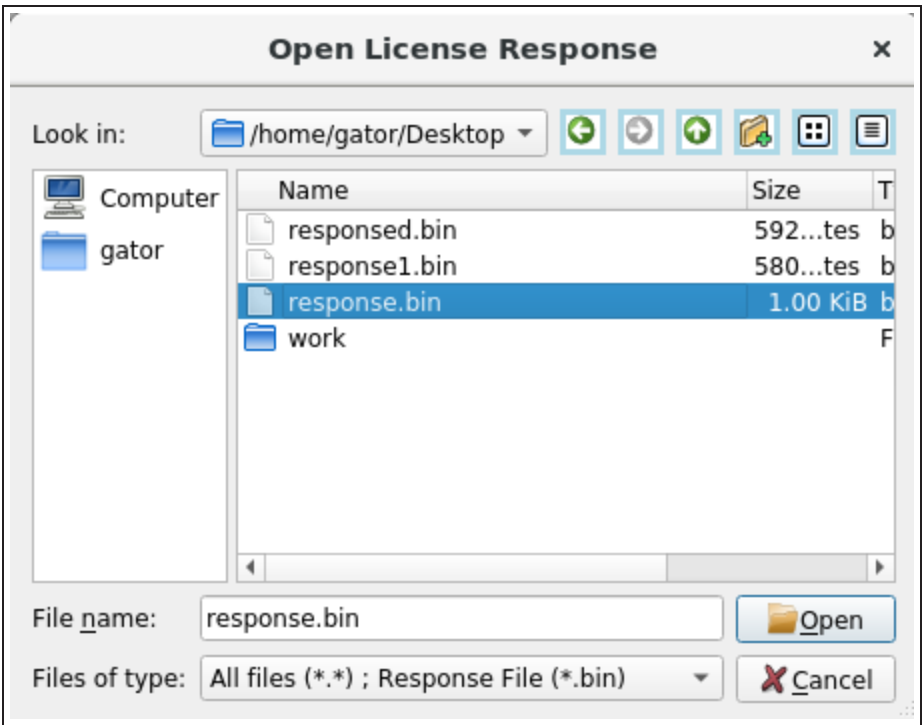
You get the **response.bin** file in your e-mail as a response from the Matrikon-License-Response@matrikonopc.com e-mail address.

- 2. Save the **response.bin** file in a desired location, accessible to a system where Step 1 is executed.

Step 3 Applying the Received Offline Activation File to the Data Broker Server.

1. Click **Process Response File** to load the **response.bin** file from the location where it is stored.

Figure 95 Open License Response



2. The License is activated.

You can see the license details in the table on the screen after a few seconds when you refresh that section by collapsing and expanding or using the refresh icon on the top right corner of the screen. If you still do not see the updated license status, try to reconnect to the Data Broker session. If the problem persists even after this, contact [Matrikon Support](#).

If you want to activate or remove node locked license using the conventional method of console client, you can see [Node Locked Licensing Using Console Client](#).

6.4 Licensing Using a Local License Server

Activating the license using a local License server can best suit you in the following scenarios:

- You are using Data Broker as a container. You can configure Data Broker to look for licenses in the local License server.
- If you have multiple Data Broker instances running and want to apply License on all machines. You can use a single license key and apply it on the license server and then configure Data Broker to connect to the local License server to borrow the licenses as needed. This prevents you from repeating licensing whenever a new instance of Data Broker is brought up and avoids loss of licensing when a system running Data Broker goes down or crashes for any reason.

Unlike the Node-Locked license, where you can use Matrikon OPC UA Explorer to activate the license, you need to use the local License server utility to Activate and Remove the license key. You can Activate and Remove the license key in both online and offline modes. You can connect with the Matrikon Support team at support@matrikonopc.com or your Account Manager to get access to the License Server installer.



You can use the local License server to run Windows systems. However, you can use the Windows instance of the license server to support Data Broker installation in a Linux environment.

In local License server mode, Matrikon Data Broker supports the features listed in the [Licensing Data Broker](#) section.

6.4.1 Setting Up Local License Server

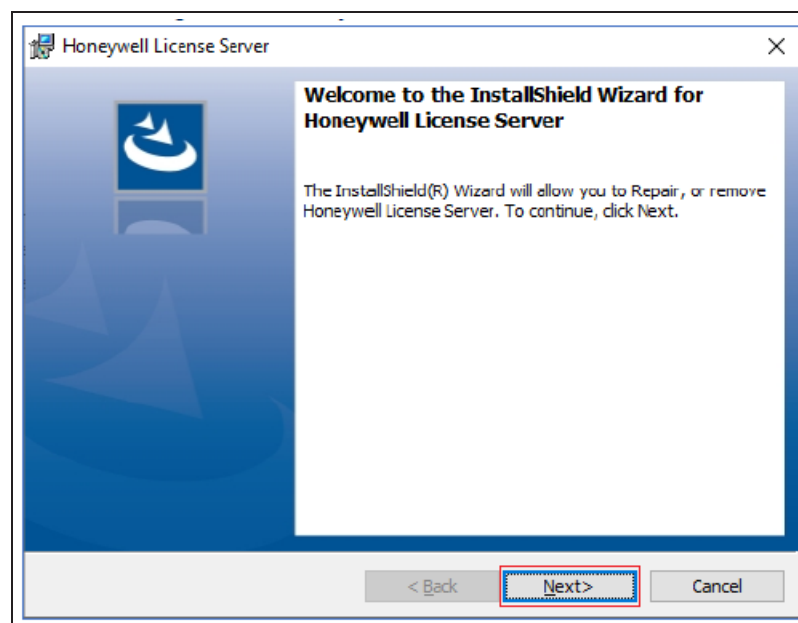
Prerequisite: You should have the local License server installer downloaded. You can connect to the Matrikon Support team at support@matrikonopc.com or your Account Manager to get access to the License Server installer. After you finish the setup, you must activate the Data Broker license in the License Server. If you do not activate the license in the License server and if the Data Broker is configured for the Local License Server and starts the service, the Data Broker looks for a license in the license server, and the licensing calls fail due to the unavailability of the license. Like the Node locked licensing, Data Broker instances run for 120 minutes in the grace period, and you must activate the Data Broker license. To Activate the license, see the following: [Activating License using Local License Server in Online Mode](#) and [Activating License using Local License Server in Offline Mode](#).

To Setup the local License server utility:

1. Run **Honeywell Licensing Server.exe** as an administrator.

The Honeywell License Server screen appears.

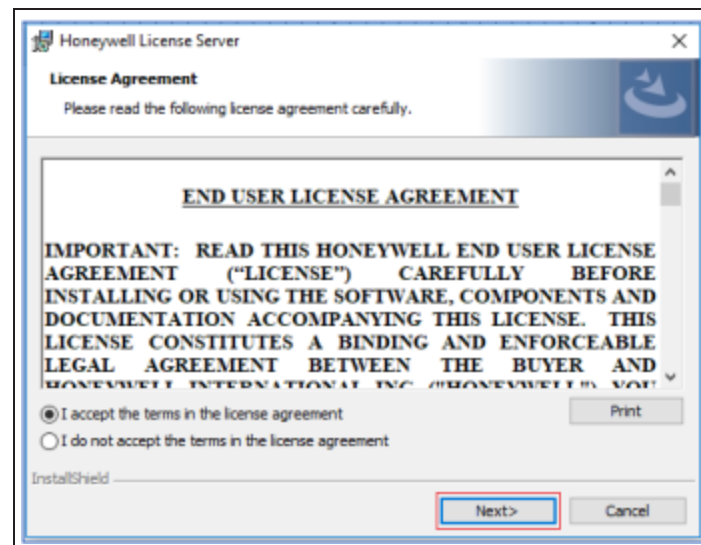
Figure 96 Honeywell License Server Screen



2. In the **Honeywell License Server** screen, click **Next**.

The **License Agreement** window appears.

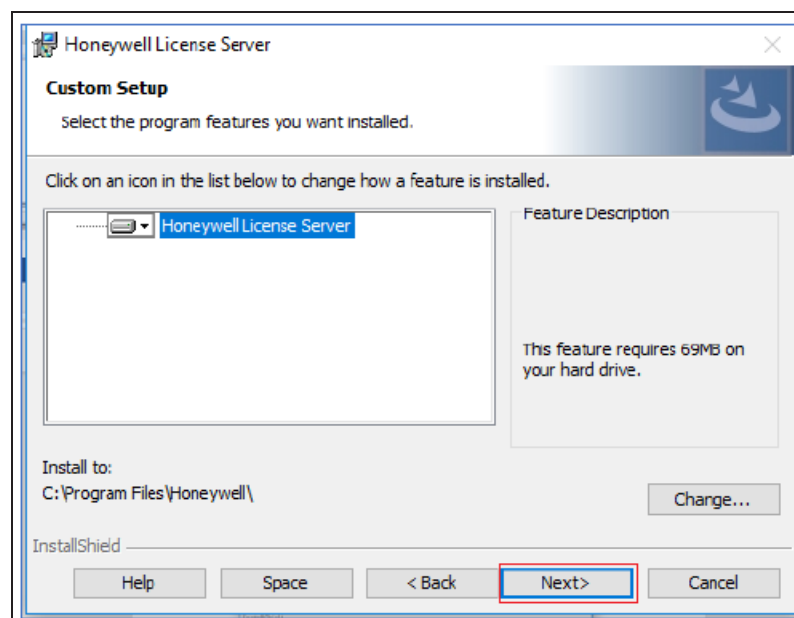
Figure 97 License Agreement Window



3. In the **License Agreement** screen, read the terms in the Agreement carefully, select **I accept the terms in the license agreement**, and then click **Next**.

The **Custom Setup** screen appears

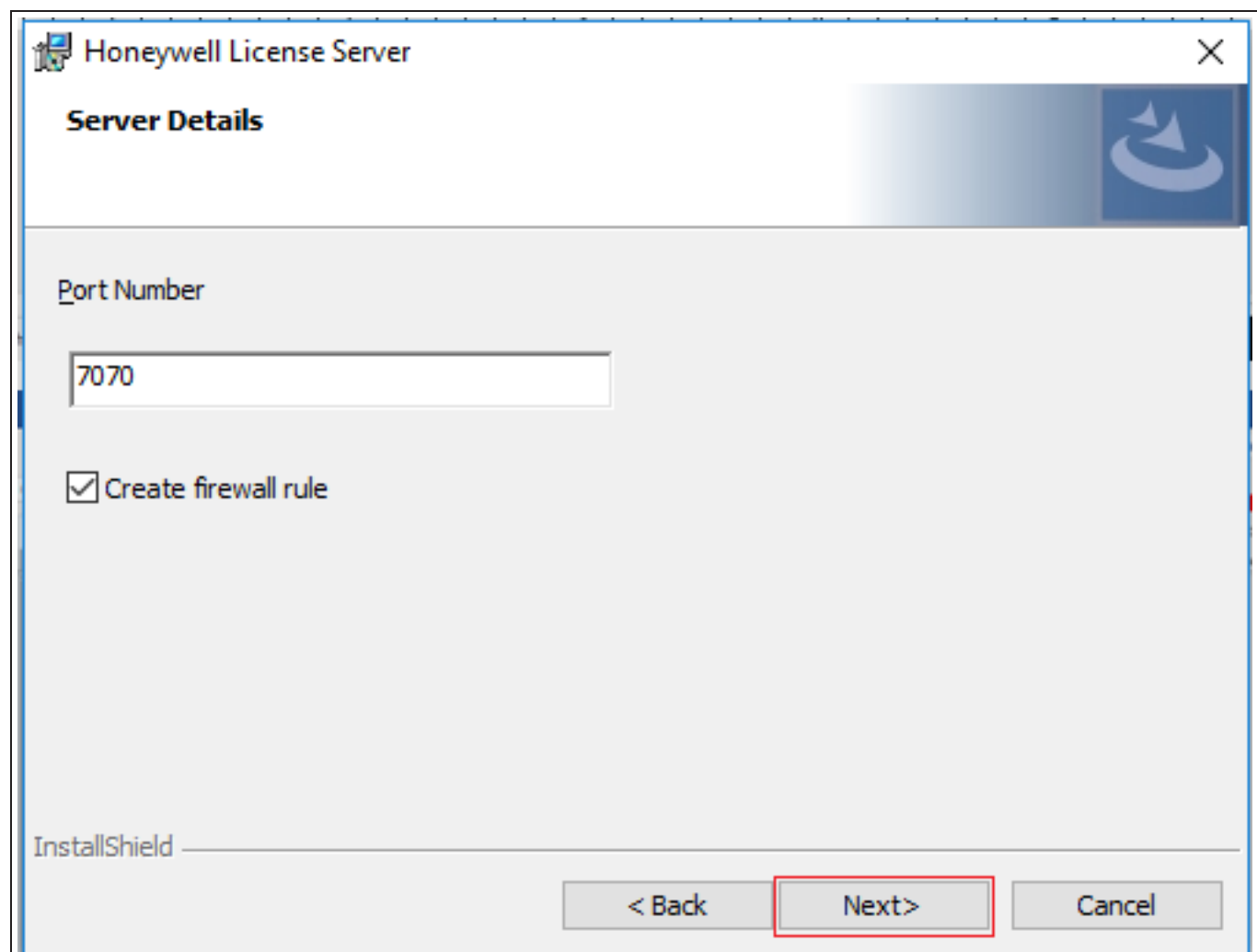
Figure 98 Custom Setup Screen



4. In the Custom Setup screen, click **Next**.

The **Server Details** screen appears.

Figure 99 Server Details Screen



Honeywell License Server

Server Details

Port Number

7070

☒ Create firewall rule

InstallShield

< Back Next> Cancel

5. Type the required **Port Number**. By default, the port number is 7070.
6. Select the **Create firewall rule** check box and click **Next**.

This enables remote connectivity between dispatch and the License server, and the **License Server admin password** screen appears.

Figure 100 License Server Admin Password

Honeywell License Server

License Server admin password

Password

Confirm Password

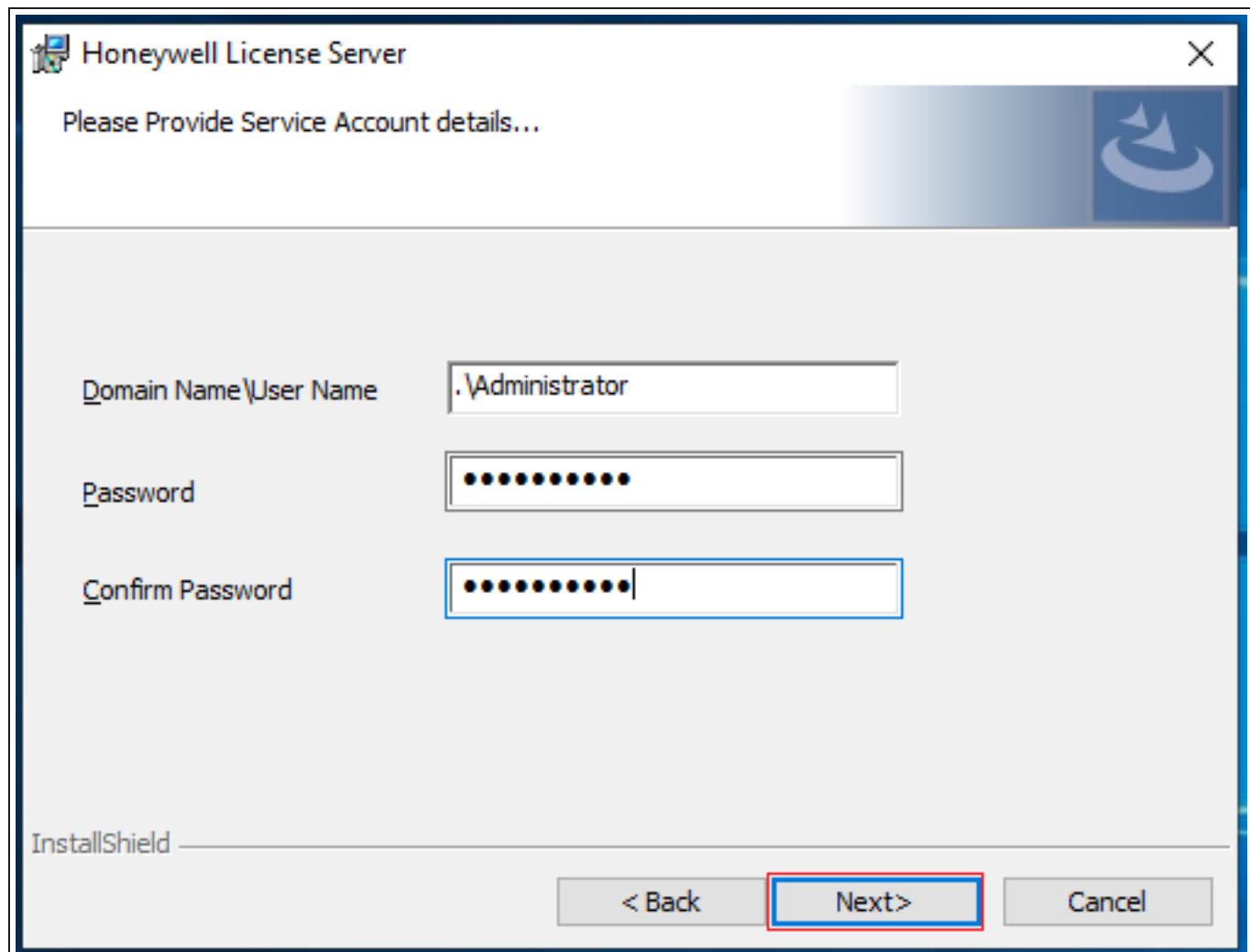
NOTE: Please follow the below password rules and must meet the following criteria.
At least 8 characters (with a maximum of 31 characters)
At least one digit
At least one upper-case character
No Whitespaces
Password should not contain following characters ", %, /, \

InstallShield

< Back Next> Cancel

7. You can enter and confirm a secured **Password** and click **Next**.
8. The Service Account details screen appears. Enter the service account details under which the license server service must run.

Figure 101 Service Account



Honeywell License Server

Please Provide Service Account details...

Domain Name\Username: .\Administrator

Password: [Masked]

Confirm Password: [Masked]

InstallShield

< Back **Next>** Cancel

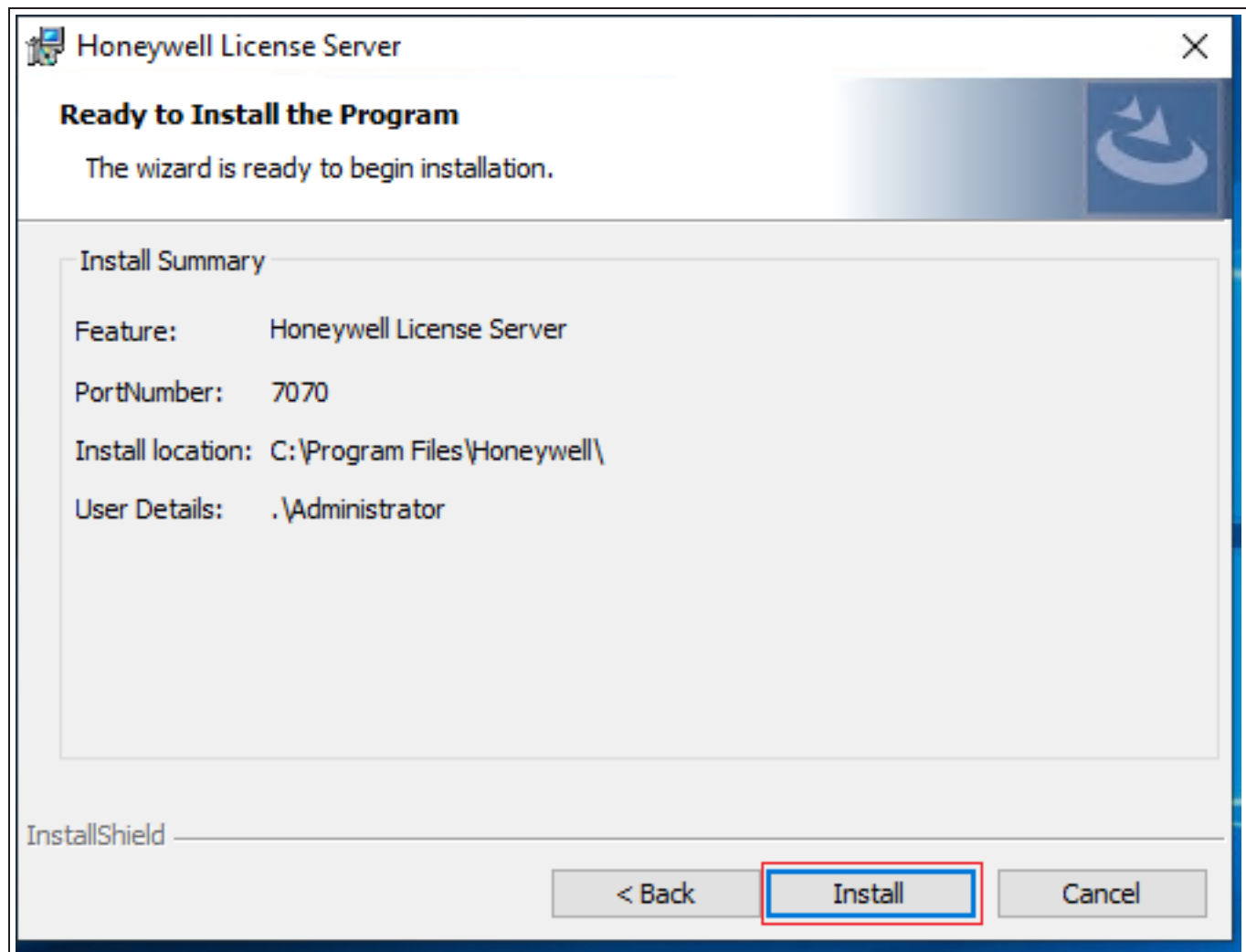


Keep this port and admin password handy. You need this information while applying for and removing the license from the License Server.

9. Click Next.

The **Ready to Install** the Program screen appears.

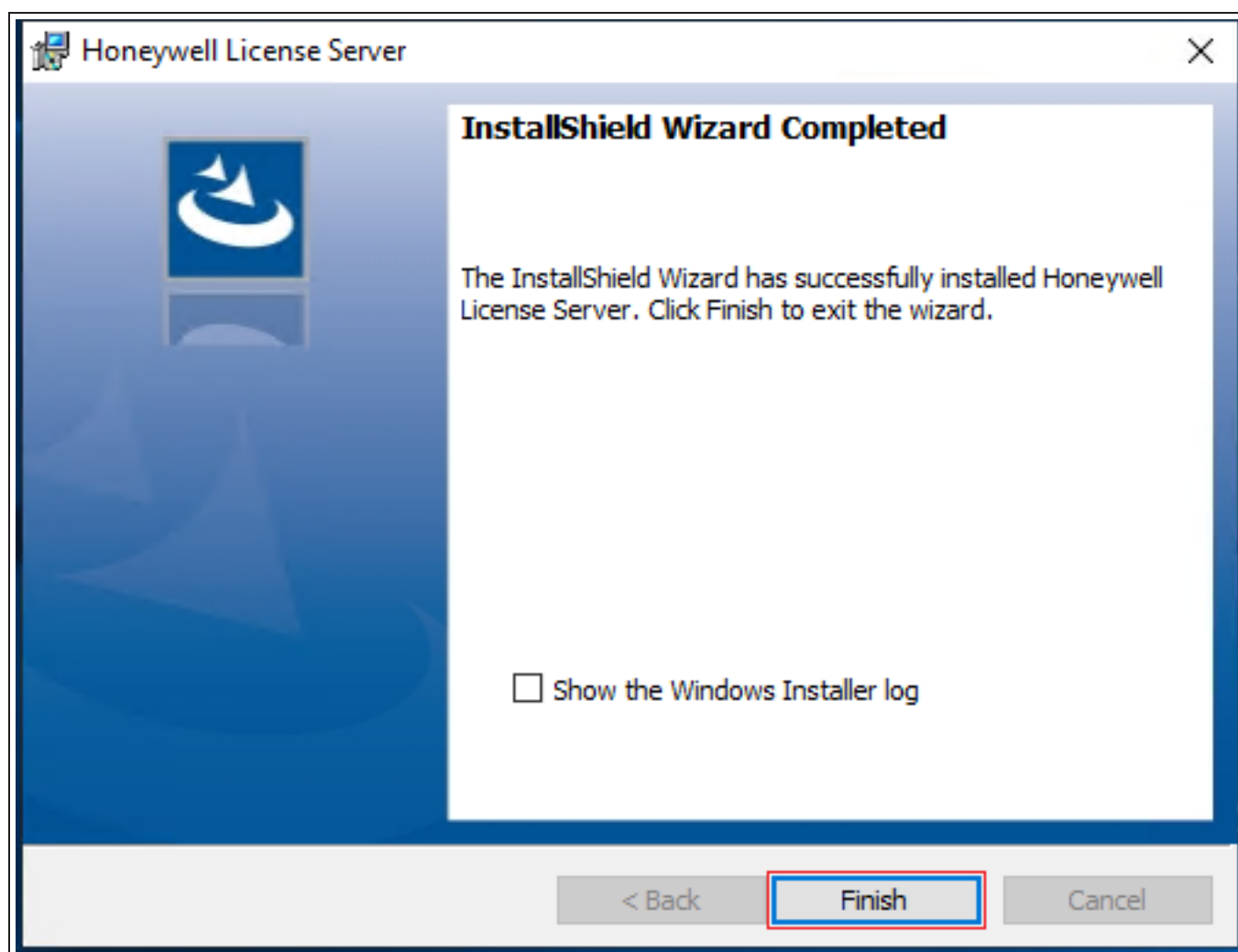
Figure 102 Ready to Install the Program Screen



10. Click **Install**.

The **InstallShield Wizard Completed** screen appears.

Figure 103 InstallShield Wizard Completed Screen



11. Click **Finish** to complete the setup.

The local License server is installed. For the uninstallation procedure, see [Uninstalling Local License Server](#).

After the installation, the below folders are created in the following location: C:\Program Files\Honeywell\Honeywell License Server.

- Enterprise
- Lib
- **Server And FlexNet License Server-Honeywell runs as a service. To check if the service is running,**

12. Open **Services.msc** window appears.

13. Check if **FlexNet License Server-Honeywell** is running.

If it is running, your installation is successful. Otherwise, you must reinstall the license server utility.

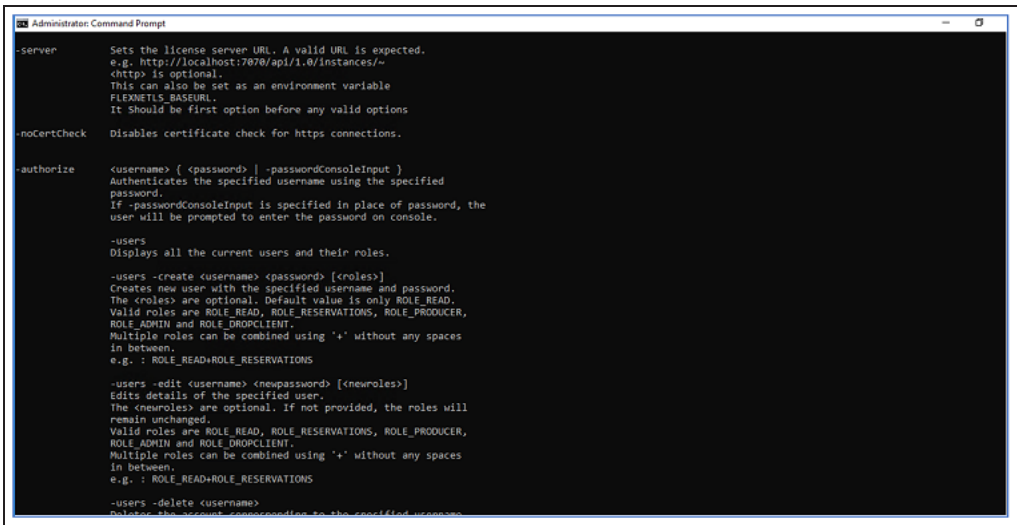
You must use the license server command line utility to apply a license to the License Server. The command line utility is also deployed when you install a License Server on a system. You can locate this file at the following paths.

Table 22 Locate the file at the following paths.

Revision	Path	Example
Windows	<Program Files>\Honeywell\Honeywell License Server\	C:\Program Files\Honeywell\Honeywell License Server\ flexnetlsadmin.bat

When you run the command `C:\Program Files\Honeywell\Honeywell License Server\flexnetlsadmin.bat -help` , usage instructions of the tool are displayed along with commands to perform the desired operations and options that are required to specify the attributes as shown in the following image:

Figure 104 Command Prompt



6.4.2 Activating License on Local License Server in Online Mode

To activate the license in online mode:

1. Open the **Command Prompt** in administrative mode.
2. Change the directory location to where the flexnetlsadmin.bat file is located. By default, it is at the location C:\Program Files\Honeywell\Honeywell License Server\Enterprise\.
3. Execute the following command:

```
flexnetlsadmin.bat -server [http://hostname:port or ip address:port]. -authorize admin [Admin Password] -activate -id[Activation Key] -count [Count Value=1].
```

Example:

```
flexnetlsadmin.bat -server http://localhost:7070 -authorize admin Password1 activate -id 34xx-hy7y-ij89-9kl8-jh8k-jk89-t09y-98hj -count 1.
```



The count is the number of activations that can be used from the activation key. For example, you can use the activation with five counts on five devices by providing the count as 1 for each activation. Based on your requirement, you can also use more than one count for activating the same device. When activating a license, the count value must be at least 1.

The license is activated.

Figure 105 License Activated Message



- 4. To check the status of the license:

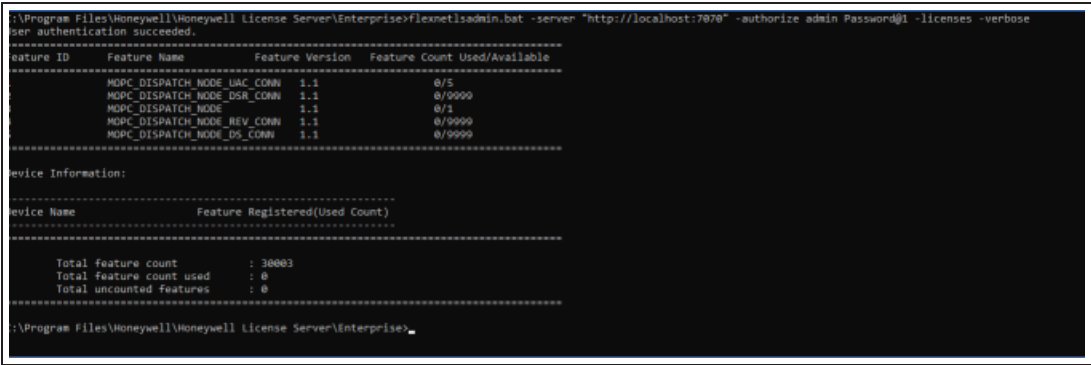
In **Command Prompt**, execute the following command from the location where the flexnetlsadmin.bat file is available:

```
Flexnetlsadmin.bat -server [ http://hostname:port or ip address:port]. -authorize admin [Admin Password] -licenses -verbose.
```

Example:

```
flexnetlsadmin.bat -server http://10.45.89.56:7070 -authorize admin Password1 -licenses -verbose.
```

Figure 106 Command Prompt



6.4.3 Activating License on Local License Server in Offline Mode

You can activate the license in 3 steps:

- Step 1: Generating request file.
- Step 2: Requesting a license file from the centralized license server through e-mail.
- Step 3: Applying the received offline activation file to the Local license server.

Steps 1 and 3 can be executed on a Local license server installed, and Step 2 on any system with internet access to send and receive e-mails.

Generating request file:

1. Open **Command Prompt**.
2. To generate an Offline Activation Request, execute the following command from the location where the `flexnetlsadmin.bat` file is available:

```
flexnetlsadmin.bat -server [http://hostname:port or ip address:port]. -authorize admin [Admin Password] -activate -id[Activation Key] -count [Count Value=1] -o [Path where you wish to store the generated request file].
```

Example

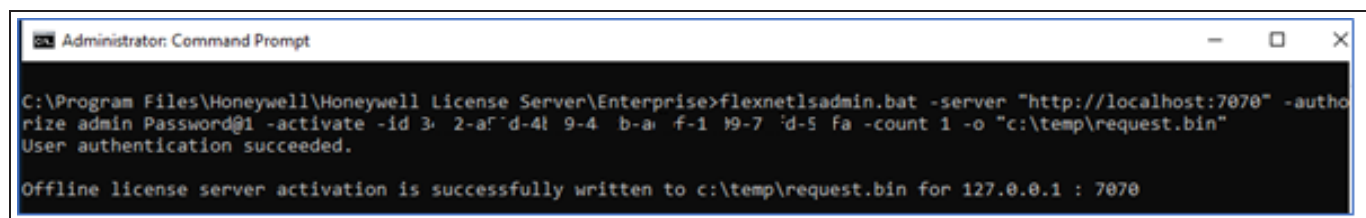
```
flexnetlsadmin.bat -server http://localhost:7070 -authorize admin Password1 -activate -id 34xx-hy7y-ij89-9kl8-jh8k-jk89-t09y-98hj -count 1 -o c:\temp\request.bin
```



The count is the number of activations that are from the activation key. For example, you can use the activation with five counts on five devices by providing the count as 1 for each activation. Based on your requirement, you can also use more than one count for activating the same device.

When activating a license, the count value must be at least 1.

Figure 107 Administrator Command Prompt



By default, a file named `request.bin` is generated in your path. You can also give a different name for the file in the `-o` option used in the command.

Requesting license file from centralized license server:

1. Send the **request.bin** file to matrikon-license-request@matrikonopc.com.
You get the **request_Response.bin** file in your email as a response from the Matrikon-License-Response@matrikonopc.com email address.
2. Save the **request_Response.bin** file into the same path where you have the **request.bin** file.

Applying the offline activation file to the Local license server:

1. Open **Command Prompt**.
2. Execute the following command from the location where the flexnetlsadmin.bat file is available:

```
flexnetlsadmin.bat -server [http://hostname:port or ip address:port]. -authorize admin [Admin Password] -activate -load [path of request_Response.bin file].
```

Example

```
flexnetlsadmin.bat -server http://localhost:7070 -authorize admin Password1 -activate -load c:\temp\request_response.bin
```

Figure 108 Command Prompt



6.5 Selecting License Mode in Data Broker

6.5.1 Selecting License Mode for Data Broker Using Matrikon OPC UA Explorer

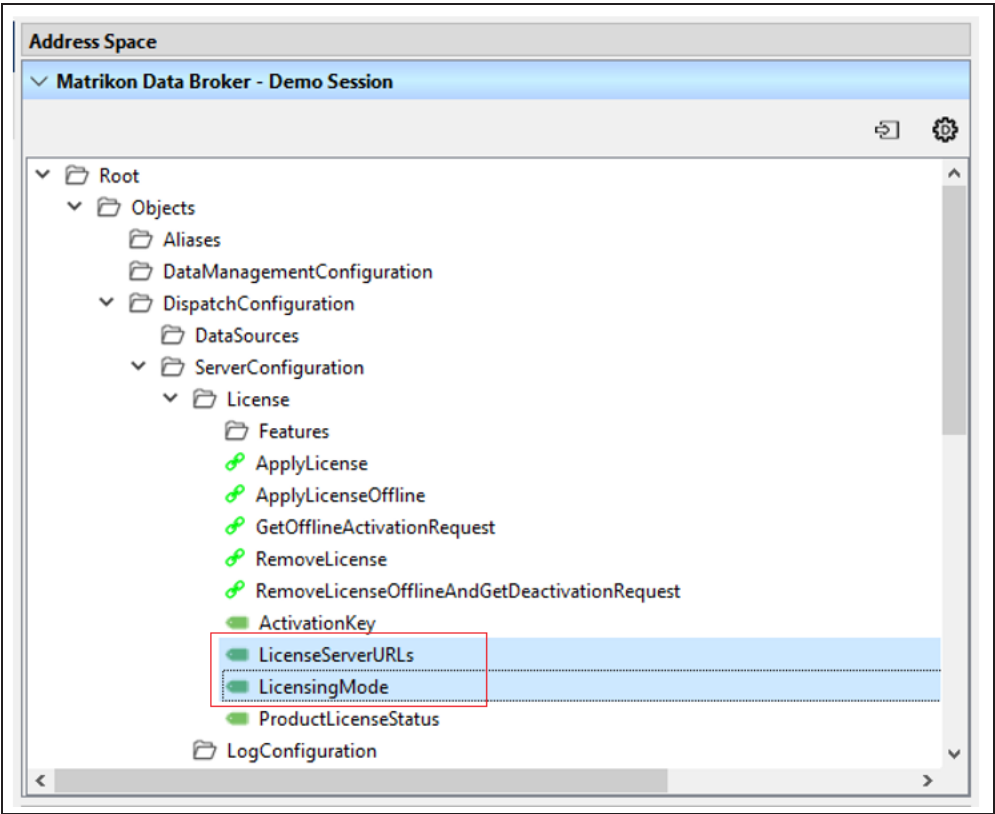
You can select the License mode for Data Broker from the Matrikon OPC UA Explorer tool.

To select the License mode:

1. Open the **Matrikon OPC UA Explorer** client and connect to the Matrikon Data Broker server you want to change the license mode.
2. Once you establish the connection, you can see the below nodes in the Data Broker **Address Space**, as shown in the following image:

- LicensingMode
- LicensingServerURLs

Figure 109 Address Space



3. You can drag the nodes into the data view for editing, as shown below, or you can edit them in the **Attribute** window.

Figure 110 Attribute Window

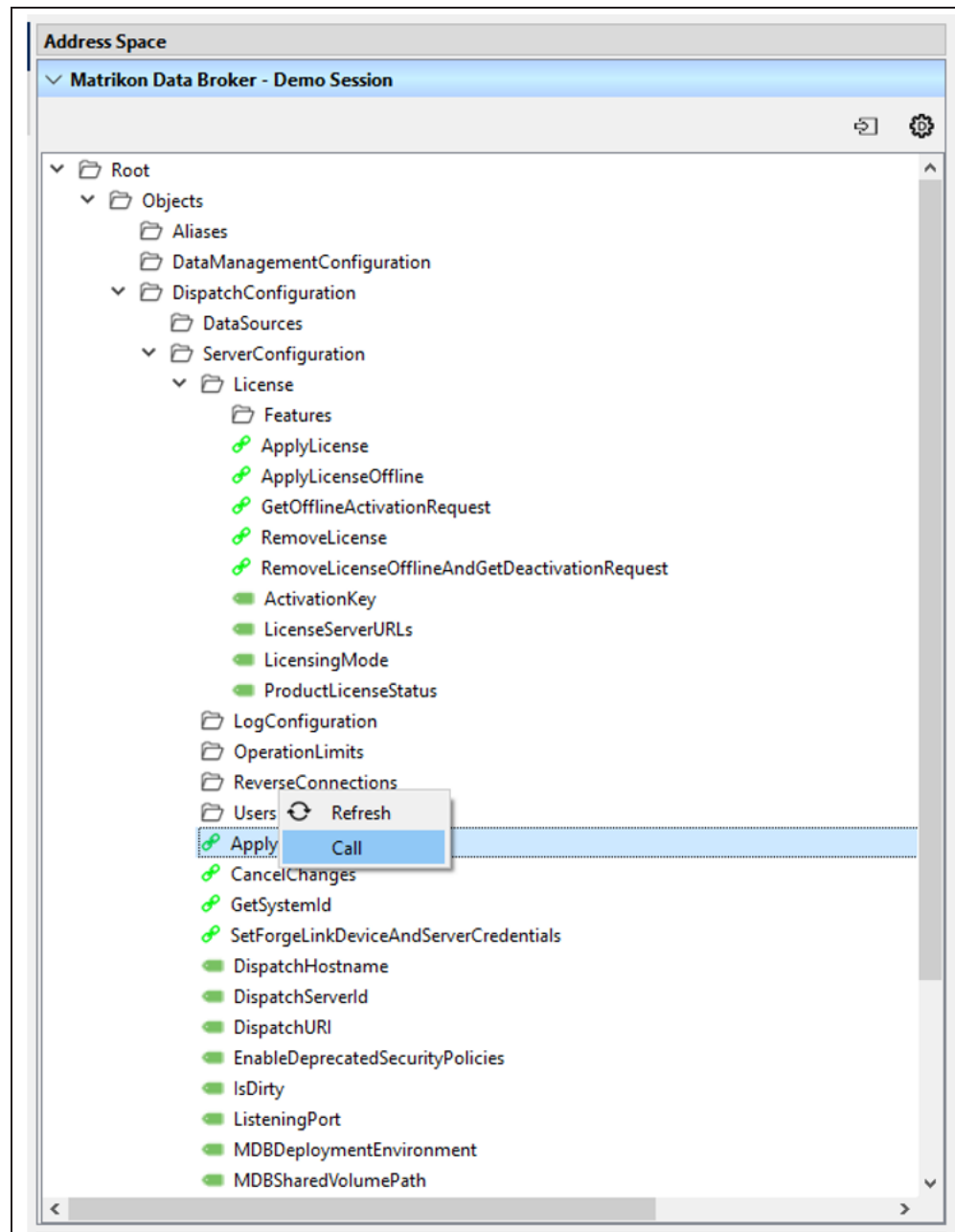
	Node Id	Display Name	Session Name	Value	Source Timestamp	Server Timestamp	Status Code
1	ns=1;i=6005	LicensingMode	Dispatch	0	2020-04-28 22:41:48.710	2020-04-28 22:41:48.710	Good: Success.(0x0)
2	ns=1;i=6002	LicenseServerURLs	Dispatch	[http://localhost:7070/fne/bin/capability]	2020-04-28 22:41:55.710	2020-04-28 22:41:55.710	Good: Success.(0x0)

4. To use Node-locked licensing mode, set the value for **LicensingMode** to 0.
5. To use License Server licensing mode, set the value for **LicensingMode** to 1.
6. When the Licensing Mode is set to License Server, you must also provide the URL to the license server in the **LicenseServerURLs** node value. The license server URL is in the format of **http://<host name of license server>:<port number>/request**. For example, **http://localhost:7070/request**.
7. Once you have changed the Licensing Mode, you must call the ApplyChanges method. To call the ApplyChanges method.

- a. In the Address Space Pane, click **DataBrokerConfiguration>ServerConfiguration>Users**, right-click **ApplyChanges**, and then click **Call**.

The changes that you made are applied.

Figure 111 Address Space Pane



For information on how to install License Server, see [Setting up Local Licensing Server](#).

6.5.2 Using Utility Tool

You can also use the licensing utility tool to select the License mode for Data Broker.

To select the Node-Locked License mode:

1. Open **Command Prompt**. (**Terminal** in case of a Linux operating system) in the system where the Data Broker is running.
2. Execute the following command:

```
Linux: ./MatrikonDataBrokerLicenseTool.AppImage configure-node-locked -s [opc.tcp://hostname:port or ip address:port]
```

Example:

```
./ MatrikonDataBrokerLicenseTool.AppImage configure-node-locked -s opc.tcp:// localhost:7070
```

Figure 112 Command Prompt

```
ubuntu@master-node:~/Downloads/latest/3/pk$ sudo ./MatrikonDataBrokerLicenseTool.AppImage configure-node-locked -s opc.tcp://127.0.0.1:56011
Matrikon Data Broker Licensing Tool
2.0.0.470
COPYRIGHT (c) 2009 - 2022 HONEYWELL Advanced Limited., ALL RIGHTS RESERVED

master-node
2022-05-19 21:20:31.153 - WARNING - In file /hone/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLEXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/ck/certificate_store_t.cpp:2189 Function CacheOwnCertificate_Status "BadNotfound" encountered
2022-05-19 21:20:31.165 - WARNING - In file /hone/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLEXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/ck/certificate_store_t.cpp:2192 Function CacheOwnPrivatekey_Status "BadNotfound" encountered
2022-05-19 21:20:31.293 - INFORMATION - Matrikon Flex OPC UA SDK RS.1
2022-05-19 21:20:31.323 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 2
2022-05-19 21:20:31.323 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 3
2022-05-19 21:20:31.323 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256, mode 3
2022-05-19 21:20:31.323 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicy#Aes128_Sha256_RsaOaep, mode 3
2022-05-19 21:20:31.323 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicy#Aes128_Sha256, mode 3
2022-05-19 21:20:31.323 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss, mode 3
2022-05-19 21:20:31.323 - INFORMATION - Connecting to opc.tcp://127.0.0.1:56011
2022-05-19 21:20:31.323 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss, Mode 3
2022-05-19 21:20:31.358 - WARNING - While validating certificate, the HOSTNAME was not present or was not as expected
2022-05-19 21:20:31.378 - INFORMATION - ...Connected
Set the licensing mode to node locked.
Set 0 license servers.
Changes applied successfully
ubuntu@master-node:~/Downloads/latest/3/pk$
```

Windows: matrikondatabrokerlicensetool.**configure-node-locked** -s [opc.tcp://hostname:port or ip address:port]

Example:

```
matrikondatabrokerlicensetool.exe configure-node-locked -s opc.tcp://localhost:7070
```

Figure 113 Command Prompt

```
C:\Program Files\Matrikon\DataBroker>matrikondatabrokerlicensetool.exe configure-node-locked -s opc.tcp://127.0.0.1:56000
Matrikon Data Broker Licensing Tool
2.0.0.466
COPYRIGHT (c) 2009 - 2022 HONEYWELL Advanced Limited., ALL RIGHTS RESERVED

AB28LAB2K19TMPLT
2022-05-19 09:05:24.902 - WARNING - In file D:\BFLEXAGGREGATOR-FD-DR19\src\libraries\flexsdk\Flex_SDK\Code\uasdk\internals\common\p
"BadNotfound" encountered
2022-05-19 09:05:24.902 - WARNING - In file D:\BFLEXAGGREGATOR-FD-DR19\src\libraries\flexsdk\Flex_SDK\Code\uasdk\internals\common\p
"BadNotfound" encountered
2022-05-19 09:05:25.043 - INFORMATION - Matrikon Flex OPC UA SDK RS.1
2022-05-19 09:05:25.121 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 2
2022-05-19 09:05:25.121 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 3
2022-05-19 09:05:25.121 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256, mode 3
2022-05-19 09:05:25.121 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicy#Aes128_Sha256_RsaOaep, mode 3
2022-05-19 09:05:25.121 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicy#Aes128_Sha256, mode 3
2022-05-19 09:05:25.121 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss, mode 3
2022-05-19 09:05:25.121 - INFORMATION - Connecting to opc.tcp://127.0.0.1:56000
2022-05-19 09:05:25.121 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss, Mode 3
2022-05-19 09:05:25.167 - WARNING - While validating certificate, the HOSTNAME was not present or was not as expected
2022-05-19 09:05:25.214 - INFORMATION - ...Connected
Set the licensing mode to node locked.
Set 0 license servers.
Changes applied successfully
```


To select the License Server mode:

1. Open the **Command Prompt** in the system where the Data Broker is running.
2. Execute the following command:

```
Windows: matrikondatabrokerlicensetool.exe configure-license-server -s [opc.tcp://hostname:port or ip address.port]
```

Example:

```
matrikondatabrokerlicensetool.exe configure-license-server -s opc.tcp://localhost:7070
```

```
Linux: ./MatrikonDataBrokerLicenseTool.AppImage configure-license-server -s [opc.tcp://hostname:port or ip address.port].
```

Example:

```
./MatrikonDataBrokerLicenseTool.AppImage configure-license-server -s opc.tcp://localhost:7070.
```

6.6 Modifying the Feature Count on an Activated License

You can also increase or decrease the feature count on the existing activated license. You can do this by applying the new activation key with an additional feature count by Matrikon.

For example, you have a Data Broker license with 10 Data source connections. For five more UA Data sources, you can buy a new activation key from Matrikon that supports five Data source connections and apply it to the existing activated license. For different modes of activating the licenses, see [Modes of Licensing Matrikon Data Broker](#).

6.7 Removing License for Data Broker

When a license is applied to a Data Broker Instance in Node Locked mode, the last used Activation key on that Data Broker Instance is stored in the Data Broker's UA Server Address Space. You can apply multiple activation keys on the same Data Broker Instance.

When you want to remove the licenses of the Activation key stored in the Data Broker Address space, enter the correct Activation Key.

