MQTT Client Service

Information on how to set up a TagProvider connection with MQTT Client.

Reference **Modules** **UNS** **UI** **Services** MQTT | Tutorial

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The MQTT Service provides access to standard MQTT data, as well as automatically parsing data using the SparkplugB specification. The MQTT TagProvider allows you to dynamically connect to MQTT brokers at Runtime. This enables the integration and visualization of data and other components of your application without the need to create local tags.

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Configuration

The software platform supports both MQTT Standard and MQTT SparkplugB protocols. MQTT Standard allows general message communication via publish/subscribe, quality of service levels, message retention, last-will messages, and secure connections. SparkplugB adds standardized data models, device birth and death messages, auto-discovery, network state monitoring, efficient binary payloads, and state retention, enhancing interoperability and network management in industrial IoT applications.

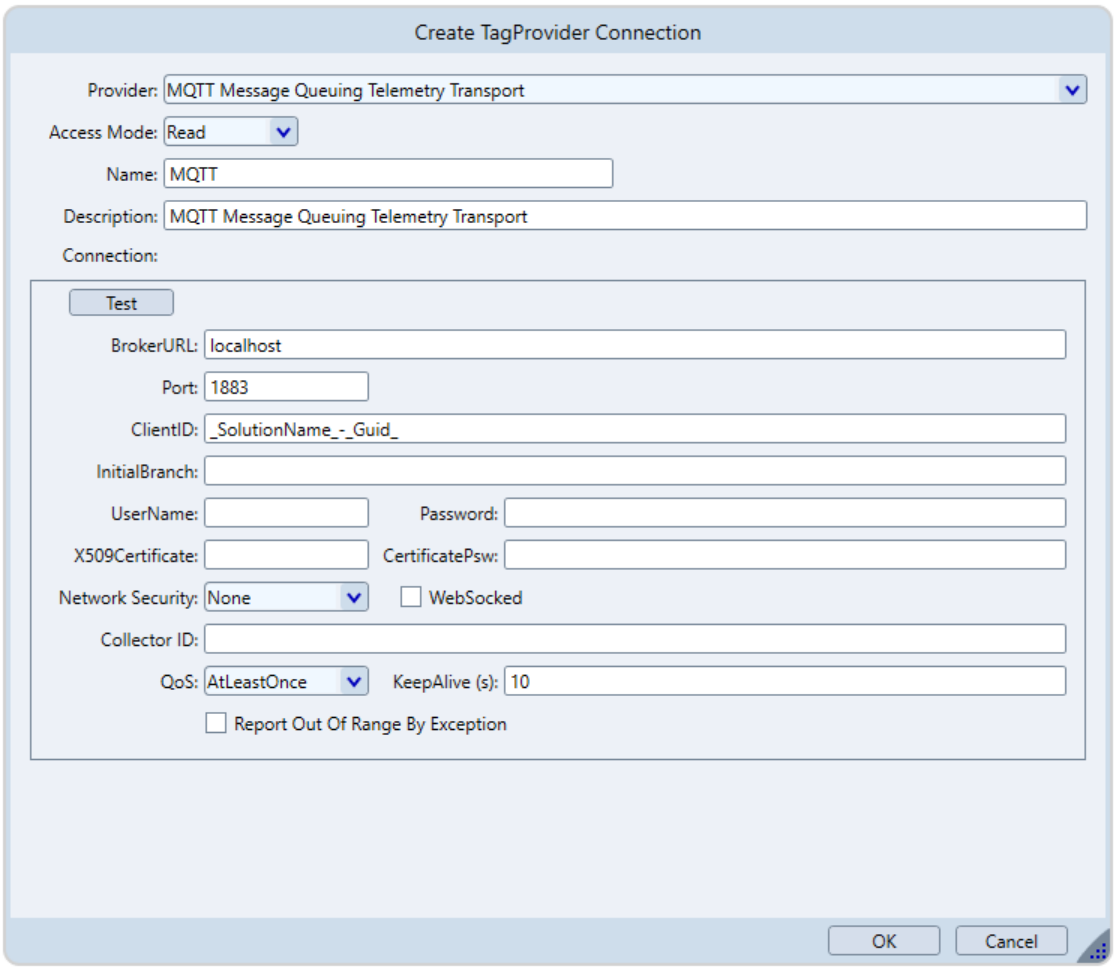
Connection Parameters

Both options share the same configuration parameters.

