

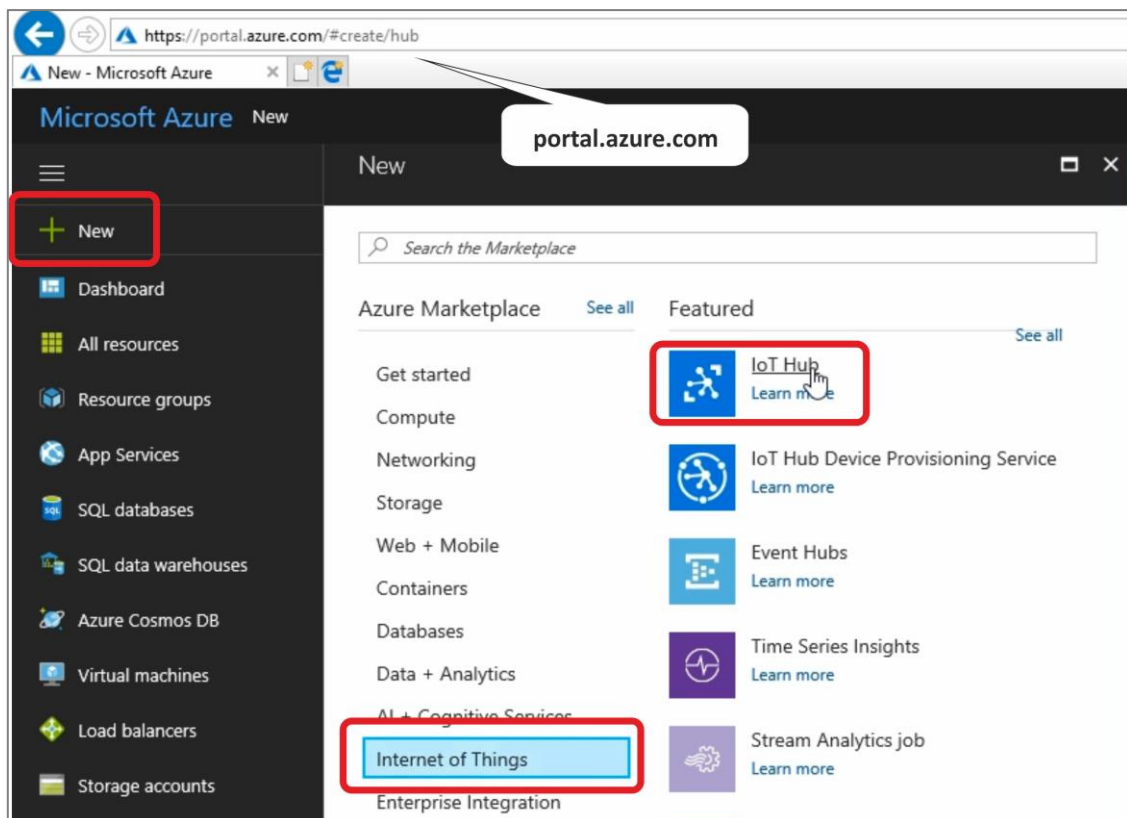
# IoT Starter Kit – Part 3b:

## How to connect to Microsoft Azure

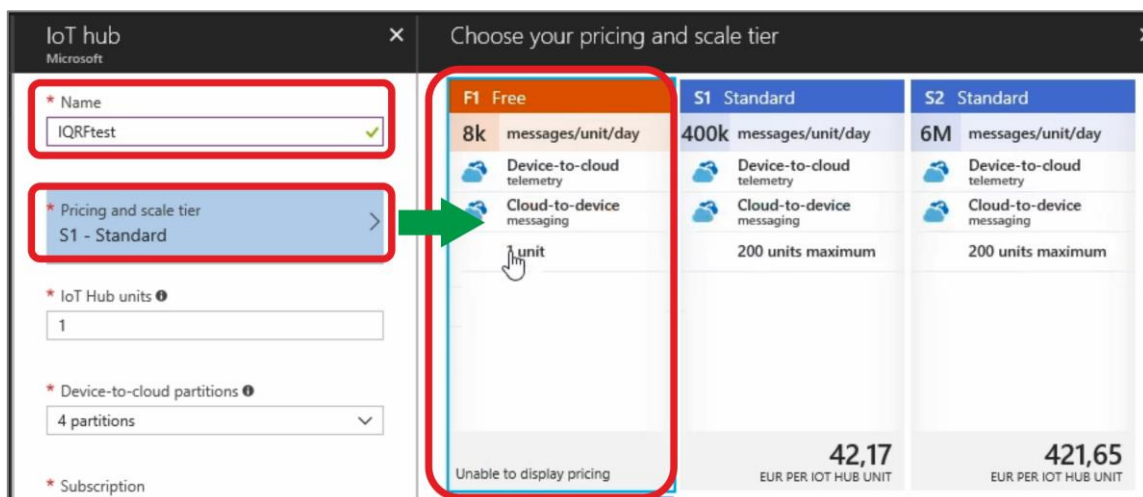
In this part, we will connect an IQRF gateway to Microsoft Azure. Microsoft Azure offers free services for developers for a limited time and in a limited amount. You will be asked to enter your credit card details. Your credit card will be used only if you exceed the services provided free of charge. It is one of the possible clouds that you can get connected to from your IQRF Gateway Daemon using the MQTT channel.