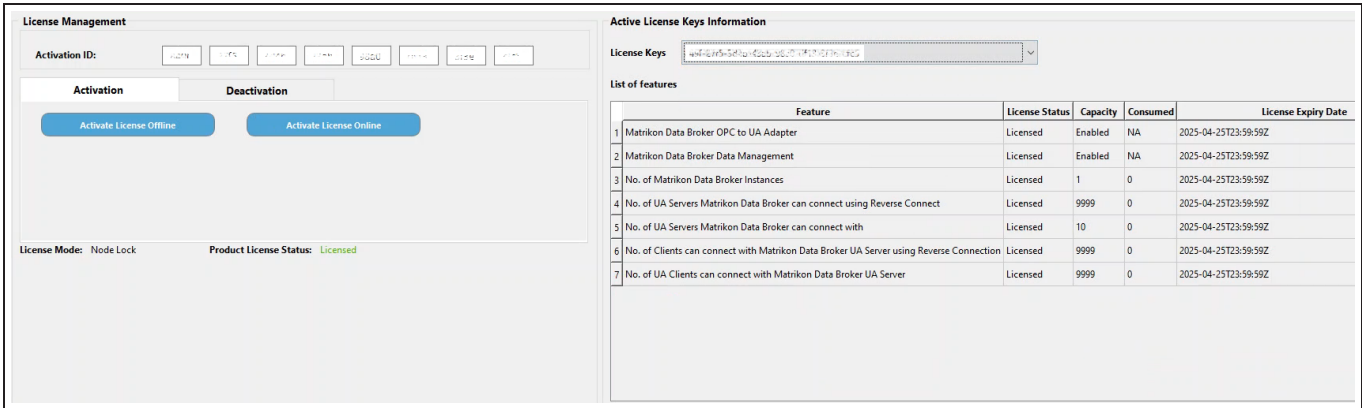
Sometimes, the Data Broker Address space does not have the key for various reasons. It is not a matter of concern as the Activation key stored is only for License removal later and not for the product to run. In this case, when you come to the License removal screen, you do not see any Activation ID entered by default, and you need to enter the Activation key for which you want to remove the license.

6.7.1 Removing Node Locked License in Online Mode

You can use Explorer to remove the license that you have activated.

- 1. You launch the **Data Broker License Management** screen.
- 2. Select the **Activation ID** from the License Keys dropdown, it would appear in the Activation ID box.

Figure 114 License Management



- 3. Click **Deactivate License Online**.
The license is removed.
- 4. You can see the license details in the table on the screen after a few seconds when you refresh that section by collapsing and expanding or using the refresh icon on the top right corner of the screen. If you still do not see the updated license status, try to reconnect to the Data Broker session. If the problem persists even after this, contact [Matrikon Support](#).



Once you remove the Node Locked license on the Data Broker server, the Data Broker server does not allow any further connections. The license status cannot be checked as the MatrikonDataBroker_license_tool connects with the Data Broker server to get the license information. You can restart the Data Broker server to allow the connections as the Data Broker runs in the Grace period after restart.

6.7.2 Removing Node Locked License in Offline Mode

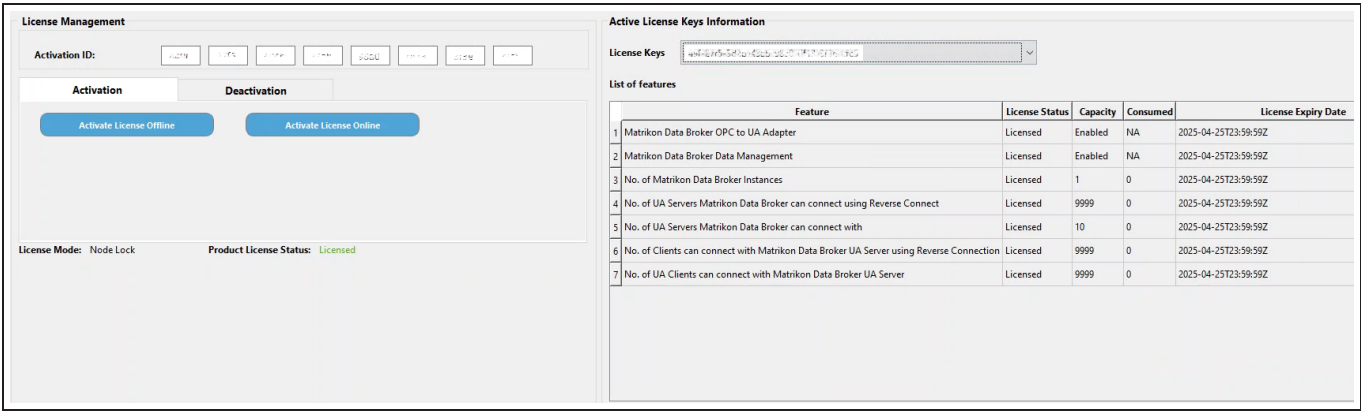
You can remove the license in 3 steps:

- Step 1: Generating request file.
- Step 2: Requesting a license file from the license server through e-mail.
- Step 3: Applying the received offline activation file to the Data Broker server.

Step1: Generating request file

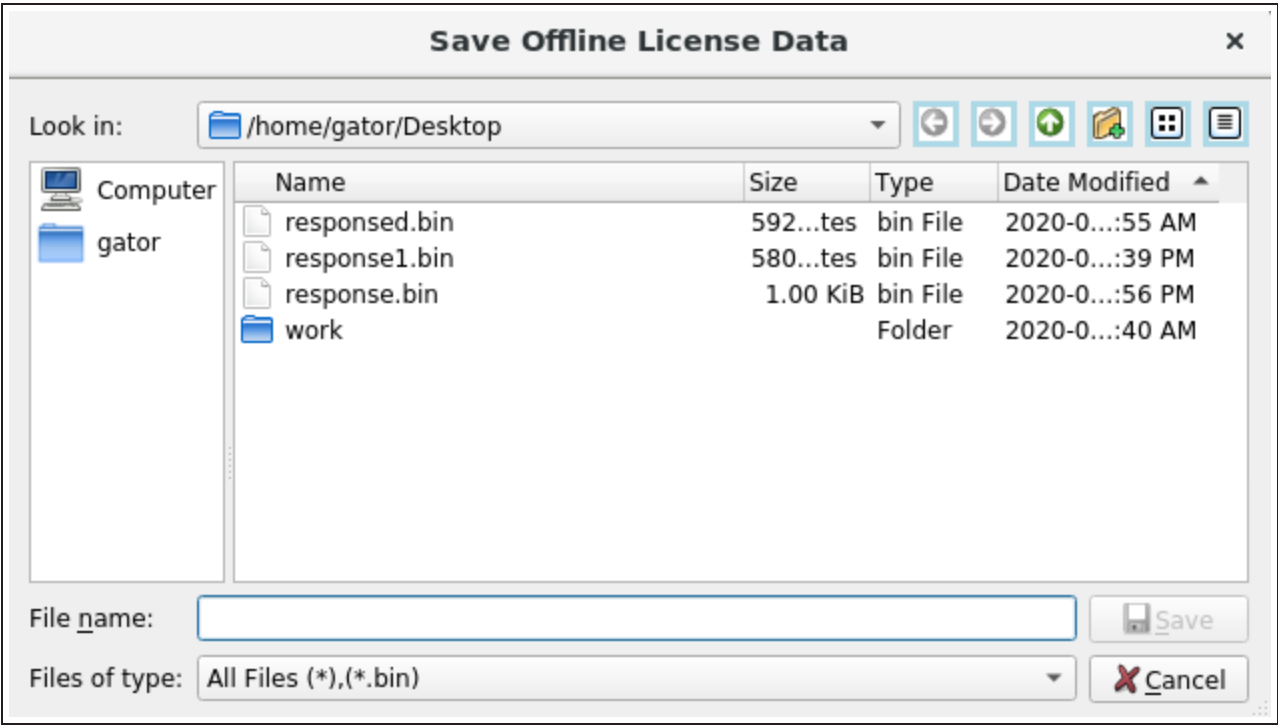
- 1. You launch the Data Broker License Management screen.
- 2. Select the**Activation ID**from the License Keys dropdown, it would appear in the Activation ID box.

Figure 115 License Management Screen



- 3. Click **Deactivate License Offline**.
 - 4. Click **Generate Request File**.
- A file browser window appears.

Figure 116 File Browser Window



- 5. Select the preferred location, type a name, and save the request .bin file.

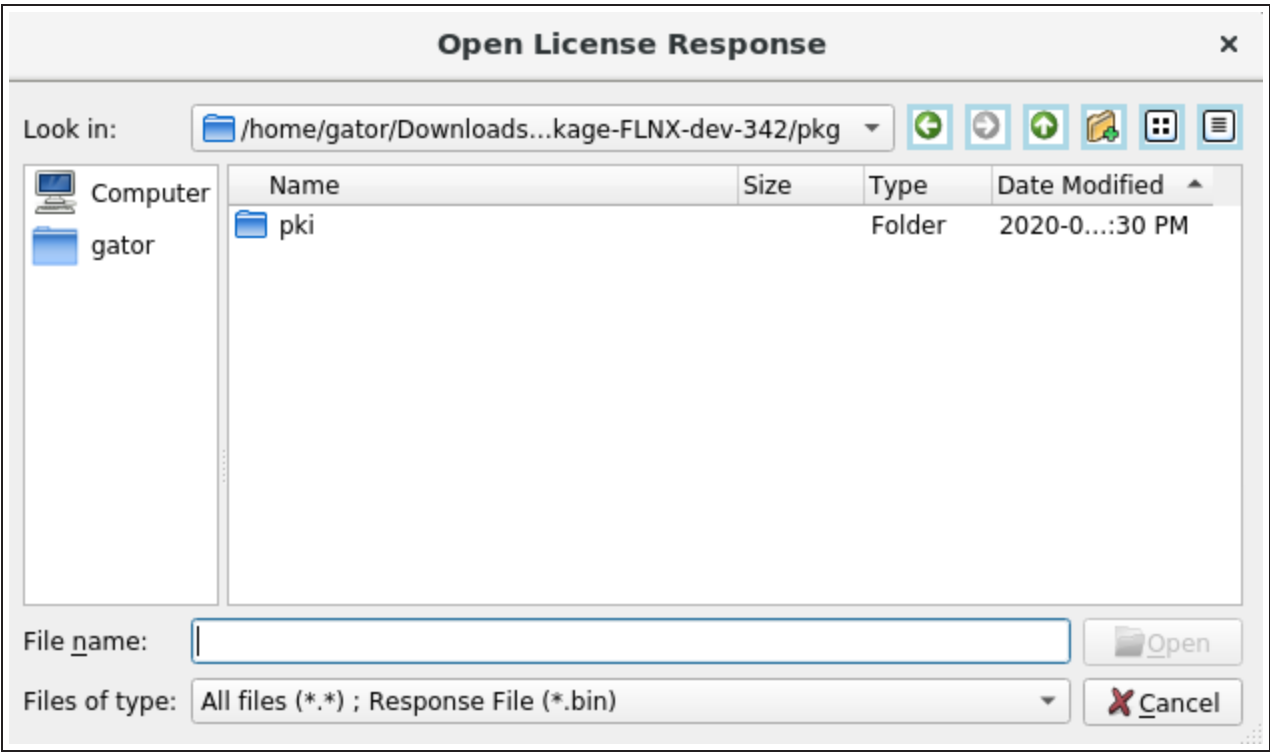
Step2: Requesting license file from the license server

- 1. Send the **request.bin** file to matrikon-license-request@matrikonopc.com.
You get the **response.bin** file in your e-mail as a response from the Matrikon-License-Response@matrikonopc.com e-mail address.
- 2. Save the **response.bin** file in a desired location, accessible to a system where Step 1 is executed.

Step3: Applying the offline activation file

- 1. Click **Process Response File**
- 2. Load the **response.bin** file.

Figure 117 Open License Response



The license is removed.

- 3. You can see the license details in the table on the screen after a few seconds when you refresh that section by collapsing and expanding or using the refresh Icon on the top right corner of the screen. If you still do not see the updated license status, try to reconnect to the Data Broker session. If the problem persists even after this, contact [Matrikon Support](#).



Once you remove the Node Locked license on the Data Broker server, the Data Broker server does not allow any further connections. The license status cannot be checked as the MatrikonDataBrokerLicenseTool connects with the Data Broker server to get the license information. You can restart the Data Broker server to allow the connections as Data Broker runs in the Grace period after restart.

6.7.3 Removing License from Local License Server

Removing License from Local License Server in Online Mode

To remove the license in online mode:

1. Open the **Command Prompt** in administrative mode.
2. Execute the following command:

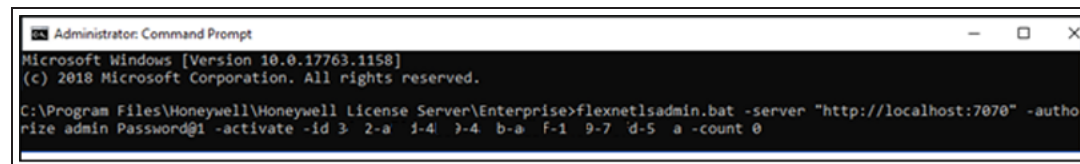
```
flexnetlsadmin.bat -server [http://hostname:port or ip address:port]. -authorize admin [Admin Password] -activate -id[Activation Key] -count [Count Value=0].
```

Example:

```
flexnetlsadmin.bat -server http://localhost:7070 -authorize admin Password1 -activate -id 34xx-hy7y-ij89-9kl8-jh8k-jk89-t09y-98hj -count 0.
```

The license is removed.

Figure 118 Command Prompt



3. To check the status of the license:
 - Execute the following command:

```
flexnetlsadmin.bat -server [http://hostname:port or ip address:port]. -authorize admin [Admin Password] -licenses -verbose.
```

Example:

```
flexnetlsadmin.bat -server http://10.45.89.56:7070 -authorize admin Password1 -licenses -verbose.
```

6.7.3.1 Removing License from Local License Server in Offline Mode

You can remove the license in 3 steps:

1. Generating request file.
2. Requesting a removal request file from the centralized license server through e-mail.
3. Apply the received offline removal file to the Local license server.
4. Steps 1 and 3 can be executed on a Local license server installed, and Step 2 on any system with internet access to send and receive e-mails.

Step 1: Generating request file

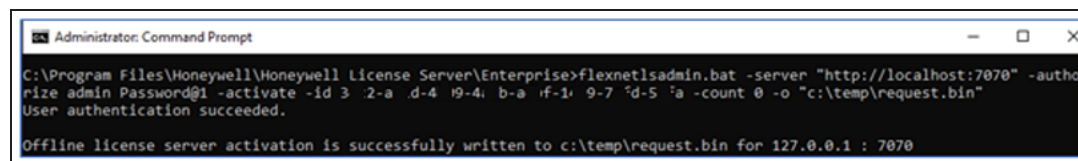
1. Open **Command Prompt**.
2. To get an Offline Removal Request, execute the following command:

```
flexnetlsadmin.bat -server [http://hostname:port or ip address:port]. -authorize admin [Admin Password] -activate -id[Activation Key] -count [Count Value=0] -o [Path where you wish to store the request].
```

Example:

```
flexnetlsadmin.bat -server http://localhost:7070 -authorize admin Password1 -activate -id 34xx-hy7y-ij89-9kl8-jh8k-jk89-t09y-98hj -count 0 -o c:\temp\request.bin.
```

Figure 119 Command Prompt



By default, a file named request.bin is generated in your provided path.

Step 2: Requesting removal of the requested file from the centralized license server

1. Send the **request.bin** file to the matrikon-license-request@matrikonopc.com.
You get the **request_Response.bin** file in your email as a response from Matrikon-License-Response@matrikonopc.com email address.
2. Save the **request_Response.bin** file into the same path where you have the **request.bin** file.

Step 3: Apply the offline activation file to the Local license server

1. Open **Command Prompt**.
2. Execute the following command:

```
flexnetlsadmin.bat -server [http://hostname:port or ip address:port]. -authorize admin [Admin Password] -activate -load [path of request_Response.bin file].
```

Example:

```
flexnetlsadmin.bat -server http://localhost:7070 -authorize admin Password1 -activate -load c:\temp\request_response.bin
```

Figure 120 Command Prompt



Using this feature, the user can provide context to the available data using pre-defined companion specifications.



Only the Data Mapping Feature needs a License, and the Data Modelling does not.

The feature works with product license for [Data Source to Instance mapping type](#). The Data Mapping needs a license to be applied as explained in [Section 6](#) [Explained in later sections] for the other three types of Data Mapping

1. [Instance to Instance](#)
2. [Instance to Data source](#)
3. [Data source to Data source](#)

The licensed Data Modeling feature looks as follows:

Figure 121 Licensed Data Modeling Feature

The screenshot displays the 'Matrikon Data Broker Configuration' window. The 'Session' dropdown is set to 'Matrikon Data Broker - SmokeTestMDB - Session - 1'. The 'License Management' section is active, showing an 'Activation ID' field with eight empty boxes. Below this are 'Activation' and 'Deactivation' tabs, with 'Activate License Offline' and 'Activate License Online' buttons. At the bottom, a table lists license features, their status, capacity, consumed amount, and expiry date.

Feature	License Status	Capacity	Consumed	License Expiry Date
1 No. of Matrikon Data Broker Instances	Grace Period for 2 Hrs	1	1	2022-05-16T13:02:42Z
2 No. of UA Servers Matrikon Data Broker can connect with	Grace Period for 2 Hrs	5	1	2022-05-16T13:02:42Z
3 No. of UA Servers Matrikon Data Broker can connect using Reverse Connect	Grace Period for 2 Hrs	5	0	2022-05-16T13:02:42Z
4 No. of UA Clients can connect with Matrikon Data Broker UA Server	Grace Period for 2 Hrs	64	1	2022-05-16T13:02:42Z
5 No. of Clients can connect with Matrikon Data Broker UA Server using Reverse Connection	Grace Period for 2 Hrs	64	0	2022-05-16T13:02:42Z
6 Matrikon Data Broker Hosts Drive	Grace Period for 2 Hrs	1	0	2022-05-16T13:02:42Z

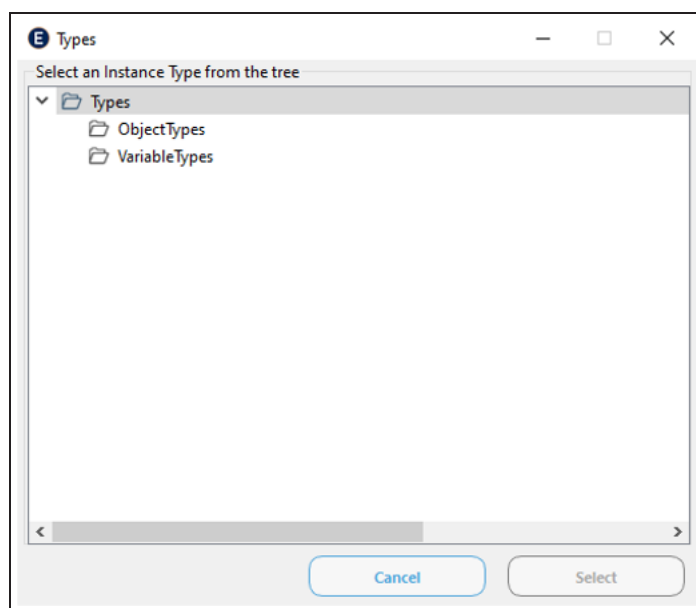
7.1 Import NodeSet File

With this feature, you can Import any Companion Specification (downloaded from [OPCF](#) or created by any vendor) into Matrikon Data Broker AddressSpace, a common Address Space. Throughout this Data Modelling Section, BoilerNodeset.xml is used as an example to show the complete workflow. BoilerNodeset2.xml - Sample file [here](#)

Quick Check to know whether the imported type already exists:

Click New Instance -> Click Type Definition NodeId -> Click "+" Button and Browse ObjectTypes->BaseObject Type

Figure 122 Data Modeling



Expected ObjectType to be created post import in Boiler Type should be imported inside dispatchbasenodesetfile.xml, shown in later screenshots.

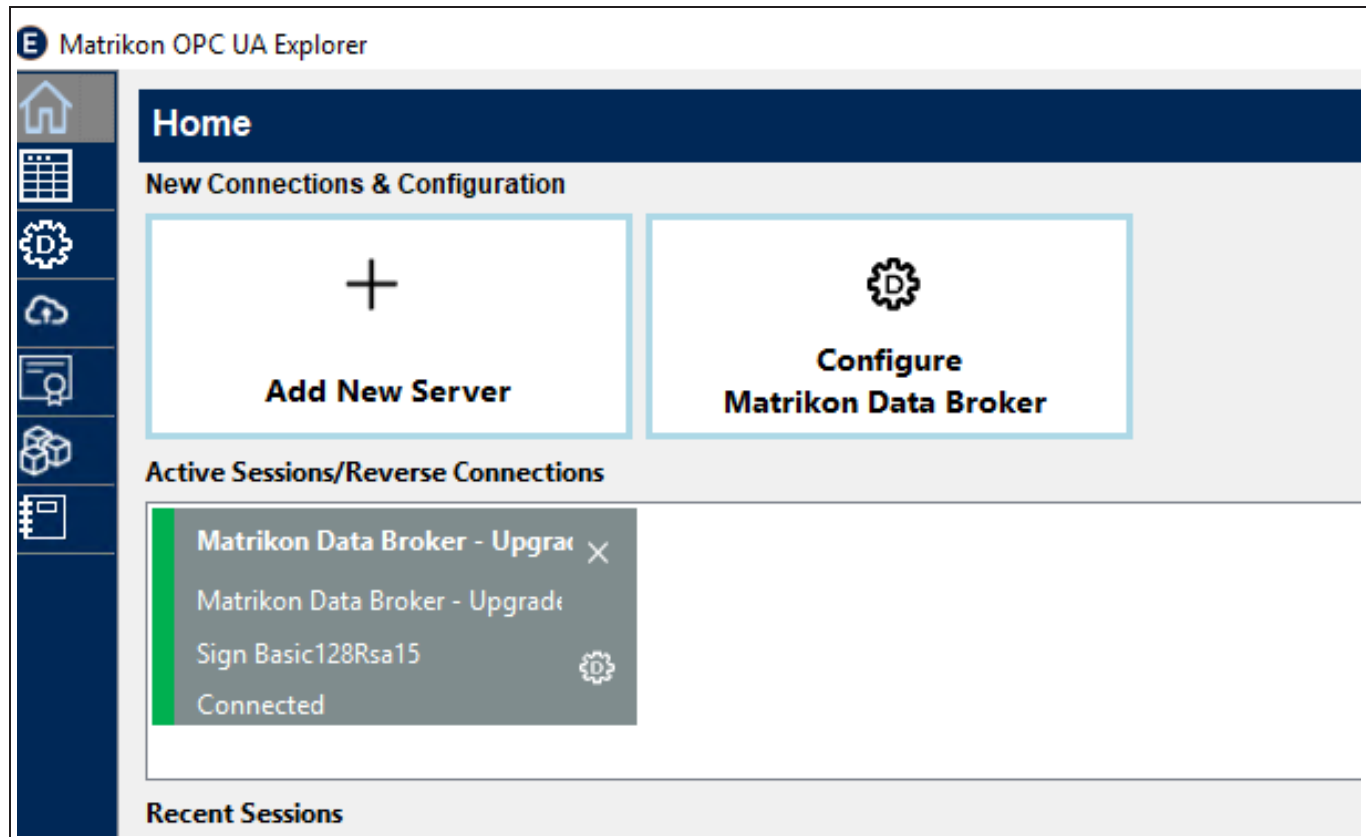
Example

```
<UAObjectType NodeId="ns=1;i=1132" BrowseName="1:BoilerType">
  <DisplayName> BoilerType</DisplayName>
```

Follow the below steps to Validate or Import a Nodeset file:

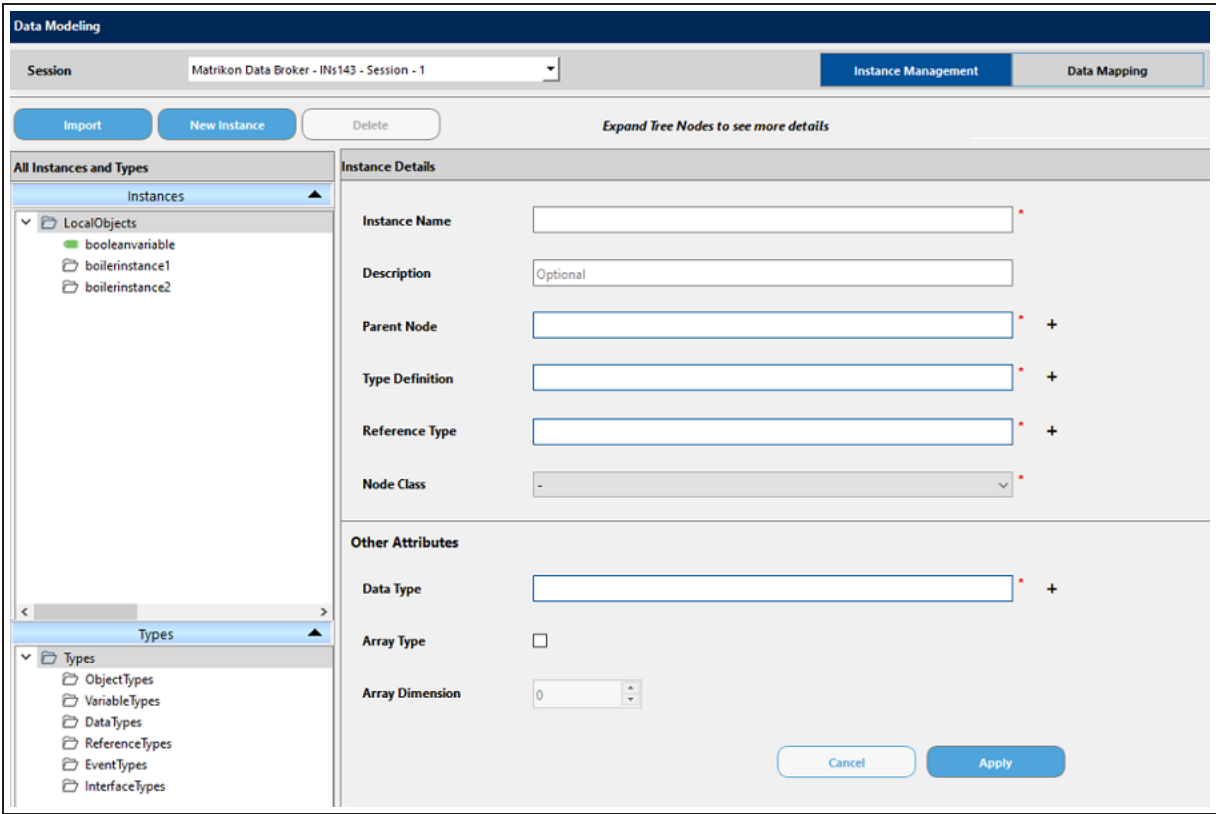
1. Connect to the Data Broker Server and click the Data Modelling icon.  in the left menu bar, as shown below.

Figure 123 Data Modelling Icon



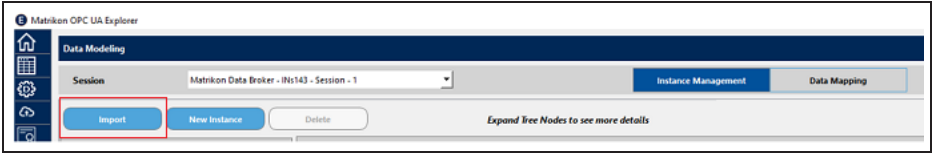
2. This navigates you to the Data Modeling screen, as shown in the below picture.

Figure 124 Data Modeling screen



- 3. Click the Import button on the right-hand side of the Data Modeling Home screen.

Figure 125 Data Modeling Home screen

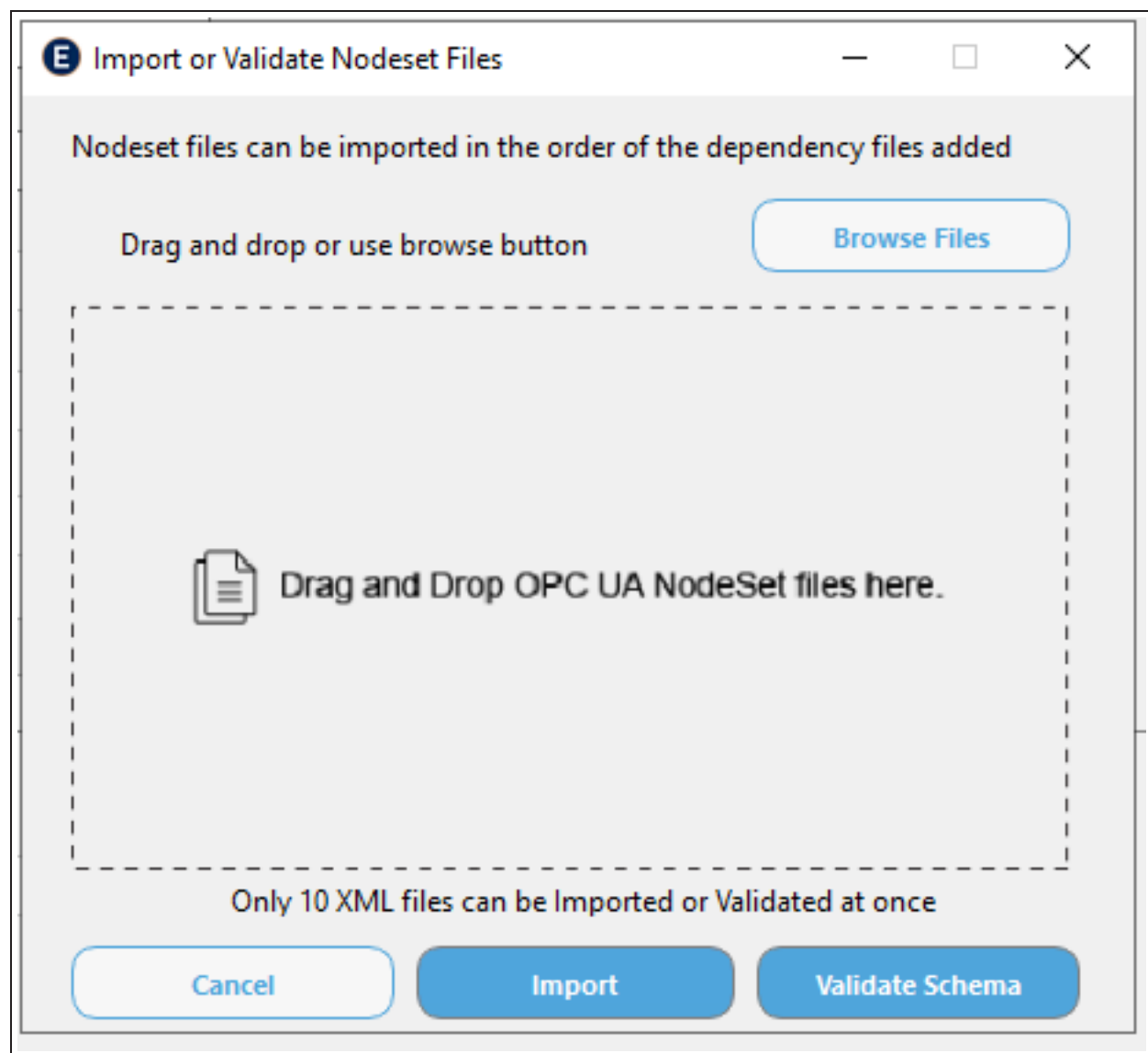


- 4. A new dialog window appears. Drag and Drop the nodesetfile in the Drag Drop area or browse the file using the browse button in the dialog window.

 A maximum of 10 nodesetfile.xml can be dropped or browsed

Also, arrange the dependent address space file in order from top to bottom while dragging.
Click the Browse Files Button to select the Companion Specifications required to be imported.

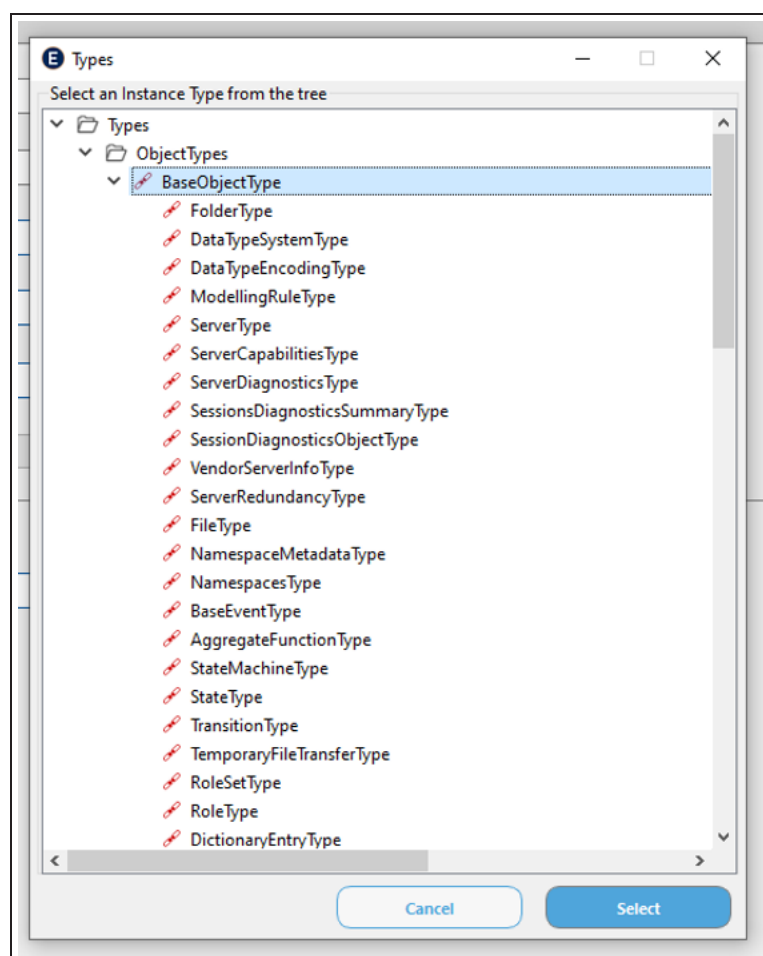
Figure 126 Import Files



5. Click the **Validate Schema** button to Validate the NodeSetFile.

Here, the Boiler is an object. So, we are selecting ObjectTypes->BaseObject Type. You should see the Boiler Type or the types you expect shown in this tree.

Figure 127 Data Modelling screen



On the Instance Management page, go to Left Panel Types and locate the BoilerType.

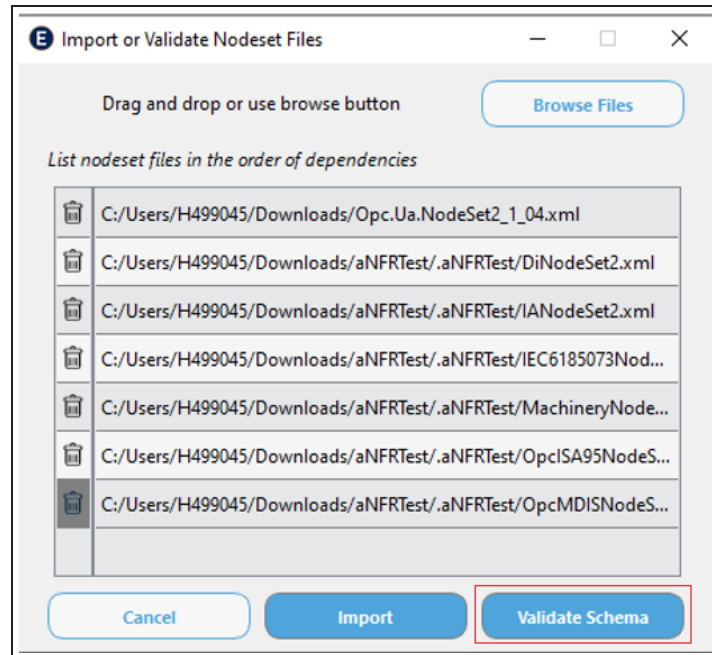
Here, the Boiler is an object. So, we are selecting ObjectTypes->BaseObject Type. You should see the Boiler Type or the types you expect shown in this tree.



Validate Schema validates the NodeSetFile against the OPC Foundation Schema standard. It does not validate the file for syntax errors. Hence, the Validate Schema can pass, but Import fails due to syntax errors.

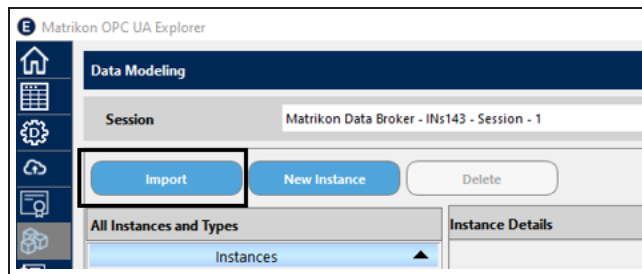
1. The screen is displayed with the Validate Schema button.

Figure 128 Data Modeling - Validate Schema Button



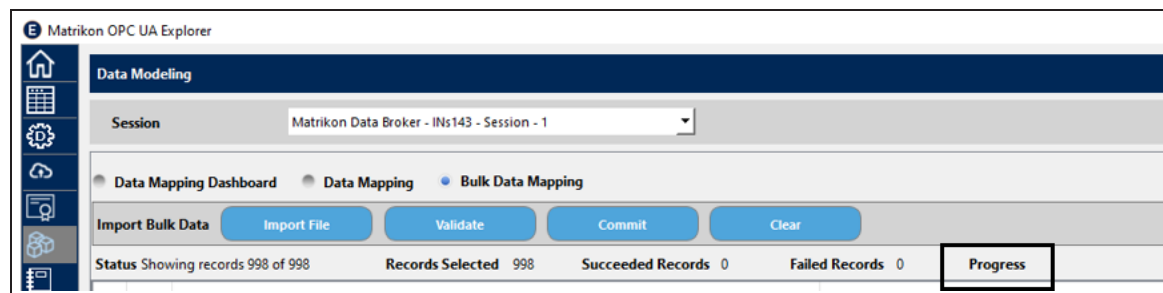
2. Click the **Import** button.

Figure 129 Data Modeling - Import button



3. Progress Bar appears below to show the progress of the import.

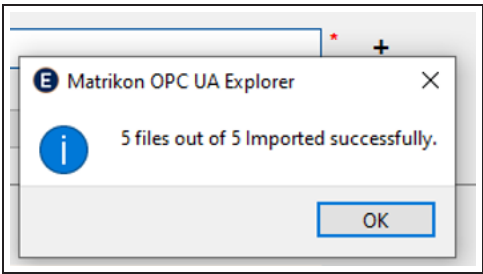
Figure 130 Data Modeling - Progress Bar



A status pop-up is displayed below after successfully importing all the specifications.

All dependent nodeset files should be imported for the import to be successful.

Figure 131 Files imported successfully screen appears.



The detailed logs can be viewed in the Log window as below.

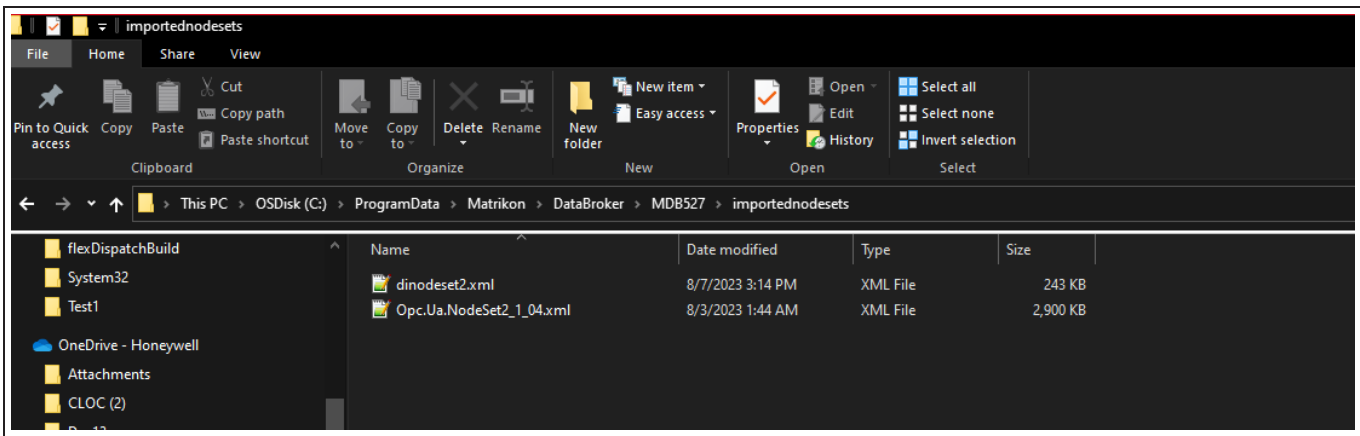
Figure 132 Log Window

Log		
Clear View ☐ Auto Clear		
Timestamp	Session Name	Message
Mon Aug 7 2023 15:14:30	Data Modeling - ImportNodeset	Import succeeded for file DiNodeSet2.xml
Mon Aug 7 2023 15:11:26	Node Mapping Source	Fetches all the typedefinitions for the child nodes of : ns=0;i=84
Mon Aug 7 2023 15:11:26	Node Mapping Source	Fetches all the typedefinitions for the child nodes of : ns=0;i=84
Mon Aug 7 2023 15:11:26	Node Mapping Source	Fetches the typedefinitions of children of node : ns=0;i=84 from the server ...
Mon Aug 7 2023 15:11:26	Node Mapping Instance	Fetches the typedefinitions of children of node : ns=0;i=84 from the server ...
Mon Aug 7 2023 15:11:26	Read Attributes	Read response received
Mon Aug 7 2023 15:11:26	Read Attributes	Read response received
Mon Aug 7 2023 15:11:25	Matrikon Data Broker - MDB527 - Session - 1	Browse request for node : ns=0;i=86
Mon Aug 7 2023 15:11:25	Read Attributes	Read requested for node: ns=0;i=86
Mon Aug 7 2023 15:11:25	Matrikon Data Broker - MDB527 - Session - 1	Browse request for node : ns=1;i=5019
Mon Aug 7 2023 15:11:25	Read Attributes	Read requested for node: ns=1;i=5019

4. The successful import can be verified by physically locating the imported file in the path below.

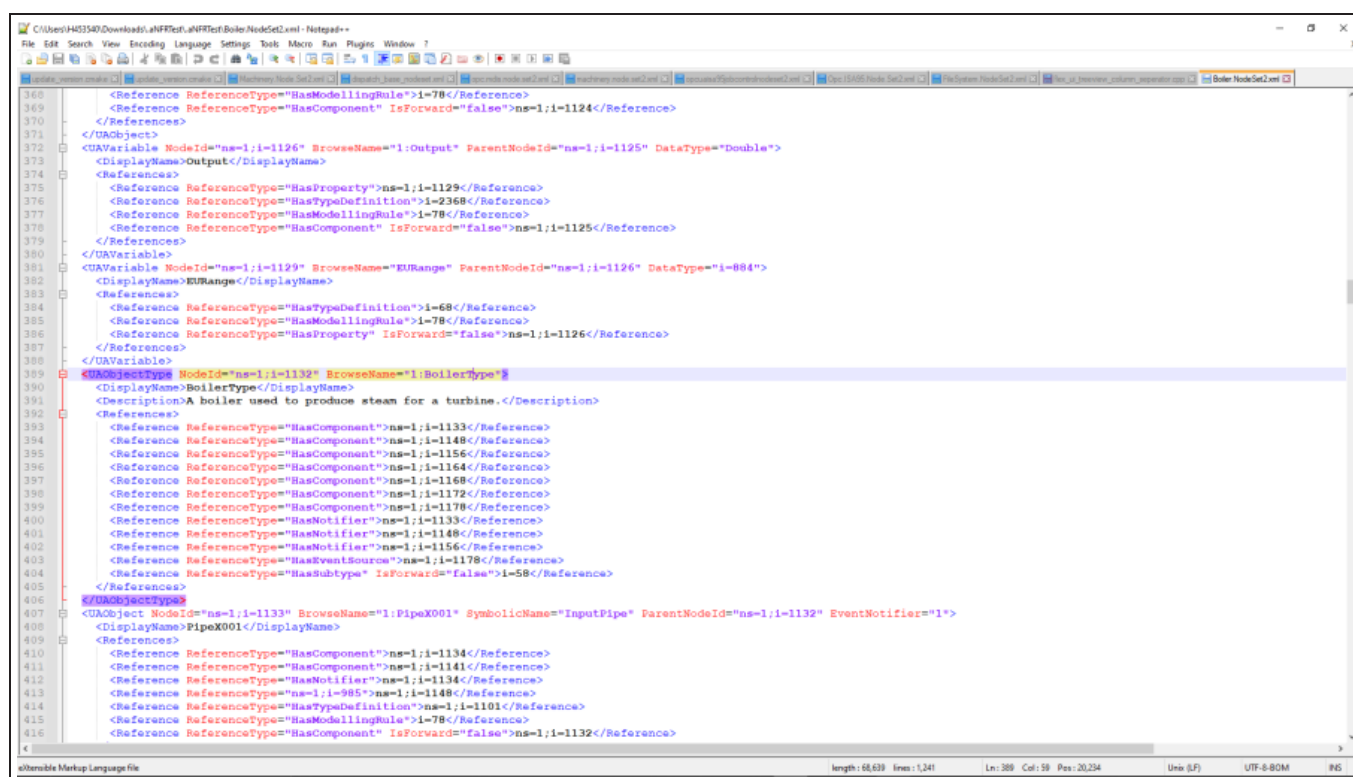
`/<Mdb_running_location_path> /importednodesets`

Figure 133 File Location



Alternately, it can be verified with the `<imported_nodeset_file.xml>`, for example Boiler.Nodeset2.xml, by searching "ns= 1; i=1132" in this example as per our sample, comparing the types available in left Pane of Instance Types as below.

Figure 134 Instance Types



7.2 Create Instance

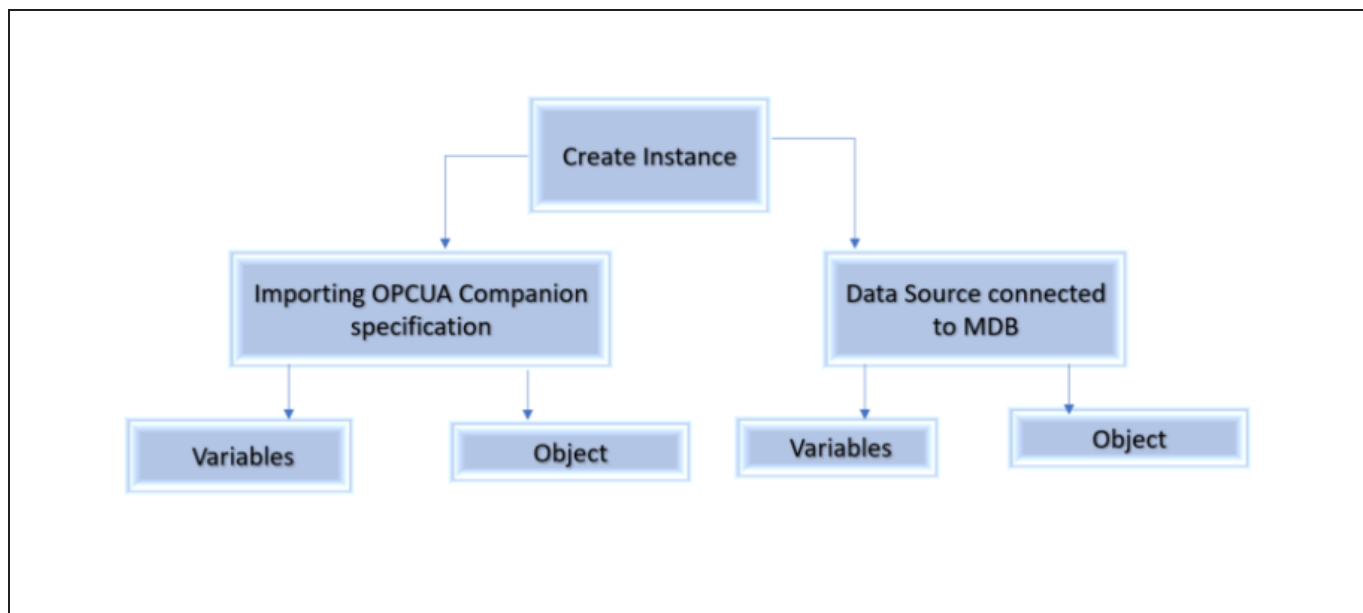
A new Instance from the existing Type can be created from two sources:

1. Data Sources connected to MDB, for example, uacpp, Beckoff, Softing, etc.
2. Companion Specifications XML adhering to OPC UA specifications imported into MDB Address space.

The new Instance can contain variables or objects from imported companion specifications or connected data sources.

Instance creation for all possible combinations is explained below.

Figure 135 Instance Creation



7.2.1 Create instance after Importing Companion Specification for Variable Type

After successful import, click the New Instance Button:

In the Instance Details Window

1. Fill in the Instance Name: example: <MDISCompanionSpecInst> - This is a user-defined field.
2. Under Parent NodeId: Select Local Objects as below.
3. Under Type Definition Node Id: Click.
4. Click the applicable ReferenceTypeNodeId - In the below example, "Organizer" is taken as a relationship.