Field	Description
Provider	Specifies the system the TagProvider will interface with. In this case, it interfaces with the MQTT Message Queuing Telemetry Transport.
Access Mode	Determines permissions for interacting with tags. **Read** allows data reading. **Write** permits data writing. **ReadWrite** enables both reading and writing.
Name	User-defined name for the TagProvider instance. Identifies the specific configuration in the system.
Description	Explains the TagProvider's purpose or the systems it interfaces with. Provides context for its usage.
Connection	Defines connection settings for the MQTT broker, including broker URL, port, client ID, username, password, and security options.

MQTT Standard

To set up a new TagProvider connection navigate to **Unified Namespace/TagProvider Connections** and press the add button to open the **New TagProvider Connection** dialog. You can also create your TagProvider Connection directly from the AssetTree. To do this, navigate to **Unified Namespace/Assets Tree** and press the icon  to open the **New TagProvider Connection** dialog. In the configuration dialog, select the **MQTT Message Queuing Telemetry Transport** and provide the connection parameters. After that, press the Ok button to finish the provider configuration. Creating the connection adds no folder to the Asset Tree. To use its data with Asset(), open **Unified Namespace / Assets Tree**, select a folder (create one first if needed) and click **Insert data from TagProvider** on the toolbar: the folder linked to the TagProvider is created inside the selected folder. A linked folder cannot sit at the root of the Asset Tree.