### Microsoft Azure virtual device

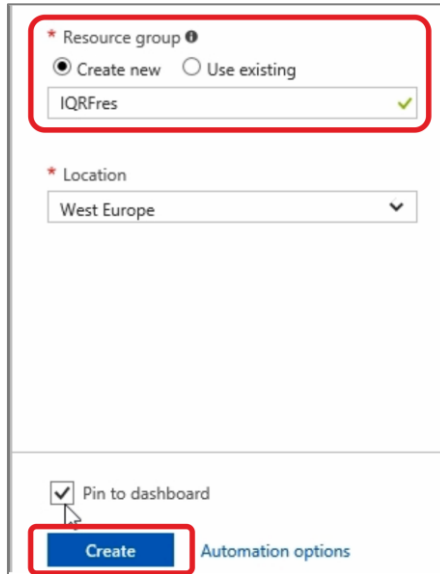
First, log in to your Microsoft Azure account on [portal.azure.com](https://portal.azure.com). Click on the **New** item in the left menu, go to the **Internet of Things** and select **IoT Hub**.



Setup the **IoT Hub** name and your **pricing model**. As a developer you can create one IoT Hub for free.

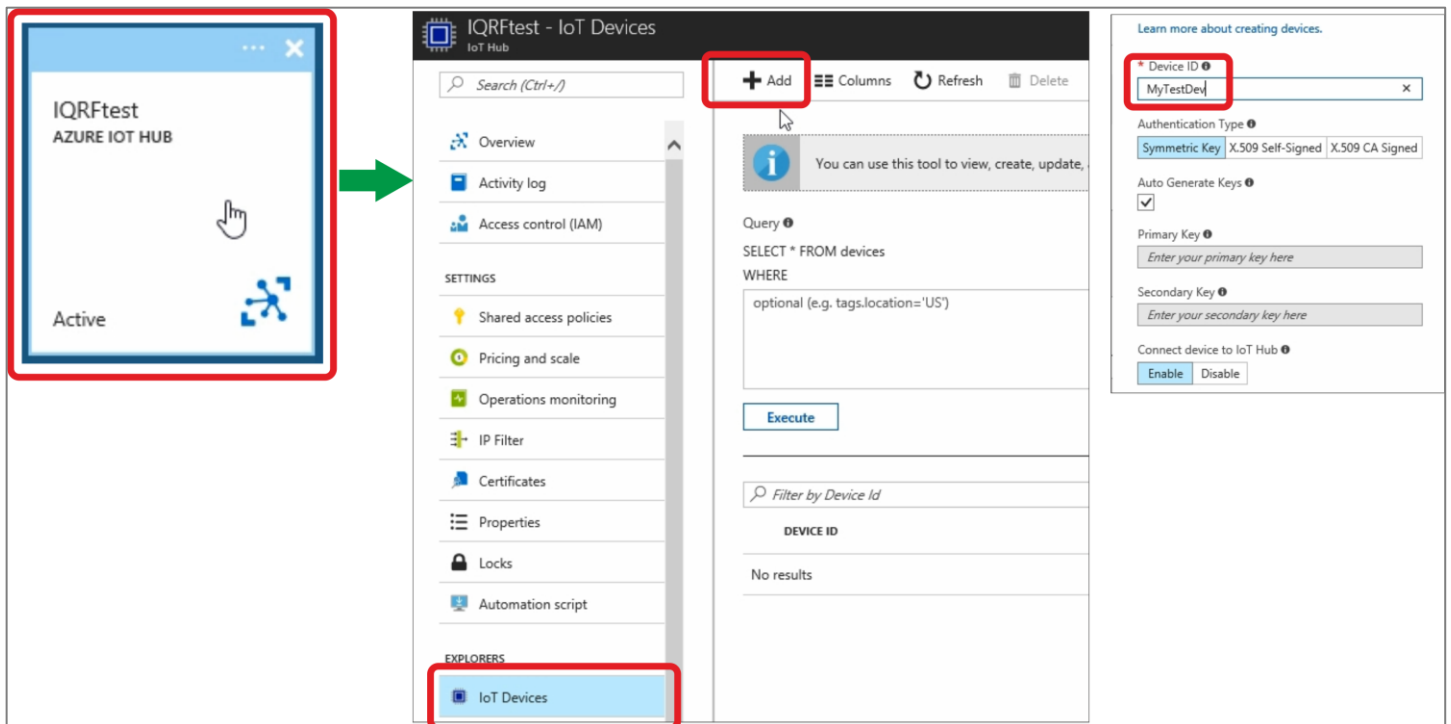


Set up a name of your **Resource group**. Click on the **Create** button.



\* Resource group ⓘ  
☒ Create new ☐ Use existing  
IQRFres ✓  
\* Location  
West Europe ▼  
☒ Pin to dashboard  
**Create** Automation options

In the **IoT Hub** find the **IoT Devices** item. Click on the **Add** button and create your new IoT device. This virtual device represents your UP board.



IQRFtest  
AZURE IOT HUB  
Active

IQRFtest - IoT Devices  
IoT Hub

+ Add Columns Refresh Delete

Search (Ctrl+/)

Overview  
Activity log  
Access control (IAM)

SETTINGS

Shared access policies  
Pricing and scale  
Operations monitoring  
IP Filter  
Certificates  
Properties  
Locks  
Automation script

EXPLORERS

IoT Devices

You can use this tool to view, create, update.

Query ⓘ  
SELECT \* FROM devices  
WHERE  
optional (e.g. tags.location='US')  
Execute

Filter by Device Id

DEVICE ID

No results

Learn more about creating devices.

