

CONFIGURATION GUIDE

How to Connect
dataFEED OPC Suite
to Azure Cloud



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1. Preliminary Remarks

This configuration guide describes how to configure *dataFEED OPC Suite* as *Azure IoT Hub* device and thus to transfer shopfloor data to the *Azure* cloud using the MQTT standard.

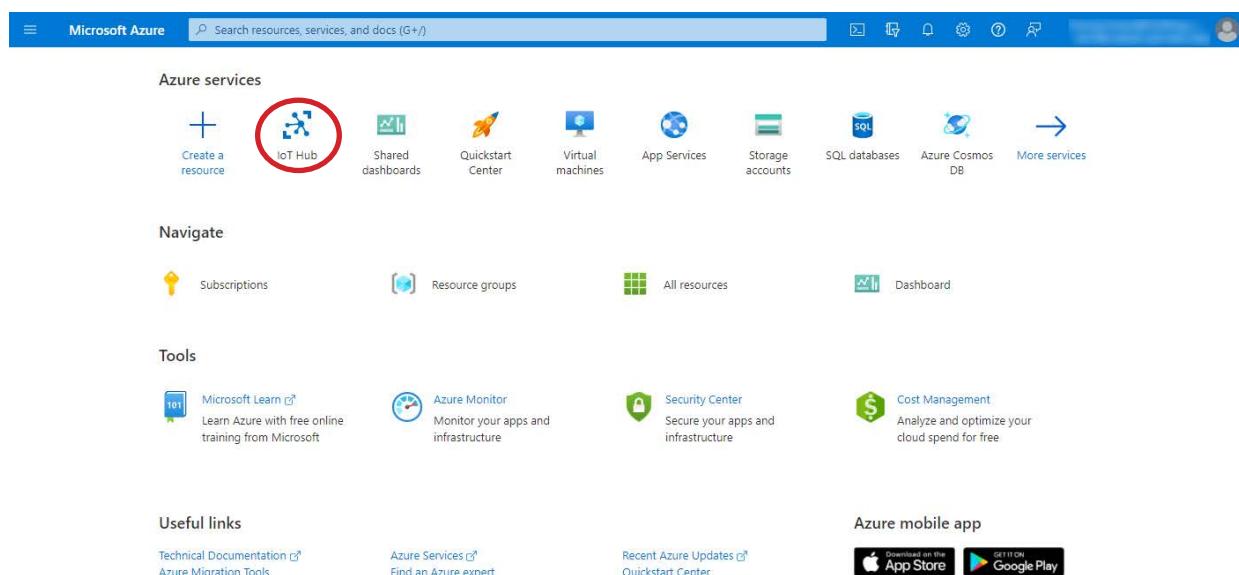
NOTE:

Additional *dataFEED OPC Suite* information can be found at the according product web pages.

- dataFEED OPC UA Suite Extended:*** <https://industrial.softing.com/products/opc-opc-ua-software-platform/opc-server-middleware/datafeed-opc-suite-extended.html>
- dataFEED OPC UA Suite Base:*** <https://industrial.softing.com/products/opc-opc-ua-software-platform/opc-server-middleware/datafeed-opc-suite-base.html>

2. Configure *Azure IoT Hub* Device for Data Exchange With Softing Gateways

- Set up an *Azure* account, if not yet available
- Download latest *Azure IoT Explorer* version from <https://github.com/Azure/azure-iot-explorer/releases> and install it, if not yet available
- Open *Azure* portal in Internet Browser using <https://portal.azure.com/> URL and sign in



- Press *IoT Hub* button

The screenshot shows the Microsoft Azure IoT Hub list view. At the top, there are navigation links for Home > IoT Hub > Softing Group. Below the header are filter options: Subscription = all, Resource group = all, Location = all, and a 'Create filter' button. The main area displays a message: 'No IoT hub to display' with a network icon. Below this, it says 'Create an IoT hub to help you connect, monitor, and manage billions of your IoT assets.' A prominent blue button labeled 'Create IoT hub' is highlighted with a red circle. Below the button are links for 'Learn more about IoT Hub' and 'Quickstart: send telemetry from device'.

- Press *Create IoT Hub* button

The screenshot shows the Microsoft Azure IoT hub creation wizard, step 1: Basics. It includes fields for Project details (Subscription: Nutzungsbasierte Bezahlung, Resource group: Create new), Instance details (IoT hub name: Enter a name for your hub, Region: East US), and navigation buttons (Review + create, Previous, Next: Networking).

- Click *Create new* link and enter resource group name
- Enter name in *IoT hub name* field
- Press *Review + create* button

The screenshot shows the Microsoft Azure IoT Hub creation interface. At the top, there's a navigation bar with 'Microsoft Azure' and a search bar. Below it, the path 'Home > IoT Hub > IoT hub' is shown. The main area is titled 'IoT hub' with a Microsoft logo. A green banner at the top says 'Validation passed.' Below this, there are tabs: Basics, Networking, Management, Tags, and Review + create. The 'Review + create' tab is selected. Under 'Basics', there are fields for Subscription (Nutzungsbasierte Bezahlung), Resource group (SiemensMQTT), Region (Germany West Central), and IoT hub name (SiemensS7). Under 'Networking', there are fields for Connectivity configuration (Public access: Enabled), Private endpoint connections (None), and Allow public network access (Enabled). Under 'Management', there are fields for Pricing and scale tier (S1), Number of S1 IoT hub units (1), Messages per day (1000000), Device-to-cloud partitions (1), Cost per month (See the [Defender for IoT pricing](#)), and Defender for IoT (Enabled). Under 'Tags', there's a 'Create' button which is circled in red.

