How to Connect your Industrial Assets to Tatsoft's FactoryStudio SCADA using N3uron's Sparkplug Client Module



Sparkplug Overview

Sparkplug standard is being widely adopted for integrating industrial data within corporate MQTT infrastructures. Its popularity is thanks to its simplicity, scalability, and robustness. The **Eclipse Foundation's** specification defines how edge gateways, native MQTT-enabled devices, and applications can communicate within an MQTT infrastructure.

Sparkplug creates a secure foundation for IIoT networks that can be easily scaled and reliably operated for mission-critical applications. This standardization introduced by Sparkplug represents one of the major breakthroughs for industrial communications, since it defines an MQTT topic namespace, an MQTT payload optimized for industrial processes, and MQTT session state management required by real-time applications like SCADA systems.

N3uron's <u>Sparkplug Client module</u> makes it easy to create and configure Sparkplug compliant clients at the network edge, simplifying connections to broker clusters and centralizing the management of data from multiple sources. It offers a plug-and-play solution for making all plant data available via an MQTT-based IIoT infrastructure.

This document explains how to communicate with Tatsoft's FactoryStudio using the Sparkplug Client module.

Although the article specifically applies to Tatsoft, all other applications compatible with the Sparkplug standard, such as Ignition, Canary, AVEVA, or OSIsoft PI, can also subscribe to and receive data from **N3uron** in real-time.



Diagram displaying how the Sparkplug Client module allows receiving and visualizing data into Tatsoft SCADA using HiveMQ as professional message broker software.

N3uron and Tatsoft's FactoryStudio Requirements

If you haven't downloaded N3uron yet, you can do so at <u>https://n3uron.com/downloads/</u>. If this is the first time you are installing N3uron, our <u>Quick User Guide</u> will guide you through the entire installation process.

You will also need to install <u>Tatsoft's FactoryStudio</u>, which can be downloaded from the following link: Tatsoft's FactoryStudio, in addition to signing up for the Cloud MQTT Broker offered by <u>HiveMQ</u>.

N₃uron

Configuring the Broker (HiveMQ Cloud MQTT)

To get started with HiveMQ Cloud, navigate to <u>console.hivemq.cloud</u>. To configure the HiveMQ Cloud MQTT Broker, proceed as follows:

Step 1: On the HiveMQ Cloud Portal dialog, switch to the Sign Up tab and sign up with your GitHub account, Google account, or email address.

Step 2: Once you have successfully registered an account, switch back to the Log In tab and log in to your HiveMQ Cloud account.

OVERVIEW ACCESS MANAGEMENT MQTT Client Sessions * 1 1 / 100 * Actual usage can vary slightly from the value shown. ************************************	INTEGRATIONS WEB CLIENT Data Traffic * 15.23 MB / 10 GB * Actual usage can vary slightly from the value shown.	GETTING STARTED
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Image displaying HiveMQ cloud portal sign up panel

Step 3: After you sign up and log in, your free HiveMQ Cloud cluster will be running and ready within a few moments.

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Screenshot showing the URL and port of the HiveMQ Cloud Cluster

Step 4: To view cluster information and access the area where you can define the credentials that your MQTT clients will use to connect to the cluster, select **Manage Cluster**.

≕ 😟 Cluster Detail	OVERVIEW ACCESS MANAGEMENT	INTEGRATIONS WEB CLIENT	GETTING STARTED
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Screenshot displaying the HiveMQ cloud cluster overview

Step 5: To connect an MQTT client to your cluster, you first need to define the MQTT credentials that allow clients to access the cluster. To create an MQTT credential, enter a Username and Password in the credentials input area of the Access Management tab for your HiveMQ Cloud cluster and select **Add**.