\* Device ID ⓘ  
MyTestDev x

Authentication Type ⓘ  
Symmetric Key X.509 Self-Signed X.509 CA Signed

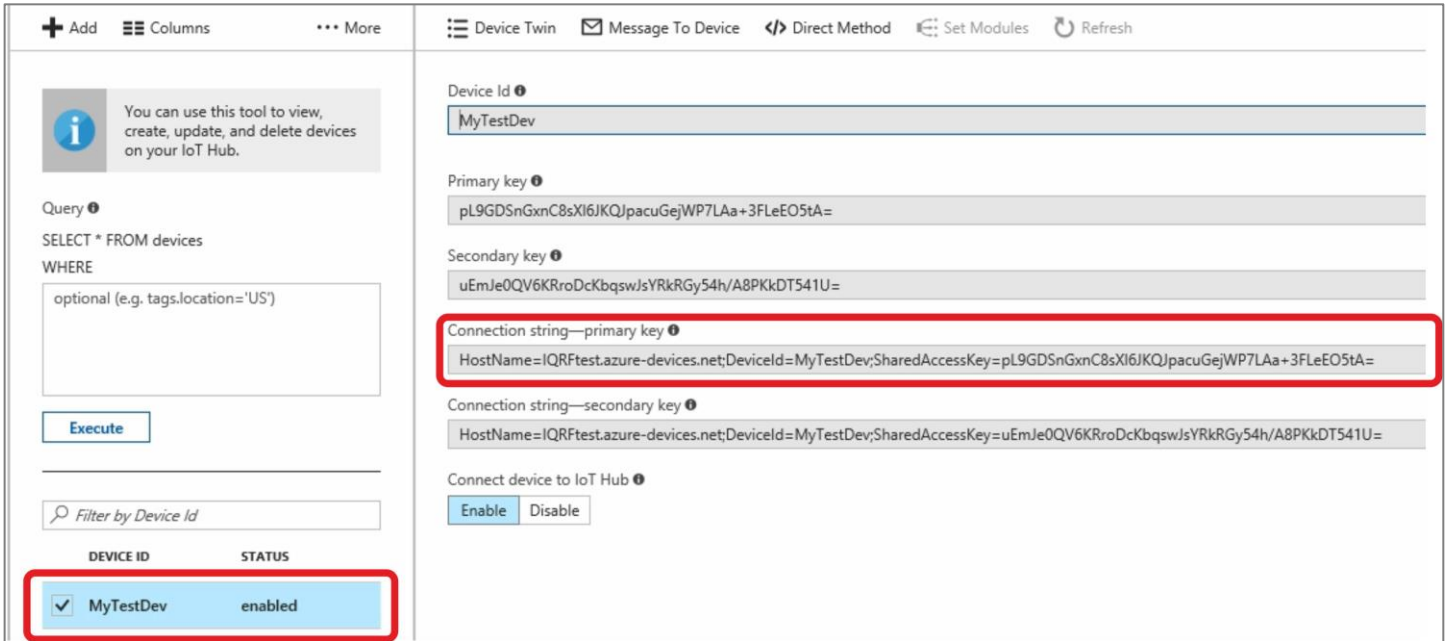
Auto Generate Keys ⓘ  
☒

Primary Key ⓘ  
Enter your primary key here

Secondary Key ⓘ  
Enter your secondary key here

Connect device to IoT Hub ⓘ  
Enable Disable

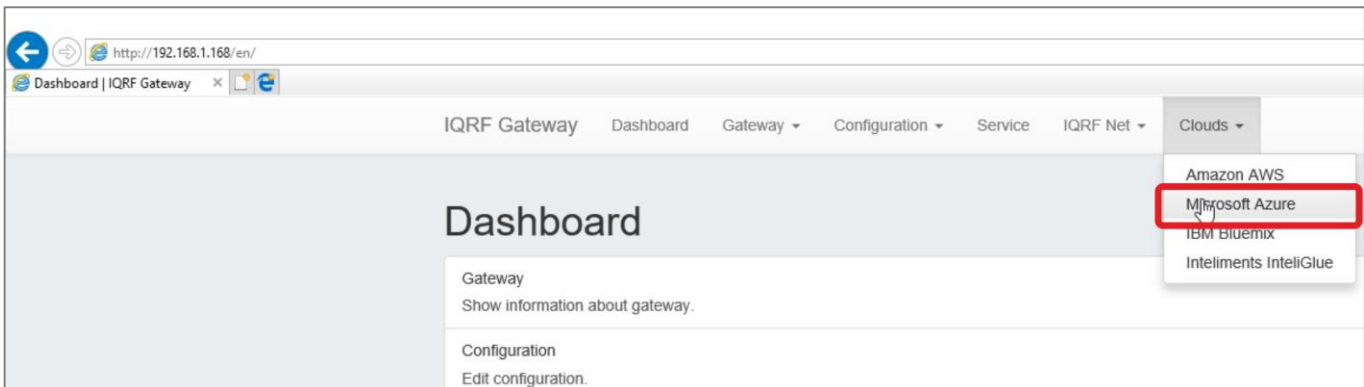
Copy the **Connection string primary key**. It will be used in the MQTT interface configuration.



The screenshot shows the IoT Hub interface. On the left, there is a 'Query' section with a SQL query: `SELECT * FROM devices WHERE optional (e.g. tags.location='US')` and an 'Execute' button. Below it is a 'Filter by Device Id' field. A table lists devices with columns 'DEVICE ID' and 'STATUS'. The device 'MyTestDev' is listed with status 'enabled' and is highlighted with a red box. On the right, the 'Device Twin' section shows details for 'MyTestDev'. The 'Primary key' is `pL9GDSnGxnC8sXI6JKQJpacuGejWP7LAa+3FLeEO5tA=`. The 'Connection string—primary key' is highlighted with a red box and contains the text: `HostName=IQRFtest.azure-devices.net;DeviceId=MyTestDev;SharedAccessKey=pL9GDSnGxnC8sXI6JKQJpacuGejWP7LAa+3FLeEO5tA=`. Below it, the 'Connection string—secondary key' is also shown.