- Press *Create* button

The screenshot shows the Microsoft Azure Deployment overview page. At the top, there's a navigation bar with 'Microsoft Azure' and a search bar. Below it, the path 'Home > Deployment' is shown. The main area is titled 'Deployment' with a green icon. There's a 'Create' button at the top left of the main content area, also circled in red. The main content shows a message 'Your deployment is complete' with a green checkmark. It lists deployment details: Deployment name: [redacted], Subscription: Nutzungsbasierte Bezahlung, Resource group: SoftingMQTT. It also shows the start time: 10/12/2021, 8:44:34 AM and Correlation ID: [redacted]. Below this, there are sections for 'Deployment details' (Download) and 'Next steps' (Add and configure IoT Devices, Recommended; Configure routing rules for device messaging, Recommended). To the right, there are links to 'Security Center', 'Free Microsoft tutorials', and 'Work with an expert'. A 'Go to resource' button is located in the 'Next steps' section, also circled in red.

- Press *Go to resource* button

The screenshot shows the Microsoft Azure portal interface. At the top, there's a navigation bar with icons for search, notifications, and user profile. Below it, a section titled "Azure services" contains icons for creating a resource, IoT Hub, Shared dashboards, Quickstart Center, Virtual machines, App Services, Storage accounts, SQL databases, Azure Cosmos DB, and More services. Under "Recent resources", there's a table with two items:

Name	Type	Last Viewed
SiemensS7	IoT Hub	a few seconds ago
SoftingMQTT	Resource group	2 minutes ago

- Click link of created IoT hub
- Navigate to *Settings/Shared access policies*

The screenshot shows the "Shared access policies" page for the "SiemensS7" IoT Hub. On the left, there's a sidebar with options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Events, and Settings. Under Settings, "Shared access policies" is selected. The main area shows a table of shared access policies:

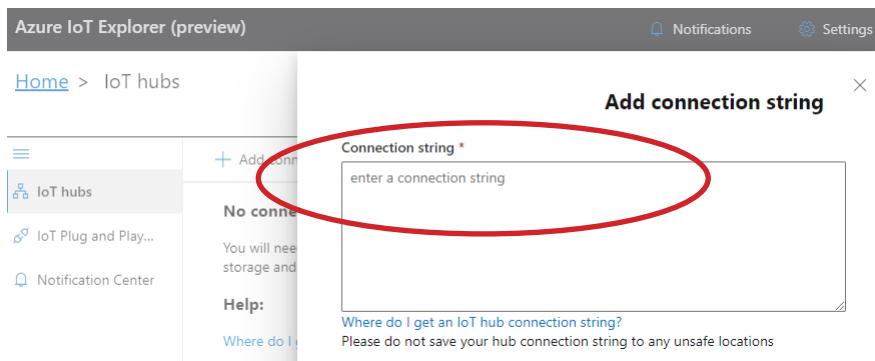
Policy Name	Permissions
iothubowner	Registry Read, Registry Write, Service Connect, Device Connect
service	Service Connect
device	Device Connect
registryRead	Registry Read
registryReadWrite	Registry Read, Registry Write

- Click *iothubowner* link

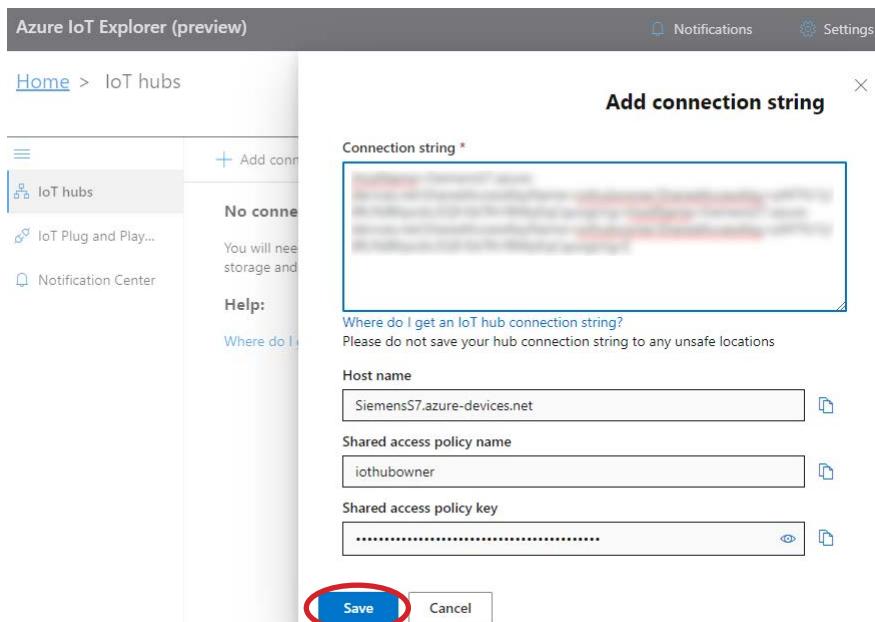
The screenshot shows the "Shared access policies" page for the "iothubowner" policy. The sidebar and table from the previous screenshot are visible. On the right, there's a detailed view for the "iothubowner" policy, including fields for "Primary key" and "Secondary key" (both circled with red boxes), "Primary connection string" and "Secondary connection string" (both also circled with red boxes), and a "Permissions" section with checkboxes for Registry Read, Registry Write, Service Connect, and Device Connect.

- Copy *Primary key*
- Copy *Primary connection string*

- Start *Azure IoT Explorer*
- Click *Add connection* link



- Paste *Primary connection string* from Azure portal to *Connection string* field



- Press *Save* button

- In Azure portal navigate to *Explorers/IoT devices*

- Click *Add Device* link

Create a device

Find Certified for Azure IoT devices in the Device Catalog

Device ID * (The ID of the new device)

Authentication type Symmetric key X.509 Self-Signed X.509 CA Signed

Auto-generate keys

Connect this device to an IoT hub Enable Disable

Parent device No parent device Set a parent device

Save

- Enter unique device name in *Device ID* field
- Do not modify default settings for rest of the fields
- Press *Save* button
- At *Explorers/IoT devices* page click *Refresh* link
The added device is shown.

- In Azure IoT Explorer click Refresh link

The added device is shown.