5. In the Node Class, select "Variable".
6. Click **Apply**.

Figure 136 Data Modeling - Instance Details window

The screenshot displays the 'Data Modeling - Instance Details' window in the Matrikon OPC UA Explorer. The window is titled 'Matrikon OPC UA Explorer' and shows a session 'Matrikon Data Broker - INs143 - Session - 1'. The 'Instance Management' tab is active. The left pane, 'All Instances and Types', shows a tree view with 'Instances' and 'Types' sections. The 'Instances' section is expanded, showing 'LocalObjects'. The 'Types' section is also expanded, showing a list of types: 'ObjectTypes', 'VariableTypes', 'DataTypes', 'ReferenceTypes', 'EventTypes', and 'InterfaceTypes'. The right pane, 'Instance Details', contains the following fields:

- Instance Name:** A text input field.
- Description:** A text input field with the value 'Optional'.
- Parent Node:** A text input field with a '+' icon to its right.
- Type Definition:** A text input field with a '+' icon to its right.
- Reference Type:** A text input field with a '+' icon to its right.
- Node Class:** A dropdown menu with the value '-' and a '+' icon to its right.
- Other Attributes:** A section containing:
 - Data Type:** A text input field with a '+' icon to its right.
 - Array Type:** A checkbox that is unchecked.
 - Array Dimension:** A text input field with the value '0'.

At the bottom right of the window are 'Cancel' and 'Apply' buttons.

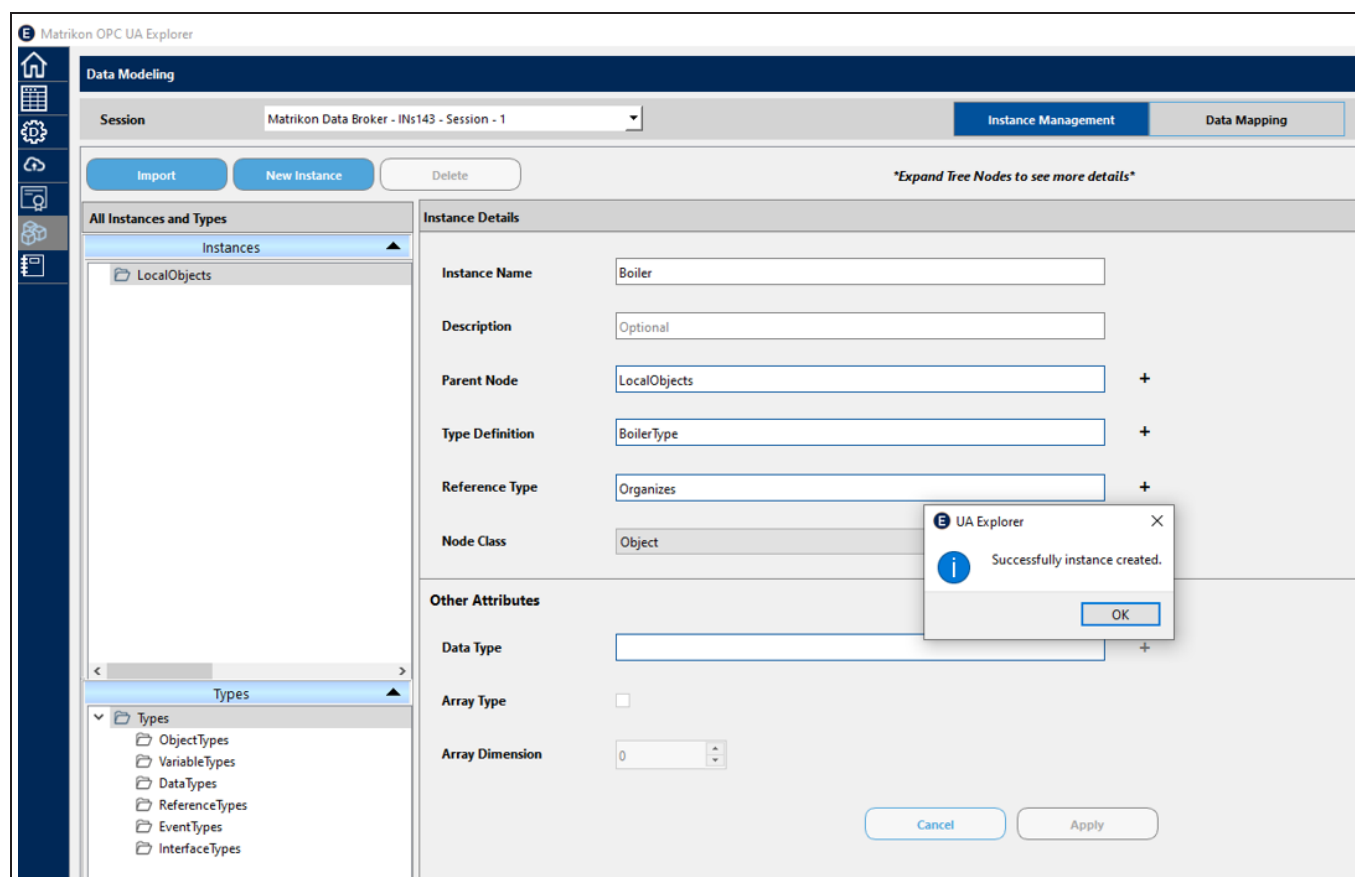
7.2.2 Create Instance using Companion Spec for Object Type

In the Instance Details Window,

1. Fill in the Instance Name: example: <BoilerCompSpecInstance> - This is a user-defined field.
2. Under Parent NodeId: Select Local Objects as below.
3. Under Type Definition Node Id: Select Boiler Type as shown below.
4. Click the applicable ReferenceTypeId - In the below example, "Organizer" is taken as a relationship.

5. In the Node Class, select "Object".
6. Click **Apply**.

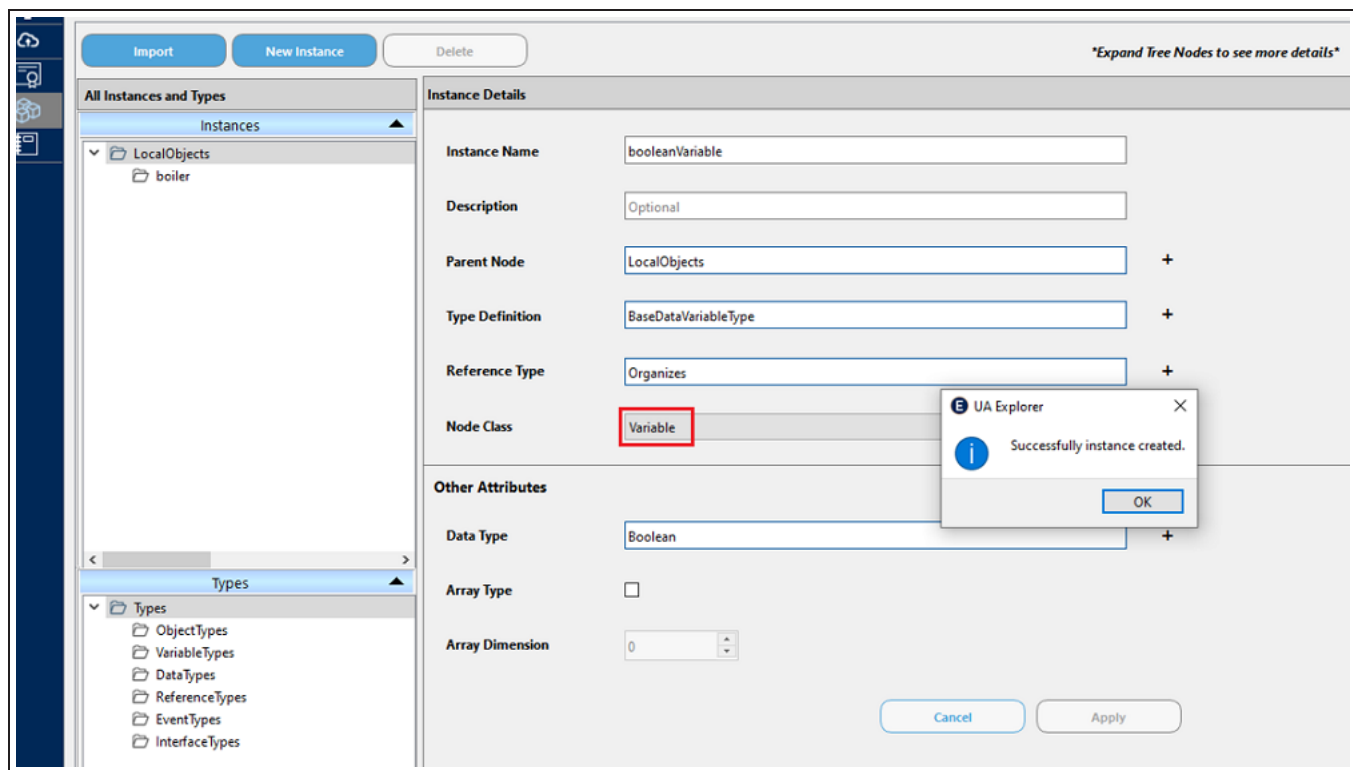
Figure 137 Data Modeling - Instance created successfully



7.2.3 Create Instance using Data Source for Variable Type

Select your desired data source connected using the left pane and follow the same steps as the [7.2.1 Section](#).

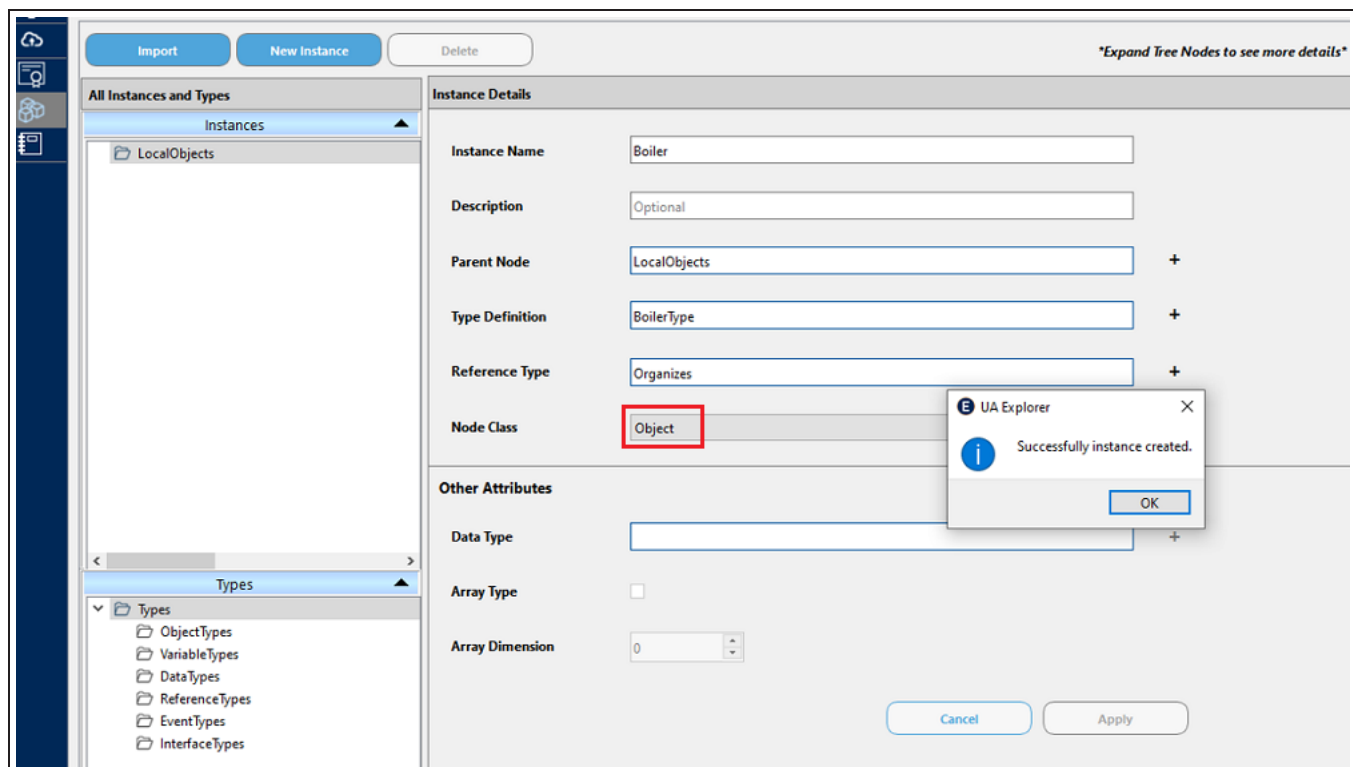
Figure 138 Data Modeling - Data Source for Variable Type



7.2.4 Create Instance using Data Source for Object Type

Select your desired data source connected using the left pane and follow the same steps as the [7.2.2 Section](#).

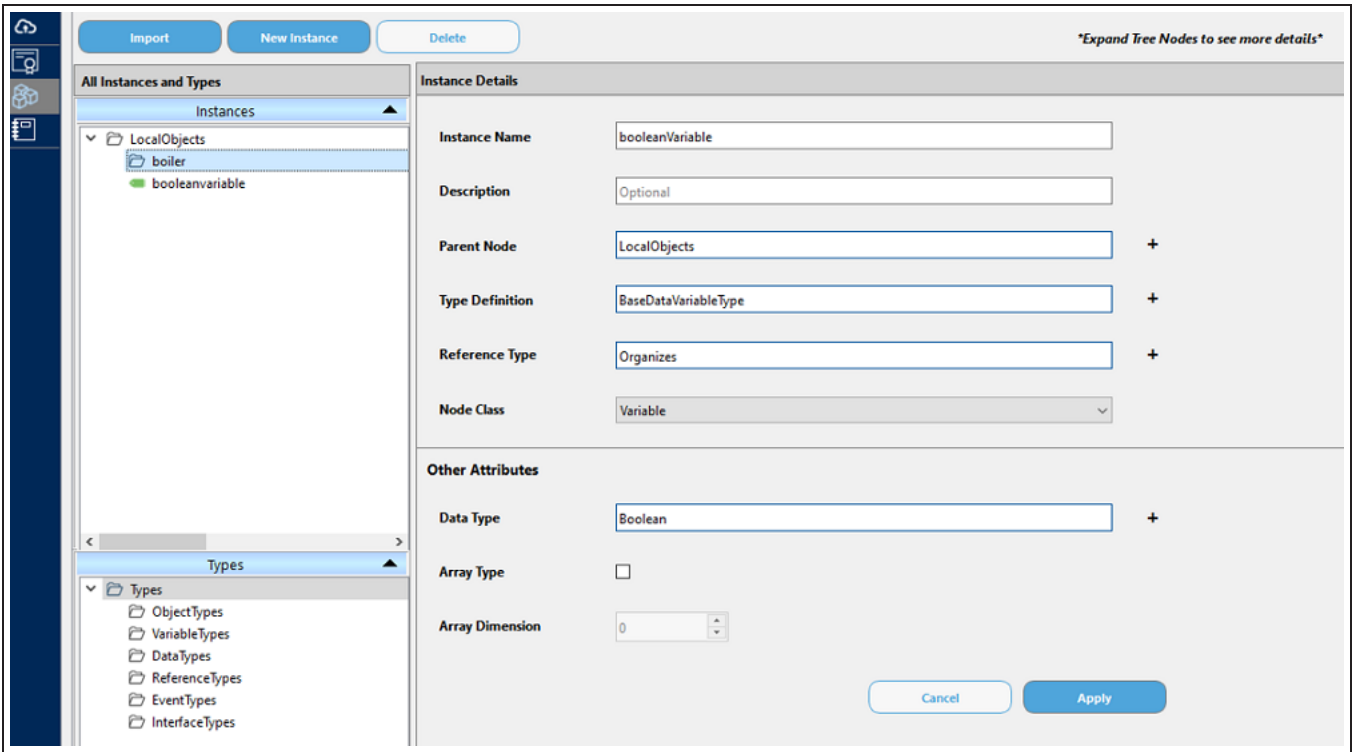
Figure 139 Data Modeling- Data Source for Object Type



7.2.5 Remove Instance

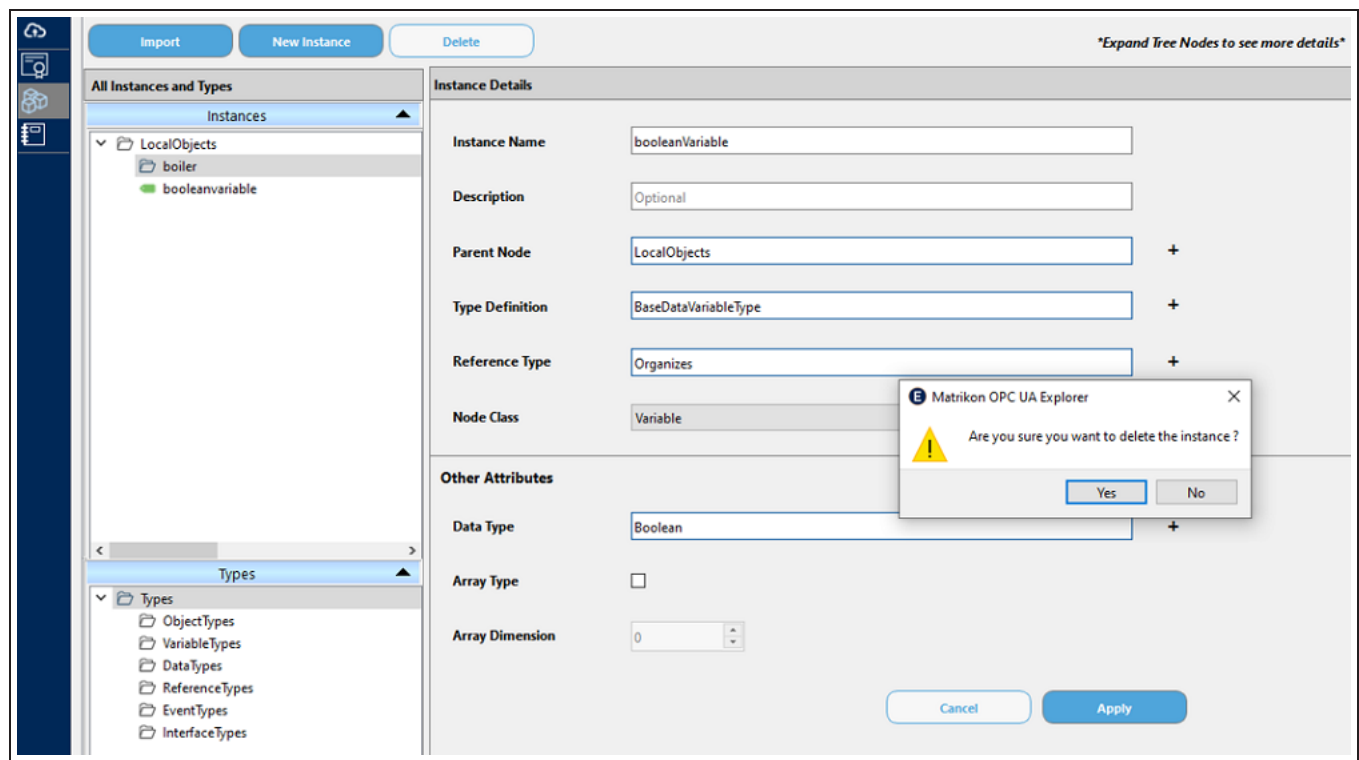
- 1. On the left pane, click the desired instance to be removed from the local objects as shown.

Figure 140 Data Modeling - Remove Instance



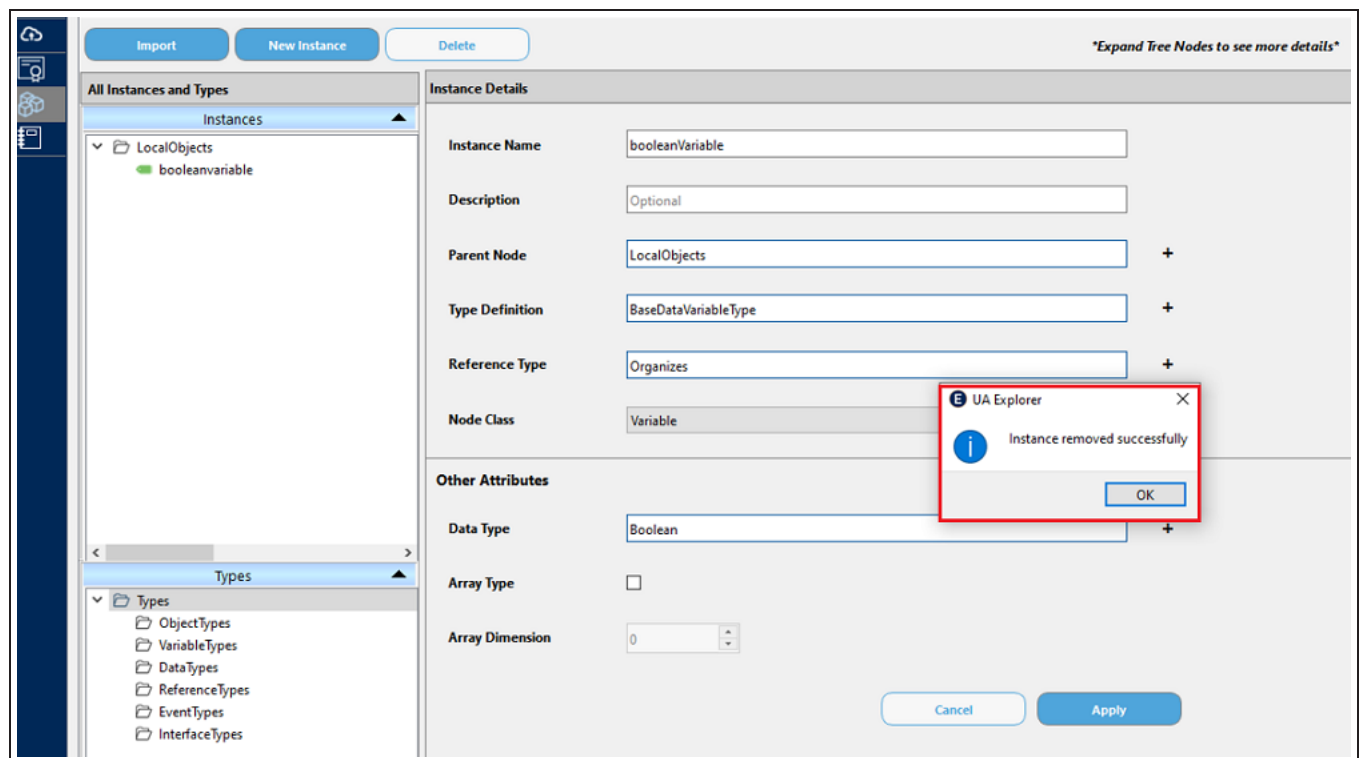
- 2. Confirm the selection.

Figure 141 Data Modeling -Confirming Selection



3. A successful delete instance message can be seen.

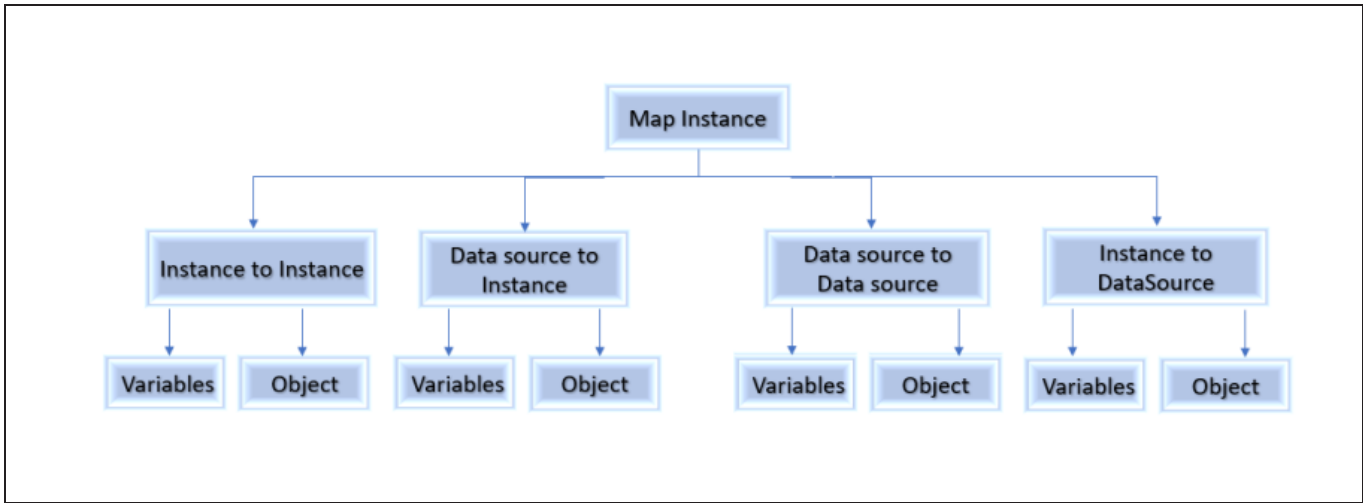
Figure 142 Data Modeling - Delete Instance successfully



7.3 Data Mapping

Mapping of the nodes present between different address spaces with the same type can be achieved using this feature. There are four ways of mapping the nodes based on the sources of nodes.

Figure 143 Map Instance



The rules of mapping are as follows:

1. Both source and destination type Definitions should match (applicable for object types only). The compatibility of Datatypes with Variable Nodes is available [here](#) in detail.
2. The destination should not have any child nodes mapped already.
3. The node provided should be part of the type [The node should be in the Types folder].
4. No multiple parents to any of the child nodes for type [No multiple source nodes for single destination node].
5. Levels of children should match (applicable for object nodes only).
6. Browse names of children should match when mapping from the same type node.
7. Mappings should not be from Types or Views folders.
8. Mapping is done based on AccessLevel permissions for source and destination nodes as per the below-mentioned table.



- For variable nodes, now mapping is allowed for both convertible types as well as the nodes that are in the same hierarchy (e.g., a source node with Number as a datatype can be mapped with the destination node of int32 data type and vice versa).
- A variable with properties/child can now be mapped to a simple variable provided if the datatypes are matched; if not, the data types of the nodes are convertible or are in the same hierarchy. In this case, only the parent-to-parent node mapping happens, and properties/child nodes are not added.

The following table depicts the "**Calculated Restrictive Access Level**" based on the AccessLevel fetched from Source & Destination variable nodes:

Table 23 Calculated Restrictive Access Level

Src. Node Access Level	Access Level when Dest. Node is Instance	Calculated Restrictive Access Level when Dest. Node is from Instance, i.e., Destination Node gets this Access Level after Mapping	Access Level when Dest. Node is Data Source	Calculated Restrictive Access Level when Dest. Node is from Data Source, i.e., Data Source Node Access Permissions does not change; only in some scenarios, mapping is not allowed.
Read	Write	Read and Write	Write	Write
Read	Read	Do not allow Mapping. (i.e., UA Explorer blocks Mapping)	Read	Do not allow Mapping (i.e., UA Explorer blocks Mapping)
Write	Read	Do not allow Mapping (i.e., UA Explorer blocks Mapping)	Read	Do not allow Mapping (i.e., UA Explorer blocks Mapping)
Write	Write	Write (Valid only for headless UA clients)	Write	Write (Valid only for headless UA clients)
Read & Write	Read	Do not allow Mapping (i.e., UA Explorer blocks Mapping)	Read	Do not allow Mapping (i.e., UA Explorer blocks Mapping)
Read & Write	Write	Write (Valid only for headless UA clients)	Write	Write (Valid only for headless UA clients)
Read & Write	Read & Write	Read & Write	Read & Write	Read & Write
Read	Read & Write	Read & Write	Read & Write	Read & Write
Write	Read & Write	Read & Write	Read & Write	Read & Write
History Read	History Write	Do not allow Mapping (i.e., UA Explorer blocks Mapping)	History Write	Do not allow Mapping (i.e., UA Explorer blocks Mapping)
Read & History Read	Read & History Read	Do not allow Mapping (i.e., UA Explorer blocks Mapping)	Read & History Read	Do not allow Mapping (i.e., UA Explorer blocks Mapping)
Unknown	Any Access Level	Do not allow Mapping (i.e., UA Explorer blocks Mapping)	Any Access Level	Do not allow Mapping (i.e., UA Explorer blocks Mapping)
Any Access Level	Unknown	Do not allow Mapping (i.e., UA Explorer blocks Mapping)	Unknown	Do not allow Mapping (i.e., UA Explorer blocks Mapping)

Data Mapping is done from the “Data Mapping” button on the “Data Modelling” page, as shown below.

Figure 144 Data Modelling page



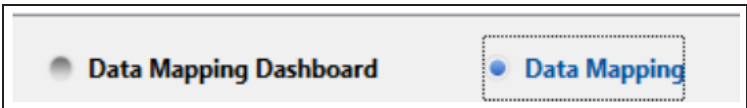
7.3.1 Instance to Instance Mapping

This mapping means the data can be transferred from one instance to another. **The pre-requisite** for this mapping is that the instances should be created and available in the Data Broker AddressSpace under Local Objects to perform the mapping.

Please follow the below Steps to perform Instance to Instance Mapping:

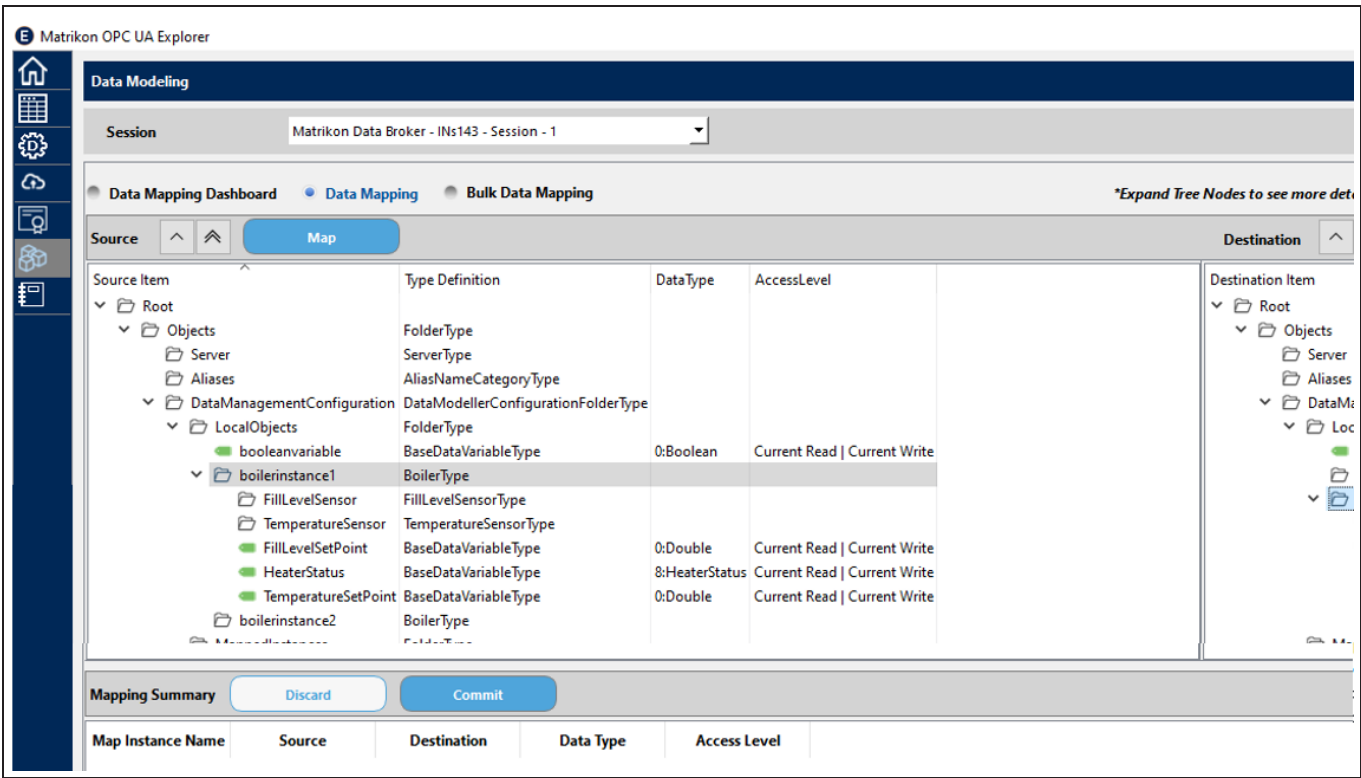
- 1. Click the **Data Modelling** Icon  and click the **Data Mapping** radio button under the **Data Mapping** tab.

Figure 145 Data Mapping tab



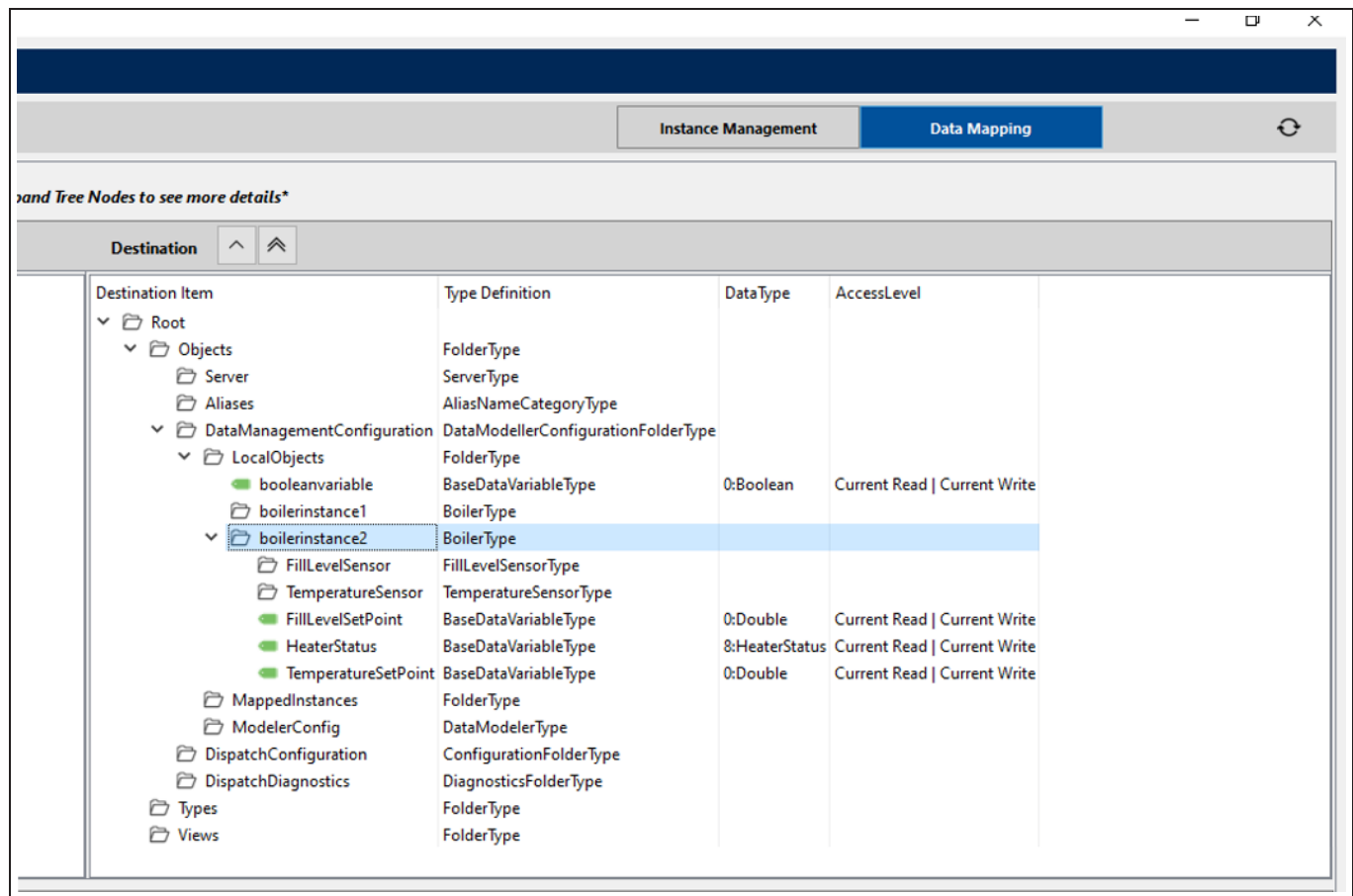
- 2. Select the source node from the left panel with the desired variable or object to be mapped.

Figure 146 Data Modeling - Instance to Instance Mapping



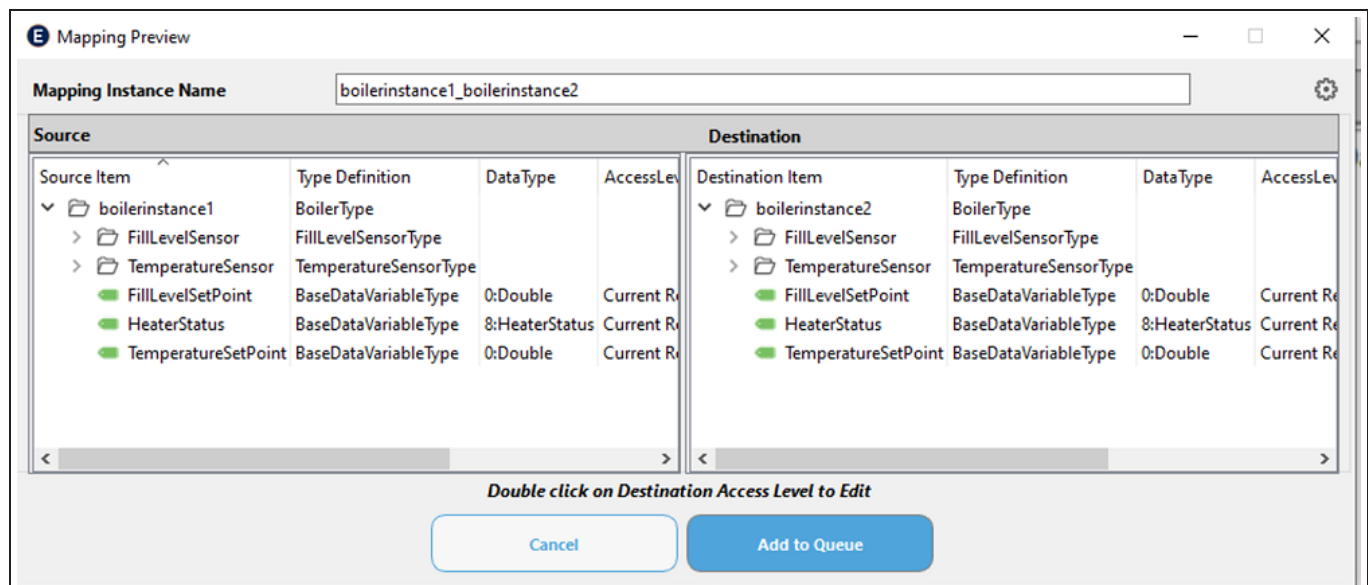
- 3. Select the destination node in the right pane node with the desired variable object to be mapped.

Figure 147 Data Modeling - Variable Object to be mapped



- Click the **Map** Button in the top right corner of the Data Mapping Page. If all the rules mentioned above are followed to map, then the Mapping Preview Page appears as shown in the picture below. Otherwise, the error gets logged in the Log Window. Verify the details, edit the Mapping Instance Name if needed, and click the **Add to Queue** button.

Figure 148 Data Modeling - Mapping Preview



5. All the nodes to map are listed under the “**Mapping Summary**” section, as shown below. Select the items to be mapped and click **Commit**. Suppose there are some items to be corrected or removed. Click **Discard** and select the items again. Once the item selection is finalized, click **Commit** to perform Mapping.

Figure 149 Mapping Summary

Mapping Summary						
		Discard	Commit			
	☐ Select All	Map Instance Name	Source	Destination	Data Type	Access Level
1	☐	boilerinstance1_boi...	FillLevel	FillLevel	0:Double	Current Read Curre...
2	☐	boilerinstance1_boi...	Definition	Definition	0:String	Current Read Curre...
3	☐	boilerinstance1_boi...	EURange	EURange	0:Range	Current Read Curre...
4	☐	boilerinstance1_boi...	EngineeringUnits	EngineeringUnits	0:EUIInformation	Current Read Curre...
5	☐	boilerinstance1_boi...	InstrumentRange	InstrumentRange	0:Range	Current Read Curre...
6	☐	boilerinstance1_boi...	ValuePrecision	ValuePrecision	0:Double	Current Read Curre...
7	☐	boilerinstance1_boi...	FillLevelSetPoint	FillLevelSetPoint	0:Double	Current Read Curre...

6. On successful completion of Mapping, the logs appear as below.

Figure 150 Log Screen

Log		
Clear View ☐ Auto Clear		
Timestamp	Session Name	Message
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : EURange with node Id : ns=3;s=ns=3;i=4/PipeX002/FTX002/Output/EURange
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : Output with node Id : ns=3;s=ns=3;i=4/PipeX002/FTX002/Output
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : EURange with node Id : ns=3;s=ns=3;i=4/PipeX001/ValveX001/Input/EURange
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : Input with node Id : ns=3;s=ns=3;i=4/PipeX001/ValveX001/Input
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : EURange with node Id : ns=3;s=ns=3;i=4/PipeX001/FTX001/Output/EURange
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : Output with node Id : ns=3;s=ns=3;i=4/PipeX001/FTX001/Output
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : SetPoint with node Id : ns=3;s=ns=3;i=4/LCX001/SetPoint
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : Measurement with node Id : ns=3;s=ns=3;i=4/LCX001/Measurement
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : ControlOut with node Id : ns=3;s=ns=3;i=4/LCX001/ControlOut

7. Once the mapping is successful, Mapped Instances appear in the **Data Mapping Dashboard** with all details, as shown in the picture below.

Figure 151 Data Mapping Dashboard

<

8. You can now monitor the Destination Nodes in DA View and see that the same data is available in the Destination Node, which is present in the Source Node.

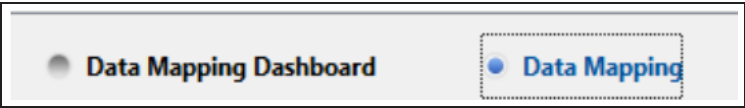
7.3.2 Instance to Data source Mapping

This mapping means the data can be transferred from the Instance Node to another node from the Data Source. **The pre-requisite** for this mapping is that the instance should be created and available in the Data Broker AddressSpace under Local Objects to perform the mapping. Also, the Data Source should be configured and available (connected state).

Follow the below Steps to perform Instance to Data Source Mapping:

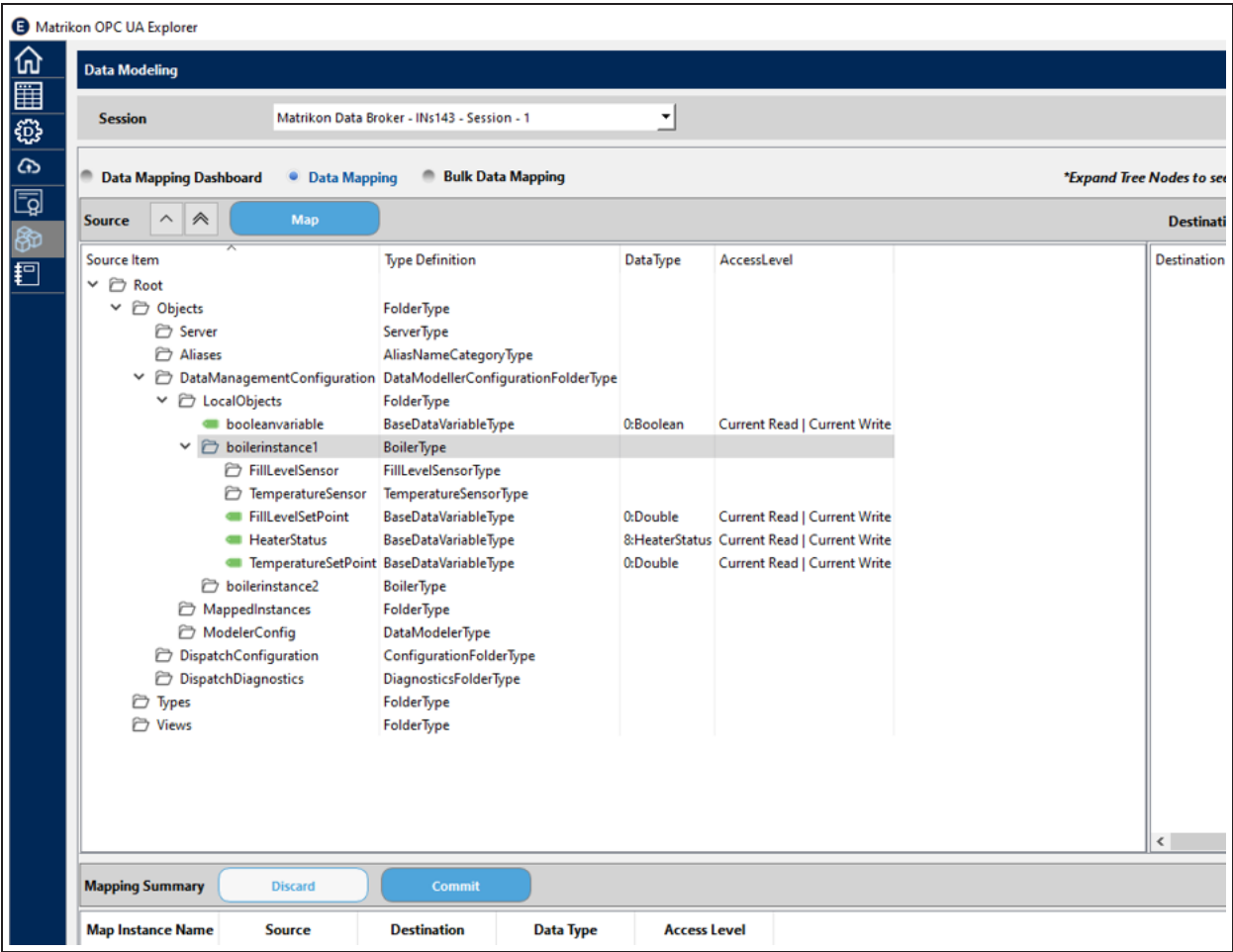
1. Click the **Data Modelling** Icon  and click the **Data Mapping** radio button under the “Data Mapping” tab.

Figure 152 Data Mapping radio button



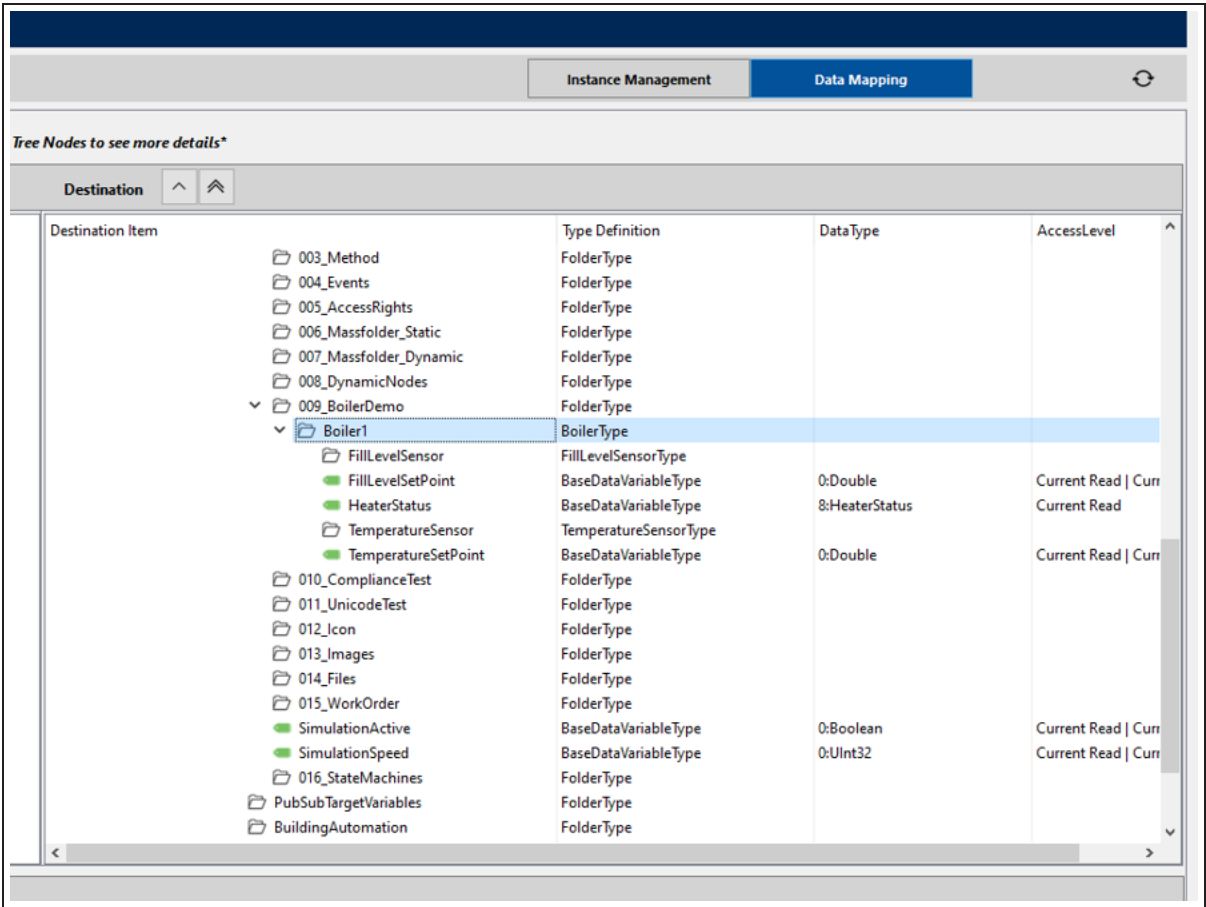
2. Select the Instance Source node (Variable or Object) in the left panel from Local objects to be mapped.