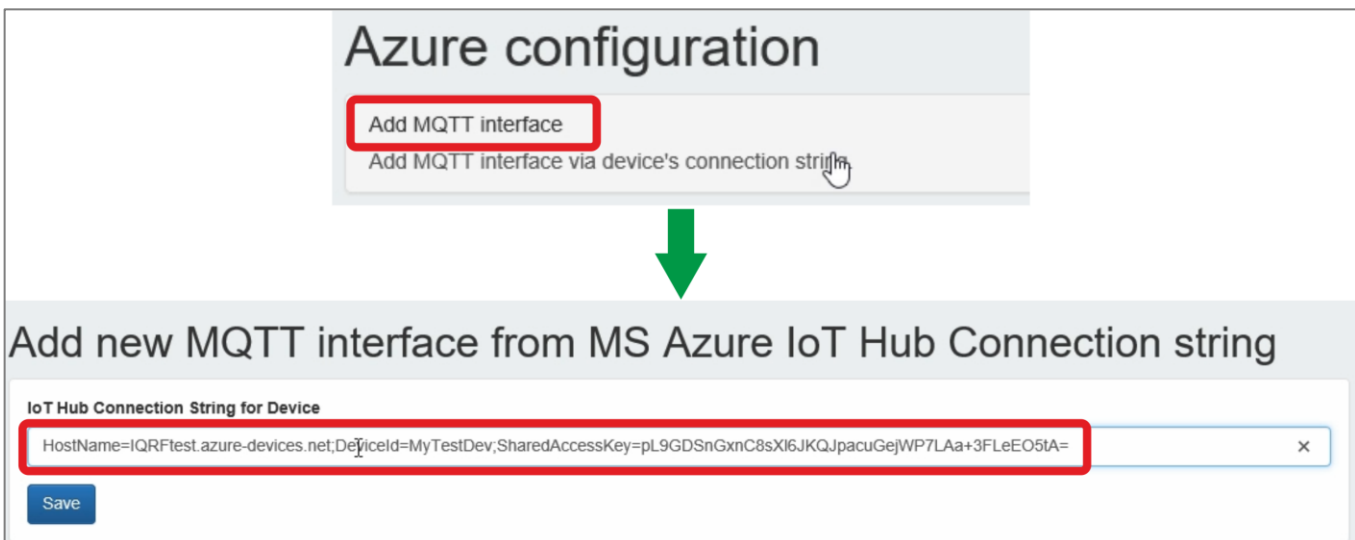
## Set the MQTT interface in the IQRF Gateway

Go to the IQRF Gateway Daemon web application, find **Clouds** and select **Microsoft Azure** in the menu.



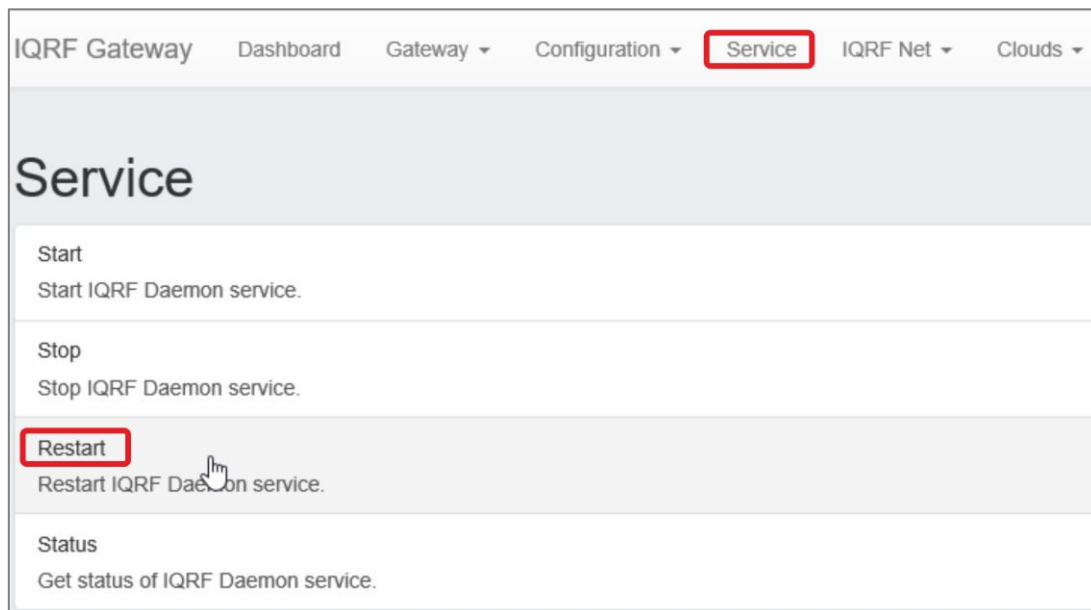
The screenshot shows the IQRF Gateway Dashboard. The top navigation bar includes 'IQRF Gateway', 'Dashboard', 'Gateway', 'Configuration', 'Service', 'IQRF Net', and 'Clouds'. The 'Clouds' menu is open, showing options: 'Amazon AWS', 'Microsoft Azure' (highlighted with a red box), 'IBM Bluemix', and 'Intelimints IntelliGlue'. The main content area shows the 'Dashboard' section with a 'Gateway' card and a 'Configuration' card.