Azure IoT Explorer (preview)

Home > SiemensS7 > Devices

+ New Refresh Delete

Query by device ID... Add query parameter

Device ID	Status	Connection st...	Authenticatio...	Last status up...	IoT Plug and ...	Edge device
dataFEEDOPCSuite	Enabled	Disconnected	Sas	--		

- Click link of added device
- Navigate to *Device Identity*
- Expand *Connection string with SAS token*

Azure IoT Explorer (preview)

Home > SiemensS7 > Devices > Gateway > Device identity

Device identity

Device ID: Gateway

Primary key:

Secondary key:

Primary connection string:

Secondary connection string:

Connection string with SAS token

Symmetric key *

Expiration (minutes): 5

SAS token connection string

Generate

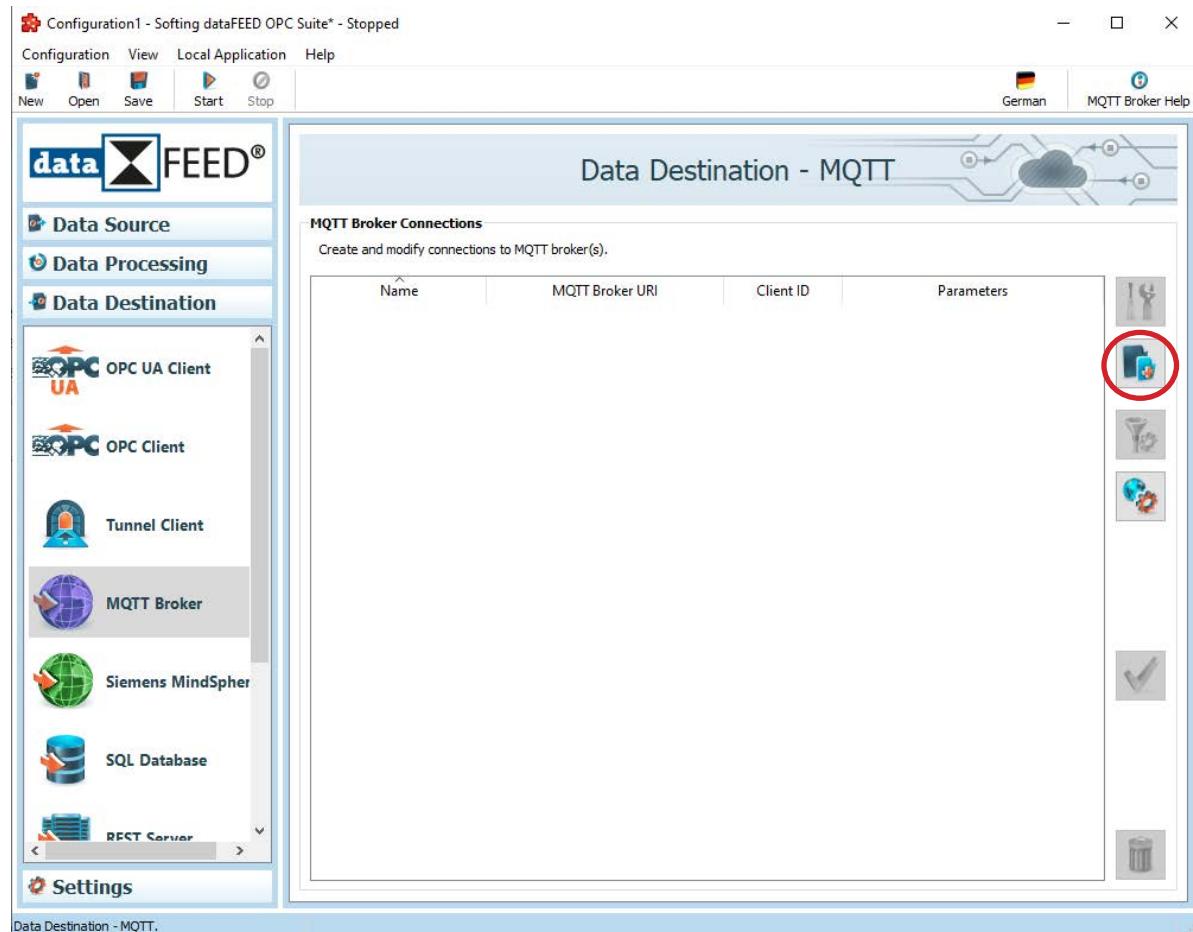
Connect this device to IoT hub

Enable

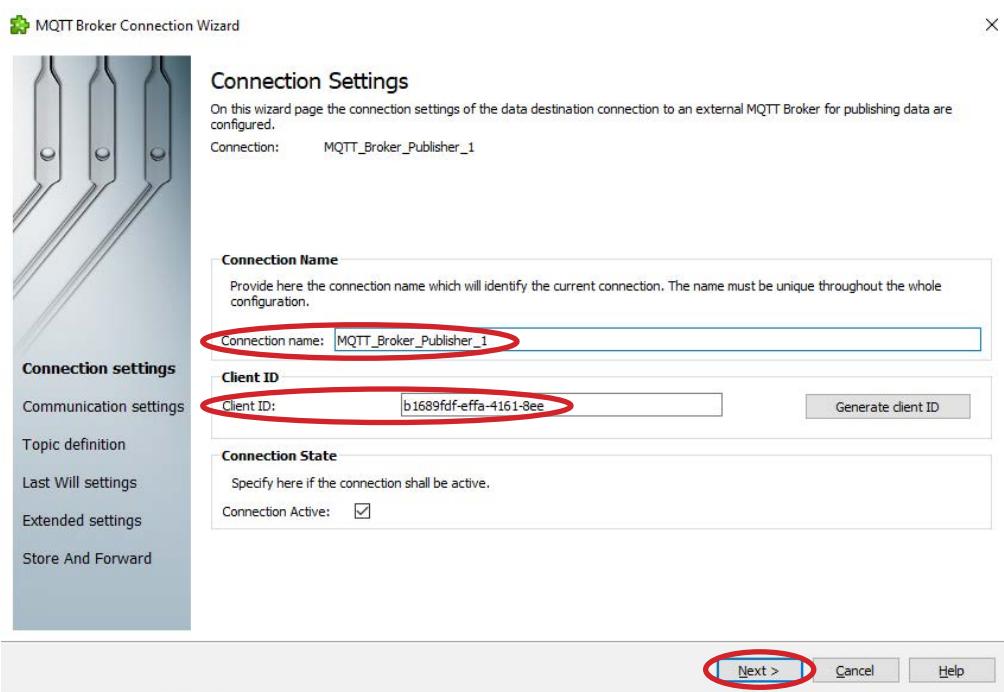
- Choose *Primary key* in *Symmetric key* field
- Enter connection string expiration time in *Expiration (minutes)* field
(e.g. 525,600, representing 1 year)
- Press *Generate* button
- Copy generated *SAS token connection string*