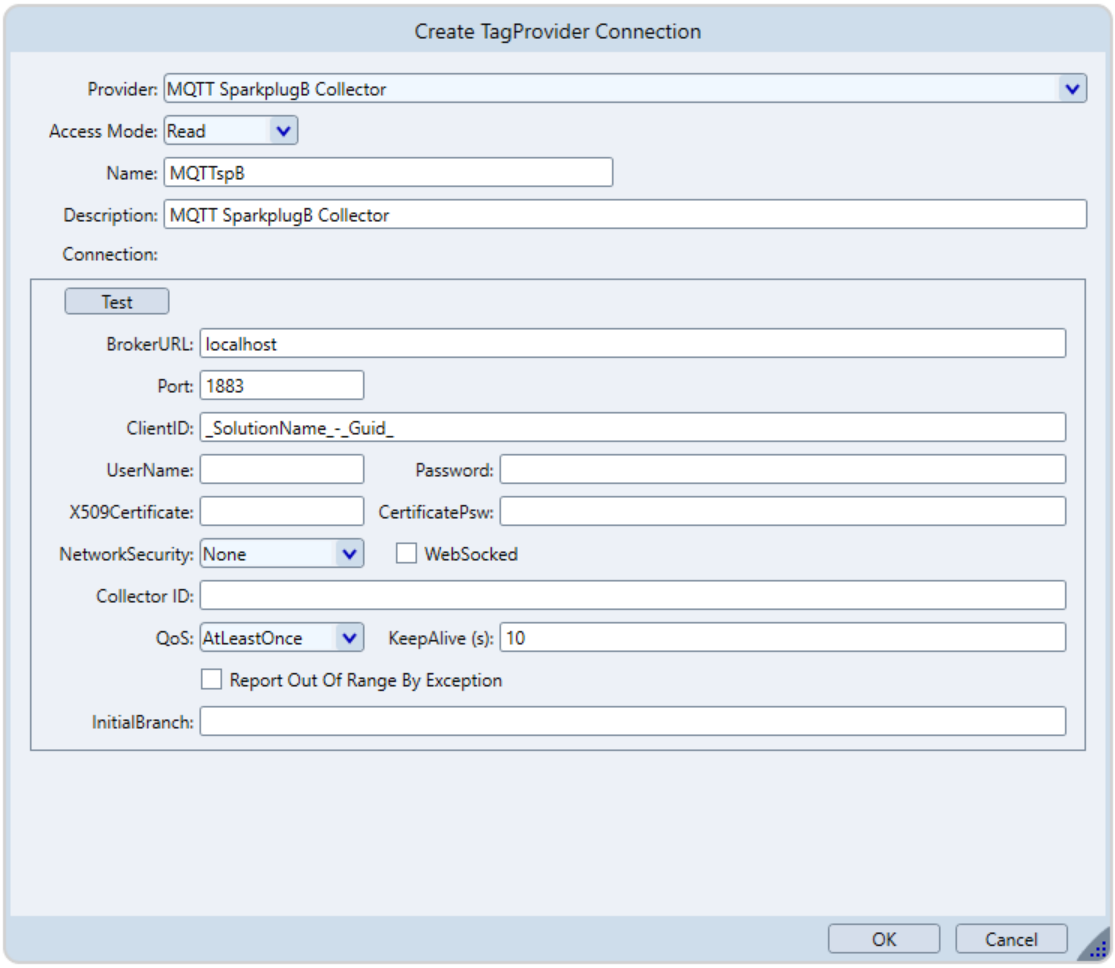


Field	Description
BrokerURL	Sets the address of the MQTT broker, typically an IP or hostname.
Port	Specifies the port number used for the MQTT connection.
ClientID	A unique identifier for the client connecting to the MQTT broker. This is a user-defined string, which can also include the following macros, intermixed with the text: • **_Guid_**: Replaced by a dynamically generated Global Unique Identifier (GUID). • **_Solution_**: Replaced by the name of the solution (without the path or file extension).
InitialBranch	Defines the starting branch or topic for tag subscriptions.
UserName	Specifies the username for authentication with the broker.
Password	Sets the password for authentication with the broker.
X509Certificate	Specifies the path or content of an X.509 certificate for secure connections.
Certificate Psw	Defines the password for the provided X.509 certificate.

Network Security	Network Security options specify the security protocol (e.g., None, SSL, TLS) and encryption level for MQTT connection. Options include: **None**: Applies no encryption or protocols, suitable for secure or isolated networks but poses risks in public settings. **SSL2**: Implements an early security protocol that is now considered obsolete due to numerous vulnerabilities, including susceptibility to man-in-the-middle attacks and lack of protection against cipher block chaining attacks. Deprecated and should not be used. **SSL3**: Offers an updated protocol but remains vulnerable to attacks such as POODLE. Lacks modern security features and should be avoided in favor of newer protocols like TLS 1.2 for secure communications. **TLS**: Uses an early version of the Transport Layer Security (TLS) protocol with enhancements for security, now outdated and vulnerable to attacks. **TLS 1.1**: Addresses initialization vector issues and includes protection against certain types of attacks but remains susceptible to modern cryptographic attacks with limited support for new standards. **TLS 1.2**: Provides significant security upgrades, supporting modern cryptographic algorithms like AES-GCM and AEAD ciphers. Ensures data confidentiality and integrity with robust mechanisms for secure key exchange and message authentication. Recommended for secure network communications and widely supported across modern systems and applications.
WebSocket	Enables or disables WebSocket communication for the connection.
Collector ID	Assigns an identifier for the data collector handling the connection.
QoS	Defines the Quality of Service level for message delivery. Options include: **AtMostOnce**: Ensures that each message is delivered at least once to the receiver. This level may result in duplicate messages but guarantees that no message is lost. **AtLeastOnce**: Guarantees that a message is delivered at most once, meaning it might not be delivered at all. This level is suitable for scenarios where occasional message loss is acceptable but duplicate messages are not. **ExactlyOnce**: Ensures that each message is delivered exactly once. This is the highest level of service, preventing both message loss and duplication, but it incurs the highest overhead.
KeepAlive (s)	Defines the interval in seconds for sending keep-alive packets to the broker.
Report Out Of Range By Exception	Not used by this service.