Add a new **MQTT interface**. Paste here the **connection string** which you copied before and save the configuration.



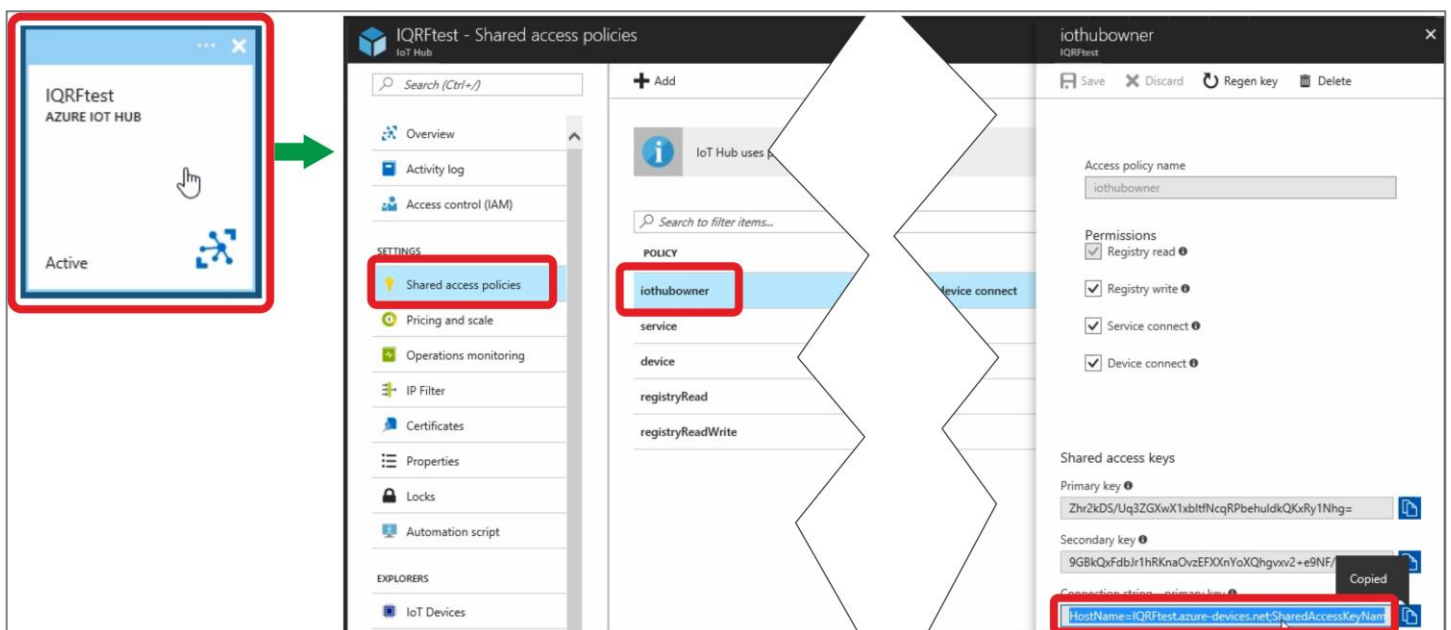
The screenshot shows the 'Azure configuration' page. A red box highlights the 'Add MQTT interface' button. Below it, a green arrow points down to the 'Add new MQTT interface from MS Azure IoT Hub Connection string' section. In this section, the 'IoT Hub Connection String for Device' is entered in a text field: `HostName=IQRFtest.azure-devices.net;DeviceId=MyTestDev;SharedAccessKey=pL9GDSnGxnC8sXI6JKQJpacuGejWP7LAa+3FLeEO5tA=`. The text field is highlighted with a red box. A 'Save' button is located below the text field.