3. Configure *dataFEED OPC Suite*

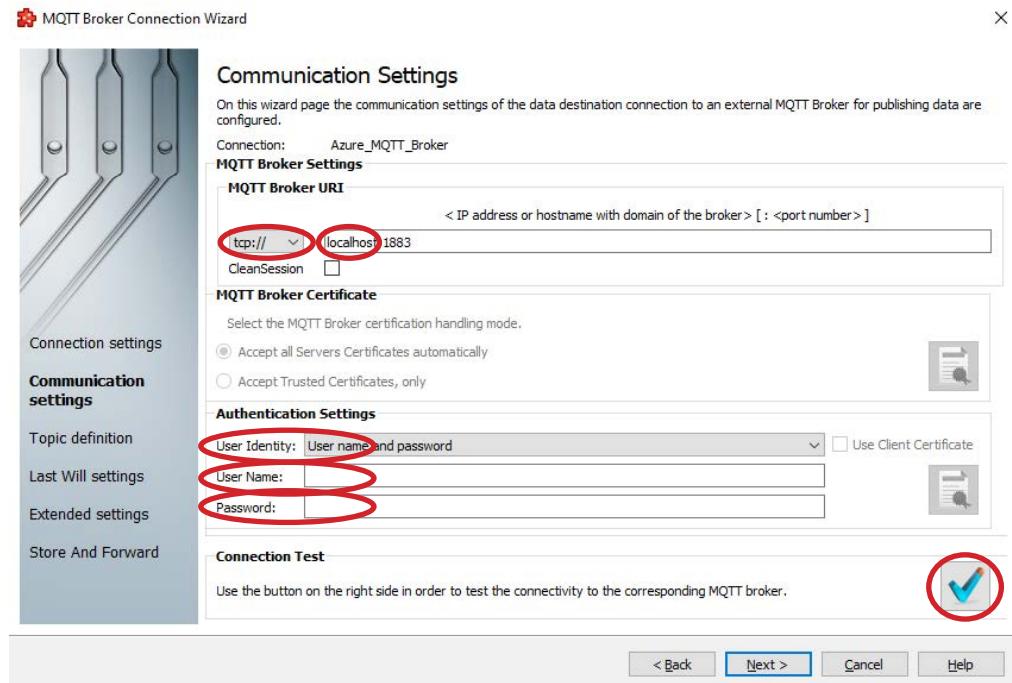
- Open *dataFEED OPC Suite* configurator
- Navigate to *Data Destination/MQTT Broker*



- Press (*Add a new data source*) button



- Enter unique connection name in *Connection Name* field
- Enter device name as defined in *Azure portal* in *Client ID* field
- Press *Next >* button

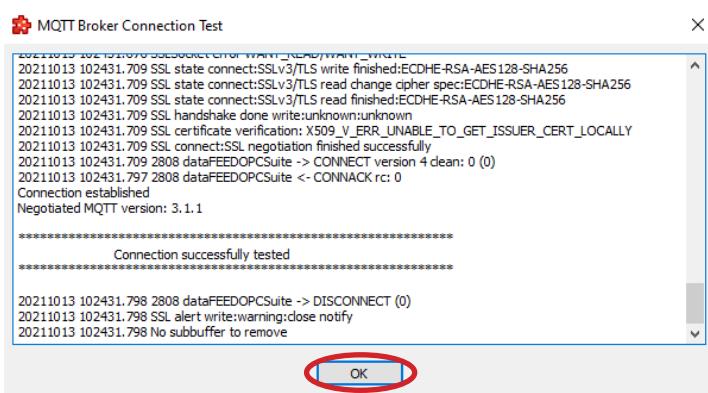


- Select *ssl://* protocol
- Enter hostname as prefix in
<IP address or hostname with domain of the broker> [:<port number>] field

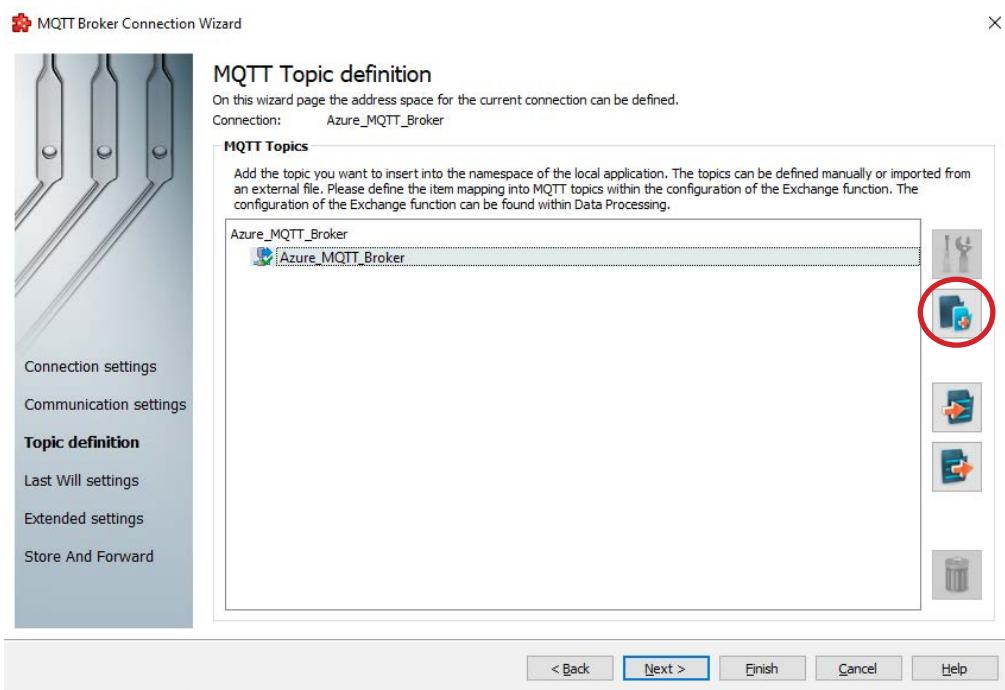
NOTE:

The hostname can be copied from the SAS token connection string as generated in *Azure IoT Explorer*.
(The hostname is the string after the *HostName=* identifier, terminated by ; character.)