Figure 153 Data Modeling - Instance to Data Source Mapping



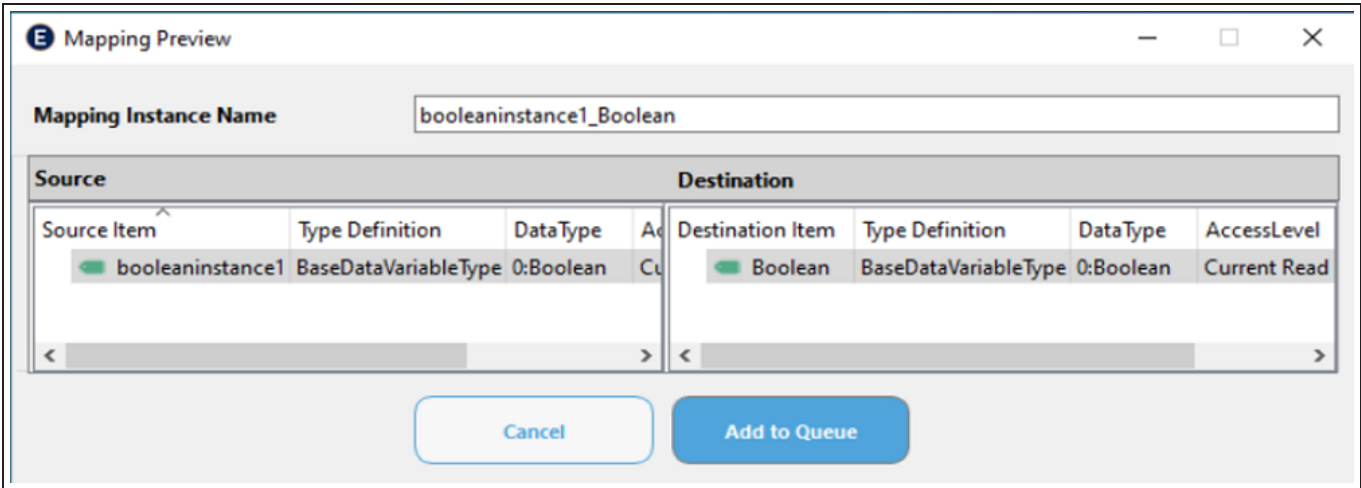
- 3. Select the Destination node (Variable or Object) to be mapped in the right pane. This node should be from the desired connected Data Source.

Figure 154 Data Modeling -Object to be mapped



- 4. Click the **Map** Button in the top right corner of the Data Mapping Page. If all the rules mentioned above are followed to map, then the Mapping Preview Page appears as shown in the picture below. Otherwise, the error gets logged in the Log Window. Verify the details, edit the Mapping Instance Name if needed, and click the **Add to Queue** button.

Figure 155 Data Modeling - Mapping Preview



5. All the nodes to map are listed under the “**Mapping Summary**” section, as shown below. Select the items to be mapped and click **Commit**. Suppose there are some items to be corrected or removed. Click **Discard** and select the items again. Once the item selection is finalized, click **Commit** to perform Mapping.

Figure 156 Mapping Summary - Instance to Data

Mapping Summary

Discard

Commit

	Select All	Map Instance Name	Source	Destination	Data Type	Access Level
1	☒	boolean1_boolean2	boolean1	boolean2	0:Boolean	Current Read Curre...

6. On successful completion of Mapping, the logs appear as below.

Figure 157 Log Screen - Instance to Data

Log		
Clear View ☐ Auto Clear		
Timestamp	Session Name	Message
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : EURange with node Id : ns=3;s=ns=3;i=4/PipeX002/FTX002/OutputEURange
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : Output with node Id : ns=3;s=ns=3;i=4/PipeX002/FTX002/Output
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : EURange with node Id : ns=3;s=ns=3;i=4/PipeX001/ValveX001/InputEURange
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : Input with node Id : ns=3;s=ns=3;i=4/PipeX001/ValveX001/Input
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : EURange with node Id : ns=3;s=ns=3;i=4/PipeX001/FTX001/OutputEURange
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : Output with node Id : ns=3;s=ns=3;i=4/PipeX001/FTX001/Output
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : SetPoint with node Id : ns=3;s=ns=3;i=4/LCX001/SetPoint
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : Measurement with node Id : ns=3;s=ns=3;i=4/LCX001/Measurement
Tue May 24 2022 11:5...	Data Modeling	Mapping success for node : ControlOut with node Id : ns=3;s=ns=3;i=4/LCX001/ControlOut

7. Once the mapping is successful, Mapped Instances appear in the **Data Mapping Dashboard** with all details, as shown in the picture below.

Figure 158 Data Mapping Dashboard - Instance to Data

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8. You can now monitor the Destination Nodes in DA View and see that the same data is available in the Destination Node, which is present in the Source Node.

7.3.3 Data source to Data source Mapping

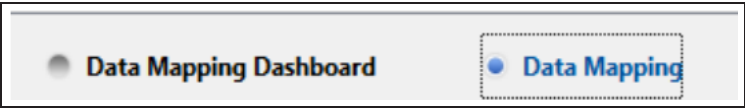
This mapping means the data can be transferred from one Data Source to another.

The pre-requisite for this mapping is that the Data Source should be configured and available (connected state).

Follow below Steps to perform Data Source to Data Source Mapping:

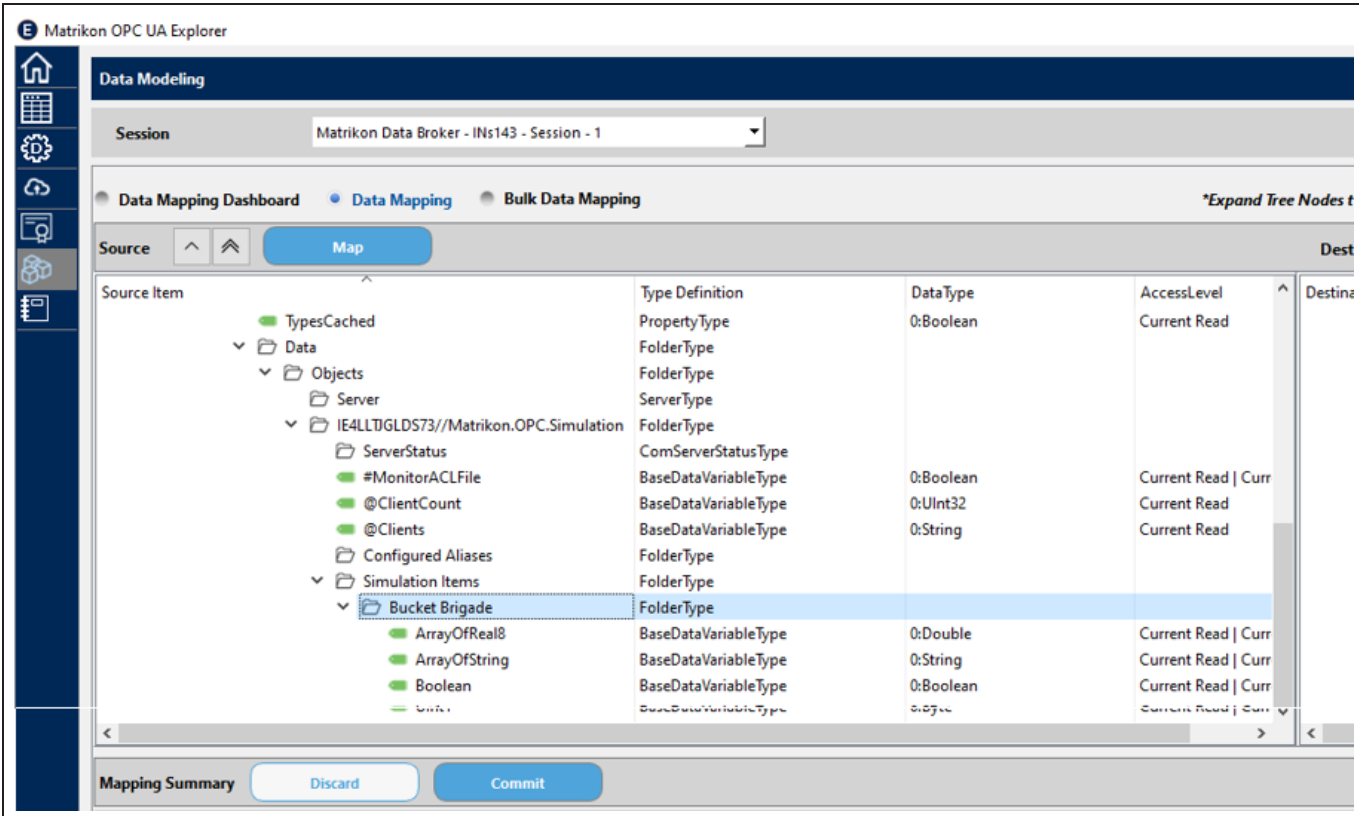
1. Click the **Data Modelling** Icon  and click the **Data Mapping** radio button under the **Data Mapping** tab.

Figure 159 Data Mapping tab



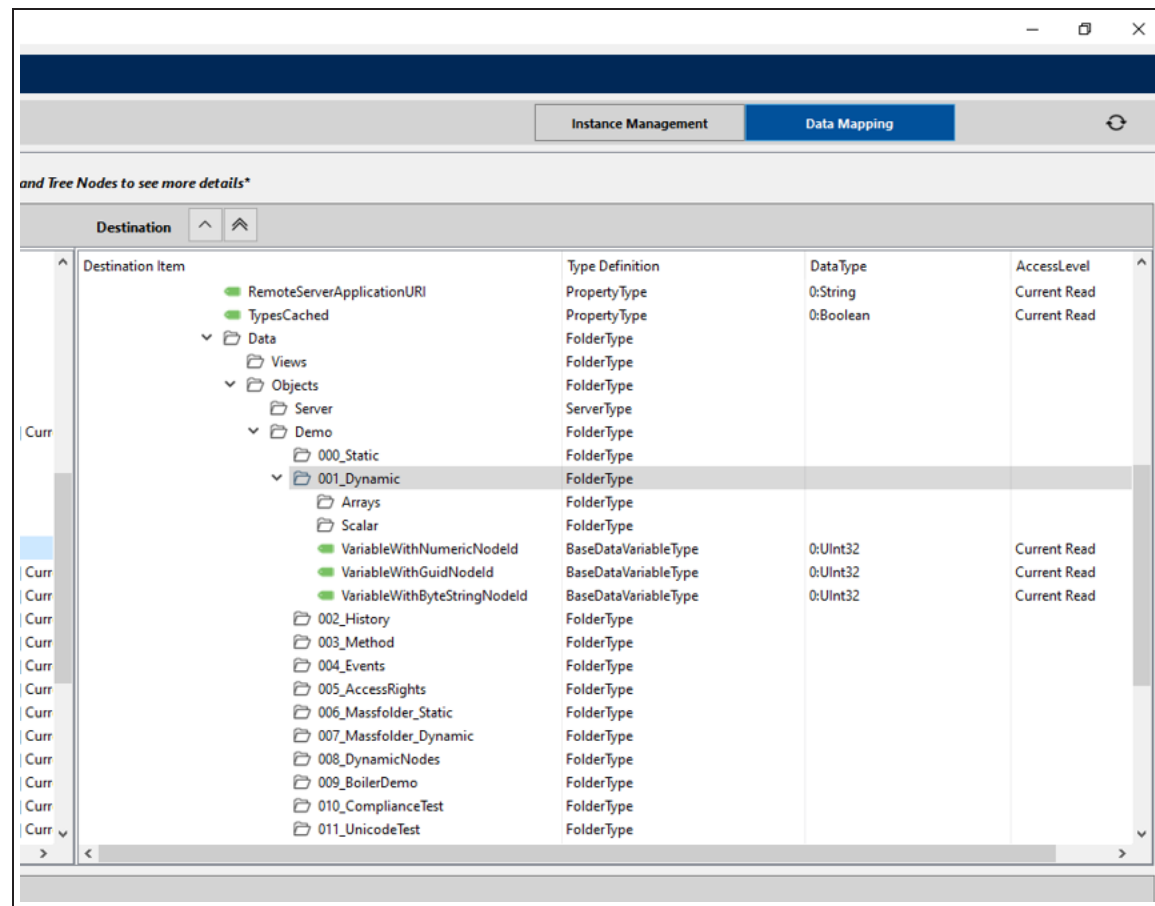
2. Select the source node from the left panel with the desired variable or object to be mapped where the source node is the preferred data source as shown below:

Figure 160 Data Modeling - Data source to Data source mapping



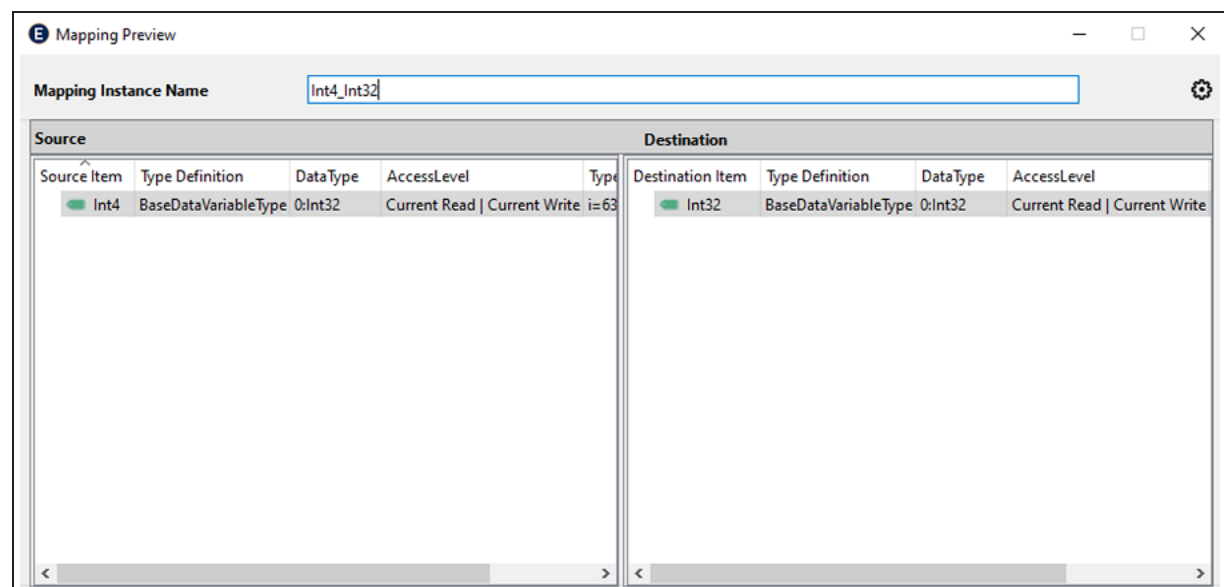
3. Select the destination node in the right pane node from the desired connected data source with the desired variable or object to be mapped.

Figure 161 Data Modeling - Object to be mapped



- Click the **Map** Button in the top right corner of the Data Mapping Page. If all the rules mentioned above are followed to map, then the Mapping Preview Page appears as shown in the picture below. Otherwise, the error gets logged in the Log Window. Verify the details, edit the Mapping Instance Name if needed, and click the **Add to Queue** button.

Figure 162 Mapping Preview



5. All the nodes to map are listed under the “**Mapping Summary**” section, as shown below. Select the items to be mapped and click **Commit**. Suppose there are some items to be corrected or removed. Click **Discard** and select the items again. Once the item selection is finalized, click **Commit** to perform Mapping.

Figure 163 Mapping Summary - Data Source to Data Source Mapping

Mapping Summary					
		Discard		Commit	
	Map Instance Name	Source	Destination	Data Type	Access Level
1	Variable0000_UInt4	Variable0000	UInt4	0:UInt32	Current Read Curre...

6. Once the mapping is successful, Mapped Instances appear in the **Data Mapping Dashboard** with all details, as shown in the picture below.

Figure 164 All Mapped Instances

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7. You can now monitor the Destination Nodes in DA View and see that the same data is available in the Destination Node, which is present in the Source Node.

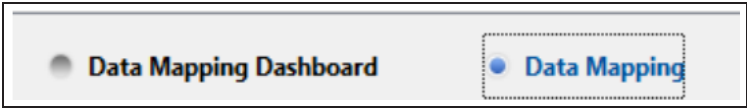
7.3.4 Data source to Instance Mapping

This mapping means the data can be transferred from the Data Source to the created Instance. The pre-requisite for this mapping is that the Data Source should be configured and available (connected state). Also, the Instance should be created under Local Objects.

Follow the below Steps to perform Data Source to Instance Mapping:

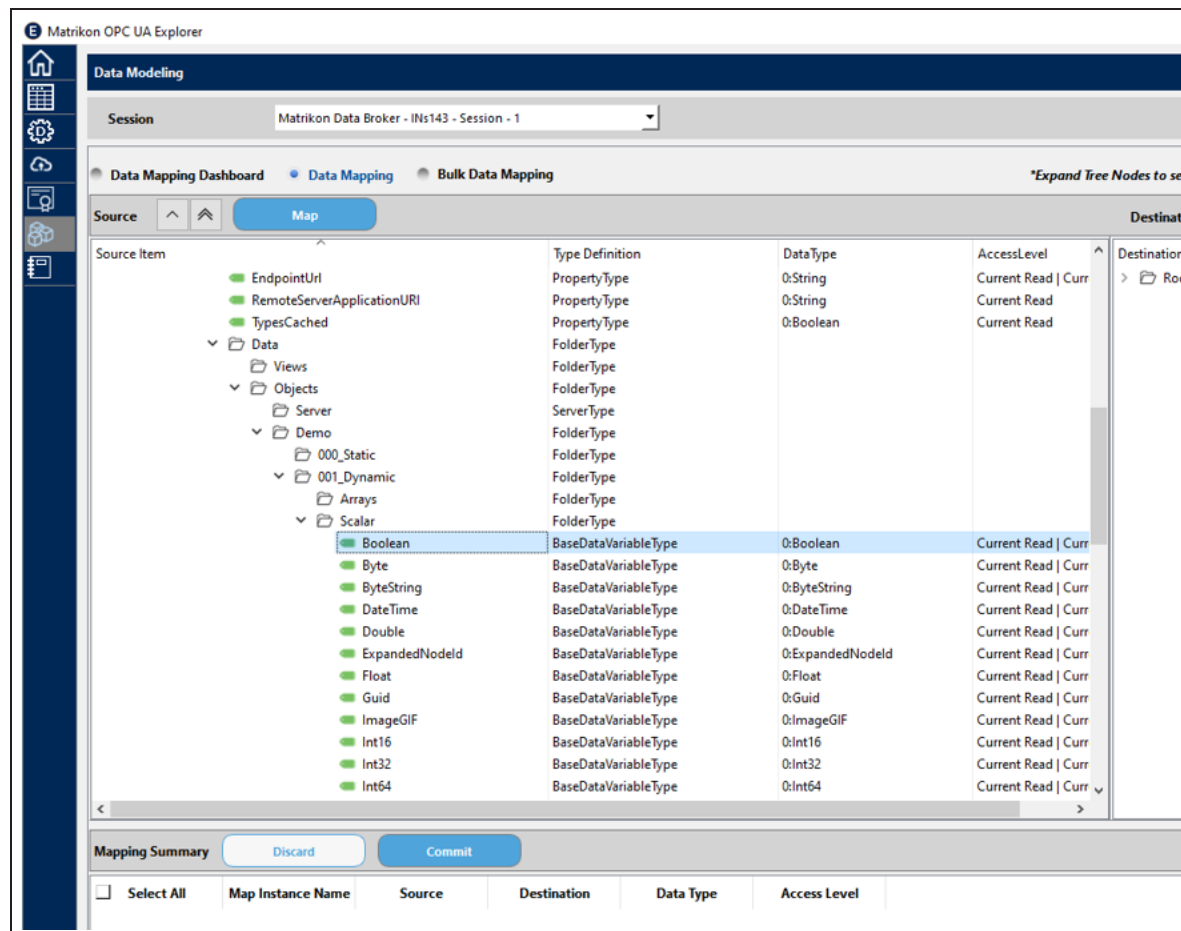
1. Click the **Datamodelling** Icon and click  the **Data Mapping** radio button under the **Data Mapping** tab.

Figure 165 Data Mapping tab



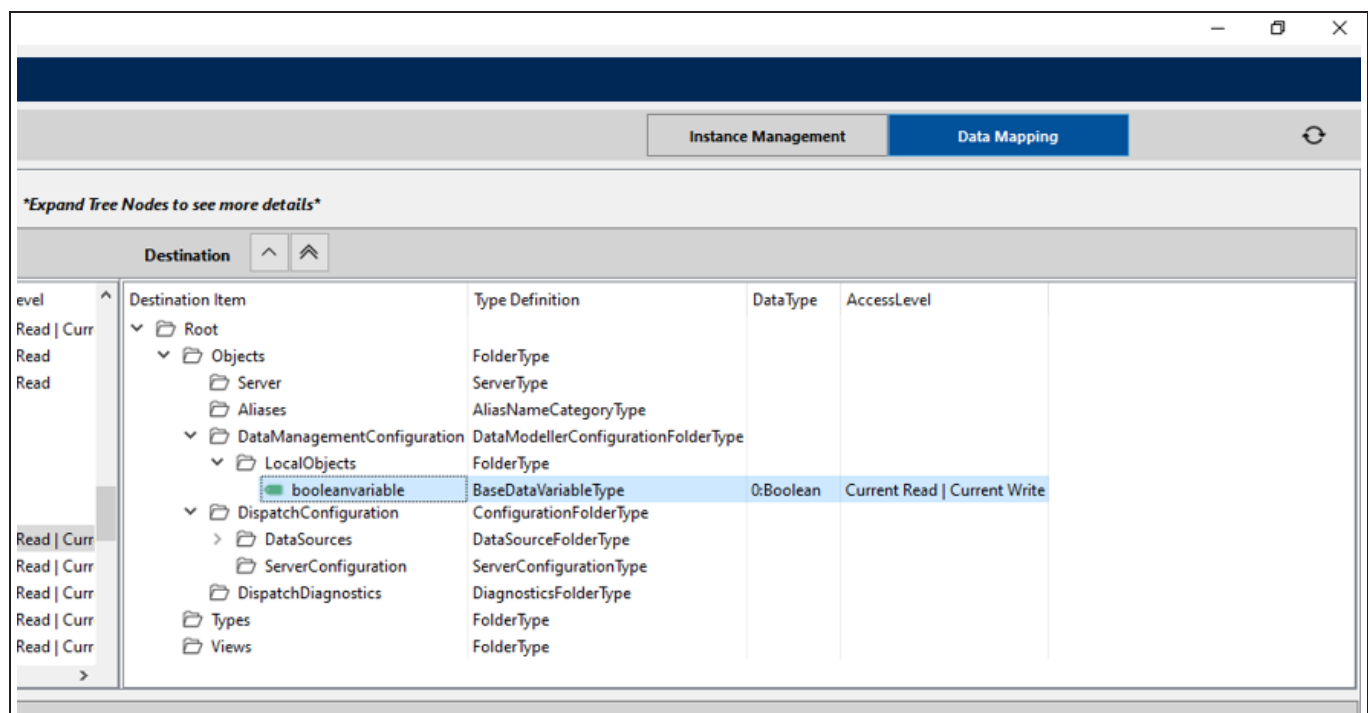
2. Select the source node from the left panel with the desired variable or object to be mapped where the source node is the preferred data source as shown from the Local objects.

Figure 166 Data Mapping Dashboard - Data Source to Instance mapping



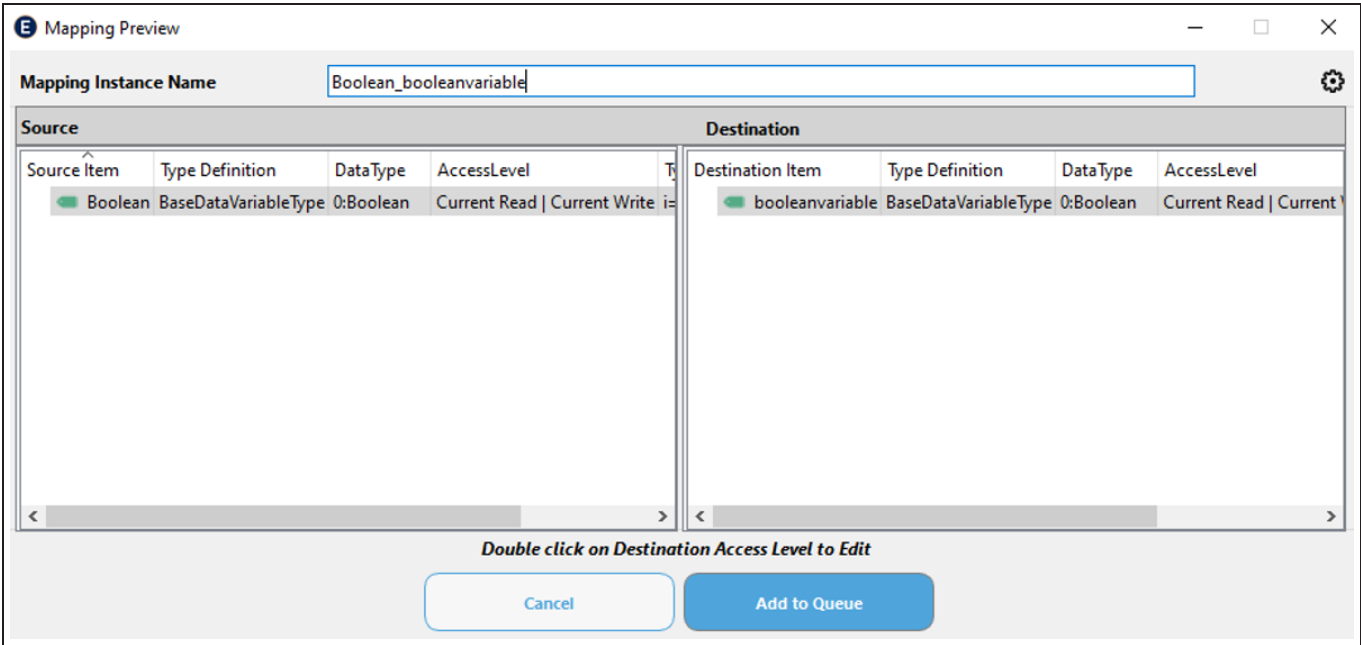
3. Select the destination node in the right pane node from the desired instance from the Local Object with the desired variable or object to be mapped.

Figure 167 Data Mapping - Object to be mapped



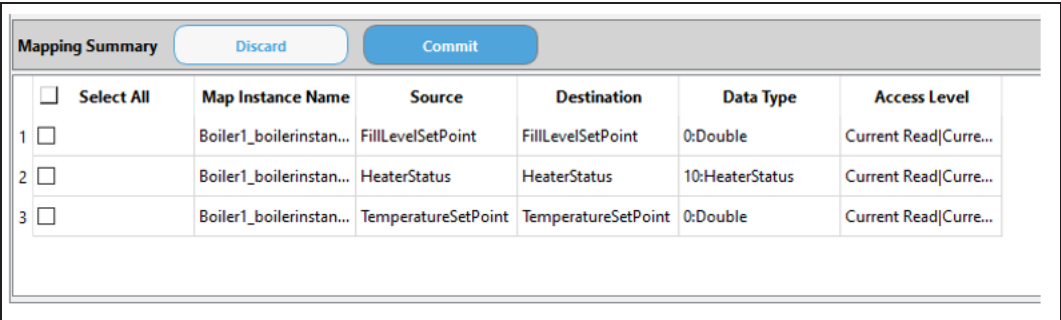
4. Click the **Map** Button in the top right corner of the Data Mapping Page. If all the rules mentioned above are followed to map, then the Mapping Preview Page appears as shown in the picture below. Otherwise, the error would be logged in the Log Window. Verify the details, edit the Mapping Instance Name if needed, and click the **Add to Queue** button.

Figure 168 Mapping Preview



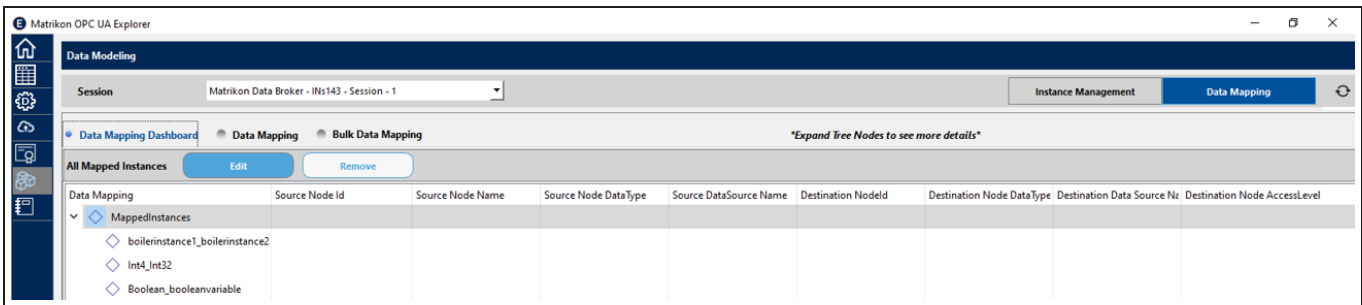
5. All the nodes to map are listed under the “**Mapping Summary**” section, as shown below. Select the items to be mapped and click **Commit**. Suppose there are some items to be corrected or removed. Click **Discard** and select the items again. Once the item selection is finalized, click **Commit** to perform Mapping.

Figure 169 Mapping Summary



6. The confirmation of successful mapping can be verified in the **Data Mapping Dashboard**.

Figure 170 All Mapped Instances



7. You can now monitor the Destination Nodes in DA View and see that the same data is available in the Destination Node, which is present in the Source Node.

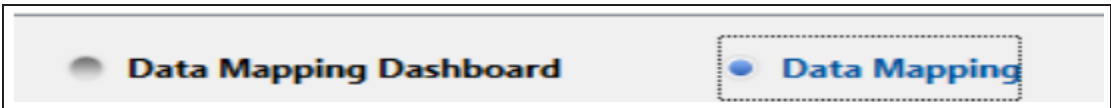
7.3.5 Array Index to Variable Mapping

Array Index to Variable mapping means the data can be transferred from one instance to another. **The pre-requisite** for this mapping is that the instances should be created and available in the Data Broker AddressSpace under Local Objects to perform the mapping.

Follow the below Steps to perform Array Index to Variable or Scalar Mapping:

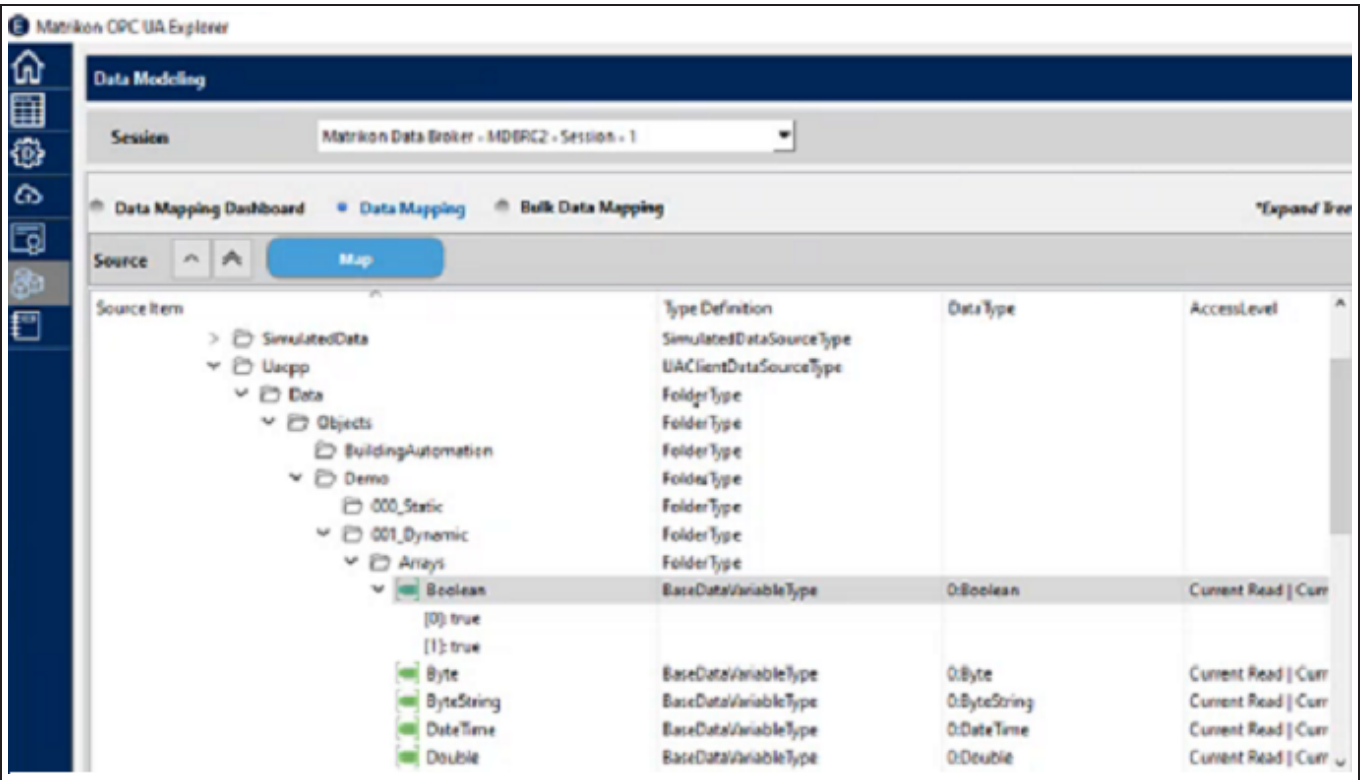
1. Click the **Data Modeling** Icon  and click the **Data Mapping** radio button under the **Data Mapping** tab.

Figure 171 Data Mapping Radio Button



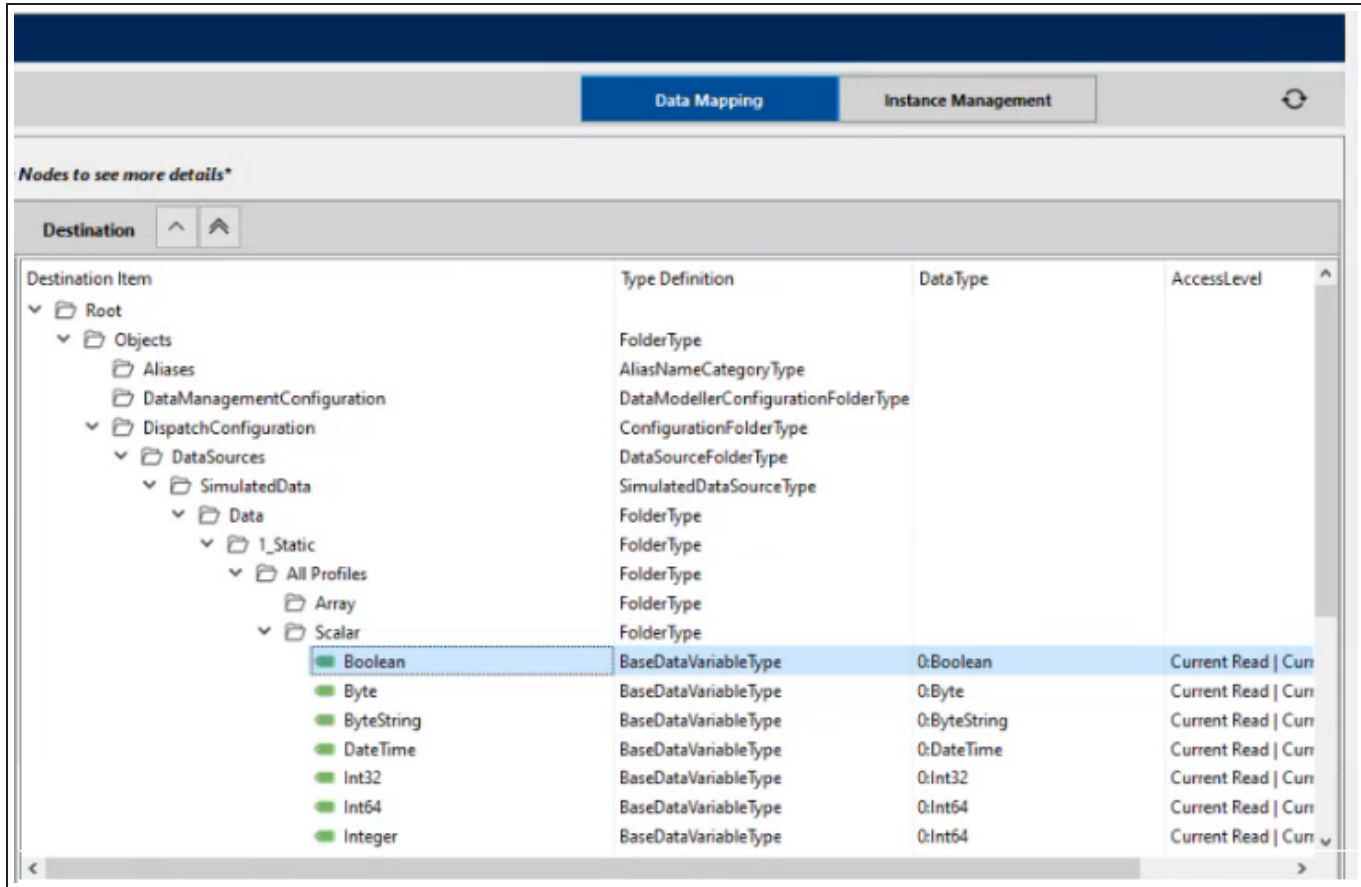
2. Select the desired index array from the left pane to map.

Figure 172 Data Modelling - Array Index to Variable Mapping



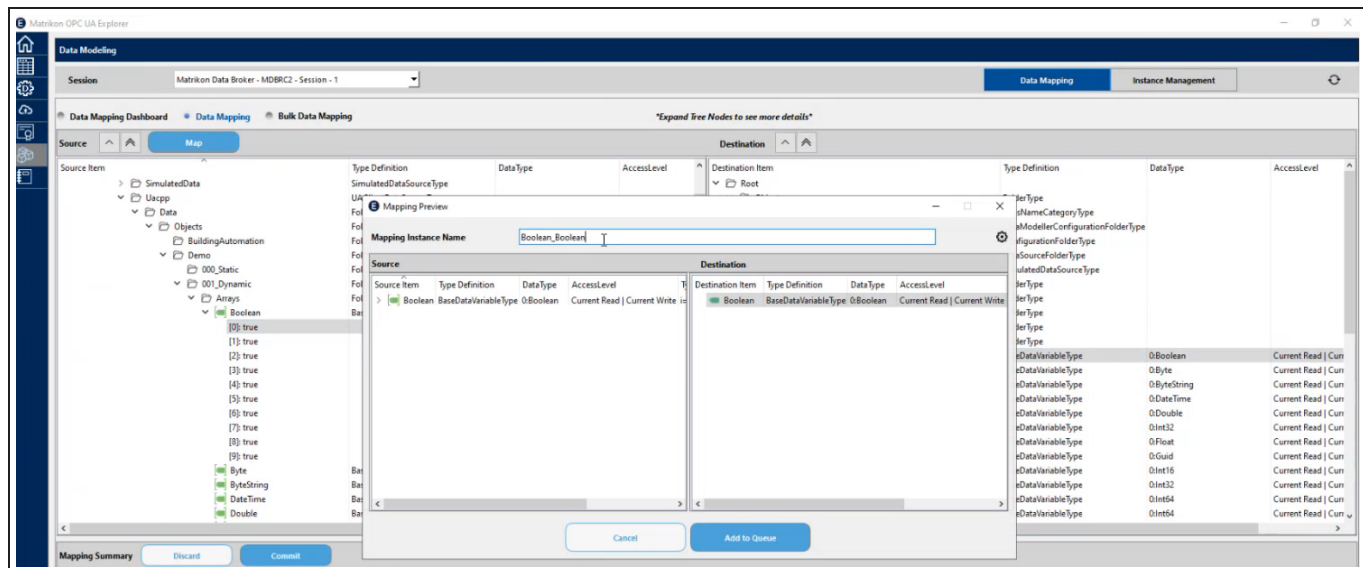
3. Select the desired variable or scalar from the right pane to map.

Figure 173 Data Modeling - Variable to mapped



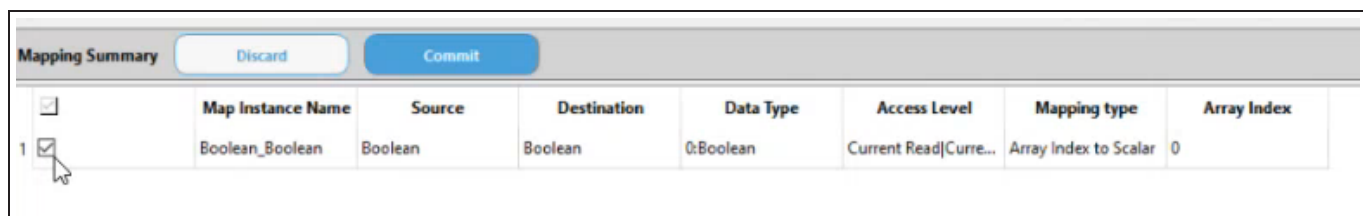
- Click the **Map** Button in the top right corner of the Data Mapping Page. If all the steps mentioned above are followed to map, then the Mapping Preview Page appears as shown in the picture below. Otherwise, the error gets logged in the Log Window. Verify the details, edit the Mapping Instance Name if needed, and click the **Add to Queue** button.

Figure 174 Mapping Instance Name



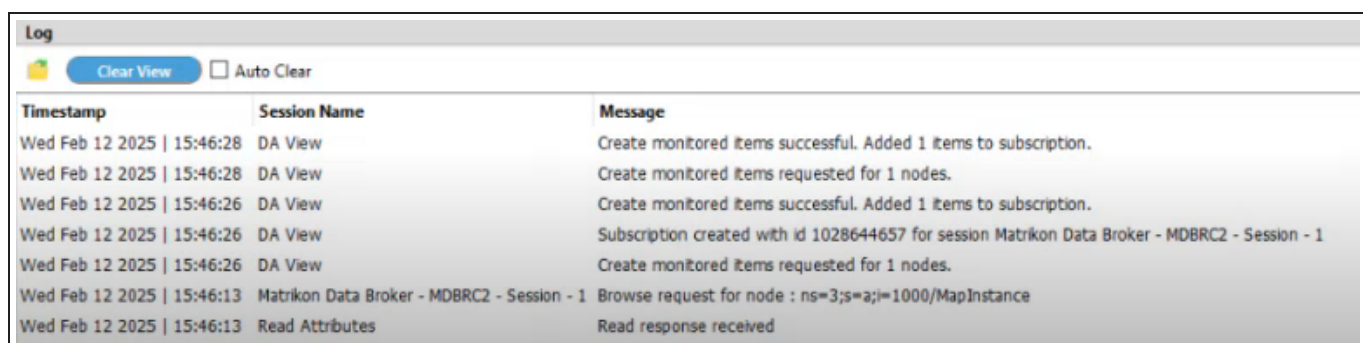
- All the nodes to map are listed under the “**Mapping Summary**” section, as shown below. Select the items to be mapped and click **Commit**. Suppose there are some items to be corrected or removed. Click **Discard** and select the items again. Once the item selection is finalized, click **Commit** to perform Mapping.

Figure 175 Mapping Summary



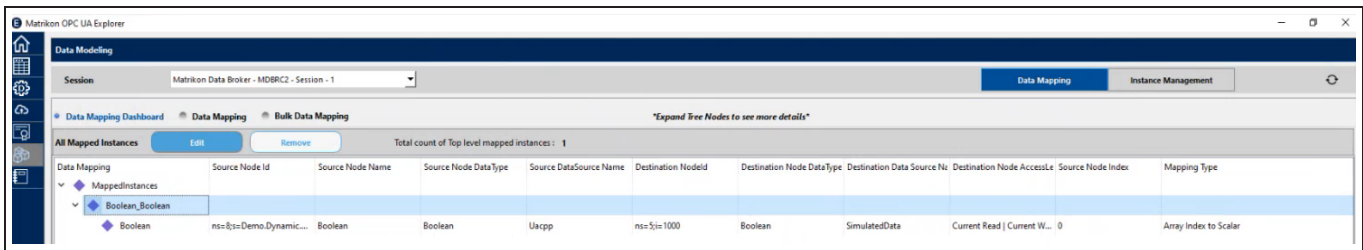
- On successful completion of Mapping, the Log appears as below.

Figure 176 Log Window



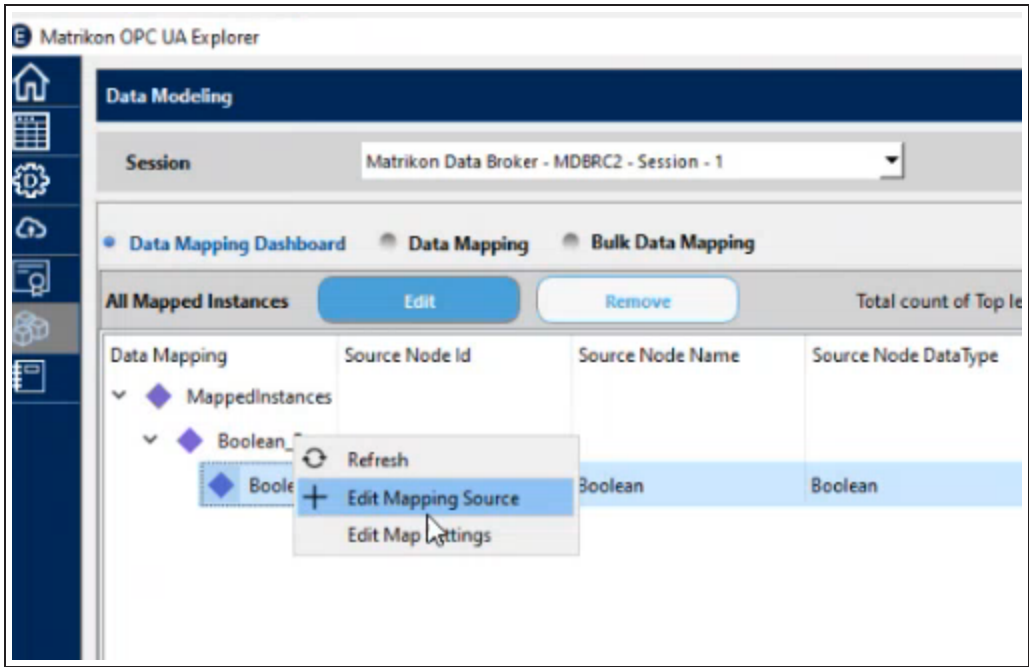
- Once the mapping is successful, Mapped Instances appear in the **Data Mapping Dashboard** with all details, as shown in the picture below.