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	N3uron At least 5 characters. Username must be unique Password At least 8 characters, numbers, upper- and lowercase letters. Confirm Password Passwords must match. ADD	AlbertoGaglia PhilipCarey	******	DELETE
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Image showing the HiveMQ cloud access management credentials

Configuring the Sparkplug Client Module (N3uron)

It is assumed that you have already created a Sparkplug Client instance. If not, please take a look at the following link <u>Create a new module instance</u>.

Step 1: Select your module instance from the **Explorer Panel**, click the button on the left-hand side of the **Model** header, select **New Group**, and give it a name. In this case, N3uron.

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Screenshot displaying how to create a new group in the N3uron's Sparkplug client module

Step 2: Once the **Group** has been created, click on the **Edge nodes** button and select **New Edge Node**, as shown in the image below.

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Image showing how to create a new edge node in the N3uron's Sparkplug client module

Step 3: Provide a name (in this case, EDGE01) and configure the rest of the parameters as follows:

- Enabled: Yes.

- MQTT Broker cluster:

EDGE01:

Protocol: MQTTS.

Broker URL: Enter the IP Address of your HiveMQ Gateway.

Port: 8883.

Client ID: Identifies each MQTT client that connects to an MQTT broker. A unique Client ID is automatically generated.

Authentication:

Authentication mode: Password.

Username: N3uron.

Password: Enter the password you used for the N3uron user when you configured it in the MQTT Distributor.

– Primary Host:

Check status: No.

- Payloads: Use Alias: No. Compression: None.

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Screenshot displaying the N3uron's Sparkplug client module configuration

Finally, once the Edge node has been configured, we need to create a new **Device**.

Step 1: Click on the **Devices** button under the node, select **New Edge Device**, and give it a name, as shown in the image below. In this example, we have named them Device01, Device02, and Device03.

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Image displaying how to create a new device in the N3uron's Sparkplug client module

Step 2: Configure the rest of the parameters as follows for each Device:

- Enabled: Yes.

- Tag Path: Define the tag path according to your data model, in this case, /.

– Block Writes: No.

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Screenshot showing different devices in the N3uron's Sparkplug client module

Step 3: You will need to create a new filter for every **Device**. These filters will be used to define which data will be published to the Broker. To do so, click on the ellipsis button and select **New Tag Filter**, as shown below:

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Image displaying how to create a new TagFilter in the N3uron's Sparkplug client module

Step 4: Provide a name for each filter (in this case, V1, V2, and V3) and enter the corresponding filtering expression in the **Regex pattern**.



Screenshot displaying the N3uron's Sparkplug client module configuration with the corresponding devices

Configuring Tatsoft's FactoryStudio

Now we are going to configure the client on the Tatsoft's FactoryStudio side. Tatsoft will act as the client application that will subscribe to the data published by N3uron to the HiveMQ's Cloud MQTT Broker It is assumed that you have already downloaded and installed Tatsoft. Once complete, access your Tatsoft's FactoryStudio Server to start the configuration.

Configuring the Client (Tatsoft's FactoryStudio)

At this point, both the Broker and the user that we will use to connect to the Broker have already been configured. Next, we need to configure the Tatsoft's FactoryStudio client, which provides Sparkplug Client functionality and allows it to subscribe to the data published to the broker.

Step 1: Once the Tatsoft FactoryStudio demo has been downloaded, open it and start creating a new project to begin configuring FactoryStudio as an MQTT Sparkplug application node.

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User Interface: en-US V	🕒 Open Project 🛛 👰 Run Project	ect areas
Project Server: localhost		fs-9.2.2

Image showing how to create a new project in Tatsoft's FactoryStudio

Step 2: Once created, open it and go to edit. Then, under edit, select **Devices** and create a channel by clicking on **Create New...**



Screenshot displaying how to create a new channel in Tatsoft's FactoryStudio

Step 3: Specify the protocol from the drop-down menu (in this case, MQTT + SparkplugB), enter a **Channel Name** (in this case, MQTTspB1), and click on **OK**.