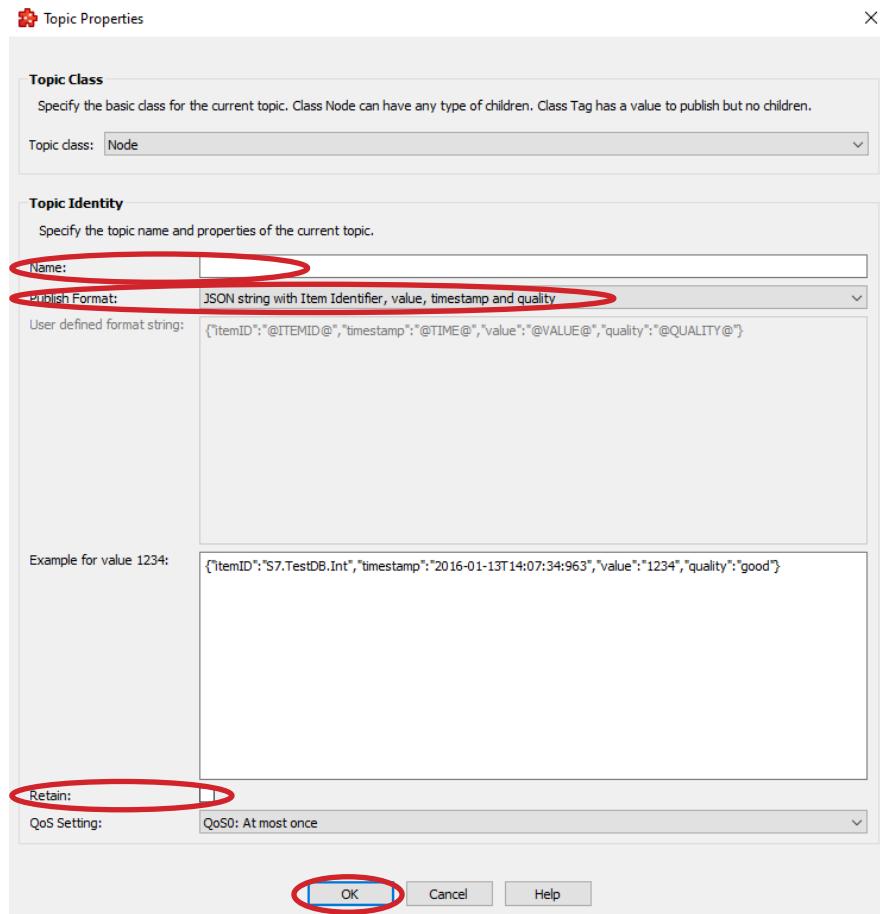
- Select *User name and password* in User Identity field
- Enter string consisting of hostname, the character / and the device ID in *User Name* field
- Copy complete string after *SharedAccessSignature=* identifier from SAS token connection string as generated in *Azure IoT Explorer* in *Password* field
- Press (*Connection test for the selected data destination*) button



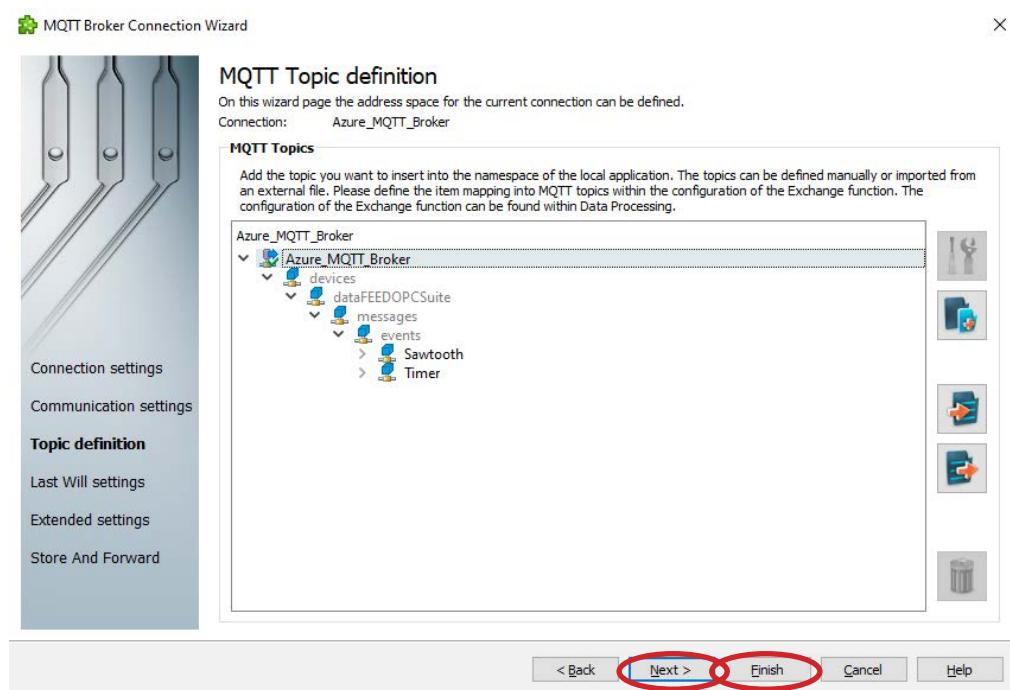
- Press *OK* button
- Press *Next >* button at *Communication Settings* page