Figure 177 Data Mapping Dashboard



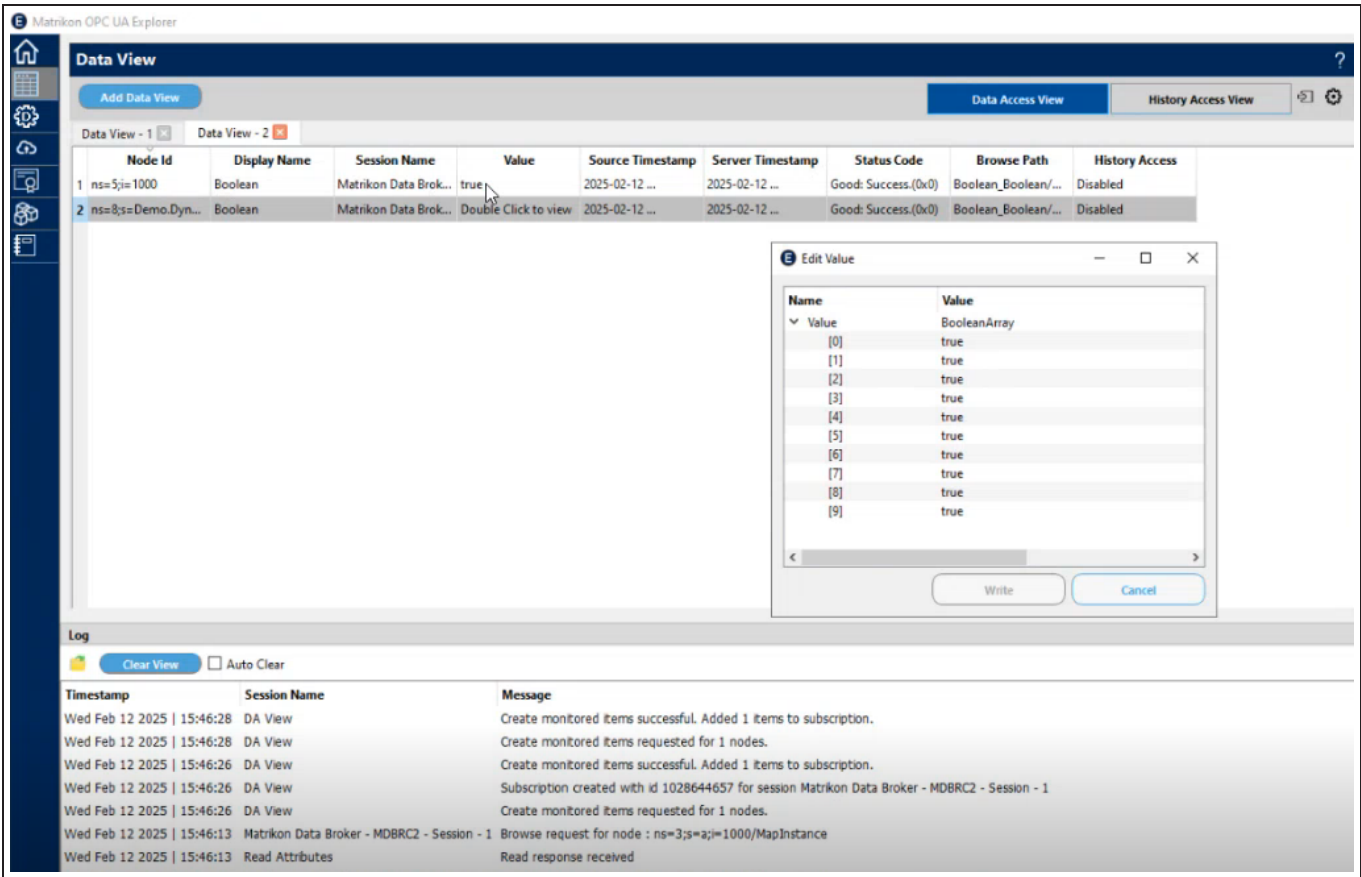
8. Users can **Edit Mapping Source**, including the source but cannot modify the destination.

Figure 178 Edit Mapping Source



9. User can monitor the Destination Nodes in Data Access View and see that the same data is available in the Destination Node, which is present in the Source Node.

Figure 179 Data Access View



These are the steps to perform Array Index to Variable Mapping.

7.3.6 Edit Mapping

The mapped instances can be edited to map to a new Source. This means the old mapping between Old Source and Destination Node gets deleted, and new mapping gets created with the same Destination. This is done using the **Edit** button on the **Data Mapping Dashboard**.

Figure 180 Edit button on Data Mapping Dashboard.





Editing only the Source Node is possible and not the destination node. The nodes that are fully mapped can only be edited. Partially mapped nodes do not have an option to edit.



Mapping Representation can be depicted as per the icons below:

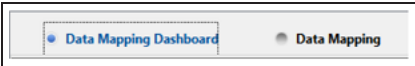
The node is not mapped



Follow the below steps to Edit the Existing Fully Mapped Instance:

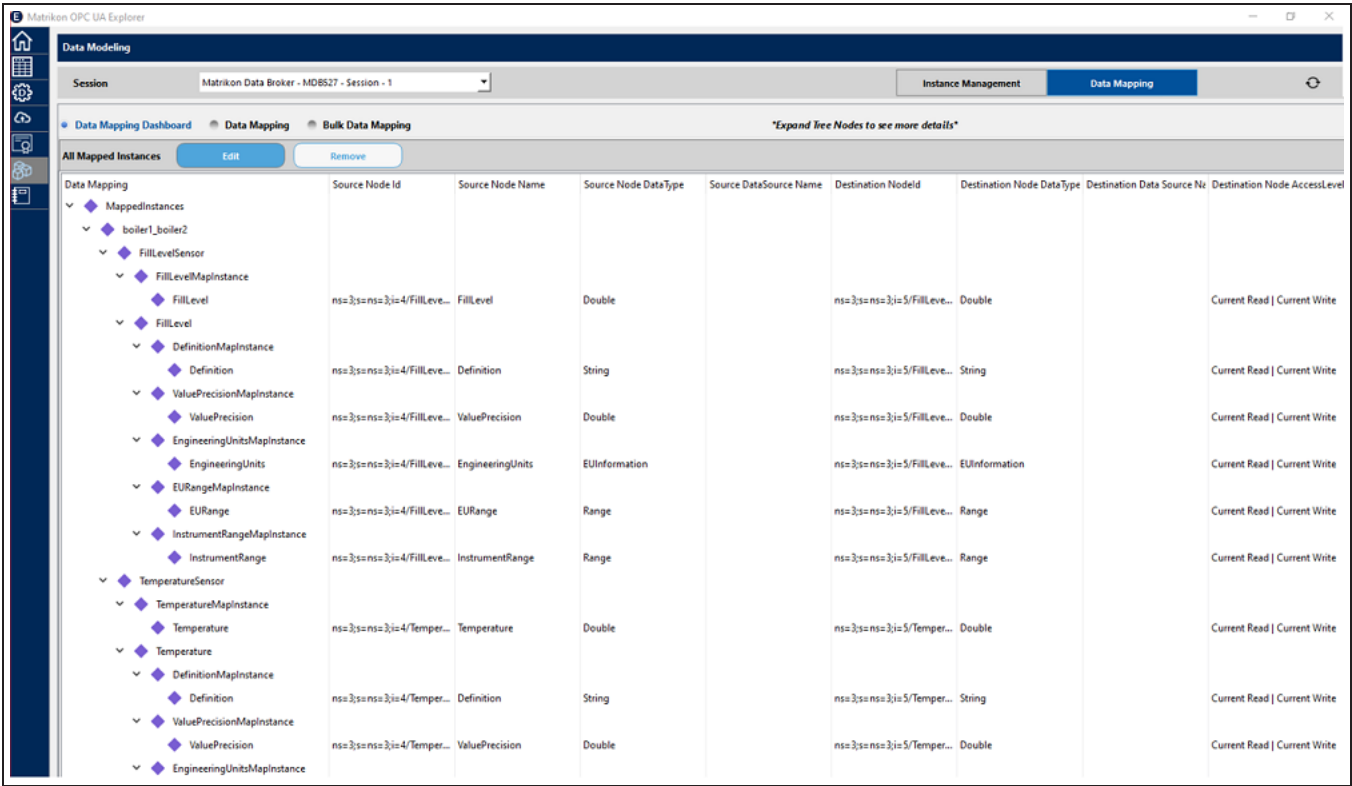
1. Click the **Data Modelling** Icon  and click the **Data Mapping Dashboard** radio button.

Figure 181 Data Mapping Dashboard radio button



2. All the Mapped InstancesA is displayed as follows:

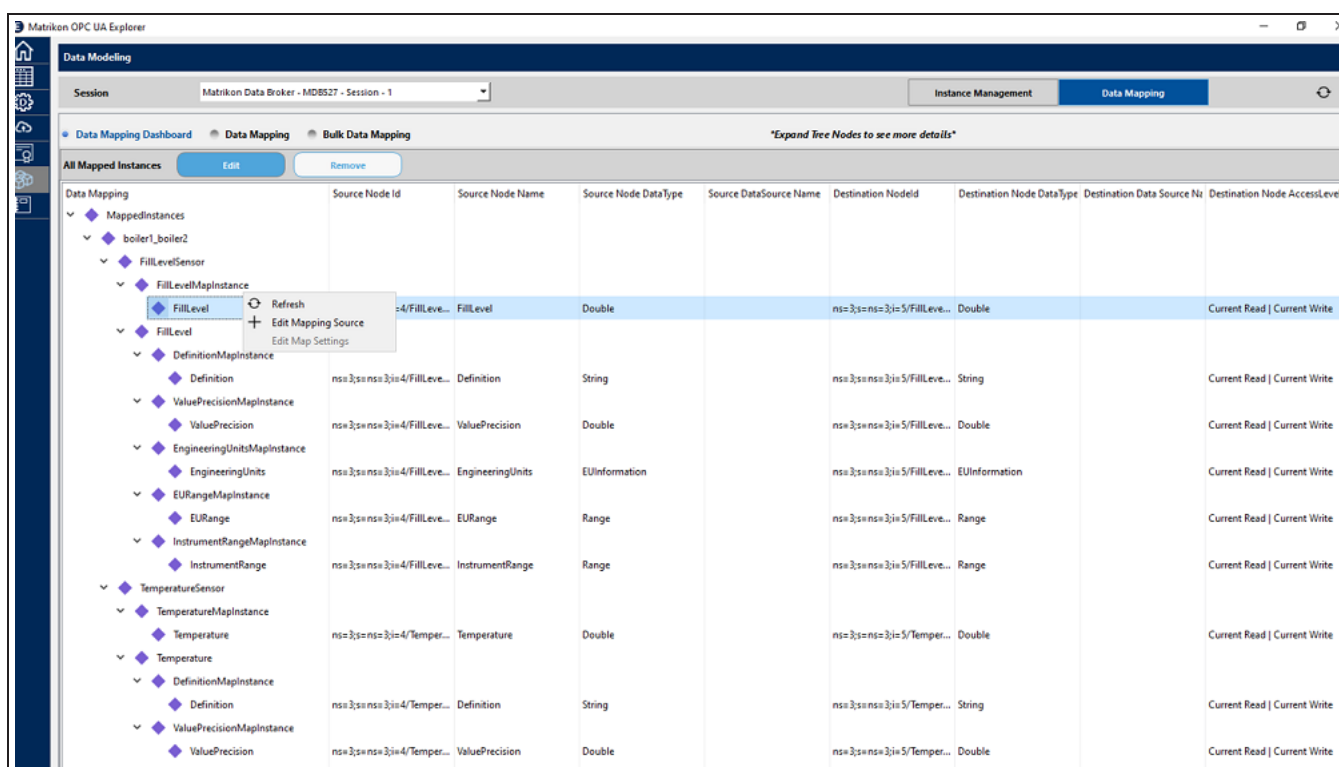
Figure 182 All Mapped Instances - Edit Mapping



Data Mapping	Source Node Id	Source Node Name	Source Node Data Type	Source DataSource Name	Destination NodeId	Destination Node Data Type	Destination DataSource Name	Destination Node AccessLevel
▼ MappedInstances								
▼ boiler1_boiler2								
▼ FillLevelSensor								
▼ FillLevelMapInstance								
▼ FillLevel	ns=3;ns=3;is=4/FillLeve...	FillLevel	Double		ns=3;ns=3;is=5/FillLeve...	Double		Current Read Current Write
▼ DefinitionMapInstance								
▼ Definition	ns=3;ns=3;is=4/FillLeve...	Definition	String		ns=3;ns=3;is=5/FillLeve...	String		Current Read Current Write
▼ ValuePrecisionMapInstance								
▼ ValuePrecision	ns=3;ns=3;is=4/FillLeve...	ValuePrecision	Double		ns=3;ns=3;is=5/FillLeve...	Double		Current Read Current Write
▼ EngineeringUnitsMapInstance								
▼ EngineeringUnits	ns=3;ns=3;is=4/FillLeve...	EngineeringUnits	EUIntformation		ns=3;ns=3;is=5/FillLeve...	EUIntformation		Current Read Current Write
▼ EURangeMapInstance								
▼ EURange	ns=3;ns=3;is=4/FillLeve...	EURange	Range		ns=3;ns=3;is=5/FillLeve...	Range		Current Read Current Write
▼ InstrumentRangeMapInstance								
▼ InstrumentRange	ns=3;ns=3;is=4/FillLeve...	InstrumentRange	Range		ns=3;ns=3;is=5/FillLeve...	Range		Current Read Current Write
▼ TemperatureSensor								
▼ TemperatureMapInstance								
▼ Temperature	ns=3;ns=3;is=4/Temper...	Temperature	Double		ns=3;ns=3;is=5/Temper...	Double		Current Read Current Write
▼ DefinitionMapInstance								
▼ Definition	ns=3;ns=3;is=4/Temper...	Definition	String		ns=3;ns=3;is=5/Temper...	String		Current Read Current Write
▼ ValuePrecisionMapInstance								
▼ ValuePrecision	ns=3;ns=3;is=4/Temper...	ValuePrecision	Double		ns=3;ns=3;is=5/Temper...	Double		Current Read Current Write
▼ EngineeringUnitsMapInstance								

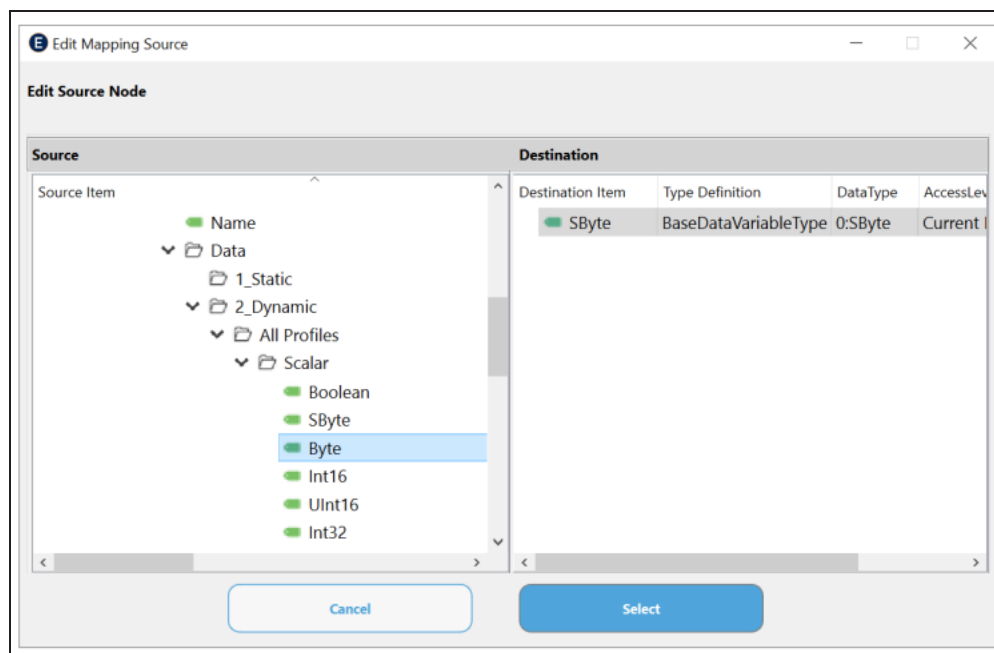
3. Click the desired mapped instance to be edited. Pop up as **Edit Instance** appears.

Figure 183 Data Modeling - Mapped Instance



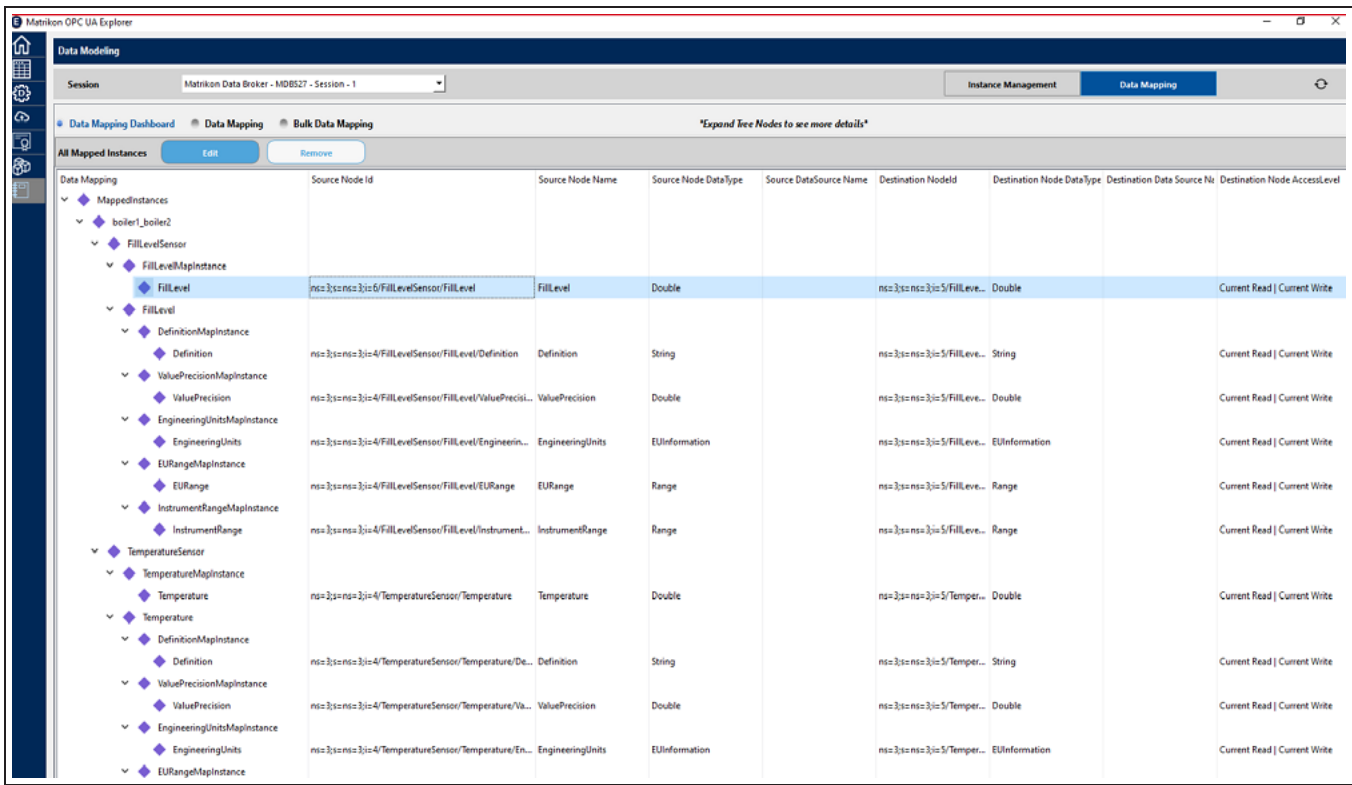
4. A New Dialog window to edit the source of the mapped instance appears. Select the new Source Node to which the Destination node needs to be mapped and click the **Select** button.

Figure 184 Edit Mapping



5. Once successfully edited, the Log window appears with a successful message. Also, the existing Mapped Instance reflects the new Source shown below in the mapped instance dashboard.

Figure 185 Data Modeling - Mapped Instance Dashboard



7.3.7 Remove Mapped Instance

The mapped instances can be removed or deleted from the AddressSpace. This means the mapping between the Source and Destination Node gets deleted, but the nodes can be intact and present in the AddressSpace. This is done using the **Remove** button on the **Data Mapping Dashboard**.

Figure 186 Remove the button on the Data Mapping Dashboard.



Follow the below steps to Remove the Mapped Instance:

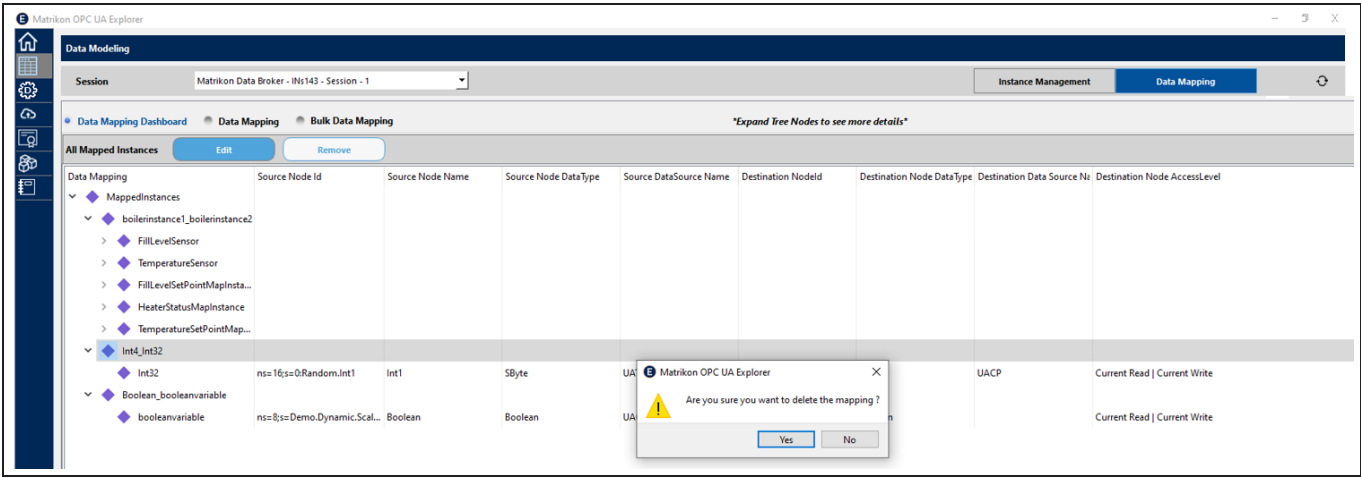
1. Click the **Data Modelling** Icon  and click the **Data Mapping Dashboard** radio button.

Figure 187 Data Mapping Dashboard radio button



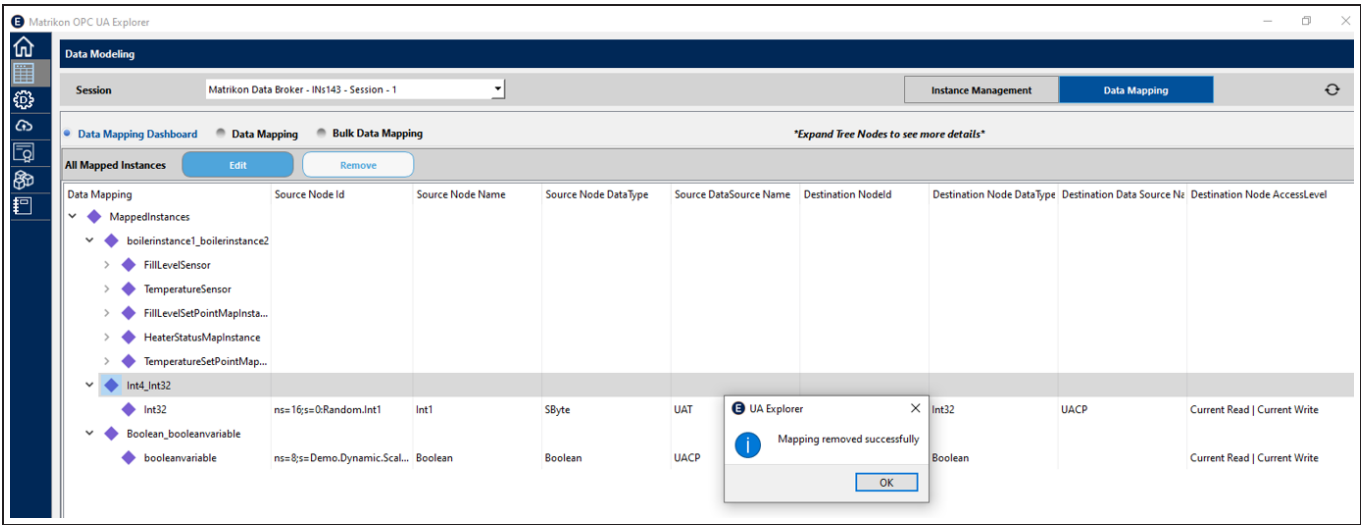
2. Click the Mapped Instance to be removed from the **Data Mapping Dashboard**. Click the **Remove** button.

Figure 188 Data Mapping Dashboard



3. Confirm the deletion by clicking **Yes**.

Figure 189 Confirmation



7.3.8 Mapping Compatibility with BaseDataType Variable Node

	Boolean	SByte	Byte	Int16	UInt16	Int32	UInt32	Int64	UInt64	Float	Double	String	DateTime	Guid	ByteString	XmlElement	NodeId	ExpandedNodeId	StatusCode	QualifiedName	LocalizedText
Boolean	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
SByte	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Byte	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Int16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
UInt16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗
Int32	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗
UInt32	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗
Int64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗
UInt64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗
Float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Double	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
String	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DateTime	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Guid	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ByteString	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
XmlElement	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NodeId	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ExpandedNodeId	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
StatusCode	✗	✗	✗	✗	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓
QualifiedName	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LocalizedText	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

7.4 Bulk Data Mapping

This functionality allows the mapping of source and destination nodes in bulk.

To perform the Bulk Data Mapping, get the Source and Destination nodes in a CSV file. The source and the destination node in the CSV or Excel file should be in **ExpandedNodeID** format. The other fields in the CSV file described below as optional are provided if needed.

- **(Mandatory) Source Node:** In this column, the extended source node ID (in expandednodeid format) is provided for mapping of the nodes.
- **(Mandatory) Destination Node:** In this column, the extended destination node ID (in expandednodeid format) is provided for the mapping of the nodes.
- **Source Node Index:** In this column, the array index of the source node will be displayed.
- **Map Instance Name:** The name of the nodes used for mapping. If it is not provided, a default name as "<<DestinationItemBrowseName>>MapInstance" is used.
- **Update Rate (in ms):** This column indicates the rate at which the data gets updated from the Source node to the Destination node in the Data View screen. A default value of 1000ms (1sec) is used.
- **Suspend:** This suspends the transferring of data from the source to the destination nodes. It can be set as true or false as needed. The default value as True is considered.



- The Source node and Destination node in the CSV file now support commas as part of a new enhancement. However, it is recommended not to use commas in the Map Instance Name when utilizing the bulk data mapping feature.
- Please note that the Source node and Destination node are mandatory parameters. Ensure that both parameters are provided correctly and without errors for successful mapping
- Please note that If Destination Node(s) are not specified in the Bulk Data Mapping .csv file, they will be automatically created as local objects with the same source type.

Figure 190 Parameters for Bulk Data Mapping

Data Mapping Dashboard Data Mapping Bulk Data Mapping								
Import Bulk Data		Import File	Validate	Commit	Clear			
Status Showing records 1000 of 1037		Records Selected	1037	Succeeded Records	1037	Failed Records	0	Progress Validation done. Please see the Error Message column to see the errors if any.
		Source Node	Destination Node	Map Instance Name	Update Rate (milli seconds)	Suspend	Source Node Type	Des
1	☒	NSU=urn:UACP/www.unifiedautomation.com/DemoServ	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/\$=		1000	☐	Variable	Vari
2	☒	NSU=urn:UACP/www.unifiedautomation.com/DemoServ	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/\$=	MapInstanceName5UACP62	1000	☐	Variable	Vari
3	☒	NSU=urn:UACP/www.unifiedautomation.com/DemoServ	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/\$=	MapInstanceName5UACP63	1000	☐	Variable	Vari

The template CSV file for Windows Bulk Data Mapping **BulkDataMappingTemplate.csv** is located in the below path:

Path: ProgramData\Matrikon\UAEplorer

The Sample data of the BulkDataMappingTemplate.csv is as follows:

1. BulkMappingTemplate.csv file consists of a **sample header** and **data** for the import.
2. The first record in the CSV file is the header that has the following columns:
 - a. Source Node
 - b. Destination Node
 - c. Source Node Index
 - d. Map Instance Name
 - e. Update Rate (Milli seconds)
 - f. Suspend
3. The second record in the CSV file has all the sample data, including the optional fields (MapInstanceName, UpdateRate, Suspend).
4. The third record in the CSV file has all the sample data except the optional field MapInstanceName.
5. The fourth record in the CSV file has all the sample data besides the optional field UpdateRate.
6. The fifth record in the CSV file has all the sample data except the optional field Suspend.
7. The sixth record in the CSV file has the sample data only for mandatory fields (Source and Destination Nodes).
8. SourceNodeId and DestinationNodeId values are their corresponding Expanded Node Id.

If an error occurs in the data provided in the CSV or Excel file while mapping, the **Error Message** column shows in which field the error is present.

The other information displayed includes **Source Node Type**, **Destination Node Type**, **Destination Access Level**, **Source Type Definition**, **Destination Type Definition**, **Source Data Type**, and **Destination Data Type** are filled in by the system for all the records. If an error is found during validation, the **Error message** column shows the error for each record.

Figure 191 Bulk Data Mapping-Error Messages

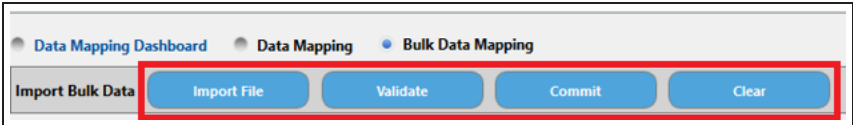
Data Mapping Dashboard												Data Mapping		Bulk Data Mapping							
Import Bulk Data														Import File		Validate		Commit		Clear	
Status Showing records 1037 of 1037				Records Selected 1037		Succeeded Records 1035		Failed Records 2		Progress Validation done. Please see the Error Message column to see the errors if any.											
		Map Instance Name		Update Rate	Suspend	Source Node Type	Destination Node Type	Destination Access Level	Source Type Definition	Destination Type Definition	Source Data Type	Destination Data Type	Error Message								
1	stic.Arrays.Byte	MapInstanceNameSUACP62		1000	☐	Object	Variable	Read Write Access	BaseDataVariableType	BaseDataVariableType	Byte	Byte	Source nodetype Error : Source node type								
2				1000	☐	Variable	Object	Read Write Access	BaseDataVariableType	BaseDataVariableType	Boolean	Boolean	Destination nodetype Error : Destination								

These are the four operations performed in Bulk Data Mapping:

- **Import File:** This allows you to import the CSV file containing the source and destination nodes (along with other optional columns) for bulk data mapping.
- **Clear:** This allows you to clear the contents present in the grid.
- **Validate:** This allows you to validate records for bulk data mapping and identify the errors in the field.
- **Commit:** Once the validation is completed, this operation allows you to proceed with the bulk data mapping. The successfully committed nodes are removed from the table, and the Error nodes are retained with the error messages

in the error message column.

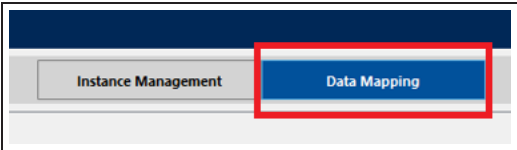
Figure 192 Bulk Data Mapping-Four Operations



Follow the below steps to proceed with the Bulk Data Mapping:

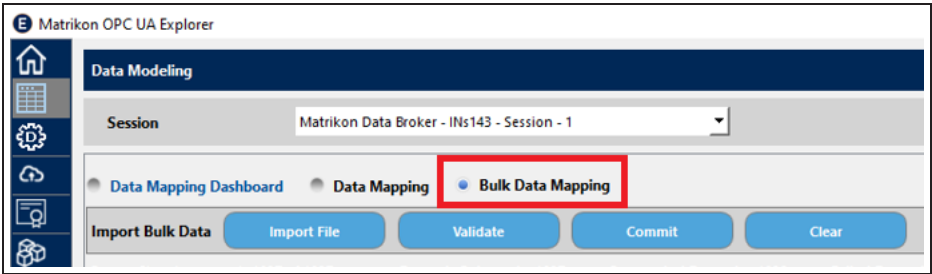
1. Connect to MDB and click the **Datamodelling**  icon.
2. Click the **Data Mapping** tab

Figure 193 Data Modelling - Data Mapping button



3. Select **Bulk Data Mapping**.

Figure 194 Bulk Data Mapping button



4. Click the **Import File** tab. This imports a file in CSV or Excel format; it reads and displays it as a grid.
5. The first column shows the option to select or de-select rows when the grid appears.

Figure 195 Bulk Data Mapping table

	Source Node	Destination Node	Map Instance Name	Update Rate (milliseconds)	Suspend
☐	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_Static.Variable0000	MapInstanceNameSUACP01	1000	☐
☐	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_Static.Variable0001	MapInstanceNameSUACP02	1000	☐
☐	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_Static.Variable0002	MapInstanceNameSUACP03	1000	☐
☐	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_Static.Variable0003	MapInstanceNameSUACP04	1000	☐
☐	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_Static.Variable0004	MapInstanceNameSUACP05	1000	☐
☐	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_Static.Variable0005	MapInstanceNameSUACP06	1000	☐
☐	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_Static.Variable0006	MapInstanceNameSUACP07	1000	☐
☐	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_	NSU=urn:UACP/www.unifiedautomation.com/DemoServer/s=Demo.Massfolder_Static.Variable0007	MapInstanceNameSUACP08	1000	☐

6. The source nodes appear in the Source Node column, and the destination nodes appear in the Destination Node column. The name appears under the Map Instance Name column if a name is given to the mapping. The Update Rate and Suspend Columns are displayed only if the input file provides the details. The suspend field is shown as a check box, and it is marked if it is true; it is unmarked.



You can provide Map Instance Name, Update Rate, and Suspend values; if not, the system provides it by default, as explained above.



When the content from the CSV file is loaded, you only see the first 1000 rows get crowded in the grid. As you scroll down to the last row, the next lot of 1000 rows is displayed and continues until all the rows are loaded. However, any operations of Validate or Commit is performed, and it gets applied to all the rows, not just the rows displayed in the grid.

7. The other columns present are for the parameters that are displayed. In case of an **error**, the error is viewed in the Error **Message** column.

Figure 196 Bulk Data Mapping - Error Message column

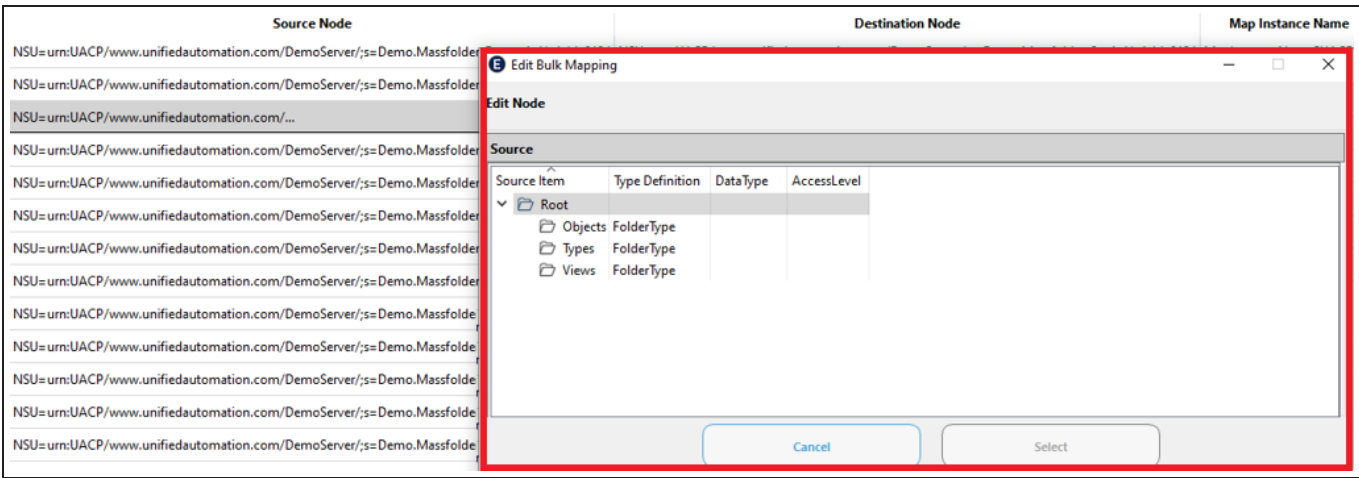
	Map Instance Name	Update Rate	Suspend	Source Node Type	Destination Node Type	Destination Access Level	Source Type Definition	Destination Type Definition	Source Data Type	Destination Data Type	Error Message
1	MapInstanceNameSUACP62	1000	☐	Object	Variable	Read Write Access	BaseData/VariableType	BaseData/VariableType	Byte	Byte	Source nodetype Error : Source node type
2		1000	☐	Variable	Object	Read Write Access	BaseData/VariableType	BaseData/VariableType	Boolean	Boolean	Destination nodetype Error : Destination

8. You can modify and rectify the errors. The Source and Destination columns are modified by double-clicking the cell; a pop-up appears where the selected nodes can be modified; for Mapped Instance, Name, and Update rate can be changed by double-clicking the cell. Suspend can be edited by the checkbox present in the column.



If the error is present under the Source node, Destination node, Map Instance name, Update Rate, and Suspend, modification can be done in the grid.

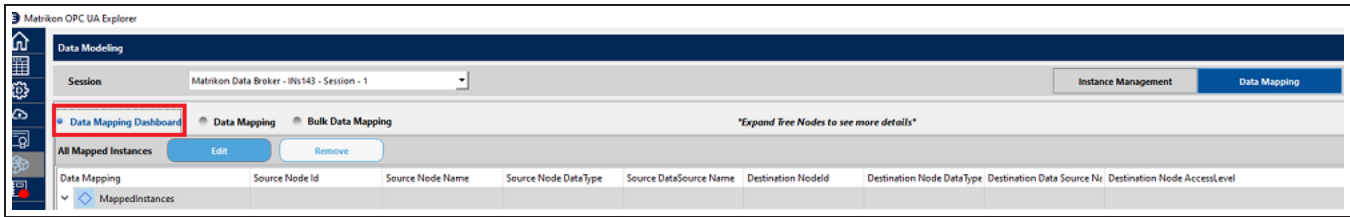
Figure 197 Bulk Data Mapping - Error Modification



Follow the below steps to proceed with the deletion of Bulk Data Mapping:

1. Ensure the Matrikon Data Broker service is stopped.
2. For Windows OS, navigate to the **exportednodesets** folder inside **ProgramData\Matrikon\DataBroker\<instanceName>**.
3. For Linux OS, navigate to the **exportednodesets** folder inside **/etc/Matrikon/DataBroker/<instanceName>**.
4. Once the service is stopped, delete the file mappedDsNodes.xml.
5. Once the file is deleted, start the Matrikon Data Broker service again.
6. Connect the Matrikon Data Broker to OPC UA Explorer.
7. Ensure in the Data Mapping Dashboard that the intended items are deleted.

Figure 198 Data Mapping Dashboard



Supported:

- Array index to variable mapping.
- Array index to localization mapping is supported.

Not Supported:

- Array index to array index is not supported.
- User can only edit the Source array index. Editing the destination node is restricted.

7.4.1 Validation

The table below provides the list of all the parameters considered for validation in Bulk Data Mapping of each record:

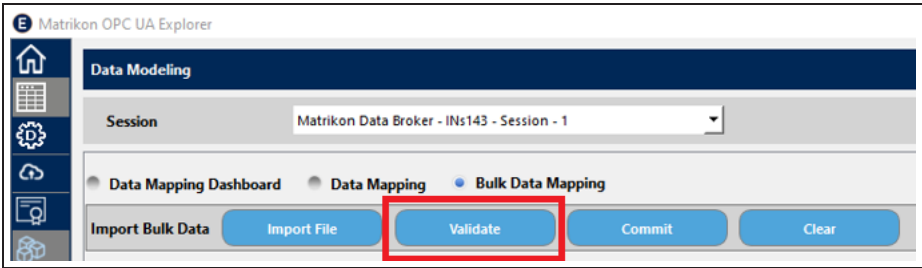
Table 24 Parameters for Validation

Sl. No.	Fields
1	Source Namespace URI
2	Namespace Index of source and destination
3	Destination Namespace URI
4	Source Node ID
5	Destination Node ID
6	Source Node Index
7	Source Node Type
8	Destination Node Type
9	Node Class mismatch of source and destination
10	Destination Access Level
11	Source Type Definition
12	Destination Type Definition
13	Type Definition mismatch of source and destination
14	Source DataType
15	Destination DataType
16	DataType mismatch of source and destination
17	Availability of License for mapping
18	Mapping status of the destination node
19	Map Instance Name
20	Sampling Interval Value
21	Suspend

Validation is an essential operation for Bulk Data Mapping. Follow the steps given below to proceed with validation:

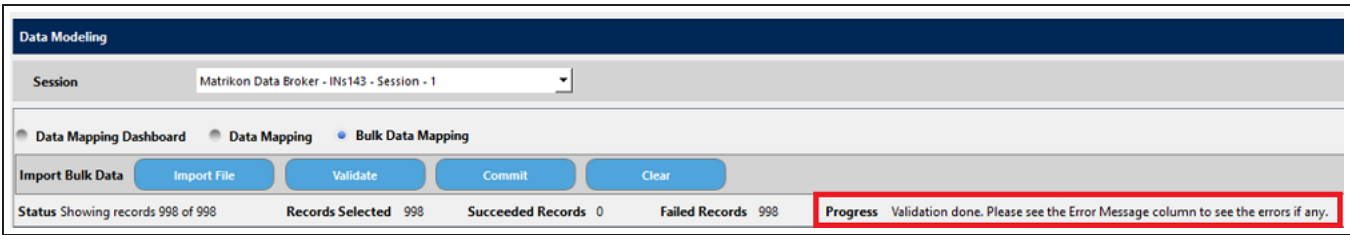
1. Once the csv or Excel file is imported and the grid appears, either **Select all** for mapping of all the records or manually select the records to be mapped and click **Validate**.

Figure 199 Bulk Data Mapping - Validate button



2. The process of validation begins and can be observed in the Progress label.

Figure 200 Bulk Data Mapping - Validation



3. You can see the progress of validation in the **Progress** label. When the validation is completed, it proceeds to the error message column to check for any errors.
4. You can proceed with Commit for Bulk Data Mapping if there are no errors.
5. If any error is present in the error message column, double-click or hover around the error message to see the complete error message.

 The records with errors appear on the top of the grid, while the error-free records appear after the erroneous columns.

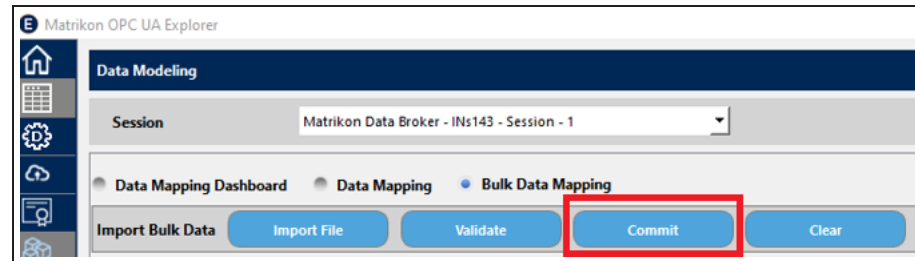
 The successful and failed records can also be viewed as present in the grid's top-right corner.

7.4.2 Commit

The Commit operation in Bulk Data Mapping helps with the Mapping of Nodes. It is the final step for the mapping of nodes after the Validation. To proceed with Commit, follow the steps below:

1. You can **Select all** for mapping all the records or manually select the records and click **Commit**.

Figure 201 Bulk Data Mapping - Commit button



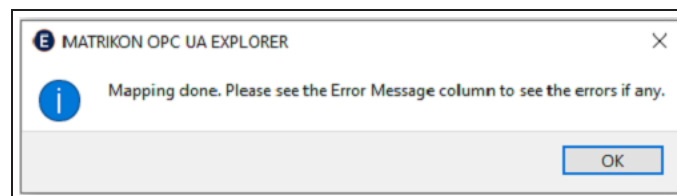
2. The process of commit takes place in two parts: first, it validates the records, and second, if the records are error-free, it proceeds with the mapping.
3. The error-free records are successfully mapped, and those with errors are retained along with the error messages.

Figure 202 Bulk Data Mapping - Records with error

Data Mapping DashboardData MappingBulk Data Mapping												
Import Bulk DataImport FileValidateCommitClear												
Status Showing records 1037 of 1037Records Selected 1037Succeeded Records 1035Failed Records 2ProgressValidation done. Please see the Error Message column to see the errors if any.												
		Map Instance Name	Update Rate	Suspend	Source Node Type	Destination Node Type	Destination Access Level	Source Type Definition	Destination Type Definition	Source Data Type	Destination Data Type	Error Message
1	stic.Arrays.Byte	MapInstanceName\$UACP62	1000	☐	Object	Variable	Read Write Access	BaseData/VariableType	BaseData/VariableType	Byte	Byte	Source nodetype Error : Source node type
2			1000	☐	Variable	Object	Read Write Access	BaseData/VariableType	BaseData/VariableType	Boolean	Boolean	Destination nodetype Error : Destination

4. When the mapping is done, a pop-up appears.

Figure 203 Bulk Data Mapping - Successful mapping pop-up



5. After completing the mapping, you can see it in the **Data Mapping Dashboard**.

LATEST DOCUMENTS

You can follow the steps below to download the latest documents.

1. Visit Matrikon website (<https://www.matrikonopc.com/opc-ua/matrikon-data-broker.aspx>).
2. You go to the **Additional Resources - Documents** section.
3. Different documents related to Matrikon Data Broker are available to download after logging in with your credentials to the MatrikonOPC website.

A.1 Matrikon Data Broker 2.4.0 (March 2025)

Release Date: March 2025

Document ID: MOPCDOC-X657-en-240A

A.1.1 New Features

Table 25 New Features in MDB 2.4.0

Feature	Description
Enhanced License Management	- View and Manage multiple license keys in License Management Screen. - Licensing MDB using Local License Server.
History Access Support for Matrikon Data Broker	UA Clients can connect to one or more OPC UA Historians aggregated through MDB.
Data Mapping of Array Element (Index) to variable Node	Supports Array Element (Index) to Variable Mapping in both Manual and Bulk mapping.
Automatic NodeID Creation in Bulk Mapping	Automatically creates destination NodeID under MDB LocalObjects folder if it is not configured in the Bulk Data Mapping .csv file.
Manageable Data Broker Server Namespace Array	- Retains Namespaces at the same Array Index even when MDB UA Server is restarted. - Provides options to user for managing MDB Namespace Array.
More Aggregate options in UA Explorer HA View	Additional Aggregate options of History ReadAtTime and ReadProcessed are available in HA View of UA Explorer.
Sortable History Access Grids	User can sort all the data column available in the History Access View Grids.
Sample Display Limitation in HA View	Limits the number of samples displayed and restricts History Read operations when one operation is in progress in HA View.
Export History Read response to csv	You can export History requests result data into CSV files for advanced analytics using other business applications.
Explorer Reference Window	Each node in connected UA Server now shows references also apart from Attributes in UA Explorer.
Support Opaque type NodeIDs	Opaque NodeIDs can now be monitored in OPC UA Explorer.

Feature	Description
General Security Enhancements	General Security Enhancements for product stability and security.

A.1.2 Resolved Issues

Table 26 Resolved Issues in MDB 2.4.0

Issue	Description
RFLEXAGGREGATOR-5930	Dispatch Firebridge Reverse Connection - Changing the Client End Point URL and clicking apply does not persist unless you stop the Databroker service.
RFLEXAGGREGATOR-7165	Documentation Improvements.
RFLEXAGGREGATOR-8562	Permanent License Overwritten by Demo License.
RFLEXAGGREGATOR-8565	Data Broker - Namespace indexes change after restart of service.
RFLEXAGGREGATOR-8566	Pre-Browse and Re-browse Falsely report a successful browse.
RFLEXAGGREGATOR-8610	Becomes unresponsive if a client requests data while the data source is being re-browsed.
RFLEXAGGREGATOR-8855	Service stops unexpectedly while Browsing/Re-Browsing DataSource.
RFLEXAGGREGATOR-8932	Data Mapping between Double and Duration is failing.
RFLEXAGGREGATOR-8955	License not updating immediately after expiration key.
RFLEXAGGREGATOR-9021	Rarely need to restart MDB to update the license feature.
RFLEXAGGREGATOR-9034	OPC UA 3rd Party UA Clients - Unable to re-subscribe to tags after restart of MDB.
RFLEXAGGREGATOR-9109	Adding tags in subsequent UA clients causes same tags in original UA client to display blank bad-status update.
RFLEXAGGREGATOR-9819	Data Broker Allows clients to connect and make requests before it is ready to handle them.
RFLEXAGGREGATOR-9821	Data Broker is Ignoring update from UA Tunneller-UA Wrapper.
RFLEXAGGREGATOR-	Data Mappings Lost after Service Restart.