MQTT SparkplugB

To set up a new TagProvider connection navigate to **Unified Namespace/TagProvider Connections** and press the add button to open the **New TagProvider Connection** dialog. You can also create your TagProvider Connection directly from the AssetTree. To do this, navigate to **Unified Namespace/Assets Tree** and press  to open the **New TagProvider Connection** dialog. In the configuration dialog, select the **MQTT SparkplugB Protocol** and provide the connection parameters. After that, press the Ok button to finish the provider configuration. Creating the connection adds no folder to the Asset Tree. To use its data with Asset(), open **Unified Namespace / Assets Tree**, select a folder (create one first if needed) and click **Insert data from TagProvider** on the toolbar: the folder linked to the TagProvider is created inside the selected folder. A linked folder cannot sit at the root of the Asset Tree.



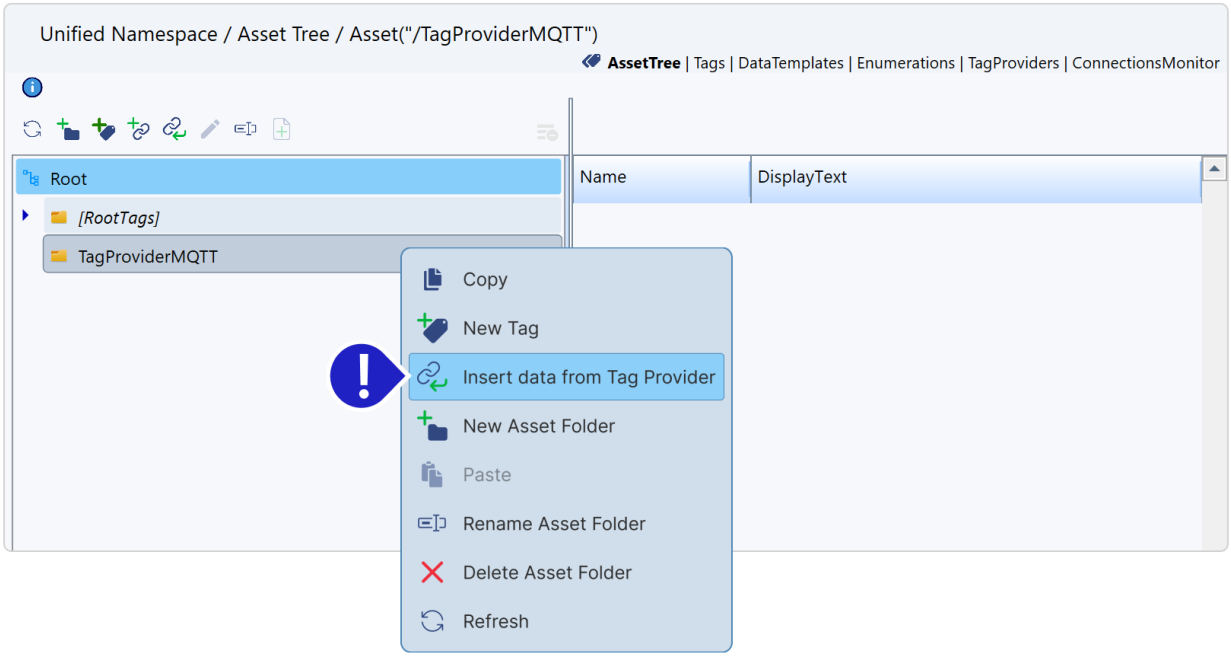
The Test button verifies the connection settings to ensure successful communication with the specified broker.