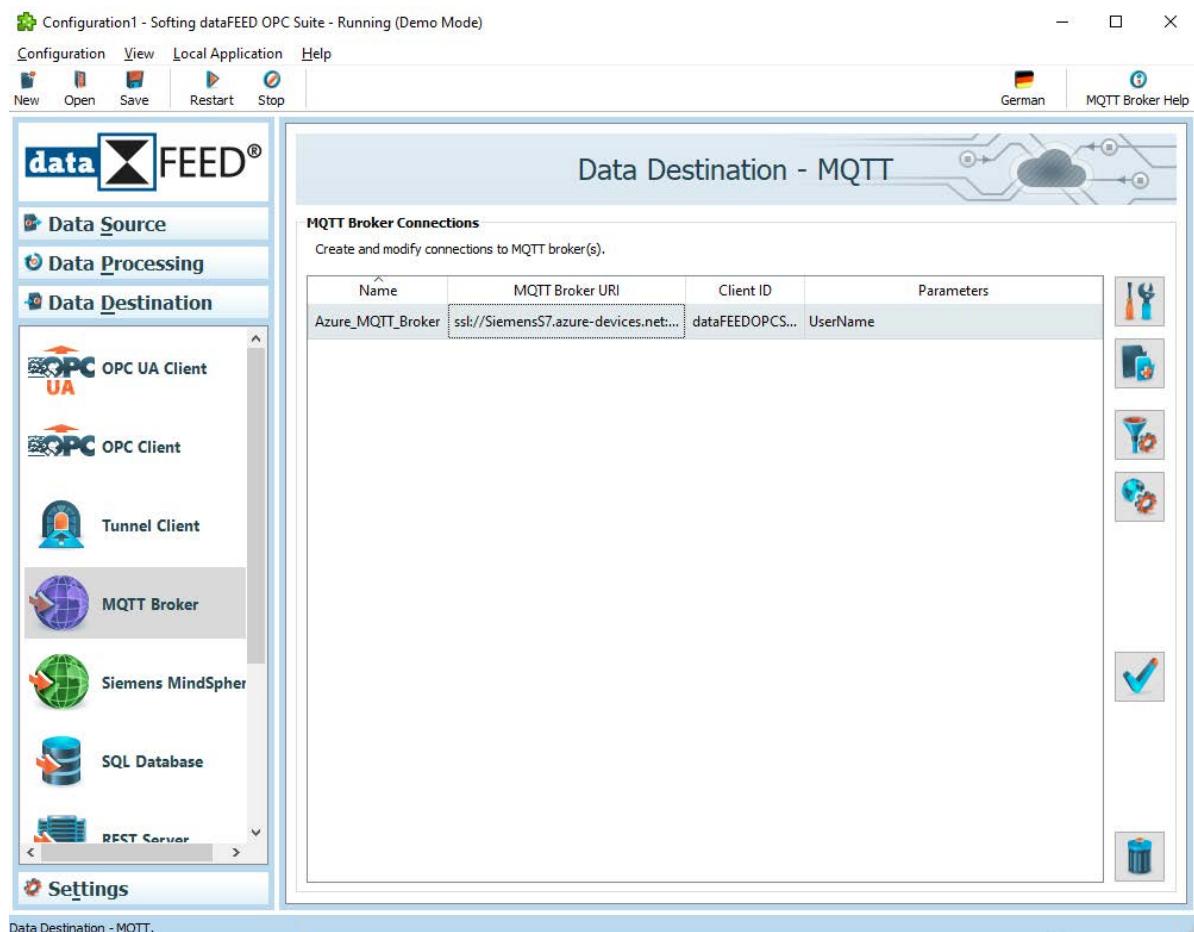
- Define *devices/<device ID>/messages/events* hierarchy for MQTT connection by pressing (*Add a new item*) button
- Press (*Add a new item*) button to add all items to be used in the MQTT connection with Azure cloud



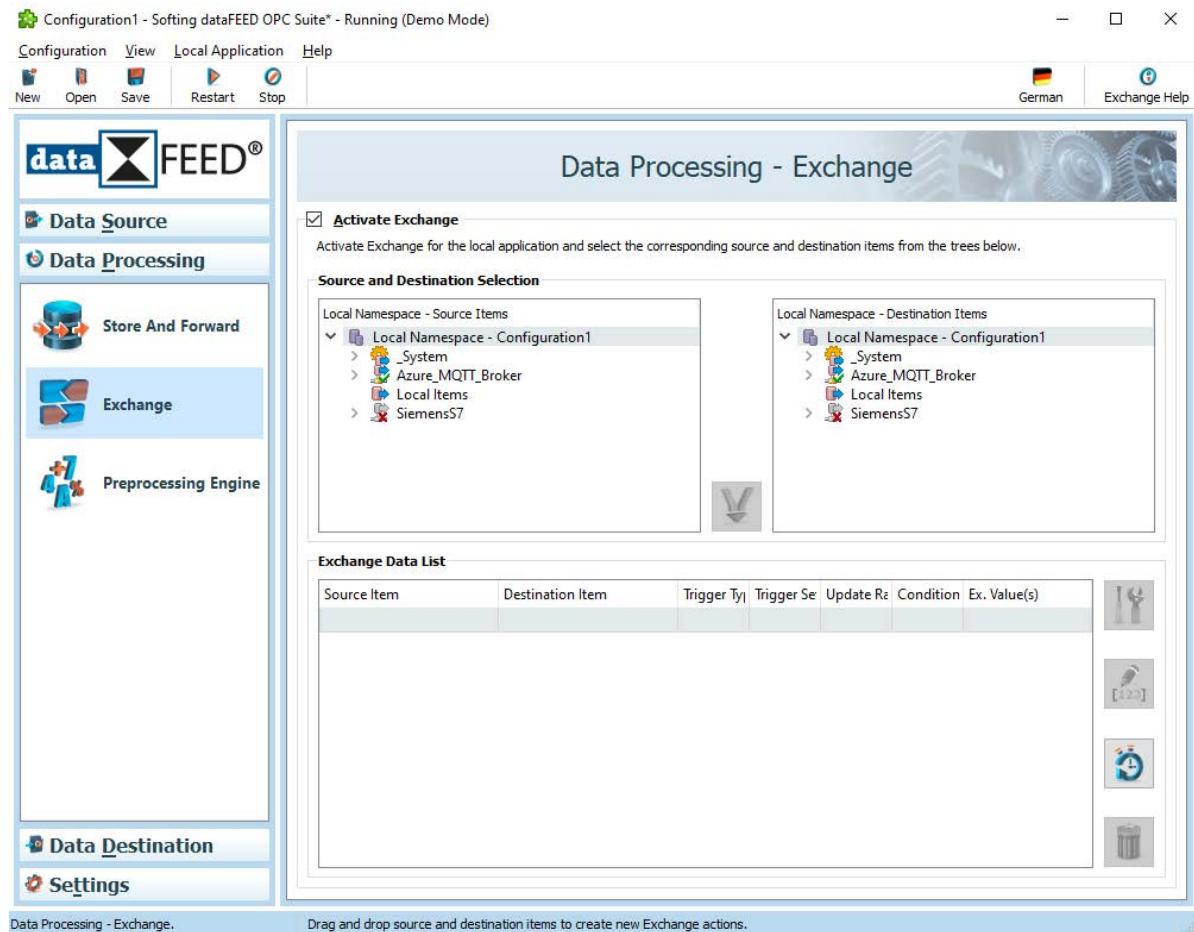
- Enter item name in *Name* field
- Select JSON string in *Publish Format* field
- Deactivate *Retain* checkbox
- Press *OK* button
-
- Select ssl:// protocol
- Enter hostname as prefix in
- < IP address or hostname with domain of the broker > [:<port number>] field
- NOTE:
- The hostname can be copied from the SAS token connection string as generated in Azure IoT Explorer.
- (The hostname is the string after the HostName= identifier, terminated by the ; character.)
- Select User name and password in User Identity field
- Enter string consisting of hostname, the character / and the device ID in User Name field
- Copy complete string after SharedAccessSignature= identifier from the SAS token connection string as generated in Azure IoT Explorer in Password field
- Press (Connection test for the selected data destination) button