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Image showing the drop-down menu button to select the corresponding protocol iwn Tatsoft's FactoryStudio

Channels	Nodes Points AccessTypes	
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Screenshot displaying the selection of the Sparkplug protocol in Tatsoft's FactoryStudio

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Channels	Nodes	Points AccessTypes
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	Interface:	ТСРІР
	Description:	MQTT +SparkplugB - Message Queuing Telemetry Transport - TCPIP

Image showing the channel configuration in Tatsoft's FactoryStudio

Step 4: Once the Channel is created, go to **ProtocolOptions** under **Channels**. Here, click on the drop-down menu button and (in this case) select **Collector**.

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Edit Draw Run Info	Channels Nodes Points Installed Protocols: MQTT +SparkplugB - Message Queuir	AccessTypes				
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Screenshot displaying the channel protocol options in Tatsoft's FactoryStudio

Step 5: Next, a MQTT + SparkplugB node must be created under this channel. To do so, go to the **Nodes** section and click on **New...**, select the channel type, give it a name and choose a description. In this case, we've called it MQTTspB_HiveMQ.

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Image showing the new node button in Tatsoft's FactoryStudio

Channels	Nodes	Points AccessTypes
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Node:		Create new Node
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Screenshot displaying how to create a new node in Tatsoft's FactoryStudio

Step 6: Now, click on **Primary Station** to introduce the HiveMQ Cloud MQTT broker details. Enter the Broker URL and the corresponding port, as well as the ClientID and the credentials. You'll also need to select **TIs12** encription in **Network Security**. In this example:

- Broker URL: cf23fd26ff9d462a941018e3d44c0885.s2.eu.hivemq.cloud.

- Port: 8883.

- ClientID: N3uron_client.



Screenshot displaying the node primary station in Tatsoft's FactoryStudio

Step 7: Once this step is complete, we must create the tags that we want to be displayed, which will be linked to the tag values that have been published. To do so, go to **Points** and here, click on the ellipsis button inside **Tag Name**, and then on **New Tag**.

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Image showing the new tag button in Tatsoft's FactoryStudio

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Screenshot displaying how to create a new tag in Tatsoft's FactoryStudio

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Screenshot showing the tag configuration in Tatsoft's FactoryStudio

Step 8: Under **Device**, click on **Enable** and click on **Browse**. The platform will listen to see if there are any devices to be announced. In this example, **N3uron** is listed, so we select all the tags we want to display.

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Image displaying the browsing tags button in Tatsoft's FactoryStudio

Channels Nodes	Points AccessTypes	
TagName	Node Search Items	
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Screenshot displaying the corresponding tag selection in Tatsoft's FactoryStudio

Once everything has been properly configured, let's open the Tatsoft's FactoryStudio in order to verify that Tatsoft has successfully subscribed to the data published by **N3uron**.

Inside **Draw**, click on the **Trend Window** button, where we'll introduce the tags we want to display. In this case, V1, V2, and V3.



Screenshot displaying the draw section in Tatsoft's FactoryStudio



Image showing how to add tags in Tatsoft's FactoryStudio



Screenshot displaying the tags selection for the chart in Tatsoft's FactoryStudio

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Imagen showing the three tags selected in Tatsoft's FactoryStudio

Next, go to **Run** and click on **Run Test** to display the value on Tatsoft's FactoryStudio acting as our application node. It should now be possible to see the corresponding chart displaying all the previously selected tags.

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Screenshot displaying the run test button in Tatsoft's FactoryStudio





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Conclusion on How to Build Scalable Data Models with N3uron's Sparkplug Client Module

Connecting your assets to any Sparkplug-enabled application, such as Tatsoft, is extremely easy using N3uron's <u>Sparkplug Client module</u>. If you're ready to get going using MQTT Sparkplug, <u>download the N3uron</u> <u>free trial version</u> and read our <u>Sparkplug Client Manual</u> on how to implement and use N3uron's Sparkplug Client module in our communication platform.