Issue	Description
9911	
RFLEXAGGREGATOR-10255	MQTT Publisher - Fails to create monitored items when connected to MDB as the Namespace URI is not available from MDB.
RFLEXAGGREGATOR-10256	Firebridge Connection Settings Lost if MDB Service is not gracefully shutdown.
RFLEXAGGREGATOR-10321	Reverse Connection Password Mismatch causes MDB to continuously spawn new listeners and does not clean them up.
RFLEXAGGREGATOR-10667	Null pointer expected error found when creating monitored items.
RFLEXAGGREGATOR-10794	UA Explorer could not set monitoring item mode to reporting after creating the item with disabled mode.
RFLEXAGGREGATOR-10836	Online license activation ends up with error with BadInternalError.
RFLEXAGGREGATOR-10987	MDB and MQTT Publisher cannot be connected from UA Explorer immediately post installation.
RFLEXAGGREGATOR-4146	UA Explorer log window displays false positive when license activation fails.
RFLEXAGGREGATOR-7897	Explorer crashes while creating Modbus channel.
RFLEXAGGREGATOR-8204	Suppress URI Mismatch and Suppress Hostname Invalid are selected by default while adding a Data Source in MDB.
RFLEXAGGREGATOR-8209	Buttons in Adapter address space configuration screen should be adjusted in location.
RFLEXAGGREGATOR-8210	Close Adapter address space config screen after clicking close.
RFLEXAGGREGATOR-8211	Confirmation message in Address Space configuration screen need adjustment.
RFLEXAGGREGATOR-8544	UA Data Source - Security Mode - List is not populated with available options from Source.
RFLEXAGGREGATOR-8754	Array Edit windows cannot be expanded.
RFLEXAGGREGATOR-9048	Explorer (App Image) is crashing on clicking commit and validation of Bulk Mapping.
RFLEXAGGREGATOR-	Newly created configuration objects show up with a delay.

Issue	Description
9192	
RFLEXAGGREGATOR-9221	UA Explorer when used with Ethernet/IP adapter is not able to import EDS files right after installation.
RFLEXAGGREGATOR-9302	The Apply Button is not getting highlighted when Spin Box controls are manually edited in OPCtoUA Adapter Configuration Screen.
RFLEXAGGREGATOR-9624	Takes 6 minutes to re-connect to MDB if MDB Namespace has changed after restart.
RFLEXAGGREGATOR-10125	Unable to export tags combined from 2 different servers in data view. Explorer exports only one set of tags from single server.
RFLEXAGGREGATOR-10399	Comma within the source node URN is an issue for the bulk-load from a csv file.
RFLEXAGGREGATOR-10670	Certificate Management Screen giving Error with Siemens MDBAdapter.
RFLEXAGGREGATOR-10781	The number of samples cannot be increased more than 19999 in HA View.
RFLEXAGGREGATOR-10794	UA Explorer could not set monitoring item mode to reporting after creating the item with disabled mode.
RFLEXAGGREGATOR-11163	OPCtoUA Adapter License failure when Multiple Adapters are connected to a single MDB.

A.1.3 Known Issues

A.1.4 Limitations

A.2 Previous Release Information

A.2.1 Matrikon Data Broker 2.3.3 (October 2024)

Release Date: October 2024

Document ID: MOPCDOC-X657-en-233A

A.2.1.1 New Features

Table 27 New Features in MDB 2.3.3

New Features	Description
Data View - History Access	In UA Explorer: The following features has been added as part of Explorer HA functionality

New Features	Description
View	- A new page called History Access view is added now to view the history data of the selected nodes - User can view the Read Raw Modified (IsModified =false) type history data in Data view > History Access View page of the explorer by providing the Start time, End time, Number of values per node, Bounding values and by clicking the Submit button. - User can view the History data of multiple nodes from multiple data sources under the History Access view page. - Multiple History Access View tabs can be added to request history data of multiple nodes. - All the data in the History Access View page will be displayed in local timestamp. - User can cancel ongoing History Read request operation with the Cancel button and Reset to the default values using the Reset button.
MQTT Configuration - History Read	History On Demand Request: - In DA view, click View Settings a new check box "Exclude Children/Properties of Variable Nodes" is added to exclude properties/children of variable nodes. - New tab "History Read" is added to the MQTT Publisher configuration screen. - In the History Read tab, the user can import a CSV file, Validate the imported data, and Initiate the History Read request to the MQTT publisher. - In the History Read tab, users can request on-demand history data for up to 24 hours by providing respective start/end times along with parameters such as the number of values per node, bounding values, etc. - History request will be sent to Publisher and publisher will publishing requested history data to configured Azure Blob storage. Note: Only History Read Raw is supported in this release for both On-demand and recovery.

A.2.1.2

Resolved Issues

Table 28 Resolved Issues in MDB 2.3.3

Issue	Description
RFLEXAGGREGATOR-9741	Explorer crashed in Linux Appimage when Bulk mapping validated in data mapping page.
RFLEXAGGREGATOR-9884	Exporting CSV with same file name is not getting overwritten.
RFLEXAGGREGATOR-9910	Explorer in app image crashes when the data mapping tab pressed from home screen.
RFLEXAGGREGATOR-10097	Explorer crashes when adapter configuration page open and switch the MDB session in MDB configuration page.

Issue	Description
RFLEXAGGREGATOR-9642	Adapters server setting detail shows wrong if more than one adapter present.

A.2.1.3 Known Issues

1. Checking of Exclude Child Nodes in History View tab is reflected in other History View tabs too, also same applies to switching from data view to history view.
2. On the Data View page, the log window is displayed at the top of the table widget. Please note that the height of the Data Access and History Access views may not automatically adjust to fit the log window.
3. Unable to export tags combined together from 2 different server in data view. Explorer exports only one set of tags from single server.
4. If an operation is in progress in one history view tab, or data is present in a history view, closing this tab may interrupt the operations in other history view tabs.

A.2.1.4 Limitations:

1. The History Access View of UA Explorer supports any OPC UA Historian Servers. When MDB is ready with support of HA, it will also be supported.
2. Please allow a few seconds between performing consecutive history operations before clicking the "submit" button multiple times in quick succession.

A.2.2 Matrikon Data Broker 2.3.2 (July 2024)

Release Date: July 2024

Document ID: MOPCDOC-X657-en-232A

A.2.2.1 Resolved Issues

Table 29 Resolved Issues in MDB 2.3.2

Issue	Description
RFLEXAGGREGATOR-9292	MDB issues with multiple Adapter licenses.
RFLEXAGGREGATOR-8220	License Capacity count gets mixed-up when license key expires.

A.2.3 Matrikon Data Broker 2.3.1 (April 2024)

Release Date: April 2024

Document ID: MOPCDOC-X657-en-231A

A.2.3.1 New License Features

Table 30 New License Features in MDB 2.3.1

Feature	Description
Matrikon Data Broker Ethernet IP Adapter	This feature enables Matrikon Data Broker connection to the "Matrikon Data Broker Ethernet/IP Adapter". This feature is a True or False type; the Ethernet IP Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker Profinet Adapter	This feature enables Matrikon Data Broker connection to the "Matrikon Data Broker Profinet Adapter". This feature is a True or False type; the Profinet Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker Siemens Adapter	This feature enables Matrikon Data Broker connection to the "Matrikon Data Broker Siemens Adapter". This feature is a True or False type; the Siemens Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker SDK Adapter	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker Adapter SDK Examples". This feature is a True or False type; the SDK Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker OPC to UA Adapter	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker OPC to UA Adapter". This feature is a True or False type; the OPC to UA Adapter functionality is allowed when enabled or is available.
Matrikon Data Broker OPC to UA Plus Adapter	This feature enables Matrikon Data Broker connection to "Matrikon Data Broker OPC to UA Adapter" with additional controls. This feature is a True or False type; the OPC to UA Plus Adapter functionality is allowed when enabled or is available.

A.2.3.2 New Features

- Browse and Read non-Value Attributes Cache Timeout for each data source can now be configured to -1, which sets the cache timeout to 5 years. Also, a value of '0' is not allowed.
- Performance of importing datasources cache file improved, thus improving the turnaround time for datasources to be available on restart of MDB.
- Pre-Browse has been improved and is now called Browse.

- Previously, performing a pre-browse operation on the whole data source was mandatory when connecting it to MDB. Now, browsing the entire data source happens explicitly by clicking the browse button.
- Previously, clicking the Pre-Browse operation, the address space browse operation, and reading all attributes were performed. Now, the attribute reading is removed, and only the address space browse operation is performed.
- Mapping is allowed between a source node and a destination node wherein the source node's datatype is derived from the destination node's datatype or vice versa.
- UA Explorer address space views are sorted alphabetically and in the order of folders, methods, and nodes.

A.2.3.3 Resolved Issues

Table 31 Resolved Issues in MDB 2.3.1

Issue	Description
RFLEXAGGREGATOR-8027	Duplicate reference issues while importing data source xml files
RFLEXAGGREGATOR-8086	MQTT goes to the grace period with a combination of MODBUS adapter
RFLEXAGGREGATOR-8170	Bad Licensing issue fix while using a data mapping feature
RFLEXAGGREGATOR-8241	License invalidation issue in retry state for grace period fixed
RFLEXAGGREGATOR-8580	Removing extra entries of duplicate security policies while adding a data source
RFLEXAGGREGATOR-8028	MDB logs to populate UTC time instead of local time
RFLEXAGGREGATOR-8639	Multiple improvements in Data Broker and Explorer • Mapping improvement for Delta-V nodes in UA Explorer. • The Quality status for items coming from classic OPC Server>Funnel>ClassicTunneller>Wrapper does not show properly in MDB and always shows a bad status, even if the wrapper status changes from bad to good after some time. • Multiple subscription issues with an architecture involving a funnel in the data source
RFLEXAGGREGATOR-8643	MDB does not save data source configuration in the nodeset file after a periodic backup time is hit.
RFLEXAGGREGATOR-8539	OPC UA Explorer- Adapter configuration: Matrikon UA Explorer doesn't update object status

Issue	Description
RFLEXAGGREGATOR-8540	OPC UA Explorer-Adapter configuration: Matrikon UA Explorer duplicates the object
RFLEXAGGREGATOR-8541	OPC UA Explorer- Adapter configuration: Matrikon UA Explorer doesn't show the QML panel
RFLEXAGGREGATOR-8170	Not able to map Modbus adapter (BadLicenseExpired) when two licenses are added in a combination of one having Data modeling and another having Modbus adapter licensing

A.2.3.4 Known Limitations

- In the Configure Matrikon Data Broker page, when expanding the menu items like Federator Data sources, License management, etc., it is recommended to wait for the particular data in the expanded item to load and then switch back to another menu item.
- In the Data Modelling page, when you try to expand the nodes in the Data mapping tab, when you expand a folder, you need to wait for the particular expanded folder till the type definition, datatype, and access level are filled. Then, you can proceed to browse another folder.
- The pop-up during bulk mapping, even while validation or commit operation, does not appear. Click import file to import the file again, or click the clear button.
- Ensure the bulk data mapping is kept below 20k tags in a single operation for better memory performance.
- Mapping two nodes is impossible if their datatypes are Double and Duration.

A.2.4 Matrikon Data Broker 2.3.0 (September 2023)

Release Date: September 2023

Document ID: MOPCDOC-X657-en-230A

A.2.4.1 New Features

Table 32 New Features in MDB 2.3.0

Feature	Description
General Improvements	• Support for New Operating Systems Windows 11, Windows Server 2022, Ubuntu 22.04. • Matrikon Data Broker Container base image is upgraded to RHEL UBI9.2. • General security improvements.
Pre-Browse Improvements	• Deletion of nodes once nodes are no longer available in the end data source. • Accept client connection once Data Broker starts and does not hold back for data source connection status before importing is completed. • Update Pre-Browse status at each data source level correctly in the new diagnostic node BrowseSynchStatus as Not Started, In-Progress, Completed, Failed. • Subscription request for data source node once data broker restarted or data source enabled, even during import.

Feature	Description
	- Browse requests for a specific node in the data source to reflect periodic changes in the address space via configurable Browse and Read non-Value Attributes Cache Timeout applicable for the data source in seconds. The default value is set to 30,000 sec (~8 hours) - The session timeout default value is increased to 1200 sec (= 20 minutes).
Bulk Data Mapping	This enables the users to do bulk mapping configuration through CSV import, validate the imported file, and allow bulk configuration of Data Mapping with the allowable access level permissions.
UA Explorer Localization	Static text UA Explorer can now be displayed in regional languages based on system regional settings.

A.2.4.2 Resolved Issues

Table 33 Resolved Issues in MDB 2.3.0

Issue	Description
RFLEXAGGREGATOR-7131	OPC UA Explorer - Export Address Space - Does not export entire address space.
RFLEXAGGREGATOR-7471	OPC UA Explorer - Export Address Space - Appends to existing file rather than replaces.
RFLEXAGGREGATOR-7757	Passwords with certain characters cause the service registration to fail.

A.2.4.3 Known Limitations

- In the Configure Matrikon Data Broker page, when expanding the menu items like Federator Data sources, License management, etc., it is recommended to wait for the particular data in the expanded item to load and then switch back to another menu item.
- In the Data Modelling page, when you try to expand the nodes in the Data mapping tab, when you expand a folder, you need to wait for the particular expanded folder till the type definition, datatype, and access level are filled. Then, you can proceed to browse another folder.
- The pop-up during bulk mapping, even while validation or commit operation, does not appear. Click import file to import the file again, or click the clear button.
- Ensure the bulk data mapping is kept below 20k tags for better memory performance.

A.2.5 Matrikon Data Broker 2.1.2 (March 2023)

Release Date: March 2023

Document ID: MOPCDOC-X657-en-212A

A.2.5.1 New Features

Table 34 New Features in MDB 2.1.2

Issue	Description
RFLEXAGGREGATOR-7337	Reduce the time taken to start MDB Service with configured Data Sources.

A.2.5.2 Resolved Issues

Table 35 Resolved Issues in MDB 2.1.2

Issue	Description
RFLEXAGGREGATOR-7288	Modbus: Licensing Improvements for Adapters

A.2.6 Matrikon Data Broker 2.1.1 (February 2023)

Release Date: February 2023

Document ID: MOPCDOC-X657-en-211A

A.2.6.1 Resolved Issues

Table 36 Resolved Issues in MDB 2.1.1

Issue	Description
RFLEXAGGREGATOR-6959	Modbus: UI: In the Modbus adapter, duplicate entries of Adapter data source names are created after clicking the Refresh button in the Adapter configuration screen.
RFLEXAGGREGATOR-6882	Modbus: UI: Every time you make a channel or add tags, it requires a re-browse to update.

A.2.7 Matrikon Data Broker 2.1.0 (December 2022)

Release Date: December 2022**Document ID:** MOPCDOC-X657-en-210A

A.2.7.1 New Features

Table 37 New Features in MDB 2.1.0

New Features	Description
Sampling Rate Support for Mapped Instances	Data Broker and UAExplorer enhanced the data transfer mechanism. Users can configure the rate at which data can be transferred from source to destination for the data source node being the source. Users can suspend the data transfer on demand.
Browse Synchronization of Data Source Nodes	Data Broker can browse and cache the data source nodes attributes. Data Broker is aware of the node's information ahead for subscription requests received from headless clients.
Log Improvements	Log improvements are performed in Data Broker and SDK
Modbus Adapter for MDB	Data Broker together with UAExplorer can configure Modbus adapter as data source. Users can configure and consume data from Modbus devices as Master and Slave.

New Features	Description
Cross Platform Adapter API	Cross Platform Adapter API provides a PI to create your new adapters for MDB either on Windows or Linux.

A.2.7.2 Resolved Issues

Table 38 Resolved Issues in MDB 2.1.0

Issue	Description
RFLEXAGGREGATOR-6875	Memory growth during recovery of Reverse Connections in daisy-chained MDBs
RFLEXAGGREGATOR-6788	MDB fails to install if Versign certificates are disabled or unable to be installed.
RFLEXAGGREGATOR-6730	Recent session fails to connect if you accidentally click "Add New Server" first.
RFLEXAGGREGATOR-6651	Field - Endpoint Url reports an invalid argument if it contains an underscore.

A.2.7.3 Known Limitations

- “UAExplorer does not give any error message for submitting an invalid item during address space configuration of Modbus adapter”.
- “MDB does not support adding all the nodes of a data source to its address space through “Re-Browse” when the end data source’s maxbrowsecontinuationpoints are fewer. Usually seen if maxbrowsecontinuationpoints is less than several subsequent folders under an object node.”
- After the MDB restart, it takes 3 mins and 15 secs to import 20K tags and 11 mins 45 secs to import 100K tags from a cache file.

A.2.8 Matrikon Data Broker 2.0.0 (May 2022)

Release Date: May 2022

Document ID: MOPCDOC-X657-en-200A

A.2.8.1 New Features

Table 39 New Features in MDB 2.0.0

New Features	Description
Data Modeling	Data Broker with UA Explorer can be used to model your site data, adding context to raw values. Modeling follows the OPC UA modeling guidelines for using OPC Foundation-compliant Companion Specifications (CS). Adding context to your data reduces complexity and errors with better understanding.
Data Mapping	Data Broker can map local model instances, providing live values to your newly contextualized data. Sources of data can be internal to the Data Broker or from any of the connected Data Sources. Additionally, a Data Broker can map data from one data source to another, allowing the sharing of data between applications that generally cannot communicate.

A.2.8.2 Resolved Issues

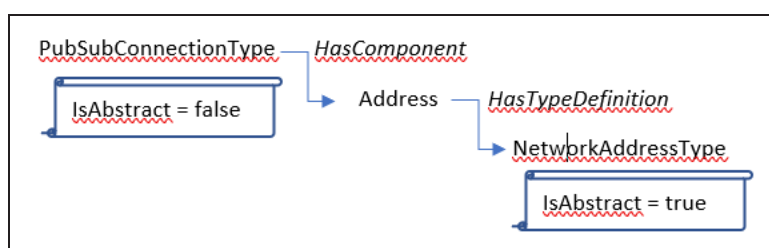
Table 40 Resolved Issues in MDB 2.0.0

Issue	Description
RFLEXAGGREGATOR-5848	The Radio Button in the Data source for Reverse connection shows as a Manual Connection.
RFLEXAGGREGATOR-5175	Error message is rendered on toggling between Manual and Discovery selection after clicking the find server.

A.2.8.3 Known Limitations

1. An instance with a non-abstract type is not allowed where the type has nodes whose typedefinition is abstract.
 - a. In the diagram below, the type PubSubConnectionType is Non-Abstract but has a child node whose TypeDefinition is NetworkAddressType, which is Abstract Type. Hence, creating an Instance of type PubSubConnectionType is not allowed in this scenario.

Figure 204 PubSubConnectionType not allowed



- b. Creation of an Instance with TypeDefinition whose DataType is Abstract is only supported with Abstract Types and not with its children. **Ex:** Creation Of Instance with AnalogItemType. AnalogItemType has DataType as an Abstract Number, so while creating an Instance of AnalogItemType, please mention DataType as a Number. It does not accept any sub-types of Number, i.e. Double, Float, etc.
 - c. The creation of Instances from Data Broker Types is not allowed.
2. Deletion of Imported NodeSetFile and Imported Types is not supported.
3. Deletion of the Data Source deletes the whole Mapping Display from the Dashboard. Please use the Remove Mapped Instance functionality to remove the Mapping Representation from the Data Mapping Dashboard.
4. Data Mapping in these scenarios is not supported:
 - a. Chaining Scenarios is not supported: **Ex:** Node A->NodeB->NodeC. Here, NodeA is the Source, and NodeB is the Destination; then, NodeB cannot act as a Source for NodeC.
 - b. Bi-Directional Support for Data Mapping is not allowed: **Ex:** In the case of Node A mapped to NodeB (NodeA->NodeB), If the user changes the value in A, it immediately reflects in B. If the user changes the value in B, it shows in B but won't update in A. Also, in this case, it overwrites the value of B as soon as the A value changes.

- c. Data Mapping between Base-Type and its subtype is not supported even though Type Definition for Source and Destination matches. **Ex:** If the Source variable's DataType is 'Number' and the Destination Variable's DataType is 'Double', then the mapping is unsupported.
 - d. Multiple Sources to a Single Destination are not allowed **Ex:** Node A is mapped to Node B, then Node C cannot map to Node B again.
 - e. Mapping the same Type of Complex Objects from One DataSource to another DataSource is not allowed. This is because every Data Source gets a different NameSpace entry. Hence, nodeId of TypeDefinitions can differ even if they are the same type as the DS.
 - f. Mapping is not possible for Types, References, and Views Nodes.
5. UAExplorer does not display the correct pki and log path location in the Server Settings Window for Container Image.
 6. A simulated Data Source is not recommended for Data Mapping or Monitoring due to the following reasons:
 - a. Dynamic nodes are not updating values sometimes.
 - b. DataType is set to BaseDataType (i=24) for all the nodes.
 - c. If multiple subscriptions are created & then one subscription is removed, data update (PublishResponse) stops for all subscriptions.
 - d. When added to the DataView, some nodes are not showing data sometimes.
 - e. Write fails into these nodes randomly.
 7. OPCUA Softing Server does not fully support Data Mapping and Data Modeling Functions.
 8. A few files like "Opc.Ua.CAS.NodeSet2.xml" have "&" in the Description Attribute. When importing such files, it is recommended to replace "&" with "and" in descriptions of xml files; else, we can see unexpected behavior in AddressSpace.
 9. UAExplorer does not support Writing or Editing LocalizedText and QualifiedName Variables from DA View.

A.2.9 Matrikon Data Broker 1.4.4 (November 2022)

Release Date: November 2022

Document ID: MOPCDOC-X657-en-144A

A.2.9.1 New Features

None

A.2.9.2 Resolved Issues

Table 41 Resolved Issues in MDB 1.4.4

Issue	Description
RFLEXAGGREGATOR-6872	Update Dispatch 1.4.3 Container with latest RHEL UBI8 Image

A.2.9.3 Known Limitations

None

A.2.10 Matrikon Data Broker 1.4.3 (May 2022)

Release Date: May 2022

Document ID: MOPCDOC-X657-en-143A

A.2.10.1 New Features

None

A.2.10.2 Resolved Issues

Table 42 Resolved Issues in MDB 1.4.3

Issue	Description
RFLEXAGGREGATOR-6010	Dispatch does not create more than 10 Subscriptions per Session

A.2.10.3 Known Limitations

None

A.2.11 Matrikon Data Broker 1.4.2 (March 2022)

Release Date: March 2022

Document ID: MOPCDOC-X657-en-142A

A.2.11.1 New Features

None

A.2.11.2 Resolved Issues

Table 43 Resolved Issues in MDB 1.4.2

Issue	Description
RFLEXAGGREGATOR-5841	Dispatch Does not recover when connected in Reverse Connect on Network Failure or South side Dispatch Restart.

A.2.11.3 Known Limitations

None

A.2.12 Matrikon Data Broker 1.4.1 (August 2021)

Release Date: August 2021

Document ID: MOPCDOC-X657-en-141A

A.2.12.1 New Features

None

A.2.12.2 Resolved Issues

Table 44 Resolved Issues in MDB 1.4.1

Issue	Description
RFLEXAGGREGATOR-4867	Getting MethodInvalid error in dispatch method calls

A.2.12.3 Known Limitations

None

A.2.13 Matrikon Data Broker 1.4.0 (June 2021)

Release Date: June 2021

Document ID: MOPCDOC-X657-en-140A

A.2.13.1 New Features

Table 45 New Features in MDB 1.4.0

New Features	Description
Matrikon Data Broker Husky Adapter	Enables you to connect to Husky Hosts systems and provide OPC UA formatted data through Matrikon Data Broker. For more details, see the <i>Matrikon Data Broker Husky Adapter User Manual</i> .
MQTT Publisher Configuration	Enables you to configure MQTT Publisher configuration. For more information, see <i>Matrikon Data Broker MQTT Publisher User Manual</i> .
Export Monitored Item	Enables you to export the monitored items from Data Grid View into a .csv file. For more information, see Export Monitored Item .

A.2.13.2 Resolved Issues

Table 46 Resolved Issues in MDB 1.4.0

Issue	Description
RFLEXAGGREGATOR-4085	Dispatch client data source session and monitored items recovery does not happen randomly with some of the Data sources.

A.2.13.3 Known Limitations:

- None

A.2.14 Matrikon Data Broker 1.3.0 (February 2021)

Release Date: February 2021

Document ID: MOPCDOC-X657-en-130A

Table 47 New Features in MDB 1.3.0

New Features	Description
Certificate Management	Enables you to trust the untrusted certificates for Dispatch. You can see How to Trust Rejected Certificates for more information.

New Features	Description
MQTT Configuration	Enables you to configure MQTT Publisher configuration files. You can see the <i>Matrikon Data Broker Publisher User Guide</i> for more details. At this release, this is applicable only for Forge Connect For Industrial users.
Unlicensed Access to Simulation Server	Dispatch's Simulation server can be accessed without a Dispatch license or Data Sources license.
Operational Limits on Dispatch	The ability to control the Operational limits on Dispatch is enabled. It helps to throttle the number of calls a UA Client connected to Dispatch makes. This also helps limit the impact of runoff UA Clients making huge calls on the Dispatch UA Server. You can see Error! Reference source not found section for more information.

A.2.14.1 Known Limitations:

- RFLEXAGGREGATOR-4085: Dispatch client data source session and monitored items recovery does not happen randomly with some Data sources.

Work Around: For any Data Sources recovered, you can go to that Data Source configuration, disable it, Apply Changes, and Enable the Data Source again. This recovers the sessions and monitors items.

A.2.15 Matrikon Data Broker 1.3 Beta (September 2020)

Release Date: September 2020

Document ID: MOPCDOC-X657-en-XxA

A.2.15.1 New Features

Table 48 New Features in MDB 1.3 Beta

New Features	Description
Export Address Space	You can export the address space root folder or a specific node into a .csv format. For more information, see Export Address Space .
Device Registration	Enables you to connect Matrikon Data Broker MQTT Publisher to the Forge IoT platform. For more information, see <i>Matrikon Data Broker MQTT Publisher User Manual</i> .

A.2.16 Matrikon Data Broker 1.2.0 (July 2020)

Release Date: July 2020

Document ID: MOPCDOC-X657-en-120A

A.2.16.1 New Features

Table 49 New Features in MDB 1.2.0

New Features	Description
License Management in Matrikon OPC UA Explorer	You can activate or deactivate the Node Locked license online or offline using the License Management screen in Dispatch Configuration. For more information, see Node Locked Licensing Using Matrikon OPC UA Explorer .
Reverse Connect while adding server	You can now set Matrikon UA Explorer to listen to reverse connection while adding a server. For more information, see Connecting to Dispatch Server .
Added support Migration from 1.1 version to 1.2	You can now easily upgrade your 1.1 installation of Dispatch or Explorer to 1.2 without needing to uninstall and reinstall.
Support of Method Calls Pass through Dispatch	Dispatch allows Method calls exposed by the end UA Server; it is Federating to pass through Dispatch so that any UA Client connected to Dispatch can make that Method calls on the End UA Servers.
Upgrading the LDS Server	LDS version used in Dispatch is changed from 1.03 to 1.04.

A.2.16.2 Issues Fixed

Table 50 Issues Fixed in MDB 1.2.0

Issues
RFLEXAGGREGATOR-3456: Dispatch on doing interop with Ignition designer, Getting the BadtooManyMonitoredItems error

A.2.17 Matrikon Data Broker 1.1.0 (May 2020)

Release Date: May 2020

Document ID: MOPCDOC-X657-en-110A

A.2.17.1 New Features

Table 51 New Features in MDB 1.1.0

New Features	Description
Dispatch and Explorer for Linux-supported machines.	Dispatch and Explorer can be used in the following Linux flavors: Redhat Linux 8.0, Centos 8.0, and Ubuntu 18.04. For more configuration information, see Linux Operating System .
Dispatch as Docker or Podman Container	You can use Dispatch as a Docker or Podman container on your machine. For more information, see Dispatch as Container in Linux-Supported Machines
Method Call using Explorer	You can browse, read, and execute method calls from the server for nodes with Nodeclass type as Method . For more information, see Method Call using Explorer .
Ability to edit data values for a	You can edit a data value of a single row in the Data View grid. For more information, see Edit Data Values for Monitored Item in the Data View Screen .

New Features	Description
Monitored item in the Data View screen	
Licensing changes	Licensing for Matrikon Data Broker has been changed from the last release. For more information, see the Licensing Dispatch section.

A.2.17.2 Issues Fixed

Table 52 Issues Fixed in MDB 1.1.0

Issues
Dispatch: Names of the generated Certificates should be customizable

A.2.18 Matrikon Data Broker R100.1 (December 2019)

Release Date: December 2019

Document ID: MOPCDOC-X657-en-R100.1A

A.2.18.1 New Features

- This is the initial release of the product. For information on new features, see [Dispatch Key Features](#).
- For information on getting started, see [Read Me Before Installation](#) and [Installation](#).

B.1 Explorer Intermittently does not Recover the Monitored Items

Sometimes, Explorer cannot recover the monitored items if the server restarts for unexplainable reasons.

B.1.1 Workaround

- You browse again items and add them back to the data view.

B.2 Data Sources / Reverse Connections are not getting Connected automatically after migration or restart of services

The Data Source and Reverse Connection are seen disabled after the migration from the old to the new version.

B.2.1 Workaround

Check the status of Data Sources and Reverse Connections. If they are disabled, enable them again.

B.3 Exporting Address Space of PHD Server Using Matrikon Data Broker Takes More Time

Exporting the address space of a PHD server using Matrikon Data Broker takes more time and shows incomplete results if the number of PHD nodes is more than 20000.

B.3.1 Workaround

Connect Explorer to a Wrapper directly and then export the address space. Once the connection is established, do the following steps:

1. You open the exported address space output CSV file.
2. You replace opc.com with the Datasource name mentioned in the Matrikon Data Broker list of the wrapper in urn format.

For example,

```

Replace as mentioned below:

NSU=opc.com://localhost/OPC.PHDServerDA.1/ffced1f1-278e-11d5-a2b0-
00c04f1bfd1b/DA3.0;s=0:HSCTEST001

to

NSU=urn.wrapper://localhost/OPC.PHDServerDA.1/ffced1f1-278e-11d5-a2b0-
00c04f1bfd1b/DA3.0;s=0:HSCTEST001

```

B.4 Matrikon Data Broker Certificate No Longer Valid

If the Matrikon Data Broker server configuration has been changed (Matrikon Data Broker URI, Matrikon Data Broker Hostname fields, or Listening Port number), or if the Matrikon Data Broker application certificate has expired, then the certificate generated cannot be considered valid by Matrikon Data Broker or other applications. You can see [How to Trust Rejected Certificates](#) for more information on managing the certificates.

If the Matrikon Data Broker URI has changed, the certificate becomes invalid because it no longer claims the same URI as the server is presenting. In this case, Matrikon Data Broker does not start and run until a certificate is provided or generated.

To get the Matrikon Data Broker to generate a new self-signed certificate, perform the following steps:

For Windows Operating System

1. Stop the Matrikon Data Broker service in the **Services** control panel. The service name is listed as “**Matrikon Data Broker - <instance name>**” where **<instance name>** is the service name provided during installation.
2. Delete both the certificates in the **<ProgramData>\Matrikon\DataBroker\<Matrikon Data Broker Instance Name>\pki\DefaultApplicationGroup\own\certs** folder.
3. Delete both private keys in the **<ProgramData>\Matrikon\DataBroker\<Matrikon Data Broker Instance Name>\pki\DefaultApplicationGroup\own\private** folder.
4. Start the Matrikon Data Broker service in the **Services** control panel.

For the Linux Operating System

1. Stop the Matrikon Data Broker service.
2. Delete both the certificates in the
/etc/Matrikon/DataBroker/<MDB Instance Name>/pki/DefaultApplicationGroup/own/certs folder.
3. Delete both private keys in the
/etc/Matrikon/DataBroker/<MDB Instance Name>/pki/DefaultApplicationGroup/own/private folder.
4. Start the Data Broker service; for more information on how to start the Data Broker service, see **Execute the Dispatch Component Applmage to Run as Service**.

The new certificates replace previously trusted certificates by all applications (clients and servers) connected to the Data Broker instance. Each application must be configured to trust the new certificates to resume communications.



All the certificates self-generated in the Matrikon Data Broker product family are generated with a validity period of 5 years by default. This gives you a longer tenure for the certificates. It is always recommended to use your certificates instead of relying on certificates self-generated by the applications.



Replacing the self-signed certificate causes any stored passwords in Data Broker to be re-entered for Data Broker Fire Bridge connections. If the Data Broker Application URI has changed, the user account passwords for the Data Broker should be reset manually. Contact [Matrikon Support](#) for assistance.

B.5 Matrikon Data Broker ApplImage fails to register as a service due to Error “Failed to create the Licensing Environment”

If you are not able to Register MatrikonDataBroker.ApplImage as a service on the Linux Operating system due to the below-mentioned error “Failed to create the Licensing Environment” Follow the below procedure to fix the problem.

B.5.1 Workaround

Figure 205 MatrikonDataBroker.ApplImage

```
18.05.2022 14:36:36.417841 HCLL>>WARNING: "LicenseManagement.c":257 () Flexara
error code=1947205640, system code=1, message=[1,7e3,4,0[74100008,1,1202014d]]
Internal.. Code 1947205640
18.05.2022 14:36:36.418012 HCLL>>WARNING: "LicenseManagement.c":257 () Failed t
o create the licensing environment. Code 1947205640
18.05.2022 14:36:36.418061 License>>ERROR: "clic_license_t.cpp":1467 (UpdateLic
ensingEnvironment) Failed to get license environment from CLL.
18.05.2022 14:36:36.418098 License>>WARNING: "clic_license_t.cpp":156 (Initialis
e) Bad status of "BadUnexpectedError" encountered
18.05.2022 14:36:36.418134 LicenseFactory>>WARNING: "dispatch_license_factory_t
.cpp":92 (CreateLicense) Bad status of "BadUnexpectedError" encountered
18.05.2022 14:36:36.418170 ServerManager>>WARNING: "server_manager_t.cpp":1405
(ConfigureServer) Bad status of "BadUnexpectedError" encountered
18.05.2022 14:36:36.418209 ServerManager>>SYSTEM: "server_manager_t.cpp":4960 (
SetupServiceConfiguration) The Matrikon Data Broker instance not configured. Er
ror=0x80010000
Failed to configure the instance.
Instance Creation Failed. -8
```

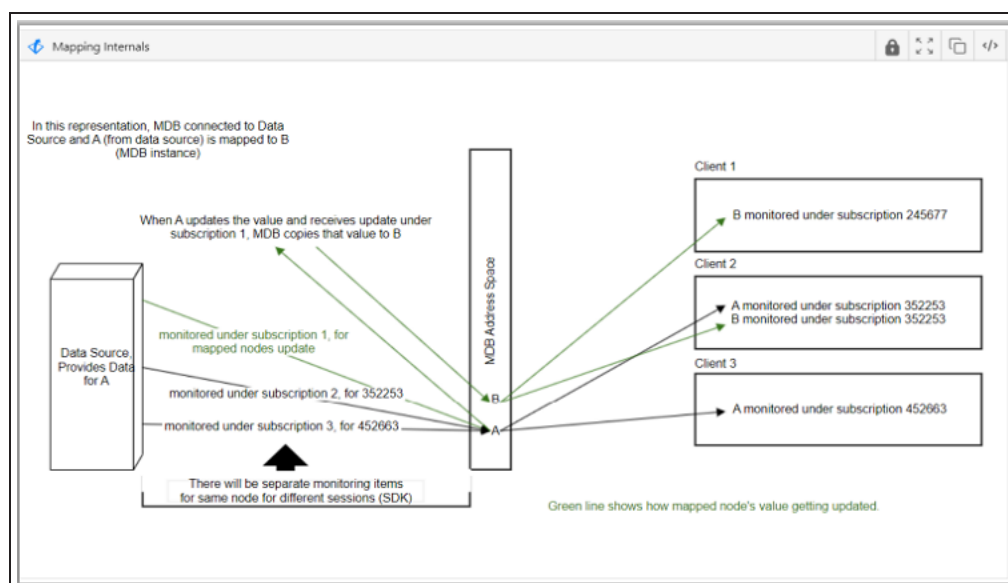
- a. Open Terminal with sudo privileges and navigate to /tmp/ directory using the command:

```
"cd /tmp".
```

- b. Execute the command “ls” to list all the files present in the directory. You can see the file starting with “fne.xxxxx”.
Example File Name: fne.QTVFQUNEMzFGMUZCNDdkZTgzN0QyRjEyQ0M3MDBGQkQtaG9uZXI3ZWw=
- c. Delete this file using the command “rm
fne.QTVFQUNEMzFGMUZCNDdkZTgzN0QyRjEyQ0M3MDBGQkQtaG9uZXI3ZWw=”
- d. Try to register the ApplImage as a service again using the steps from the Install Matrikon Data Broker App Image.

B.6 Why Data from Source and Destination Node is not in Synch after Data Mapping

Mapping Internals



This is the scenario where Node A is mapped to Node B, and three Clients 1,2,3 are subscribing to it. If Client 2 and Client 3 get disconnected, subscriptions 2 & 3 (to data source) are destroyed immediately. But Client 1 still gets A's value correctly since subscription 1 is intact and dedicated to updating the mapped nodes. To make this happen, it is required to maintain a separate subscription to update the mapped instances.

Since a separate subscription is kept for updating the mapped instances, the sampling time is slightly different for Node A and B in any client. A's value can be somewhat different if we connect other sessions to MDB and monitor Node A.

B.7 Failed to browse Types from migrated Data Sources. Returns Error: “BadNotFound”

After migration from the old version to the new version, types from previous Data Sources cannot be found in the Type System, or browsing them can result in the Error “BadNotFound”.

B.7.1 Workaround

Delete the existing Data Source and add it again.

B.8 GetEndpoints Request Fails While Adding Remote UA Server

In the Matrikon Data Broker Federator Data Sources pane, while adding a remote UA Server as a data source, the GetEndpoints request fails.

This usually happens when the find server response contains an underscore (_) in the hostname of the remote UA server.

B.8.1 Workaround

1. In the **Data Source Configuration** window, select **Manual**
2. You type the Endpoint URL of the remote UA server.
3. You replace the hostname or machine name with the IP address of the remote server.
4. Click **Find Servers**.

B.9 Invalid user credentials error message at the service registration screen in Matrikon Data Broker Installer

You can get an invalid user credentials error message while installing the Matrikon Data Broker in the service registration screen.

B.9.1 Workaround

1. You go to the **Local Security** policy panel, locate, and then open the **Allow Log On Locally** policy.
2. You add the user account used with the service registration.
3. You save the changes and attempt to continue with the installation.

Contact [Matrikon Support](#) for more support.

B.10 Fails to Import below mentioned NodeSetFile due to Enum Values present in “Name_Value” format in Extension Field Object

Follow the below steps if you fail to import the below-mentioned NodeSetFile.

-OpcUaCASNodeSet2.xml

-OpcUaI4AASNodeSet2.xml

-OpcUaMachineVisionNodeSet2.xml

-OpcUaPnNodeSet2.xml

-OpcUATMCNodeSet2.xml

B.10.1 Workaround:

Ex: for OpcUaCASNodeSet2.xml

1. Open NodeSetFile.
2. You can go to the line number from where the problem is reported. In this example, lines **18272** and **49078**.
3. Change the value to 0.

Like: 0_0 0_0 0_0 change to 0 0 0 both in 18272 and 49078

B.11 UAExplorer's Data Mapping View shows Node's TypeDefinition/DataTypes as missing or wrong sometimes

UAExplorer's Data Mapping View shows TypeDefinition or DataTypes as missing or wrong, sometimes leading to the failure of Data Mapping with the error "BadTypeMismatch".

B.11.1 Workaround

Please export the Address Space using the Export Address functionality to resolve this issue. Once the Export AddressSpace is completed, TypeDefinition or DataTypes shows correctly. You can go ahead and perform the Data Mapping now.

B.12 Reverse Connections is missing sometimes after migration

After migration from the old version to the new version, the Reverse Connection entry can be seen missing sometimes in Reverse Connections Configuration Windows, and monitored items from that Reverse Connection cannot start monitoring back.

B.12.1 Workaround

Re-configure or re-add the Reverse Connection and monitor the items again.

B.13 Matrikon Data Broker on Windows fails to register as a service due to Error "Failed to create the Licensing Environment"

Follow the below procedure if you fail to Register MatrikonDataBroker on Windows as a service on the Windows Operating system.

B.13.1 Workaround

1. Try updating the Windows server. If it is already on the latest version, ignore this step and move to step 2.
2. You open the Windows PowerShell as an administrator.
3. Move directory to c:/ by using `cd C:\`
4. Execute `certutil.exe -generateSSTFromWU roots.sst`
5. Copy both the commands at once and paste them into Windows Powershell.
`$sst = (Get-ChildItem -Path C:\roots.sst)`
`$sst | Import-Certificate -CertStoreLocation Cert:\LocalMachine\Root`
6. This installs all the missing certificates from the Windows update.
7. Reboot the Client's machine.
8. Verify the certificate chain again by using `signtool.exe verify /pa FlxCore64.dll`.
9. Now, try to activate the license.

B.14 Explorer shuts down when adding 20 or more sessions

Explorer can shut down when you add 20 or more sessions with certain UA servers and restart the server.

B.14.1 Workaround

- Launch multiple instances of Explorer to distribute different sessions. All the instances remember all the sessions.

B.15 Find Servers fails intermittently when adding Data Source

The servers fail intermittently while adding a Data Source for the first time.

B.15.1 Workaround

1. You close and relaunch the Explorer.
2. You try adding the data source again.
3. Alternatively, you need to map the hostname and IP address of the system hosting the OPC UA Server in the Windows host file to overcome this problem.

B.16 Explorer Log Window Disappears

B.16.1 Issue

When the Matrikon Data Broker instances are connected, and you click the Matrikon Data Broker Config Window or MQTT Publisher window, the Explorer log window disappears, and a custom screen appears.

B.16.2 Reason

This is the default behavior of the application when no connection is established with MQTT Publisher or Matrikon Data Broker UA Servers.

B.16.3 Workaround

- Click "Click here to return to home" on the custom screen or click the Log icon to re-display the log window if required.

Double-click the log window title bar and dock out if the Log window pull-up does not work. Double-click again and try pulling up. If it still does not work, then close and restart the Explorer.

B.17 Matrikon Data Broker fails to add data sources after a limit on Ubuntu/Redhat Linux operating system

Follow the below procedure if you fail to add Data sources after a limit on the Linux operating system.

1. Open terminal window
2. Check the current value of `max_user_instances` by typing the below command:

```
$ cat /proc/sys/fs/inotify/max_user_instances
```

3. The variable's value limits the Data Broker to add data source nodes. Increase this value by using the following command:
4. Open file `/etc/sysctl.conf` in text editor
5. Add below line at the end of the file:
`fs.inotify.max_user_instances = 2048`
6. Save the file and log out from the system.
7. Log in again and try adding data sources on Data Broker.
8. This resolves the problem.

B.18 Matrikon Data Broker or Explorer not accessing the local LDS in Windows Operating System

If you cannot access the LDS (Local Discovery Server) from the Explorer, Matrikon Data Broker does not show up as an entry in the LDS.

B.18.1 Reason

The LDS does not accept an unsecured connection by default. This can prevent the Explorer and Matrikon Data Broker from accessing it.

B.18.2 Workaround

- Recommended - Perform the following procedure to trust the application certificates between Matrikon Data Broker and the LDS. This allows the connections to the LDS. Restart the LDS and Matrikon Data Broker after the certificates are exchanged. Restart the LDS first and then the Matrikon Data Broker.

Steps to trust the application certificates between the Matrikon Data Broker and the LDS.

Background: The LDS stores its certificates in the default location: `<ProgramData>\OPC Foundation\UA\Discovery\pki`.

1. Go to the following location on the system where LDS is installed - **`<ProgramData>\OPC Foundation\UA\pki\rejected\certs`**.
2. Move the existing certificate from the above location to the trusted certificates directory of the LDS:
`<ProgramData>\OPC Foundation\UA\pki\trusted\certs`.
3. Go to Matrikon Data Broker certificate store in the following location:
`<ProgramData>\Matrikon\DataBroker\<service instance name>\pki\DefaultApplicationGroup\rejected\certs`.

4. Move the existing certificate of the LDS to the trusted certificates directory of the Matrikon Data Broker:

**<ProgramData>\Matrikon\DataBroker\<service instance
name>\pki\DefaultApplicationGroup\trusted\certs.**

- Alternative - (this is not recommended) - The LDS can be configured to accept all the connections. Setting this allows both Matrikon Data Broker and Explorer to connect to it. This is not recommended because it also allows all access to the LDS, which can lead to a less secure system. You can see the LDS documentation for details on configuration. Contact Matrikon Support before you execute, as this is not a recommended alternative.

C

KNOWN ISSUES

C.1 Issues while Installation

Issues while Installation

Description	Workaround
Two installers running in the background.	1. Go to Task Manager and stop any one installer process. 2. Click OK and terminate the process. 3. You restart the installation.
During Windows migration Installation from 1.2 or 1.3 to 1.4, the User Name field in the Service creation screen can show the Port# as a wrong entry.	You need to look for the Computer\HKEY_LOCAL_MACHINE\SOFTWARE\Matrikon\DataBroker\RuntimeAccount field in the registry and update it with the correct User Name that you are using to run the service before restarting the installation. Take a backup of the Registry before editing to avoid any corruption causing further problems.

C.2 Issues while Uninstallation

Issues while Uninstallation

Description	Workaround
Service instance can be listed in the services panel after uninstallation. This is observed rarely on highly secured systems where the installer's user account needs help to remove the service instance successfully.	You can delete the left-out Matrikon Data Broker lservice using the command below at Windows RUN Prompt: <pre>sc DEL <Service Name></pre> Where, Service Name is the Data Broker service in the format "Matrikon Data Broker-"<Instance Name provided during installation >. You can also look for this service by opening and locating it in the services panel.

C.3 Issues while Using Explorer

Issues while Using Explorer

Description	Workaround
" Session Name Already Exists " message. Sometimes, this happens when an active session is disconnected and removed from the recent sessions. When you connect again with the same session name, the Explorer sometimes shows a message that the session name already exists.	Ensure the session is removed from favorite sessions (if included) and attempt to connect with a new session name.
In the Matrikon Data Broker Configuration screen, the added Data Source is not enabled for the first time. This happens when the Enable check box is not selected for the first time.	Close the Data Source Configuration screen and open it again. Ensure that the Enable checkbox is selected.
Address Space shrinks to the Root node when attempting to browse a deleted data source. This can occur when one data source is not visible in the address space or is removed from the Matrikon Data Broker configuration.	On the left of the Root node, click the Browse arrow >. This brings back all the address space nodes.
In the Matrikon Data Broker Configuration screen, Find Servers fails when adding a new data source. This can occur for several reasons, such as network latency, slow response from the discovery server, etc.	1. Go to Advanced Settings and increase the Default Request Timeout by 10000 milliseconds (10 seconds). 2. Go back to General Settings and attempt to Find Servers again.
In the Matrikon Data Broker Configuration screen, Find Servers is successful, but the Get End Points request fails when adding a new data source. This issue is mainly observed due to the hostname of the external server either needing to be reachable or having underscores in its machine name.	1. You can go to End Point Url under Connection Point and replace the hostname with the IP address of the external server. For example, <code>opc.tcp://192.168.55.75:56000</code> 2. Attempt to Get End Points again.
Access levels of specific nodes belonging to Variable and VariableType node classes and node IDs of custom data types are displayed in numeric format.	This will be resolved in the future release.
Explorer auto-accepts the server certificates.	This is the default behavior of Explorer.
Explorer replaces its invalid certificate	On startup; if Explorer fails to validate its certificate, it replaces the existing certificate with a valid certificate. When this happens, the UA Explorer's certificate must be again trusted by connected UA Servers.

C.4 Issues in Data Broker

Issues in Data Broker

Description	Workaround
Data Broker can stop responding when any one or both of the following server configuration parameters are modified: • Data Broker Hostname • Data Broker URI	If the hostname or the server URI is changed, the certificate must be reissued to be considered valid. This generates a new private key, which can cause issues with Decrypting the user account passwords. Due to this, the users cannot connect to the Data Broker. Therefore, it is not recommended to modify these server configuration settings. You can contact Matrikon Support for more information.