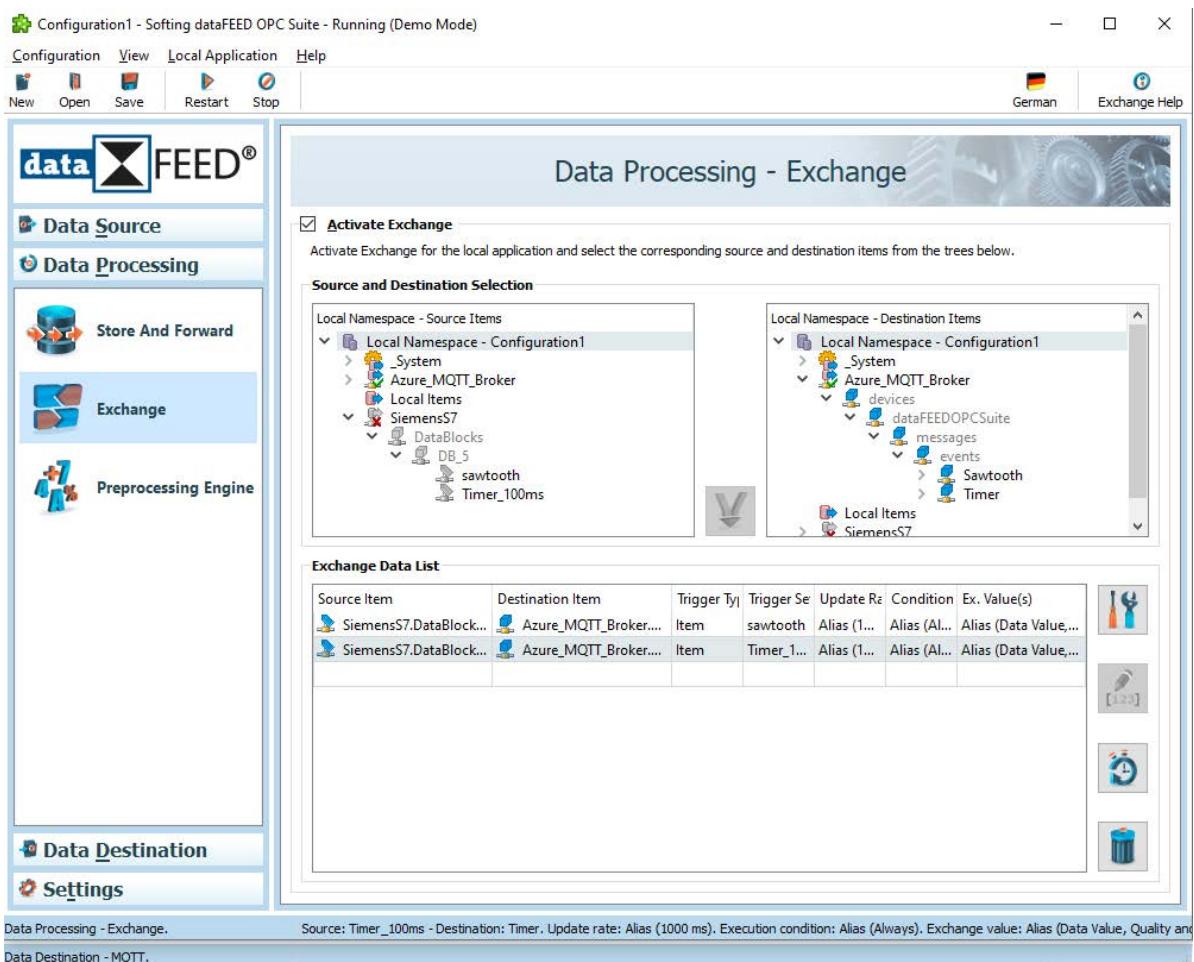
- Once all items are configured press *Next >* button to proceed to the next MQTT Broker settings or press *Finish* button to finish the MQTT Broker configuration.