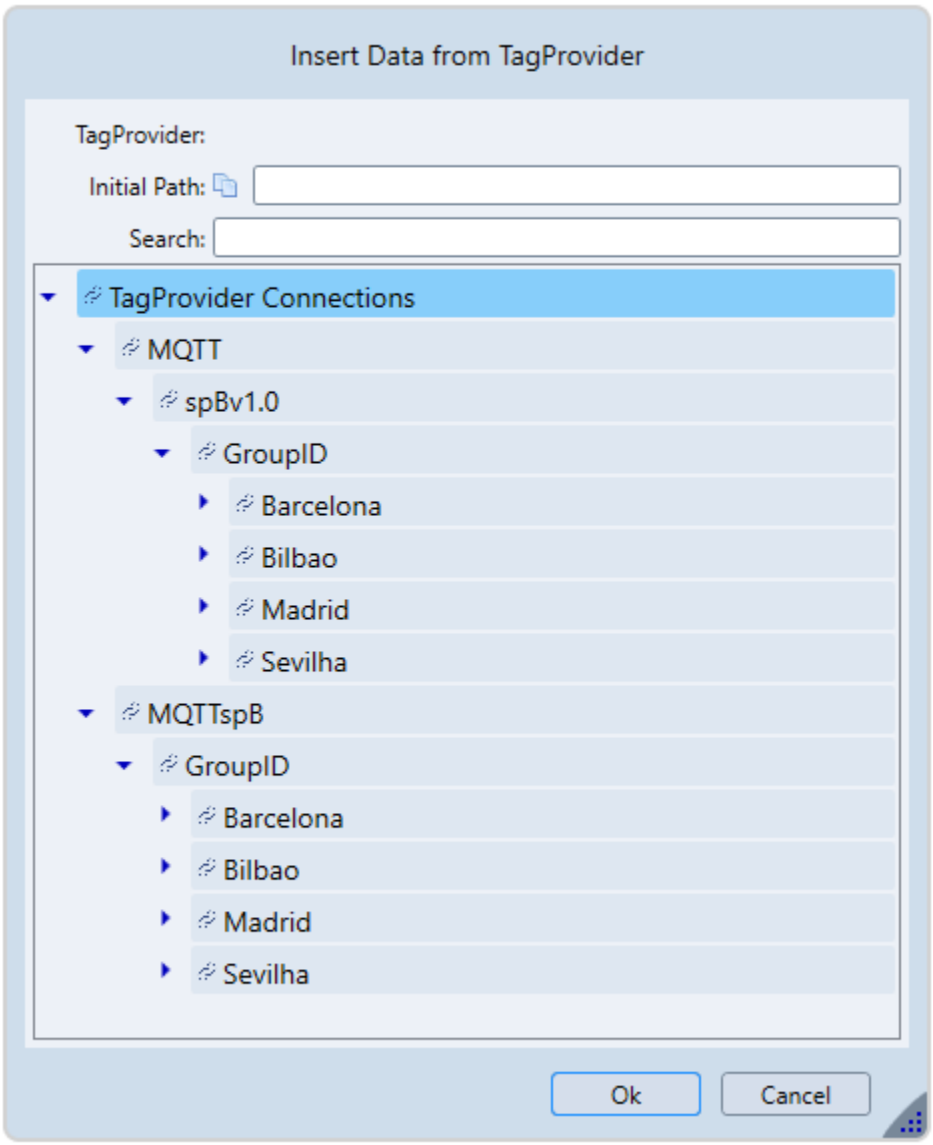
Field	Description
BrokerURL	Specifies the address of the MQTT broker, such as an IP or hostname.
Port	Defines the port number used to establish the MQTT connection.
ClientID	Assigns a unique identifier for the SparkplugB client connecting to the broker. This is a user-defined string, which can also include the following macros, intermixed with the text: • **_Guid_**: Replaced by a dynamically generated Global Unique Identifier (GUID). • **_Solution_**: Replaced by the name of the solution (without the path or file extension).
UserName	Specifies the username required for broker authentication.
Password	Sets the password required for broker authentication.
X509Certificate	Provides the path or content of an X.509 certificate for secure communication.
Certificate Psw	Specifies the password for the provided X.509 certificate.

NetworkSecurity	Network Security options specify the security protocol (e.g., None, SSL, TLS) and encryption level for MQTT connection. Options include: **None**: Applies no encryption or protocols, suitable for secure or isolated networks but poses risks in public settings. **SSL2**: Implements an early security protocol that is now considered obsolete due to numerous vulnerabilities, including susceptibility to man-in-the-middle attacks and lack of protection against cipher block chaining attacks. Deprecated and should not be used. **SSL3**: Offers an updated protocol but remains vulnerable to attacks such as POODLE. Lacks modern security features and should be avoided in favor of newer protocols like TLS 1.2 for secure communications. **TLS**: Uses an early version of the Transport Layer Security (TLS) protocol with enhancements for security, now outdated and vulnerable to attacks. **TLS 1.1**: Addresses initialization vector issues and includes protection against certain types of attacks but remains susceptible to modern cryptographic attacks with limited support for new standards. **TLS 1.2**: Provides significant security upgrades, supporting modern cryptographic algorithms like AES-GCM and AEAD ciphers. Ensures data confidentiality and integrity with robust mechanisms for secure key exchange and message authentication. Recommended for secure network communications and widely supported across modern systems and applications.
WebSocket	Enables or disables WebSocket communication for the SparkplugB connection.
Collector ID	Defines an identifier used to track the data collector.
QoS	Specifies the Quality of Service level for message delivery guarantees.
KeepAlive (s)	Defines the interval in seconds for sending keep-alive packets to the broker.
Report Out Of Range By Exception	Not used by this service.
InitialBranch	Sets the initial branch or topic for SparkplugB tag subscriptions.