D.1 Installation and Post Installation Notes

The following situations can be encountered while you install the Matrikon Data Broker:

Table 53 Installation and Post Installation Notes

User Details / Actions	Installer Action
Bad user ID / Password: The user enters a username and a password combination that is not a valid Windows user for running the Matrikon Data Broker service.	Matrikon Data Broker rejects username or password. The username and password provided during installation must be good. The account must be enabled to configure the server.
Admin User login: The user provides a service account that is a member of the Windows Local Administrators group.	Matrikon Data Broker accepts User ID and password but displays " not recommended user ". Windows services must be run by accounts that do not have administrative rights. It is recommended to create and use a new local or domain user account that does not have administrative permissions.
The user without Log On As Service Rights: A valid username and password have been provided, but that user account does not have the Log On As A Service right.	Invalidates the User ID or Password and does not register the service. The account registering the service must have the Log On As A Service Right , which can be set using the Windows Local Security Policy administrative tool. In this tool, under Local Policies\User Rights Assignment , configure the Log on as a service policy to include the user account under which the Matrikon Data Broker service runs.
The user enters an invalid port.	Matrikon Data Broker rejects the port entered.
The user enters invalid characters in Instance ID	Matrikon Data Broker rejects the Instance ID.

- The Explorer component is selected by default in the Matrikon Data Broker installer. If you unselect the Explorer component and want to install it separately, download the Explorer MSI or contact [Matrikon Support](#).
- Explorer can be installed without manual intervention, i.e., silent install, via the Windows command line. To do this, perform the following steps:

1. Open **Command Prompt** on Windows and change to the directory where the Explorer MSI is downloaded.
 2. Type the following command: **MatrikonOPCUAExplorer.msi /quiet**
 3. Wait until the installer executes all the steps. To verify, look for the OPC UA Explorer shortcut on the desktop. For more information and help, contact [Matrikon Support](#).
- Currently, Modify and Repair are not supported by Matrikon Data Broker. In case of any issues during installation or uninstall, contact [Matrikon Support](#).
 - Local Discovery Service (LDS): The Installer attempts to install LDS version 1.04.405.482. If there is an earlier version of LDS, it attempts to upgrade. If there is no LDS in the system, then this version is installed. The LDS upgrade process can fail, and the earlier version might remain in the system. In this case, it is recommended that you obtain the latest version of LDS directly from the OPC Foundation website or by contacting Matrikon Support and upgrading manually to this version.
 - When you uninstall the Matrikon OPC UA Explorer and the Matrikon Data Broker, the following folders and files remain in the system.

To remove the folders and files if you are not using the product on this system again, do the following:

1. **Windows OS:** You can delete them manually.
 - c:\users\< <DataBroker Service User>\AppData\Local\Matrikon\OPCUAExplorer\matrikon_opcua_explorer_connections.xml -> XML file for connections history.
 - <Install location>\Matrikon\ <DataBroker folder -> stores license DLL.
 - c:\ProgramData\Matrikon\Licenses\ <DataBroker -> holds the existing <DataBroker license information.
 - c:\users\<user currently using Explorer>\AppData\Local\Matrikon\OPCUAExplorer -> PKI subfolder for existing certificates, and uacilentlogs subfolder for storing all logs from Explorer.
2. **Linux OS:** You can execute the following command and delete a specific MatrikonDataBroker instance or all the MatrikonDataBroker instances and all its files and folders:
 - Remove DataBroker instance by name: `sudo ./ MatrikonDataBroker -r DemolInstance.`
 - Remove all the DataBroker Instances: `sudo ./ MatrikonDataBroker -r -a.`

D.2 Configuring Data Broker to Accept Low-Security Connections

Data Broker is developed with a high level of security in mind, and as installed, the following OPC UA connection options are disabled:

- Use of the Anonymous token type.
- Use of the Security profile "NONE."
- Use of the Message Mode "NONE"

If these options are required for interoperability, they can be enabled using the following procedures:

- [Enabling Deprecated Security Policies](#)
- [Enabling Anonymous User Access](#)



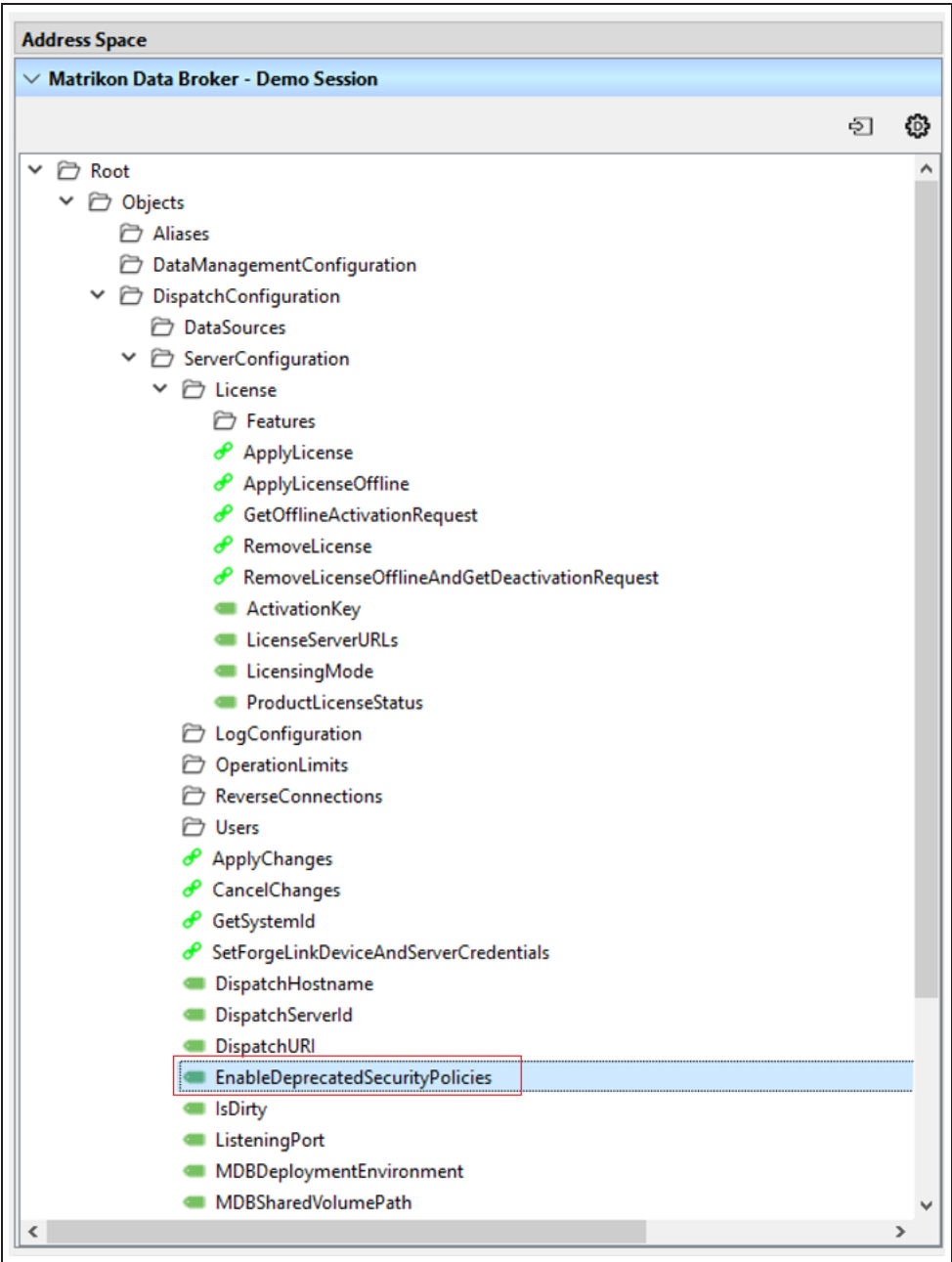
Enabling low-security connections should only be done if necessary and should be configured during the initial setup. Following this procedure can cause the server to drop all connections and restart.

D.2.1 Enabling Deprecated Security Policies

To enable the deprecated security policies, perform the following:

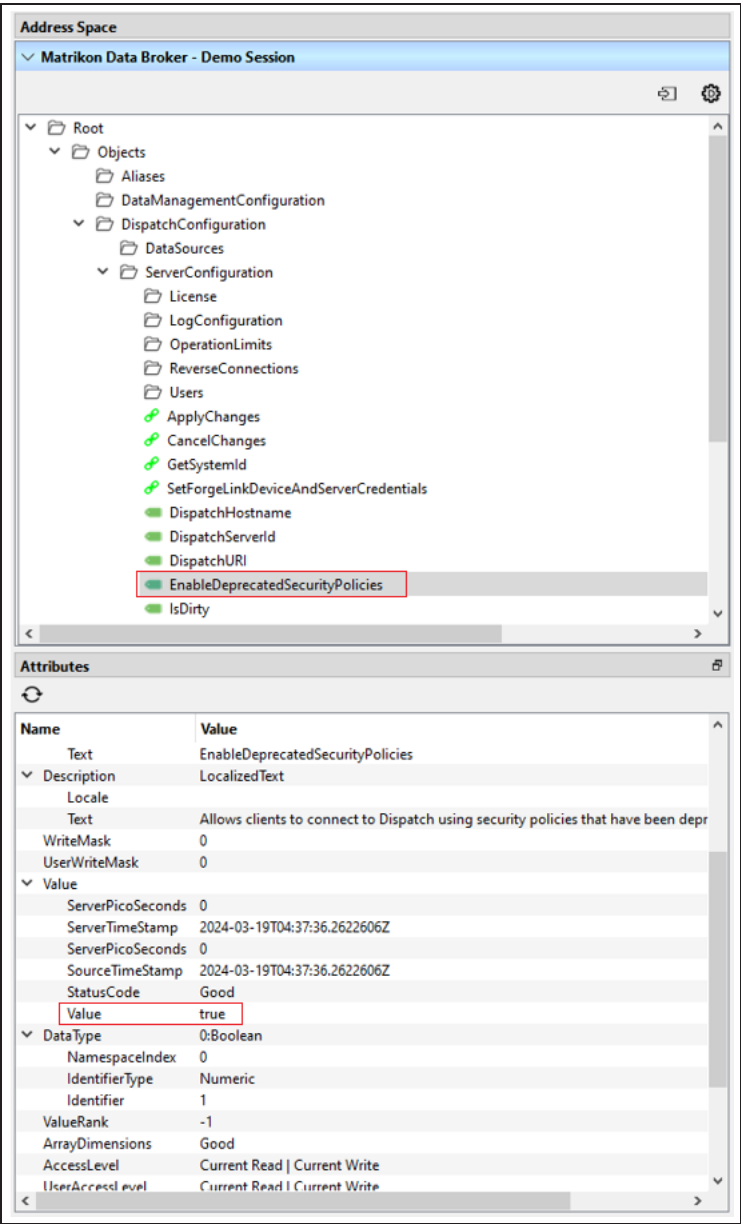
1. Open the **Explorer** application.
2. Connect to Data Broker and log in using the Admin username and password.
3. In the Address Space pane, locate
Objects/DispatchConfiguration/ServerConfiguration/EnableDeprecatedSecurityPolicies.

Figure 206 Address Space Pane



4. Click EnableDeprecatedSecurityPolicies.
The attributes of EnableDeprecatedSecurityPolicies are populated in the Attributes section.
5. In the **Attributes** section, below the **Name** column, locate and double-click the grey space below the **Value** column, then type **True**.

Figure 207 Attributes Section



- 6. You can go to the Data Broker Configuration window.
 - 7. Click **Apply**.
- The Data Broker disconnects and restarts.



Once Data Broker restarts, the NONE security policy and NONE security mode are available for connections.

D.2.2 Enabling Anonymous User Access

To enable Anonymous user access:

- 1. Please enable the deprecated security policies described in [Enabling Deprecated Security Policies](#).
- 2. Using Explorer, go to the **Data Broker Configuration** screen.
- 3. Click and expand the **User Management** section.
- 4. Select the **Anonymous** user row and select the check box below the **Enabled** column.
- 5. Click **Apply**.

Now, it is possible to connect using the Anonymous token type. Note that the Anonymous user is granted read-only permissions and cannot make configuration changes or write to aggregated values.

D.3 Node Locked Licensing Using Console Client

When you purchase a license for Matrikon Data Broker, you are provided with an activation key and instructions with several activations possible (to the extent of your purchase) using the activation key.



You need to have your activation Key readily available before you start the licensing process. If you need the activation key, STOP here and contact your Matrikon Account Manager.

You must use the matrikondatabrokerlicensetool.exe command line utility to apply for a license in Matrikon Data Broker. The command line utility is also deployed when you install Matrikon Data Broker on a system. You can locate this file at the following paths.

Table 54 Node Locked Licensing Using Console Client

Operating System	Path	Example
Windows	<Program Files>\Matrikon\DataBroker	C:\Program Files\Matrikon\DataBroker\matrikondatabrokerlicensetool.exe
Linux	<Media>/MatrikonDatabrokerLicenseTool.Appimage	/home/Media/DataBrokerLicenseTool.AppImage



Windows: License tool utility must be executed from the command prompt with Administrator privileges.
Linux: License tool utility must be executed from Terminal with sudo.

When you run the command matrikondatabrokerlicensetool.exe on Windows or **MatrikonDatabrokerLicenseTool.AppImage** on Linux, from the folder where it is available, usage instructions of the tool are displayed along with commands to perform the desired operations and options required to specify the attributes, as shown in the following table. License Tool is a UA client that connects to the Data Broker server with an admin user. If a password is already set in the Data Broker server for the admin user account, that password should be provided using the ‘-p’ option followed by the password.

The following table lists the available commands/options and their descriptions:

Table 55 Available commands and their Description

Commands	Description
Status	Displays the license status from a DataBroker server.
configure-node-locked	Configures DataBroker to use a node-locked license.
configure-license-server	Configures DataBroker to use a license server instead of a node-locked license.
activate	Activates a license online.  This requires DataBroker to directly connect to the Matrikon License server over the internet. If DataBroker is hosted in a network that cannot access the internet, use the offline activation method. For more information on the offline mode of activation, see Activating License using Node Locked Licensing in Offline Mode and Activating License using Local License Server in Offline Mode
get-offline-activation	Retrieves the activation request from DataBroker for offline activation.
activate-offline	Applies the license using an offline activation response.
deactivate-online	Deactivates the license online.
deactivate-offline	Deactivates the license offline.

Table 56 Options and Description

Options	Description
-s server_url	The opc.tcp url of the DataBroker, including the port. For example, -s http://hostname:port or -s http://ipaddress:port{*}.
-p password	The admin password for the DataBroker server. Type this option as: p: If the admin password is set to the default of a blank password. For example, -p samplePassword1. p ": If a password contains a space or special characters. For example, -p "s@mple P@ssw0rd1"  All the commands require this if there is a password set for the admin account.

Options	Description
-k activation-key	The activation key for the license as provided by Matrikon. It would be best to type the entire key, including the hyphens. For example, -k 1111-2abc-0000-11ad-ff0d-10c0-0000-e00b.  Please keep this key handy; you'll need this key during activation and to get offline activation requests.
-i input_file	The input file received from the automated Matrikon email box. This file is required for offline activation.
-o output_file	Optional: Name and location of the response file you want to provide for the offline activation request. This file must be sent to Matrikon's automated email box. If no file name is provided, the default file name is taken. If no location is provided, then the activation request file is placed in the exact location where the command line utility is executing.
-l licenseServer:port	Option to configure the local license server for the local license server mode.

D.3.1 Initial Configuration of License Tool

Since the license tool `matrikondatabrokerlicensetool.exe` is a UA Client, the Data Broker UA Server must accept the license tool's certificate for it to connect to the Matrikon Data Broker server

To enable the Matrikon Data Broker Server to accept the license tool certificate:

1. Open **Command Prompt** in Windows or **Terminal** in Linux systems.
2. Make sure the Data Broker service is running and not stopped.
3. The license tool connects to the Data Broker instance as the "admin" Data Broker user. If there is a password setup for the admin user, you must provide the password in all the commands using the **-p** option.
4. To generate the `matrikondatabrokerlicensetool`'s certificate, you must either run `matrikondatabrokerlicensetool` with valid options or connect to a Data Broker instance. Once you run the tool or connect to a Data Broker instance.
5. To get the status of the license from the Data Broker server, execute the following command:

```
Linux: ./MatrikonDataBrokerLicenseTool.AppImage status -s [opc.tcp://hostname:port or ip address:port]
```

```
Windows: matrikondatabrokerlicensetool.exe status -s [opc.tcp://hostname:port or ip address:port]
```

6. To generate the `DataBroker_license_tool`'s certificate, you must either run `DataBroker_license_tool` with valid options or connect to a Data Broker instance. Once you run the tool or connect to a Data Broker instance, the certificate is created in the following location:

Windows: <Programdata>\Matrikon\DataBroker\< Data Broker Instance Name>\pki\DefaultApplicationGroup\rejected\certs

Linux: /etc/Matrikon/DataBroker/< Data Broker Instance Name>/pki/rejected/certs

When the tool tries to establish a connection with the Data Broker Server, it is rejected as the license tool certificate is not trusted by the Data Broker Server, as shown in the following image/ text:

Linux:

Figure 208 Linux Command Prompt

```

MatrikonDataBroker:~/Downloads/licenses$ sudo ./MatrikonDataBroker/LicenseTool/AppImage status -s opc.tcp://127.0.0.1:58000
Matrikon Data Broker Licensing Tool
2.0.0.470
COPYRIGHT (c) 2009 - 2022 HONEYWELL Advanced Limited., ALL RIGHTS RESERVED

Master-node

2022-05-19 21:34:18.975 - WARNING - In file /home/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/Internals/common/portable/sta
ck/certificate_store.t.cpp:2189 Function CacheOwnCertificate_Status "BadNotfound" encountered
2022-05-19 21:34:18.990 - WARNING - In file /home/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/Internals/common/portable/sta
ck/certificate_store.t.cpp:2152 Function CacheOwnPrivateKey_Status "BadNotfound" encountered
2022-05-19 21:34:19.110 - INFORMATION - Matrikon Flex OPC UA SDK RS.1
2022-05-19 21:34:19.155 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 2
2022-05-19 21:34:19.155 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 3
2022-05-19 21:34:19.155 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256, mode 3
2022-05-19 21:34:19.155 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128_Sha256_RsaOaep, mode 3
2022-05-19 21:34:19.155 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256, mode 3
2022-05-19 21:34:19.155 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss, mode 3
2022-05-19 21:34:19.155 - INFORMATION - Connecting to opc.tcp://127.0.0.1:58000
2022-05-19 21:34:19.155 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss, mode 3
2022-05-19 21:34:19.185 - WARNING - In file /home/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/Internals/client/portable/cll
ent_core.t.cpp:132 Function EstablishSession_Status "BadSecurityChecksFailed" encountered
2022-05-19 21:34:19.185 - WARNING - In file /home/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLXAGGREGATOR-FD-FLNX/src/tools/license_tool/license_tool.t.cpp:499 Function ConnectStatus "B
adSecurityChecksFailed" encountered
Error Connecting

```

Windows:

Figure 209 Windows Command Prompt

```

Administrator: Command Prompt

C:\Program Files\Matrikon\FLEXDispatch>FLEXDispatch_license_tool.exe status -s opc.tcp://localhost:58000

Matrikon FLEX Dispatch Licensing Tool
(C) 2020

FDInstTest

2020-04-28 13:03:04.541 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15
2020-04-28 13:03:04.603 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15
2020-04-28 13:03:04.603 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15
2020-04-28 13:03:04.603 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256
2020-04-28 13:03:04.603 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128_Sha256_RsaOaep
2020-04-28 13:03:04.603 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256
2020-04-28 13:03:04.603 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss
2020-04-28 13:03:04.603 - INFORMATION - Connecting to opc.tcp://FDINSTTEST:58000
2020-04-28 13:03:04.603 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss
unction uasdk::CertificateStore_t::GetOwnCertificateStatus "BadNotfound" encountered

```

When the license tool is presented with this error, the license tool certificate is in a rejected folder of the Data Broker Instance. It must be moved manually into a trusted folder.



Further in the document, only some screenshots are shown in Windows and Linux. However, the content displayed in any of the OS is the same as in the screenshots shown in the document.

7. To make the Data Broker License tool certificate accepted in Data Broker, follow the steps mentioned in [How to Trust the Rejected Certificates in Dispatch](#).
8. Once the above step is completed and you run the status command once again, a screen confirming that the license tool can connect to the Data Broker server is displayed as shown in the following image or text:

Figure 210 Command Prompt

```

user@ubuntu:~/Media$ ./FLEXDispatch_license_tool.AppImage status -s opc.tcp://localhost:58000
Matrikon FLEX Dispatch Licensing Tool
(C) 2020
ubuntu
2020-05-17 16:33:55.079 - WARNING - In file /home/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLEXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/internals/common/portable/stk/certificate_store.t.cpp:2112 function CacheOwnCertificate_Status "BadNotFound" encountered
2020-05-17 16:33:55.090 - WARNING - In file /home/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLEXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/internals/common/portable/stk/certificate_store.t.cpp:2155 function CacheOwnPrivateKey_Status "BadNotFound" encountered
2020-05-17 16:33:56.004 - INFORMATION - Matrikon Flex OPC UA SDK R410.5
2020-05-17 16:33:56.087 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 2
2020-05-17 16:33:56.087 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 3
2020-05-17 16:33:56.087 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256, mode 3
2020-05-17 16:33:56.087 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256_Sha256_RsaOaep, mode 3
2020-05-17 16:33:56.087 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256, mode 3
2020-05-17 16:33:56.087 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256_RsaPss, mode 3
2020-05-17 16:33:56.087 - INFORMATION - Connecting to opc.tcp://ubuntu:58000
2020-05-17 16:33:56.087 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256_Sha256_RsaPss, Mode 3
2020-05-17 16:33:56.110 - INFORMATION - ...Connected
License Mode: NODE-LOCKED
License URL: http://localhost:7070/request
License State: ON GRACE PERIOD
Feature: MOPC_DISPATCH_NODE(1.1) 3 9999/9999 Expires: 2020-05-17 18:32:45 (local)
Feature: MOPC_DISPATCH_NODE_DS_CONN(1.1) 3 9999/9999 Expires: 2020-05-17 18:32:45 (local)
Feature: MOPC_DISPATCH_NODE_USR_CONN(1.1) 3 9999/9999 Expires: 2020-05-17 18:32:45 (local)
Feature: MOPC_DISPATCH_NODE_UAC_CONN(1.1) 3 9999/9999 Expires: 2020-05-17 18:32:45 (local)
Feature: MOPC_DISPATCH_NODE_REV_CONN(1.1) 3 9999/9999 Expires: 2020-05-17 18:32:45 (local)
2020-05-17 16:33:56.124 - INFORMATION - Disconnected: 0x00000000
user@ubuntu:~/Media$

```

D.3.2 Activating Node Locked License in Online Mode1

Once you receive the license key from the [Matrikon Support](#) team, activate the license in online mode:

1. Open **Command Prompt**. (Terminal in case of a Linux operating system.)
2. To activate the license, execute the following command:

Linux: `./MatrikonDataBrokerLicenseTool.AppImage activate -k [Activation Key] -s [opc.tcp://hostname:port or ip address:port]`

Windows: `matrikondatabrokerlicensetool.exe activate -k [Activation Key] -s [opc.tcp://hostname:port or ip address]`

Figure 211 Command Prompt - In the case of the Linux operating system

```

user@ubuntu:~/Media$ ./FLEXDispatch_license_tool.AppImage activate -k 8...-a50f-1 -s4 -f-a -f-3 -f4 -f-1 -s opc.tcp://localhost:58000
Matrikon FLEX Dispatch Licensing Tool
(C) 2020
ubuntu
2020-05-17 21:33:16.313 - WARNING - In file /home/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLEXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/internals/common/portable/stk/certificate_store.t.cpp:2112 function CacheOwnCertificate_Status "BadNotFound" encountered
2020-05-17 21:33:16.323 - WARNING - In file /home/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLEXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/internals/common/portable/stk/certificate_store.t.cpp:2155 function CacheOwnPrivateKey_Status "BadNotFound" encountered
2020-05-17 21:33:16.436 - INFORMATION - Matrikon Flex OPC UA SDK R410.5
2020-05-17 21:33:16.446 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 2
2020-05-17 21:33:16.467 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 3
2020-05-17 21:33:16.467 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256, mode 3
2020-05-17 21:33:16.467 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256_Sha256_RsaOaep, mode 3
2020-05-17 21:33:16.467 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256, mode 3
2020-05-17 21:33:16.467 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256_RsaPss, mode 3
2020-05-17 21:33:16.467 - INFORMATION - Connecting to opc.tcp://ubuntu:58000
2020-05-17 21:33:16.467 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256_Sha256_RsaPss, Mode 3
2020-05-17 21:33:16.486 - INFORMATION - ...Connected
Changes applied successfully.
License activated successfully.
2020-05-17 21:33:28.216 - INFORMATION - Disconnected: 0x00000000
user@ubuntu:~/Media$

```

The license is activated.

3. To check the status of the license:

- a. In **Command Prompt** (Terminal in case of a Linux operating system), execute the following command:

```
Linux: ./ MatrikonDataBrokerLicenseTool.AppImage status -s [opc.tcp://hostname:port or ip
address:port]

Windows: matrikondatabrokerlicensetool.exe status -s[opc.tcp://hostname:port or ip
address:port]
```

- b. The status of the license is displayed as shown in the following image/ text:

Figure 212 Status of License- Linux operating system

```
user@ubuntu:~/Media$ ./FLEXDispatch_license_tool.AppImage status -s opc.tcp://localhost:58000
Matrikon FLEX Dispatch Licensing Tool
(C) 2020
ubuntu
2020-05-17 16:51:24.634 - WARNING - In file /home/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLEXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/internals/common/portable/st
ck/certificate_store_1.cpp:2112 function CacheOwnCertificate_Status "BadNotFound" encountered
2020-05-17 16:51:24.645 - WARNING - In file /home/gator/BamboAgents/bambo_agent_home_1/xml-data/build-dir/BFLEXAGGREGATOR-FD-FLNX/src/libraries/flexsdk/Flex_SDK/Code/uasdk/internals/common/portable/st
ck/certificate_store_1.cpp:2155 function CacheOwnPrivateKey_Status "BadNotFound" encountered
2020-05-17 16:51:24.760 - INFORMATION - Matrikon Flex OPC UA SDK R410.5
2020-05-17 16:51:24.791 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 2
2020-05-17 16:51:24.791 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 3
2020-05-17 16:51:24.791 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256, mode 3
2020-05-17 16:51:24.791 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicy#Aes128_Sha256_RsaOaep, mode 3
2020-05-17 16:51:24.791 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256, mode 3
2020-05-17 16:51:24.791 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss, mode 3
2020-05-17 16:51:24.791 - INFORMATION - Connecting to opc.tcp://ubuntu:58000
2020-05-17 16:51:24.791 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicy#Aes256_Sha256_RsaPss, Mode 3
2020-05-17 16:51:24.823 - INFORMATION - ...Connected
License Mode: NODE-LOCKED
License URLs: http://localhost:7070/request
License State: LICENSED
Feature: MOPC_DISPATCH_NODE(1.1) 5 1/5 Expires: 2021-12-31 15:59:59 (local)
Feature: MOPC_DISPATCH_NODE_DS_CONN(1.1) 5 0/49995 Expires: 2021-12-31 15:59:59 (local)
Feature: MOPC_DISPATCH_NODE_DS_CONN(1.1) 5 0/49995 Expires: 2021-12-31 15:59:59 (local)
Feature: MOPC_DISPATCH_NODE_UAC_CONN(1.1) 5 0/300 Expires: 2021-12-31 15:59:59 (local)
Feature: MOPC_DISPATCH_NODE_REV_CONN(1.1) 5 0/49995 Expires: 2021-12-31 15:59:59 (local)
2020-05-17 16:51:24.931 - INFORMATION - Disconnected: 0x00000000
user@ubuntu:~/Media$
```

4. The command status gives information on the current license mode, configured server URLs, license state, and details on the features.



License State: LICENSED denotes the Matrikon Data Broker license is activated.

License State: ON GRACE PERIOD denotes the Matrikon Data Broker license is running in grace time.

And any feature X/Y denotes, X of licenses out of Y count is consumed. When the server is in the grace period, X/Y always shows the exact count and does not change based on usage.

You can also see the date when the license applied is expiring.

D.3.3 Activating Node Locked License in Offline Mode0

You can activate the license in 3 steps:

Step 1 Generating the request file.

Step 2: Requesting a license file from the license server through e-mail.

Step 3 Applying the received offline activation file to the Data Broker server.

Steps 1 and 3 can be executed on a system where the Data Broker product is installed, and Step 2 can be run on any system with internet access to send and receive e-mails.

Step1: Generating request file

1. Open **Command Prompt**. (**Terminal** in case of a Linux operating system.)
2. To get an Offline Activation Request, execute the following command:

```
Linux: ./ /MatrikonDataBrokerLicenseTool.AppImage get-offline-activation -k [Activation Key] -s
[opc.tcp://hostname:port or ip address:port] -o [licenserequest.bin]
Windows: matrikondatabrokerlicensetool.exe get-offline-activation -k [Activation Key] -s
[opc.tcp://hostname:port or ip address:port] -o[licenserequest.bin]
```

Figure 213 Command Prompt - To get an Offline Activation request

```
C:\Program Files\Matrikon\DataBroker\Matrikondatabrokerlicensetool.exe activate-offline -s opc.tcp://127.0.0.1:50001 -i licenserequest_response.bin
Matrikon Data Broker Licensing Tool
2.0.0.466
COPYRIGHT (c) 2009 - 2022 HONEYWELL Advanced Limited., ALL RIGHTS RESERVED
AB22BLAR2K19TNPLT
2022-05-19 10:51:54.200 - WARNING - In file D:\BFLXAGGREGATOR-FD-DM19\src\libraries\FlexSdk\Flex_SDK\Code\usdk\internals\common\portable\stack\certificate_store_t.cpp:2109 function usdk::CertificateStore::FindCertificateByThumbprint encountered
2022-05-19 10:51:54.200 - WARNING - In file D:\BFLXAGGREGATOR-FD-DM19\src\libraries\FlexSdk\Flex_SDK\Code\usdk\internals\common\portable\stack\certificate_store_t.cpp:2152 function usdk::CertificateStore::FindCertificateByThumbprint encountered
2022-05-19 10:51:54.204 - INFORMATION - Matrikon Flex OPC UA SDK AS.1
2022-05-19 10:51:54.426 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 2
2022-05-19 10:51:54.426 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 3
2022-05-19 10:51:54.426 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256, mode 1
2022-05-19 10:51:54.426 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128_Sha256_RsaOep, mode 3
2022-05-19 10:51:54.426 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256, mode 3
2022-05-19 10:51:54.426 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256_Sha256_RsaPss, mode 3
2022-05-19 10:51:54.426 - INFORMATION - Connecting to opc.tcp://127.0.0.1:50001
2022-05-19 10:51:54.426 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256_Sha256_RsaPss, Mode 3
2022-05-19 10:51:54.473 - WARNING - While validating certificate, the NG576446 was not present or was not as expected
2022-05-19 10:51:54.520 - INFORMATION - ...Connected
Changes applied successfully
2022-05-19 10:51:54.551 - INFORMATION - Disconnected: 0x00000000
```

3. When the -o option is not provided, by default, a file named **offline_request.bin** is generated in the location where matrikondatabrokerlicensetool is executed.
4. If the -o option has the full path name, the requested file gets created in the provided location. In the -o option, if there is no full path of the file is provided and only the file name is provided (in the format of <<filename>>.bin then the file gets created in the exact location where the license tool is executed from,

Step2: Requesting license file from the license server

1. Send the **offline_activation_data.bin** file to matrikon-license-request@matrikonopc.com.

You get the **offline_activation_data_response.bin** file in your e-mail as a response from the [Matrikon-License-Response@matrikonopc.com](mailto:Response@matrikonopc.com) e-mail address.

2. Save the **offline_activation_data_response.bin** file in a desired location, accessible to a system where Step 1 is executed.

Step3: Applying the offline activation file

1. Copy the **offline_activation_data_response.bin** file received in step 2 into the folder where the **matrikondatabrokerlicensetool** file is available.
2. Open **Command Prompt**. (**Terminal** in case of a Linux operating system.)
 - a. Execute the following command:

```
Linux: ./ MatrikonDataBrokerLicenseTool.AppImage activate-offline -s
[opc.tcp://hostname:port or ip address:port] -i [offline_activation_data_response.bin]
Windows: matrikondatabrokerlicensetool.exe activate-offline -s [opc.tcp://hostname:port
or ip address:port] -i [offline_activation_data_response.bin]
```

Figure 214 Command Prompt - Applying Offline Activation data

```
C:\Program Files\Matrikon\DataBroker\matrikondatabrokerlicensetool.exe status -s opc.tcp://127.0.0.1:5040
Matrikon Data Broker Licensing Tool
2.0.0.466
COPYRIGHT (c) 2009 - 2022 HONEYWELL Advanced Limited., All RIGHTS RESERVED
AB2BLAB2K19THPLT
2022-05-19 10:52:58.442 - WARNING - In file D:\BFLXAGGREGATOR-PD-DRS\src\libraries\FlexSdk\Flex_SDK\Code\usadk\Internal\common\portable\stack\certificate_store_t.cpp:2109 function usadk::Cert
"BadRootFound" encountered
2022-05-19 10:52:58.458 - WARNING - In file D:\BFLXAGGREGATOR-PD-DRS\src\libraries\FlexSdk\Flex_SDK\Code\usadk\Internal\common\portable\stack\certificate_store_t.cpp:2152 function usadk::Cert
"BadRootFound" encountered
2022-05-19 10:52:58.598 - INFORMATION - Matrikon Flex OPC UA SDK RS.1
2022-05-19 10:52:58.661 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicyBasic128Rsa15, mode 2
2022-05-19 10:52:58.661 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicyBasic128Rsa15, mode 3
2022-05-19 10:52:58.661 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicyBasic256, mode 2
2022-05-19 10:52:58.661 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicyBasic128_Sha256_Rsa256, mode 3
2022-05-19 10:52:58.661 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicyBasic128_Sha256_Rsa256, mode 3
2022-05-19 10:52:58.676 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicyBasic256_Sha256_Rsa256, mode 3
2022-05-19 10:52:58.676 - INFORMATION - Connecting to opc.tcp://127.0.0.1:5040
2022-05-19 10:52:58.676 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicyBasic256_Sha256_Rsa256, Mode 3
2022-05-19 10:52:58.723 - WARNING - While validating certificate, the HOSTNAME was not present or was not as expected
2022-05-19 10:52:58.770 - INFORMATION - ...Connected
License Mode: MODE_LOCKED
License URL: http://localhost:7870/request
License State: ON GRACE PERIOD
Feature: MOPC_DISPATCH_MODE(1.2) 1/3 Expires: 2022-05-19 12:44:14 (local)
Feature: MOPC_DISPATCH_MODE_DS_CONN(1.2) 0/5 Expires: 2022-05-19 12:44:14 (local)
Feature: MOPC_DISPATCH_MODE_DS_CONN(1.2) 0/5 Expires: 2022-05-19 12:44:14 (local)
Feature: MOPC_DISPATCH_MODE_DS_CONN(1.2) 1/64 Expires: 2022-05-19 12:44:14 (local)
Feature: MOPC_DISPATCH_MODE_REV_CONN(1.2) 0/64 Expires: 2022-05-19 12:44:14 (local)
Feature: MOPC_DISPATCH_MODE_MUSAY(1.2) 0/1 Expires: 2022-05-19 12:44:14 (local)
Feature: MOPC_DISPATCH_MODE_MUSAY(1.2) 0/1 Expires: 2022-05-19 12:44:14 (local)
2022-05-19 10:52:58.786 - INFORMATION - Disconnected: @#####
```

3. The license is activated.
4. Check the status of the license.

To check the status of the license:

5. In **Command Prompt**. (**Terminal** in case of a Linux operating system), execute the following command:

```
Linux: ./ MatrikonDataBrokerLicenseTool.AppImage status -s [opc.tcp://hostname:port or ip
address:port]
Windows: matrikondatabrokerlicensetool.exe status -s [opc.tcp://hostname:port or ip address:port]
```

Figure 215 Command Prompt

```
C:\Program Files\Matrikon\DataBroker\matrikondatabrokerlicensetool.exe activate-offline -s opc.tcp://127.0.0.1:54001 -i licenserequest_response.bin
Matrikon Data Broker Licensing Tool
2.0.0.466
COPYRIGHT (c) 2009 - 2022 HONEYWELL Advanced Limited., All RIGHTS RESERVED
AB2B1A02K19TNPLT
2022-05-19 18:51:54.288 - WARNING - In file D:\BFLEXAGGREGATOR-FD-DR19\src\libraries\FlexSdk\Flex_SDK\Code\usdk\internals\common\portable\stack\certificate_store_t.cpp:2189 function usdk::CertificateStore::FindCertificateByThumbprint encountered "BadNotFound" encountered
2022-05-19 18:51:54.288 - WARNING - In file D:\BFLEXAGGREGATOR-FD-DR19\src\libraries\FlexSdk\Flex_SDK\Code\usdk\internals\common\portable\stack\certificate_store_t.cpp:2192 function usdk::CertificateStore::FindCertificateByThumbprint encountered "BadNotFound" encountered
2022-05-19 18:51:54.364 - INFORMATION - Matrikon Flex OPC UA SDK RS.1
2022-05-19 18:51:54.426 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 2
2022-05-19 18:51:54.426 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Rsa15, mode 3
2022-05-19 18:51:54.426 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256, mode 3
2022-05-19 18:51:54.426 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128_Sha256_RsaOaep, mode 3
2022-05-19 18:51:54.426 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256, mode 3
2022-05-19 18:51:54.426 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256_RsaPss, mode 3
2022-05-19 18:51:54.426 - INFORMATION - Connecting to opc.tcp://127.0.0.1:54001
2022-05-19 18:51:54.426 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256_RsaPss, Mode 3
2022-05-19 18:51:54.473 - WARNING - While validating certificate, the HOSTNAME was not present or was not as expected
2022-05-19 18:51:54.528 - INFORMATION - ...Connected
Changes applied successfully
2022-05-19 18:51:54.551 - INFORMATION - Disconnected: 0x00000000
```

D.3.4 Removing Node Locked License

You can use the same `matrikondatabrokerlicensetool.exe` on Windows and `matrikondatabrokerlicensetool` on Linux to remove the license for Matrikon Data Broker.

This can be done in either online or offline mode.

D.3.4.1 Removing Node Locked License in Online Mode

Removing the license in online mode does not require the activation key, as the information is available on the license server.

To remove the license in online mode:

1. Open **Command Prompt**. (**Terminal** in case of a Linux operating system.)
2. Execute the following command:

```
Linux: ./ /MatrikonDataBrokerLicenseTool.AppImage deactivate-online -s [opc.tcp://hostname:port or ip address:port] -k [Activation Key]

Windows: matrikondatabrokerlicensetool.exe deactivate-online -s [opc.tcp://hostname:port or ip address:port] -k [Activation Key]
```

The license is removed from the DatabRoker server.



You can use the -k [Activation Key] option in the command only to remove a specific activation key. If the activation key is not specified in the command, then the activation key stored on the server in the following path: *Data BrokerConfiguration /Server Configuration/License/ActivationKey node is used for removal.*

Figure 216 Command Prompt - To remove License in Online mode

```
C:\Program Files\Matrikon\DataBroker\matrikondatabrokerlicensetool.exe activate-offline -s opc.tcp://127.0.0.1:56001 -i licenserequest_response.bin
Matrikon Data Broker Licensing Tool
2.0.0.466
COPYRIGHT (c) 2009 - 2022 HONEYWELL Advanced Limited., ALL RIGHTS RESERVED
AB2B1AB2K187NPLT
2022-05-19 10:51:54.200 - WARNING - In file D:\BFLXAGGREGATOR-FD-DR19\src\libraries\FlexSdk\Flex_SDK\Code\usdk\Internals\common\portablestack\certificate_store_t.cpp:2109 function usdk::CertificateStore::FindCertificateByThumbprint encountered
2022-05-19 10:51:54.200 - WARNING - In file D:\BFLXAGGREGATOR-FD-DR19\src\libraries\FlexSdk\Flex_SDK\Code\usdk\Internals\common\portablestack\certificate_store_t.cpp:2152 function usdk::CertificateStore::FindCertificateByThumbprint encountered
2022-05-19 10:51:54.364 - INFORMATION - Matrikon Flex OPC UA SDK RS.1
2022-05-19 10:51:54.426 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicyBasic128Sha15, mode 2
2022-05-19 10:51:54.426 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicyBasic128Sha15, mode 3
2022-05-19 10:51:54.426 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicyBasic256, mode 3
2022-05-19 10:51:54.426 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicyBasic128_Sha256_RsaOaep, mode 3
2022-05-19 10:51:54.426 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicyBasic256Sha256, mode 3
2022-05-19 10:51:54.426 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicyBasic256_Sha256_RsaPss, mode 3
2022-05-19 10:51:54.426 - INFORMATION - Connecting to opc.tcp://127.0.0.1:56001
2022-05-19 10:51:54.426 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicyBasic256_Sha256_RsaPss, Mode 3
2022-05-19 10:51:54.473 - WARNING - While validating certificate, the HOSTNAME was not present or was not as expected
2022-05-19 10:51:54.520 - INFORMATION - ...Connected
Changes applied successfully
2022-05-19 10:51:54.551 - INFORMATION - Disconnected: 0x00000000
```

1. You can check the license status after restarting the Data Broker server.

To check the status of the license:

2. In **Command Prompt** (**Terminal** in case of a Linux operating system), execute the following command:

```
Linux: ./ MatrikonDataBrokerLicenseTool.AppImage status -s [opc.tcp://hostname:port or ip address:port]

Windows: matrikondatabrokerlicensetool.exe status -s [opc.tcp://hostname:port or ip address:port]
```

The status is displayed as shown in the following image/ text:

Figure 217 Command Prompt

```

C:\Program Files\Matrikon\DataBroker>matrikondatabrokerlicensetool.exe activate-offline -s opc.tcp://127.0.0.1:50001 -l licenserequest_response.bin
Matrikon Data Broker Licensing Tool
2.0.0.466
COPYRIGHT (c) 2009 - 2022 HONEYWELL Advanced Limited., ALL RIGHTS RESERVED
AR2BLAR2K19TNP1T
2022-05-19 10:51:54.200 - WARNING - In file D:\B\FLEXAGGREGATOR-FD-DRIP\src\libraries\FlexSdk\Flex_SDK\Code\uasdk\internal\common\portable\stack\certificate_store_t.cpp:2109 function uasdk::CertificateStore::LoadCertificateStore() encountered "BadNotfound" encountered
2022-05-19 10:51:54.200 - WARNING - In file D:\B\FLEXAGGREGATOR-FD-DRIP\src\libraries\FlexSdk\Flex_SDK\Code\uasdk\internal\common\portable\stack\certificate_store_t.cpp:2152 function uasdk::CertificateStore::LoadCertificateStore() encountered "BadNotfound" encountered
2022-05-19 10:51:54.426 - INFORMATION - Matrikon Flex OPC UA SDK RS.1
2022-05-19 10:51:54.426 - INFORMATION - level: 1 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Sha15, mode 2
2022-05-19 10:51:54.426 - INFORMATION - level: 6 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128Sha15, mode 3
2022-05-19 10:51:54.426 - INFORMATION - level: 7 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256, mode 1
2022-05-19 10:51:54.426 - INFORMATION - level: 8 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic128_Sha256_Sha256, mode 3
2022-05-19 10:51:54.426 - INFORMATION - level: 9 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256Sha256, mode 3
2022-05-19 10:51:54.426 - INFORMATION - level: 10 Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256_Sha256_Sha256, mode 3
2022-05-19 10:51:54.426 - INFORMATION - Connecting to opc.tcp://127.0.0.1:50001
2022-05-19 10:51:54.426 - INFORMATION - Policy http://opcfoundation.org/UA/SecurityPolicy#Basic256_Sha256_Sha256, mode 3
2022-05-19 10:51:54.477 - WARNING - While validating certificate, the HOSTNAME was not present or was not as expected
2022-05-19 10:51:54.520 - INFORMATION - ...Connected
Changes applied successfully
2022-05-19 10:51:54.551 - INFORMATION - Disconnected: 0x00000000

```



Once you remove the license on the Data Broker server, the Data Broker server does not allow any further connections. The license status cannot be checked as the matrikondatabrokerlicensetool connects with the Data Broker server to get the license information. You can restart the Data Broker server to allow the connections as the Data Broker runs in the Grace period after restart.

D.3.4.2 Removing Node Locked License in Offline Mode

You do not require the activation key to remove the license offline, as the information is available on the license server.

You can remove the license in 3 steps:

Step 1 Generating request file.

Step 2 Requesting an offline removal request file from the license server through e-mail.

Step 3 Applying the received offline removal file to the Data Broker server.

Steps 1 and 3 can be executed on a system where the Data Broker product is installed, and Step 2 can be run on any system with internet access to send and receive e-mails.

Step 1: Generating license removal request file:

1. Open **Command Prompt**. (**Terminal** in case of a Linux operating system.) in a system where the Data Broker is running and must be un-licensed.
2. Execute the following command:

```
Linux: ./ MatrikonDataBrokerLicenseTool.AppImage deactivate-offline -s [opc.tcp://hostname:port or ip address:port] -[Activation Key]
```

```
Windows: matrikondatabrokerlicensetool.exe deactivate-offline -s [opc.tcp://hostname:port or ip address:port] -k [Activation Key]
```

A file offline_removal_data.bin is generated in the location where matrikondatabrokerlicensetool.exe is executed.

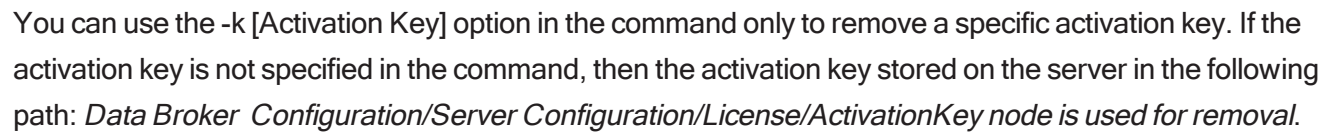
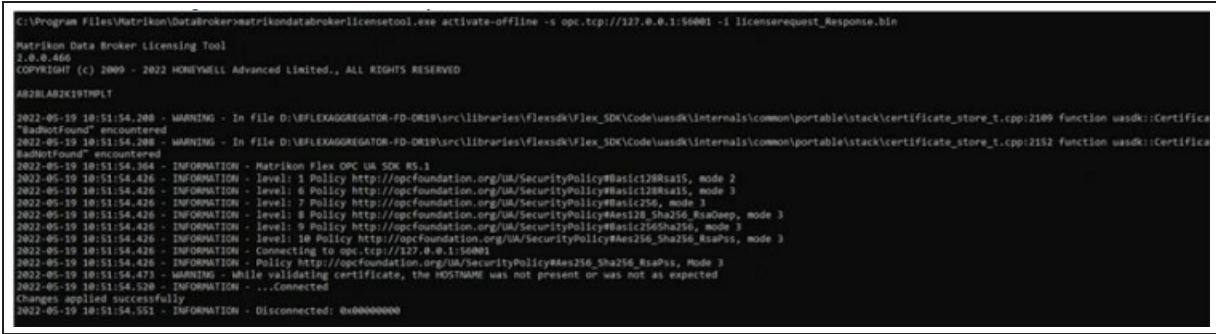


Figure 219 Command Prompt - Offline License removal file to Data Broker server



The license is removed.

- 4. Check the status of the license after restarting the Data Broker server. To check the status of the license
- 5. In **Command Prompt** (Terminal in case of a Linux operating system), execute the following command:

```
Linux: ./ /MatrikonDataBrokerLicenseTool.AppImage status -s [opc.tcp://hostname:port or ip address:port]

Windows: matrikondatabrokerlicensetool.exe status -s [opc.tcp://hostname:port or ip address:port]
```

D.4 Frequently Asked Questions

Frequently Asked Questions

Questions	Answers
Do I need Administrator privileges to run the installer?	You need Administrator privileges to install and register Matrikon software correctly so that the installer: • Has the write access to the registry • Has the write access to protected folders in the file system.
Does the product need to be started manually when installed as a service?	No, the product is configured to automatically start on server boot by default.