- Navigate to *Data Processing/Exchange*



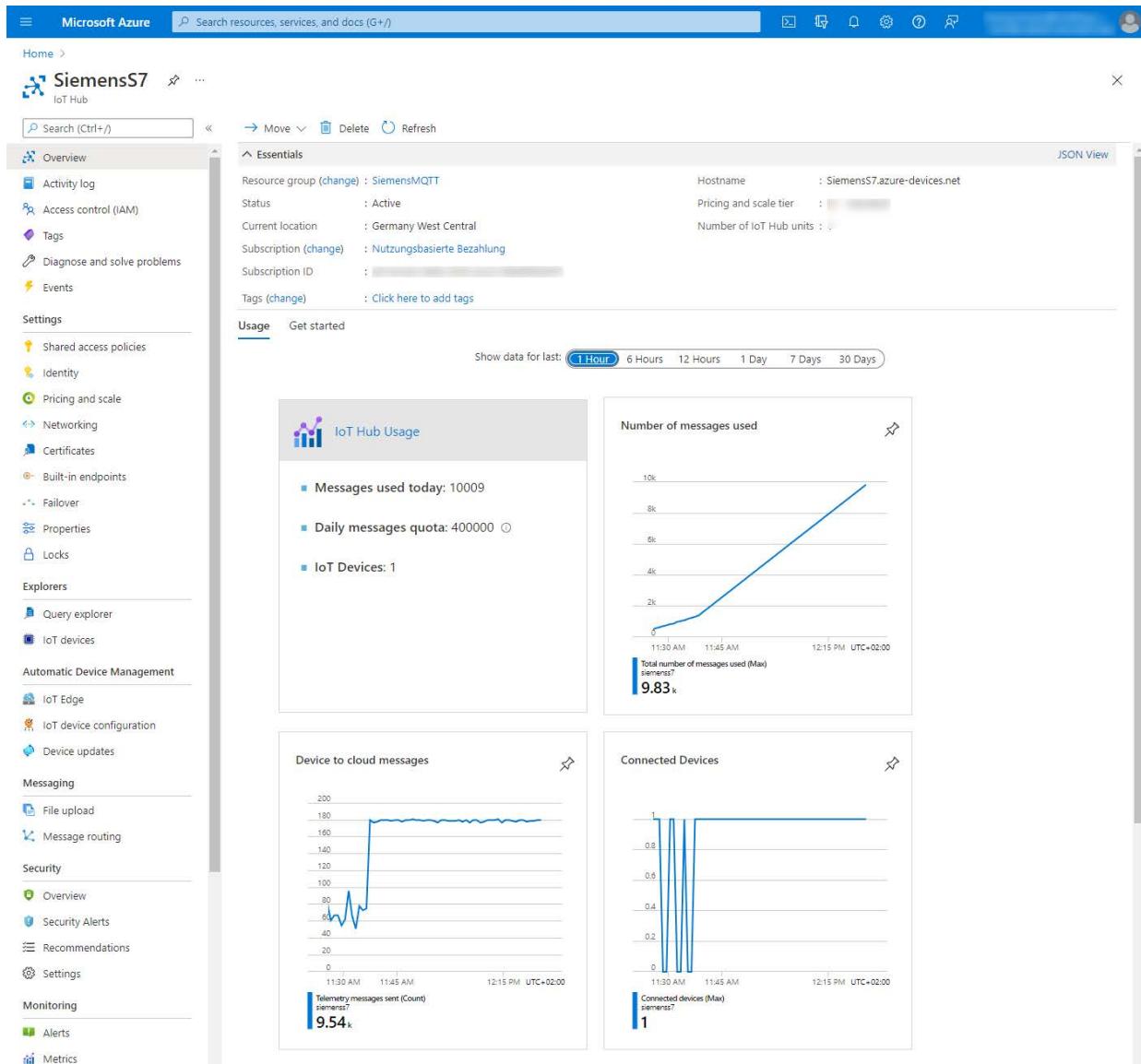
- Define mapping of source items (shopfloor data) to destination items (configured MQTT Broker items) by selecting the appropriate combinations in the *Local Namespace - Source Items* tree and the *Local Namespace - Destination Items* tree and afterwards by pressing the (Use the selected items as a new Exchange action) button



- Press (Save) button to store ***dataFEED OPC Suite*** configuration
- Press (Start) button to start ***dataFEED OPC Suite***

4. Test MQTT Connection and Data Exchange

- In Azure portal navigate to *Overview*



Various MQTT message KPIs are shown for the connected device.

- In Azure *IoT Explorer* portal navigate to *Devices/Telemetry*

The screenshot shows the Azure IoT Explorer (preview) interface. The left sidebar has a 'Telemetry' item selected. The main area is titled 'Telemetry' and shows configuration options like 'Consumer group' (\$Default), 'Specify enqueue time' (No), 'Use built-in event hub' (Yes), and 'Receiving events...' (radio button). Below these settings, two JSON data entries are listed under the timestamp 'Wed Oct 13 2021 11:54:42 GMT+0200 (Mitteleuropäische Sommerzeit):'. Each entry contains a 'body' object with fields: itemID, timestamp, value, quality, and properties (Timer: null).

```

{
  "body": {
    "itemID": "SiemensS7.DataBlocks.DB_5.Timer_100ms",
    "timestamp": "10/13/2021 09:54:42.464 AM",
    "value": "65288",
    "quality": "good"
  },
  "enqueuedTime": "Wed Oct 13 2021 11:54:42 GMT+0200 (Mitteleuropäische Sommerzeit)",
  "properties": {
    "Timer": null
  }
}

{
  "body": {
    "itemID": "SiemensS7.DataBlocks.DB_5.Timer_100ms",
    "timestamp": "10/13/2021 09:54:42.464 AM",
    "value": "65288",
    "quality": "good"
  },
  "enqueuedTime": "Wed Oct 13 2021 11:54:42 GMT+0200 (Mitteleuropäische Sommerzeit)",
  "properties": {
    "Timer": null
  }
}

```

The data values of the connected device are shown in JSON format.

NOTE:

The given URLs have last been checked on Jan 18, 2022.