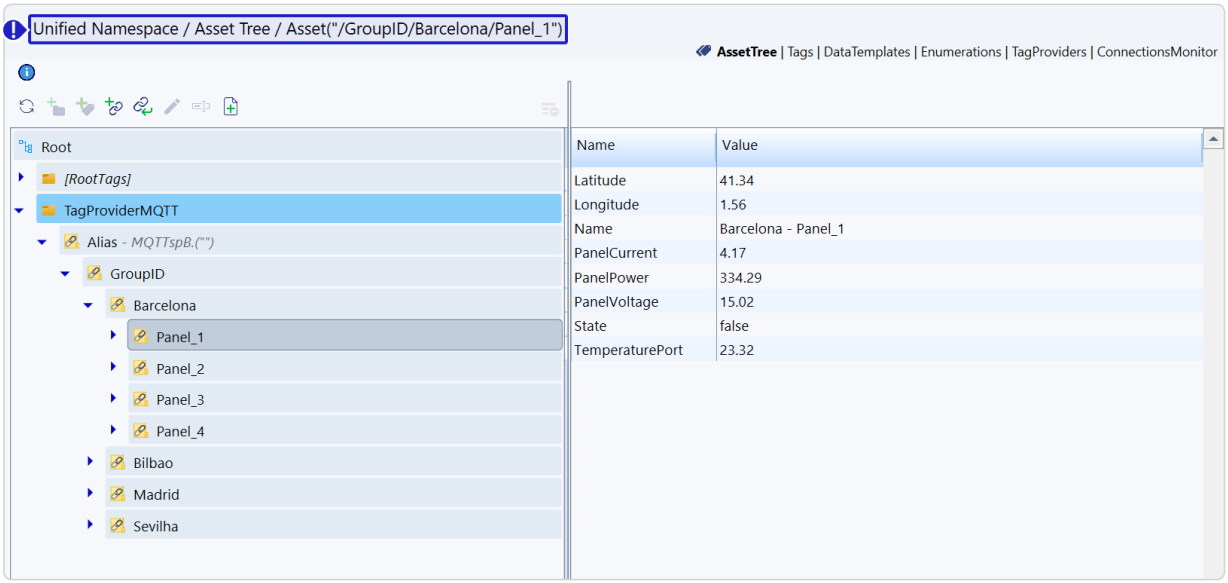
Importing Tags from Broker

If you are navigating and exploring tags from an MQTT Broker by using the data discovering tool available on **Data Explorer/MQTT Tools**, you can view the tags from the MQTT broker before importing them. After, you can select the tags and map the selected connection and data to the solution by pressing **Map to the Solution** in the top-left corner. To view the imported data, navigate to **Unified Namespace/Asset Tree**, create a folder, select it, and use the "Insert Data from TagProvider"  to select the MQTT data you want added. You can link all the data to the folder on your Asset Tree or select a specific part of the application.


Unified Namespace / Asset Tree / Asset("/TagProviderMQTT")
AssetTree | Tags | DataTemplates | Enumerations | TagProviders | ConnectionsMonitor
Root
[RootTags]
TagProviderMQTT
Name
DisplayText
Copy
New Tag
Insert data from Tag Provider
New Asset Folder
Paste
Rename Asset Folder
Delete Asset Folder
Refresh



Once the data is added to the Asset Tree, you'll be able to browse all the values.



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