D.5 Introduction to OPC UA Applications

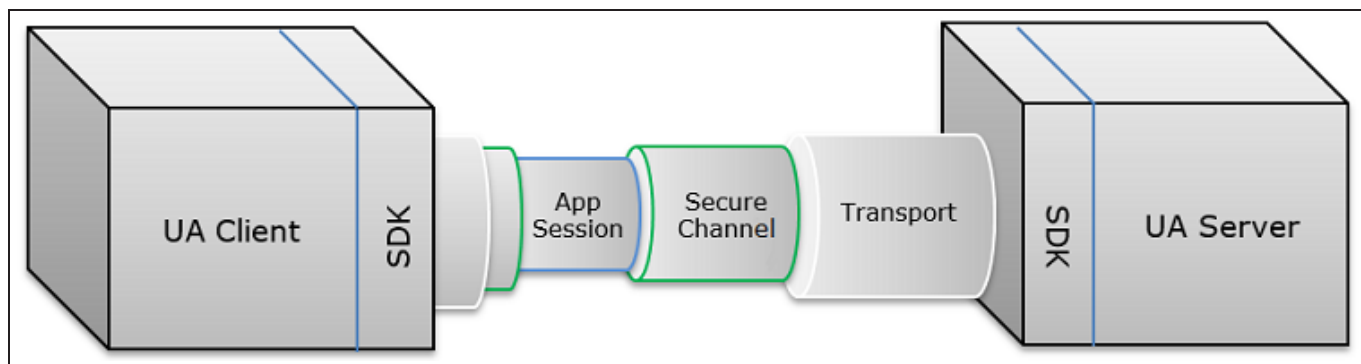
Any Application that follows the OPC UA standard is inter-operable with any other OPC UA application irrespective of the vendor, hardware, or platform. The only limitation is that a client can only communicate to servers, and a server can only communicate to clients.

OPC UA is an operating system, host-architecture independent communications, and data modeling standard for exchanging process data over networks. OPC UA supports two communication models: Client or Server, where the Client

makes requests and the Server fulfills them, and Pub or Sub, where one side subscribes to data and the other publishes it. Typical OPC UA Client applications are Human Machine Interfaces (HMI), Supervisory Control, Data Acquisition (SCADA) systems, and Distributed Control Systems (DCS). Typical OPC UA Server applications produce process data or provide an interface to data within a PLC or sensor.

The following diagram shows typical OPC UA communication between OPC UA Server and OPC UA Client applications.

Figure 220 Introduction to OPC UA



- SDK is a Software Development Kit that helps the application developer to develop an OPC UA application within a short duration and with minimal or no knowledge of OPC UA. Although building an OPC UA application does not require an SDK, it is highly recommended. Matrikon® Matrikon Data Broker™ is built using the Matrikon® FLEX OPC UA SDK.
- Transport is the communication medium used to communicate between OPC UA applications. OPC UA Client or Server communication uses TCP or IP as the Transport.
- A secure Channel is a logical connection between a single Client and a Server that is typically encrypted and signed, making all communication between client and server safe.
- The session is a “login” associated with a specific user. Having multiple sessions inside a single secure channel is possible using the same or different user identities.

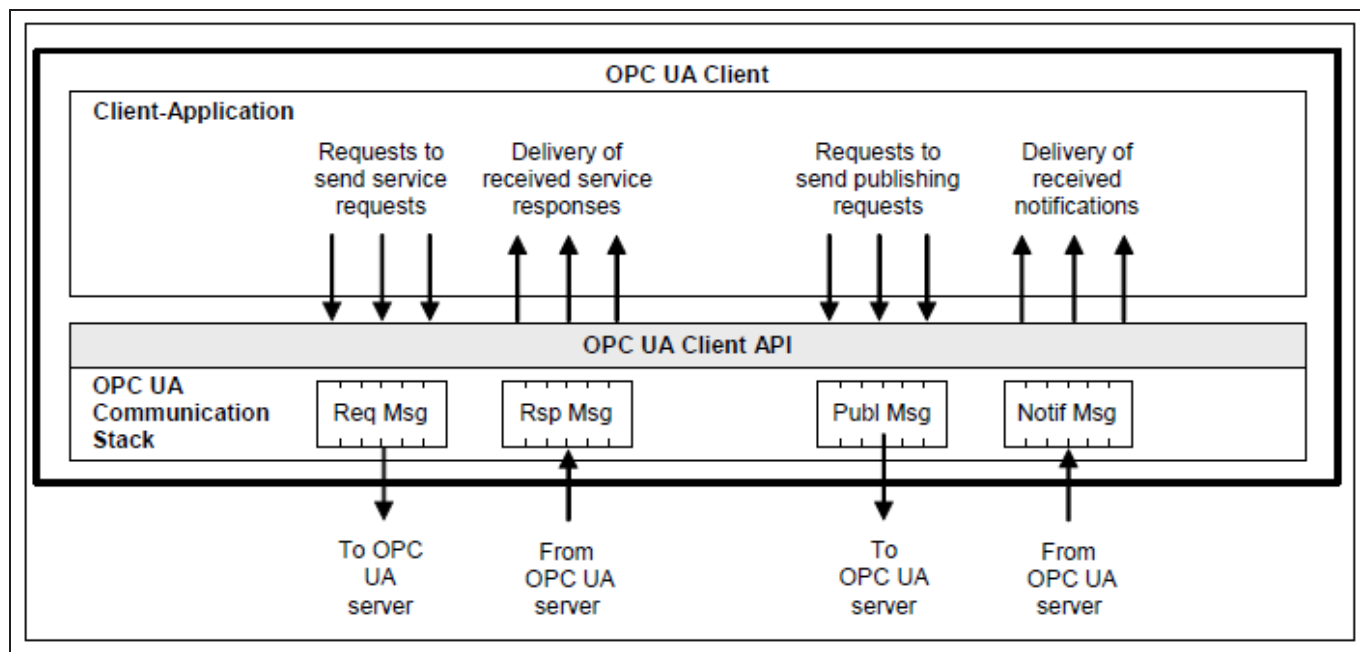
The OPC UA Specification is in the following OPC Foundation website:

<https://opcfoundation.org/>. For more information on OPC UA applications, security in OPC, and profiles, see [Security in OPC UA](#) and [Profiles and Facets](#).

D.5.1 OPC UA Client Application

An OPC UA Client application requests data from an OPC UA Server application. Data Broker contains two OPC UA Clients: Data Broker and OPC UA Explorer. The following diagram shows how clients and servers communicate.

Figure 221 OPC UA Client Application



D.5.2 OPC UA Server Application

An OPC UA Server is an application that exposes device data to OPC UA Clients.

Download *OPC 10000-1 - Part 1: Overview and Concepts* from <https://opcfoundation.org/developer-tools/specifications-unified-architecture/part-1-overview-and-concepts> where the key components are listed.

- Objects are processes or data variables that the server exposes. These objects are mapped to nodes in the address space. Each node contains attributes that contain information about the node. The most important attribute of a node is the value attribute, which represents the value of the real object.
- A View is a subset of the address space accessible to OPC UA clients.

D.5.3 Address Space

The address space is the core of an OPC UA Server. It is a representative model of the data that the server exposes.

Nodes, References, Attributes and Properties

The address space is constructed of nodes and references.

- Nodes are objects that contain attributes and properties.
- References are the links connecting nodes, limited only by how the server developer intends to portray the address space. While most servers display nodes in a tree structure, other links, including circular references, are allowed.
- Attributes are the information that makes the helpful node, such as the variable's value, the variable's read and write permissions, a textual description of the variable, etc.
- Properties are child nodes that a node refers to. For example, an **AnalogItem** node has a **EURange** property that contains an upper and a lower limit for the value of the **AnalogItem** in the Engineering Units of the **AnalogItem**. **AnalogItem** and all other relevant node types.

Folders

Folders are nodes that contain other nodes, like a folder containing documents.

Variables

Variables are the most critical nodes in the address space, and they expose the process data to the client.

Variable Types

OPC-UA supports various variable types, including the different types of address space nodes containing process data values. This is distinct from the data type of the process data value itself. For example, a Data Item is a specific node or variable type in the address space. That can contain various data types within its value attributes, such as a 16-bit signed integer or a double-precision floating point value. Data Broker supports only one variable type: `BaseDataVariable`.

BaseDataVariable

A **BaseDataVariable** is the simplest way to model process data, containing only one value; however, this value can be any of many OPC UA data types, such as a 16-bit signed integer or a double-precision floating-point value.

D.5.4 Session and Requests

A session is established when a client successfully connects to an OPC UA Server. In the session, the client provides the server information about itself and state information related to the communication between the client and the server.

Subscriptions and Monitored Items

If a client wants to monitor values periodically, it establishes a subscription with the server. The client then adds attributes to the subscription called monitored items. The server reads each monitored item at the sampling interval.

The client must send publish request messages for each subscription at the publishing interval (typically 100ms - 5000ms). The server replies with data changes. Publishing and sampling intervals can be set in the Data Broker configuration. For configuration information, see [Edit Monitored Items](#) and [Edit Subscriptions](#).

D.6 Security in OPC UA

Security is inherent in OPC UA. Clients and Servers authenticate against each other before communicating sensitive information, leading to secure-by-design communication where messages are encrypted and signed (configurable) from end to end and never decrypted in transit.

OPC UA provides security using PKI-based encryption and X.509v3 application instance certificates. Asymmetric public key algorithms are used for symmetric key generation and exchanged periodically. Client or server communication is then secured with symmetric algorithms.

Data Broker is a secure OPC UA product, so it must be provided with a certificate during commissioning by generating a default self-signed certificate on the host or using a certificate generated elsewhere.



It is strongly recommended that all the users install corporate signed certificates. A self-signed certificate is highly discouraged because it is not verified by a trusted third party.

The client and server establish a secure communications path called a secure channel to communicate. Once this is done, the client can send its authorization token (a user ID/password or specify "Anonymous") to create a session that contains its permissions.



It is strongly recommended not to use Anonymous users. Users should be set up and require an authorizing token with minimal rights enabled.

For security considerations to deploy Matrikon Data Broker, see [Security Considerations](#).

D.7 Profiles and Facets

A profile is a public OPC Foundation mechanism for defining functionality in an OPC UA product by specifying required features. A facet is a single piece of defined functionality, such as Data Access, Historical Access, Events, etc. Profiles are collections of Facets and other Profiles. For more information on Profiles, see the following links to download the required documents:

<https://apps.opcfoundation.org/profilereporting/>.

<https://opcfoundation.org/developer-tools/specifications-unified-architecture/part-7-profiles>

Matrikon Data Broker supports the following Profiles and facets:

D.7.1 Server

Table 57 Profile and Facets - Server

Profile	Server/ Client	Availability	Comments
Nano Embedded Device 2017 Server Profile	Server	Yes	
Micro Embedded Device 2017 Server Profile	Server	Yes	
Embedded 2017 UA Server Profile	Server	Yes	
Standard 2017 UA Server Profile	Server	No	
Global Discovery Server 2017 Profile	Server	No	
Global Discovery and Certificate Management 2017 Server	Server	No	

D.7.2 Client

Table 58 Profile and Facets - Client

Profile	Server/ Client	Availability	Comments
Standard 2017 UA Client Profile	Client	Yes	
Global Certificate Management Client 2017 Profile	Client	No	

D.7.3 Global Discovery

Table 59 Profile and Facets - Global Discovery

Profile	Server/ Client	Availability	Comments
Global Discovery Server 2017 Profile	Server and Client	No	
Global Disc and Certificate Management 2017 Server	Server and Client	No	
Global Certificate Management Client 2017 Profile	Server and Client	No	

D.7.4 Matrikon Data Broker supports the following Facets

Table 60 Profile and Facets - Matrikon Data Broker Support

Facet	Server/ Client	Availability	Comments
Core 2017 Server Facet	Server	Yes	
Sessionless Server Facet	Server	No	
Reverse Connect Server Facet	Server	Yes	
Request State Change Server Facet	Server	No	
Base Server Behavior Facet	Server	Yes	
Subnet Discovery Server Facet	Server	No	
Global Certificate Management Server Facet	Server	Yes	
Authorization Service Server Facet	Server	No	
KeyCredential Service Server Facet	Server	No	
Attribute WriteMask Server Facet	Server	Yes	
File Access Server Facet	Server	Yes	
Documentation Server Facet	Server	Yes	
Core 2017 Client Facet	Client	Yes	
Sessionless Client Facet	Client	No	
Reverse Connect Client Facet	Client	Yes	
Base Client Behavior Facet	Client	Yes	

Facet	Server/ Client	Availability	Comments
Discovery Client Facet	Client	Yes	
Subnet Discovery Client Facet	Client	No	
Global Discovery Client Facet	Client	No	
Global Certificate Management Client Facet	Client	No	
Access Token Request Client Facet	Client	No	
KeyCredential Service Client Facet	Client	No	
AddressSpace Lookup Client Facet	Client	Yes	
Request State Change Client Facet	Client	Yes	
File Access Client Facet	Client	Yes	
Entry Level Support 2015 Client Facet	Client	Yes	
Multi-Server Client Connection Facet	Client	Yes	
Documentation-Client	Client	Yes	

D.7.5 Data Access

Table 61 Profile and Facets - Data Access

Facet	Server/ Client	Availability	Comments
Embedded DataChange Subscription Server Facet	Server	Yes	
Standard DataChange Subscription 2017 Server Facet	Server	Yes	
Enhanced DataChange Subscription 2017 Server Facet	Server	Yes	
Durable Subscription Server Facet	Server	No	
Data Access Server Facet	Server	Yes	
ComplexType 2017 Server Facet	Server	Yes	
Attribute Read Client Facet	Client	Yes	
Attribute Write Client Facet	Client	Yes	
DataChange Subscriber Client Facet	Client	Yes	
Durable Subscription Client Facet	Client	No	
DataAccess Client Facet	Client	Yes	

D.7.6 Transport

Table 62 Profile and Facets - Transport

Transport	Server/ Client	Availability	Comments
UA-TCP UA SC UA Binary Facet	Server and Client	Yes	
HTTPS UA Binary	Server and Client	No	
HTTPS UA XML	Server and Client	No	
HTTPS UA JSON	Server and Client	No	
WSS UA SC UA Binary	Server and Client	No	
PubSub UDP UADP	Server and Client	No	
PubSub AMQP UADP	Server and Client	No	
PubSub AMQP JSON	Server and Client	No	
PubSub MQTT UADP	Server and Client	No	
PubSub MQTT JSON	Server and Client	No	

D.7.7 Security

Table 63 Profile and Facets - Security

Security	Server/ Client	Availability	Comments
Security User Access Control Full	Server	Yes	
Security User Access Control Base	Server	Yes	
Security Time Synchronization	Server and Client	No	
Best Practice - Audit Events	Server and Client	Yes	
Best Practice - Alarm Handling	Server and Client	Yes	
Best Practice - Random Numbers	Server and Client	Yes	
Best Practice - Timeouts	Server and Client	Yes	
Best Practice - Administrative Access	Server and Client	No	
Best Practice - Strict Message Handling	Server and Client	Yes	
Best Practice - Audit Events Client	Client	Yes	

D.7.8 User Token

Table 64 Profile and Facets - User Token

User Token	Server/ Client	Availability	Comments
User Token - Anonymous Facet	Server	Yes	

User Token	Server/ Client	Availability	Comments
User Token - User Name Password Server Facet	Server	Yes	
User Token - X509 Certificate Server Facet	Server	Yes	
User Token - Issued Token Server Facet	Server	No	
User Token - Issued Token Windows Server Facet	Server	No	
User Token - JWT Server Facet	Server	No	
User Token - User Name Password Client Facet	Client	Yes	
User Token - X509 Certificate Client Facet	Client	Yes	
User Token - Issued Token Client Facet	Client	No	
User Token - Issued Token Windows Client Facet	Client	No	
User Token - JWT Client Facet	Client	No	

D.7.9 Security Policies

Table 65 Profile and Facets - Security Policies

Security Policy	Server/ Client	Availability	Comments
SecurityPolicy - None	Server and Client	Yes	
SecurityPolicy [A] - Aes128-Sha256-RsaOaep	Server and Client	Yes	
SecurityPolicy [B] - Basic256Sha256	Server and Client	Yes	
SecurityPolicy - Aes256-Sha256-RsaPss	Server and Client	Yes	
SecurityPolicy - PubSub-Aes128-CTR	Server and Client	No	
SecurityPolicy - PubSub-Aes128-CTR	Server and Client	No	
SecurityPolicy - Basic128Rsa15 [Deprecated]	Server and Client	Yes	Deprecated but available if explicitly turned on.
SecurityPolicy - Basic256 [Deprecated]	Server and Client	Yes	Deprecated but available if explicitly turned on.
SecurityPolicy - Basic256Sha256 [Deprecated]	Server and Client	Yes	Deprecated but available if explicitly turned on.

D.7.10 Transport Security

Table 66 Profile and Facets - Transport Security

Transport Security	Server/ Client	Availability	Comments
TransportSecurity - TLS 1.2	Server and Client	No	
TransportSecurity - TLS 1.2 with PFS	Server and Client	No	

D.7.11 Events

Table 67 Profile and Facets - Events

Events Facet	Server/ Client	Availability	Comments
Standard Event Subscription Server Facet	Server	Yes	
Address Space Notifier Server Facet	Server	Yes	
Base Event Processing Client Facet	Client	Yes	
Notifier And Source Hierarchy Client Facet	Client	Yes	

D.7.12 Alarms and Conditions

Table 68 Profile and Facets - Alarms and Condition

Alarms and Conditions Facet	Server/ Client	Availability	Comments
All Alarms and Conditions Facet	Server and Client	No	

D.7.13 Historical Access

Table 69 Profile and Facets - Historical Access

Historical Access Facet	Server/ Client	Availability	Comments
All Historical Facets	Server and Client	No	

D.7.14 Generic Features

Table 70 Profile and Facets - Generic Features

Generic Feature Facet	Server/ Client	Availability	Comments
Method Server Facet	Server	Yes	
Auditing Server Facet	Server	Yes	
Node Management Server Facet	Server	Yes	
User Role Base Server Facet	Server	No	
User Role Management Server Facet	Server	No	

Generic Feature Facet	Server/ Client	Availability	Comments
State Machine Server Facet	Server	No	
Method Client Facet	Client	Yes	
Auditing Client Facet	Client	Yes	
Node Management Client Facet	Client	Yes	
Advanced Type Programming Client Facet	Client	Yes	
User Role Management Client Facet	Client	No	
State Machine Client Facet	Client	No	
Diagnostic Client Facet	Client	No	

D.7.15 Redundancy

Table 71 Profile and Facets - Redundancy

Redundancy Facets	Server/ Client	Availability	Comments
Client Redundancy Server Facet	Server	No	
Redundancy Transparent Server Facet	Server	No	
Redundancy Visible Server Facet	Server	No	
Redundant Client Facet	Client	No	
Redundancy Switch Client Facet	Client	No	

D.7.16 Aggregates

Table 72 Profile and Facets - Aggregates

Aggregate Facets	Server/ Client	Availability	Comments
Aggregate Subscription Server Facet	Server	No	
Aggregate Subscriber Client Facet	Client	No	

D.7.17 Global Discovery

Table 73 Profile and Facets - Global Discovery

Global Discovery Facets	Server/ Client	Availability	Comments
Global Service Authorization Request Server Facet	Server and Client	No	
Global Service KeyCredential Pull Facet	Server and Client	No	
Global Service KeyCredential Push Facet	Server and Client	No	

D.7.18 Others

Table 74 Profile and Facets - Others

Global Discovery Facets	Server/ Client	Availability	Comments
Programs Model	Server and Client	No	
Query	Server and Client	No	

Table 75 Supported Services Set Type

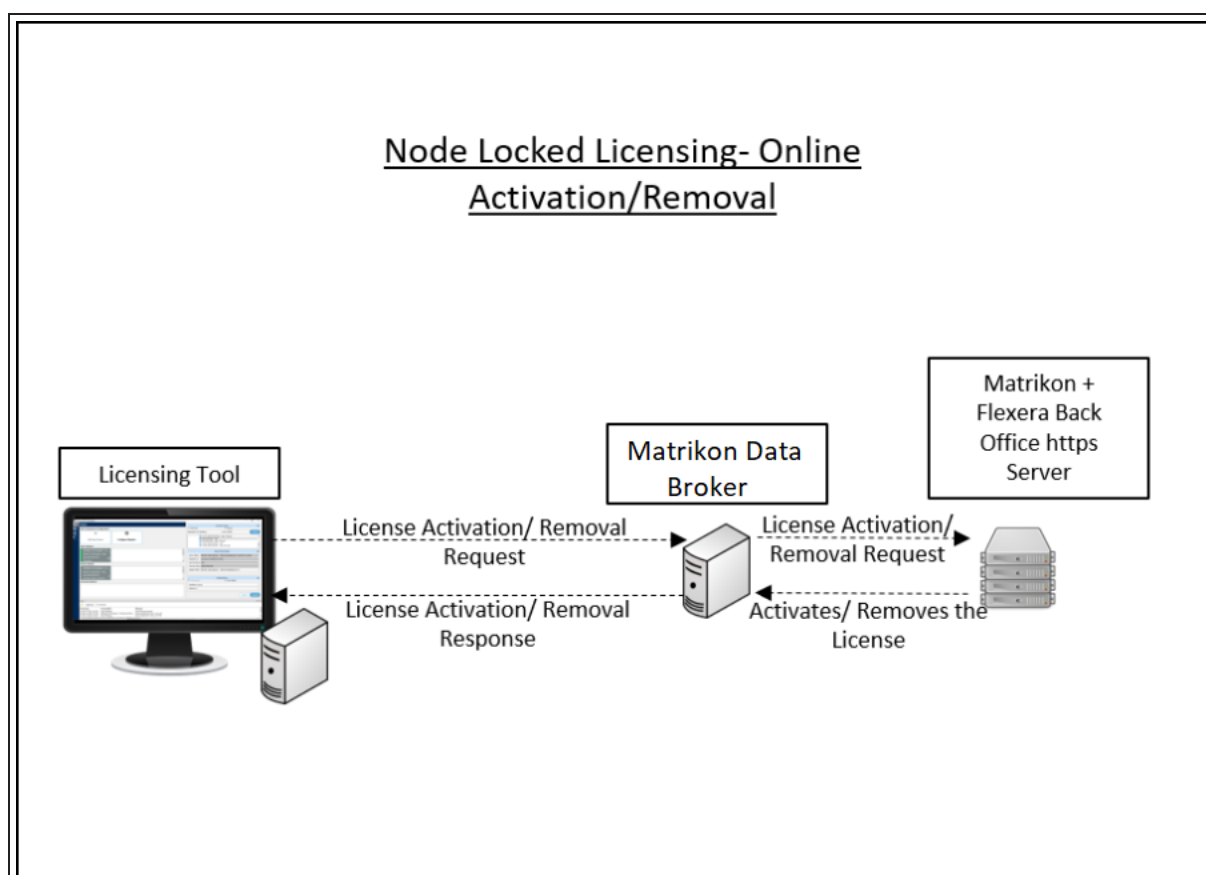
Supported Services Service Set Type	Service	Server/ Client	Supported	Comments
Discovery Service Set	FindServer	Server and Client	Yes	Discovery Service Set
Discovery Service Set	GetEndpoint	Server and Client	Yes	Discovery Service Set
Secure Channel Service Set	OpenSecureChannel	Server and Client	Yes	Secure Channel Service Set
Secure Channel Service Set	CloseSecureChannel	Server and Client	Yes	Secure Channel Service Set
Session Service Set	CreateSession	Server and Client	Yes	Session Service Set
Session Service Set	ActivateSession	Server and Client	Yes	Session Service Set
Session Service Set	CloseSession	Server and Client	Yes	Session Service Set
View Service Set	Browse	Server and Client	Yes	View Service Set
View Service Set	BrowseNext	Server and Client	Yes	View Service Set
View Service Set	TranslateBrowsePath	Server and Client	Yes	View Service Set
View Service Set	RegisterNodes	Server and Client	Yes	View Service Set
View Service Set	UnregisterNodes	Server and Client	Yes	View Service Set
Attribute Service Set	Read	Server and Client	Yes	Attribute Service Set

Supported ServicesService Set Type	Service	Server/Client	Supported	Comments
Attribute Service Set	HistoryRead	Server and Client	No	Attribute Service Set
Attribute Service Set	Write	Server and Client	Yes	Attribute Service Set
Attribute Service Set	HistoryUpdate	Server and Client	No	Attribute Service Set
Method Service Set	Call	Server and Client	Yes	Method Service Set
MonitoredItem Service Set	CreateMonitoredItems	Server and Client	Yes	MonitoredItem Service Set
MonitoredItem Service Set	ModifyMonitoredItems	Server and Client	Yes	MonitoredItem Service Set
MonitoredItem Service Set	SetMonitoringMode	Server and Client	Yes	MonitoredItem Service Set
MonitoredItem Service Set	SetTriggering	Server and Client	Yes	MonitoredItem Service Set
MonitoredItem Service Set	DeleteMonitoredItems	Server and Client	Yes	MonitoredItem Service Set
Subscription	CreateSubscription	Server and Client	Yes	Subscription
Subscription	ModifySubscription	Server and Client	Yes	Subscription
Subscription	SetPublishingMode	Server and Client	Yes	Subscription
Subscription	Publish	Server and Client	Yes	Subscription
Subscription	Republish	Server and Client	Yes	Subscription
Subscription	TransferSubscriptions	Server and Client	No	Subscription
NodeManagement Service Set	AddNodes	Server and Client	Yes	NodeManagement Service Set
NodeManagement Service Set	DeleteNodes	Server and Client	Yes	NodeManagement Service Set

D.8 How License Activation/Deactivation Works

D.8.1 Node Locked Licensing- Online Activation/Deactivation

Node Locked Licensing - Online Activation/Removal



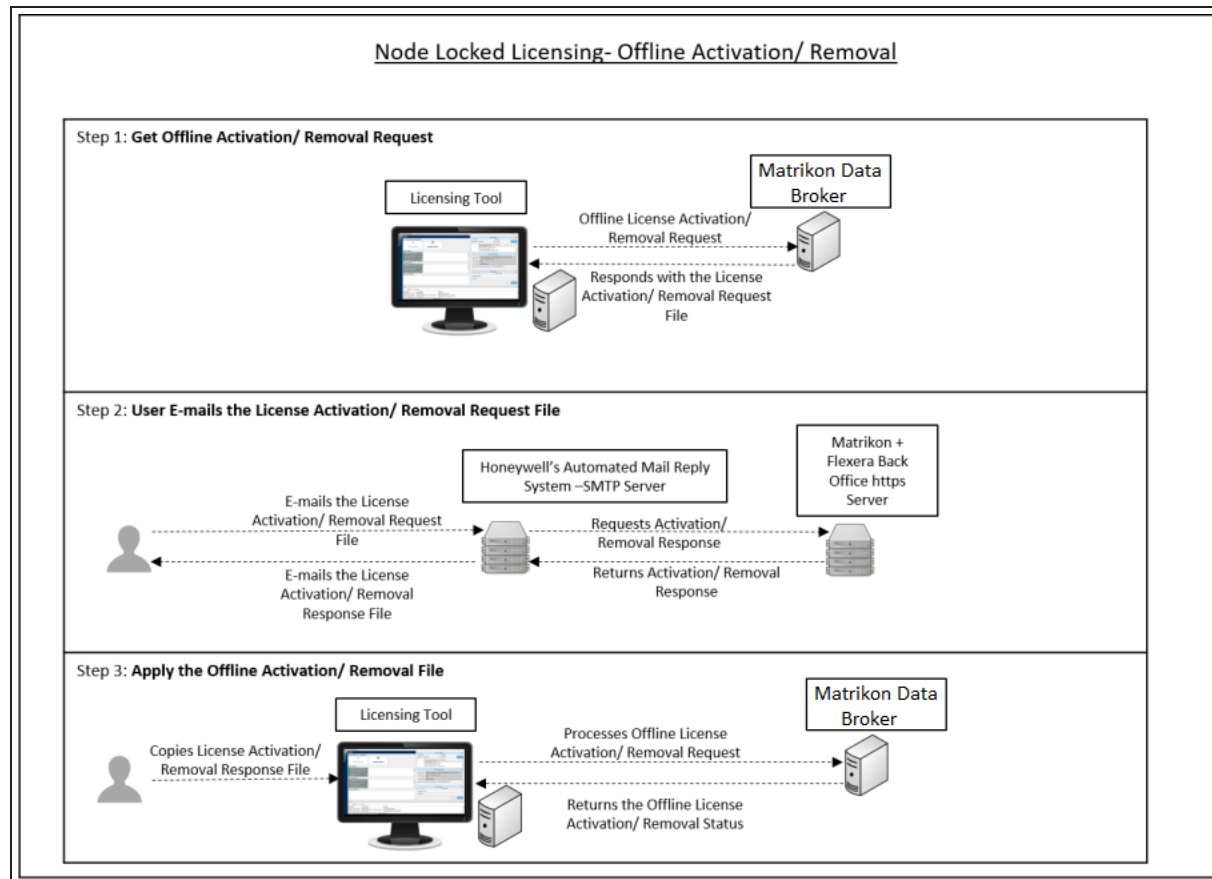
Following is the process explanation of the above diagram:

1. Connect to the Licensing Tool and then to Data Broker, for which you want to activate or remove the license using the node lock method online.
2. You request the license activation or deactivation using the Licensing Tool.
3. The Data Broker sends your request to the Matrikon and Flexera back office https server.
4. The Matrikon and Flexera back office server validates the license, returns a success message, and activates or removes the license on or from the Data Broker.

To return to Node locked licensing- online activation or deactivation, click [Activating Node Locked License in Online Mode](#) or [Removing Node Locked License in Online Mode](#).

D.8.2 Node Lock Licensing- Offline Activation/Deactivation

Node Locked Licensing - Offline Activation/Removal



Following is the process explanation of the above diagrams:

Step 1: Getting Offline Activation/ Deactivation Request

1. You can connect to the Licensing Tool and then to Data Broker, for which you want to activate or remove the license using the node lock method offline.
2. You request offline license activation or deactivation using the Licensing Tool.
3. The Data Broker sends you an offline activation or deactivation request file.

Step 2: E-mail the License Activation/ Deactivation Request File

1. You must copy the offline activation or deactivation request file to your local machine or the machine with the internet.
2. Send the offline activation or deactivation request file to matrikon-license-request@matrikonopc.com
The e-mail is sent to Matrikon's automated mail reply system in an SMTP server.
3. The Matrikon's automated mail reply system requests the offline license activation or deactivation response to the Matrikon and Flexera back office https server.
4. The Matrikon and Flexera back office https server returns the offline license activation or deactivation response to Matrikon's automated mail reply system.
5. Matrikon's automated mail reply system sends you the offline license activation or deactivation response to your e-mail.
6. Copy the file to your local machine.

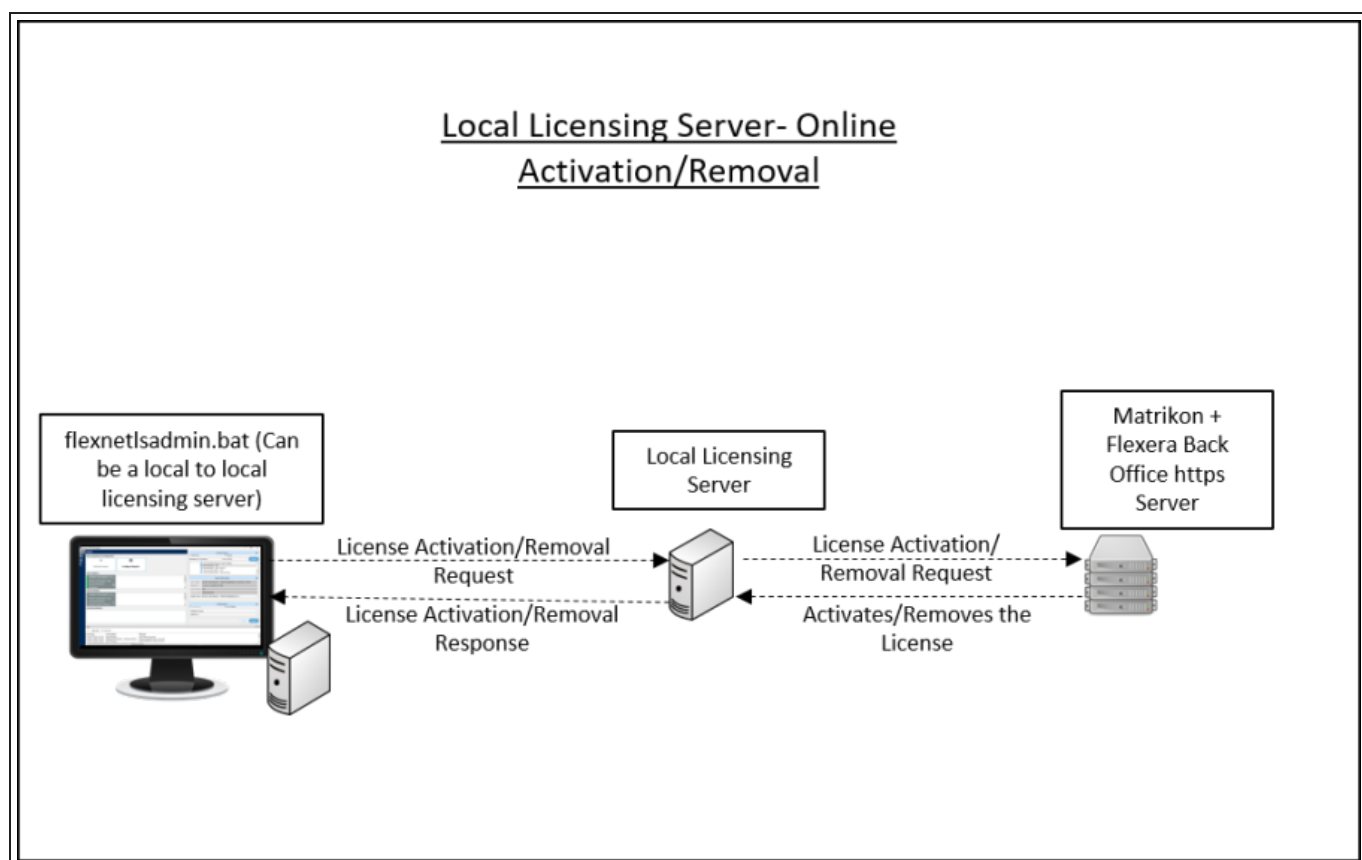
Step 3: Applying Offline Activation Request

1. If you have closed your Licensing Tool, repeat the step 1.
2. Using the Licensing Tool, you must apply the offline license activation or deactivation response.
3. The Licensing Tool activates or removes the license on or from the Data Broker.
4. The Data Broker returns the offline license activation or deactivation status.

To return to Node locked licensing- online activation or deactivation, click [Activating Node Locked License in Offline Mode](#) or [Removing Node Locked License in Offline Mode](#).

D.8.3 Local License Server- Online Activation/ Deactivation

Local License Server - Online Activation/Removal



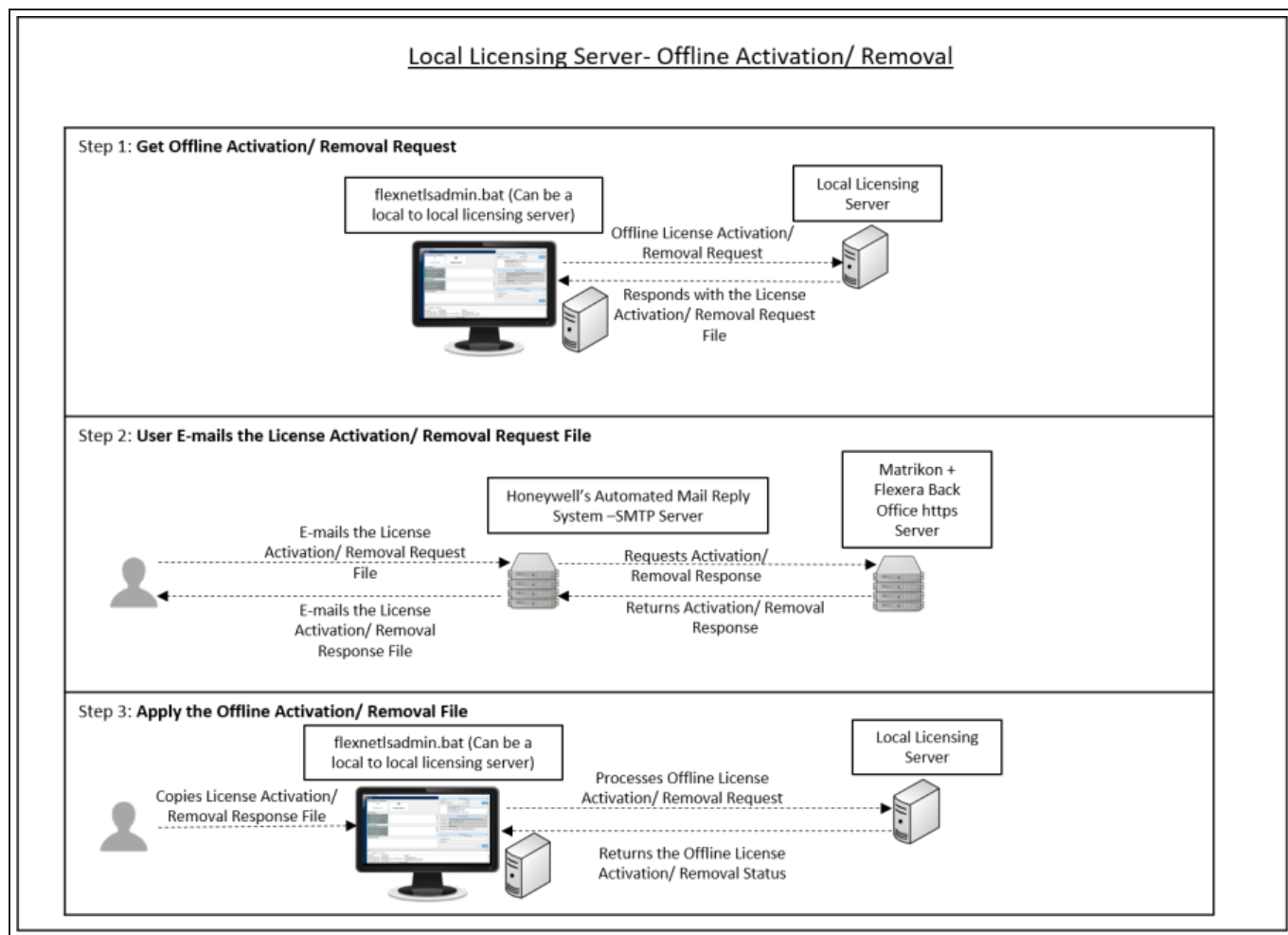
Following is the process explanation of the above diagram:

1. Open Command Prompt and connect to flexnetlsadmin.bat.
2. You request the license activation or deactivation using flexnetlsadmin.bat.
3. The flexnetlsadmin.bat sends your request to the Local License server.
4. The Local License server sends the request to the Matrikon and Flexera back-office servers.
5. The Matrikon and Flexera back office server validates the license, returns a success message, and activates or removes the license on or from the Data Broker.

To go back to Local License server- online activation or deactivation, click [Activating License on Local License Server in Online Mode](#) or [Removing License from Local License Server in Online Mode](#).

D.8.4 Local License Server- Offline Activation/Deactivation

Local License Server - Offline Activation/Removal



Following is the process explanation of the above diagrams:

Step 1: Getting Offline Activation/ Deactivation Request

1. Open Command Prompt and connect to `flexnetlsadmin.bat`.
2. You request offline license activation or deactivation from the License Server using `flexnetlsadmin.bat`.
3. The Local License server sends you an offline activation or deactivation request file.

Step 2: E-mail the License Activation/ Deactivation Request File

1. You must copy the offline activation or deactivation request file to your local machine or the machine with the internet.
2. Send the offline activation or deactivation request file to matrikon-license-request@matrikonopc.com.
The e-mail is sent to Matrikon's automated mail reply system in an SMTP server.
3. The Matrikon's automated mail reply system requests the offline license activation or deactivation response to the Matrikon and Flexera back office https server.

4. The Matrikon and Flexera back office https server returns the offline license activation or deactivation response to Matrikon's automated mail reply system.
5. Matrikon's automated mail reply system sends you the offline license activation or deactivation response to your e-mail.
6. Copy the file to your local machine.

Step 3: Applying Offline Activation Request

1. If you have closed your Licensing Tool, repeat the step 1.
2. You must apply the offline license activation or deactivation response using the flexnetlsadmin.bat.
3. flexnetlsadmin.bat sends the activation or deactivation request to the License server.
4. The License server activates or removes the license and returns the offline license activation or deactivation status.
5. To return to the Local License server- online activation or deactivation, click [Activating License on Local License Server in Offline Mode](#) or [Removing License from Local License Server in Offline Mode](#).

D.8.5 Uninstalling License Server

Uninstallation of the license server tool is a two-step process:

Step 1: Stop the FlexNet License Server-honeywell service from your machine.

1. Open Services.msc.
2. Look for **FlexNet License Server-honeywell** service and stop the service.

Step 2: Uninstall the License server tool.

1. Open Control Panel > Programs > Programs and Features.
2. **Right-click Honeywell License Server from the programs and features list and click Uninstall.**

The license server is uninstalled.

D.9 Interoperability with Other Matrikon OPC Products

This section describes how to make Data Broker interoperable with the following Matrikon OPC products:

D.9.1 Connecting to Matrikon OPC UA Modbus Gateway

Data Broker can be configured to connect to OPC UA Modbus Gateway in the [Federator Data Sources](#) pane. While configuring UA Modbus Gateway as a data source, you must ensure that the option of Suppress Hostname Invalid is checked in the Data Source configuration screen's Advance Settings options.

D.9.2 Matrikon OPC UA Tunneller

Matrikon OPC UA Tunneller allows OPC UA-enabled client applications to communicate with the OPC Classic Servers and the Clients, as well as OPC UA Servers and vice versa.

D.9.3 UA Client to Classic Server

Data Broker can be configured to connect to UA Tunneller. This way, UA Tunneller becomes a UA data source for Data Broker and provides wrapped OPC UA data from classic OPC servers. The UA Client to Classic Server component of UA Tunneller converts OPC classic data to OPC UA data. See [How to Add and Configure Data Sources](#) to add this as a data source.

To successfully connect, perform the following:

1. Stop the UA Client to Classic Server component (MatrikonOPC UA Wrapper for COM OPC Servers) service.
2. In the **UA Tunneller configuration** window, for the UA Client to Classic Server component, please ensure that all the connections for classic OPC servers have their **Separator Char** parameter set.
3. Close the UA Tunneller configuration window.
4. In the **MatrikonOpcUaWrapper.Config.xml** configuration file, set **ReadOnlyDataTypeAndAccessRightsDuringBrowse** to **true** for all the OPC Classic server connections and save the file.
For more information, see Matrikon OPC UA Tunneller User Manual.
5. Restart the UA Client to Classic Server component (MatrikonOPC UA Wrapper for COM OPC Servers) service.
6. In Data Broker, follow the procedure mentioned in [How to Add and Configure Data Sources](#).

D.9.4 Classic Client to UA Server

The Classic Client to UA Server component of the UA Tunneller can connect to the Data Broker as a UA client. This way, the Classic OPC clients can access UA data from the Data Broker, including all the aggregated UA servers' data.

To successfully connect, perform the following:

1. Stop the Classic Client to UA Server (UA Proxy) service for the respective instance.
2. Locate the instance-specific UA Proxy configuration file, set **SaveBrowsedNodes** to **0**, and save the file.
3. Restart the Classic Client to UA Server (UA Proxy) instance-specific service.
4. When the service starts, the Proxy attempts to connect to the Data Broker.
5. Ensure that the UA Proxy accepts the Data Broker server certificate.
For more information, see Matrikon OPC UA Tunneller User Manual.
6. Ensure that the Data Broker accepts the UA Proxy certificate. See [How to Trust the Rejected Certificates](#).

For more information on Matrikon® OPC UA Tunneller, see <https://www.matrikonopc.com/opc-ua/products/opc-ua-tunneller.aspx>.

D.9.5 Matrikon® OPC UA Modbus Gateway

Matrikon OPC UA Modbus Gateway provides a simple and secure method to gain access to data from RTUs, PLCs, or any other devices that use the MODBUS data protocol. This device is compact and can be used in applications where space and power are limited and wide ambient temperature swings are possible.

D.10 General Notes

- The listening port provided during installation for DataBroker is hardcoded in the URI of the certificate. Changing the DataBroker port number from the config screen makes the certificate invalid and not replaceable. So, it is better to create or register a new instance with a unique port number if required. Configuring DataBroker is only supported through UA Explorer, creating a new DataBroker Instance. [Matrikon Support](#)
- DataBroker and UA Explorer currently do not support OPC UA HA and AC. You can see this included in the future releases.
- DataBroker aggregation - Custom non-hierarchical references are currently not supported by DataBroker; therefore, the same gets filtered out. You can see the future releases of DataBroker supports custom non-hierarchical relations.

D.11 Certificate Management

The OPC UA protocol is designed with security in mind and relies on X.509 certificates to ensure that only trusted applications can communicate with each other. This section describes how DataBroker and Explorer manage certificates.

The X.509 standard uses Public Key Infrastructure (PKI) and asymmetric encryption. This means that each application must have a private key that is never shared and a public key that is shared.

While a complete discussion of X.509 certificates and how OPC UA applications use them is out of the scope of this user manual, here is some general information.

When any OPC UA application connects with any other, both applications must decide whether each other's application certificates are valid and whether each trusts the application certificates provided.

The validity of a certificate is determined by looking at the certificate and validating:

- That the certificate is not expired.
- That the Application URI claimed in the certificate matches the URI claimed by the application.
- The public key in the certificate meets the requirements necessary for the security policy.
- That the certificate is not on a list of revoked certificates.
- That the application certificate is signed acceptably.
- The IP address and hostnames used to connect to the application are claimed in the certificate.
- If the certificate is being used consistently with its intended use as a client or server certificate, it can be valid for both client and server use.

If the certificate usage is valid, then the application must determine if the certificate is trusted. Certificate trust is determined by the user telling the application that the user trusts this certificate directly or by using a signature from a trusted authority.

In OPC UA, while negotiating the connection, both sides of the link must provide certificates to each other, and each application is responsible for the following:

- Validating the certificate received from the other side of the connection
- Determining the certificate can be trusted.

A connection can only be completed once the client and server are satisfied.

D.11.1 Application Certificates

DataBroker and Explorer automatically generate two self-signed certificates on installation or first use. The certificates use slightly different properties to support the requirements of various security policies. The certificates:

- Claim the application URI generated based on the instance name provided during the installation.
- Claim the Hostname of the computer as detected during installation.
- Claim the primary adaptor TCP/IP address as detected during installation.
- It has an expiry date of 1 year from the certificate generation time.

 DataBroker supports only X.509 v3 certificates in '.der' format.

D.11.2 Certificate Storage

Explorer and DataBroker use directory-style certificate stores as defined by the OPC UA Specification. DataBroker requires two certificate stores, one for the UA server side of DataBroker and one for the UA Client side.

 Only administrative users (members of the Local Administrators group) and the DataBroker service account can read and write the certificate and private key files to protect the pki certificate store. Use an administrative account to manage certificates.

Table 76 Certificate Storage

Certificate Store Location	Description
For Windows Operating System <ProgramData>\Matrikon\DataBroker\<Instance Name>\pki\DefaultApplicationGroup For the Linux Operating System /etc/Matrikon/DataBroker/<DataBroker Instance Name>/pki/DefaultApplicationGroup	The DataBroker UA Server-side certificate store. The <Instance Name> is the name configured during installation.
For Windows Operating System <ProgramData>\Matrikon\DataBroker\<Instance Name>\pki\DefaultUserTokenGroup For the Linux Operating System /etc/Matrikon/DataBroker/<DataBroker Instance Name>/pki/DefaultUserTokenGroup	The DataBroker user token certificate store. Reserved for future use.
For Windows Operating System	The Explorer certificate store for the logged-in user.

Certificate Store Location	Description
<AppData>\Local\Matrikon\OPCUAExplorer\pki\DefaultApplicationGroup For the Linux Operating System <Media>* *\pki\DefaultApplicationGroup	<AppData> is the users AppData directory, e.g. c:\users\<username>\AppData\ on most Windows computers.

CONTACTING SUPPORT

The Matrikon Customer Services department (www.opcsupport.com) is available 24 hours a day, seven days a week. Contact Matrikon Support using the information below, or email support@MatrikonOPC.com. For Monday to Friday daytime support requests, contact [Matrikon Support](#) using the regional phone numbers provided below:

Table 77 Contacting Support

Region	Office Hours	Contact Information
North America UTC/GMT -7 hours (MST)	8:00 am-5:00 pm	+1-877-OPC-4-ALL (672-4255) +1-780-945-4011
South America UTC/GMT -3 hours (BRT)	9:00 am-5:00 pm	+55 (11) 4380-8995
Europe /Africa/Middle East UTC/GMT +1 hours (CET)	9:00 am-5:00 pm	+49-699-675-8875 (Request OPC Support)
Australia/Asia UTC/GMT +10 hours (AEST)	9:00 am-5:00 pm	+61-3-7037-2768

Table 78 Contacting Support

Region	Contact Information
All*	+1-780-231-9480

For after-hours support in all regions, use the following number. There is no extra charge from Matrikon OPC for calling their after-hours support number.

*Available only to priority and premium support customers.