Restart the IQRF Gateway Daemon service.

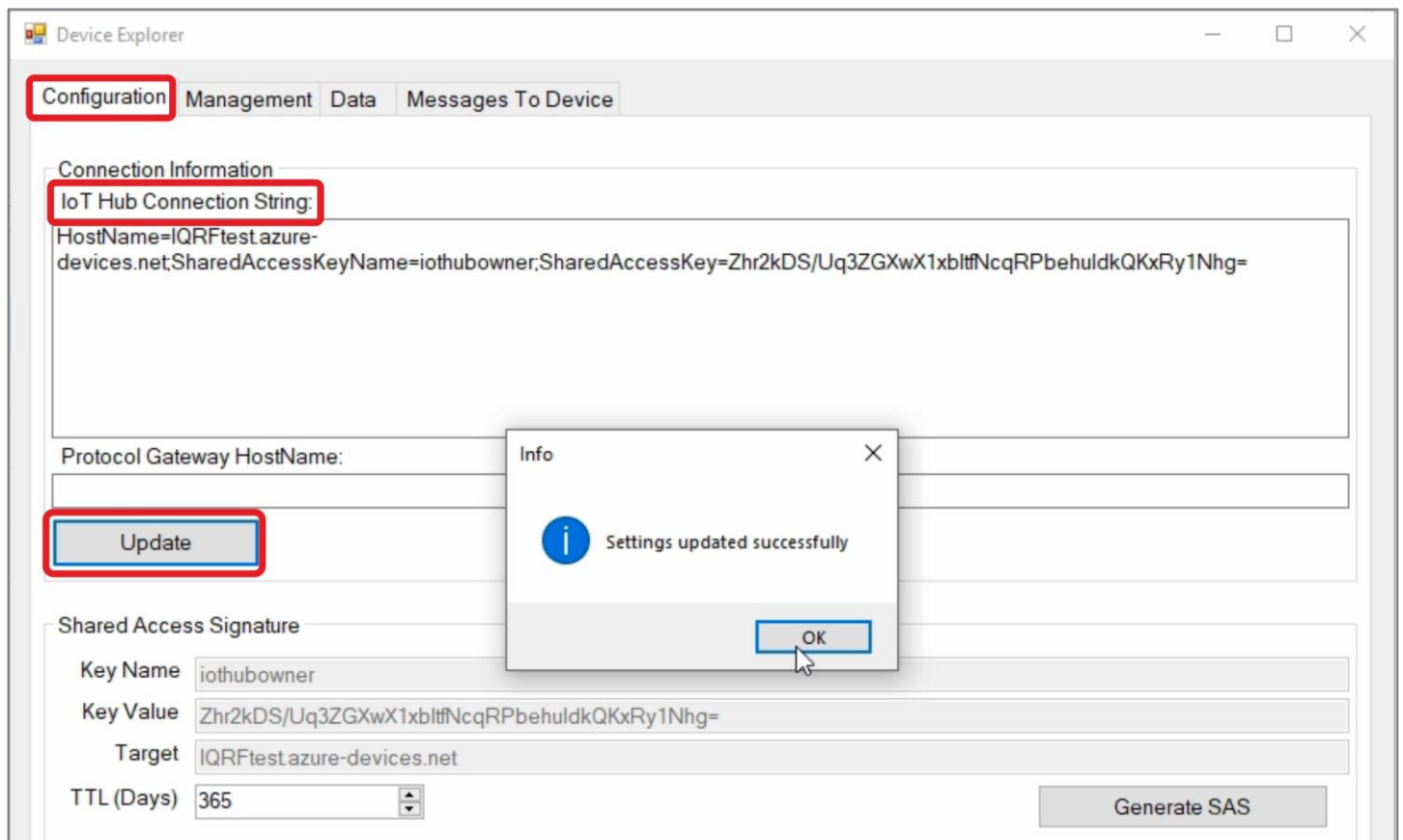


## Use Device Explorer for MQTT connection test

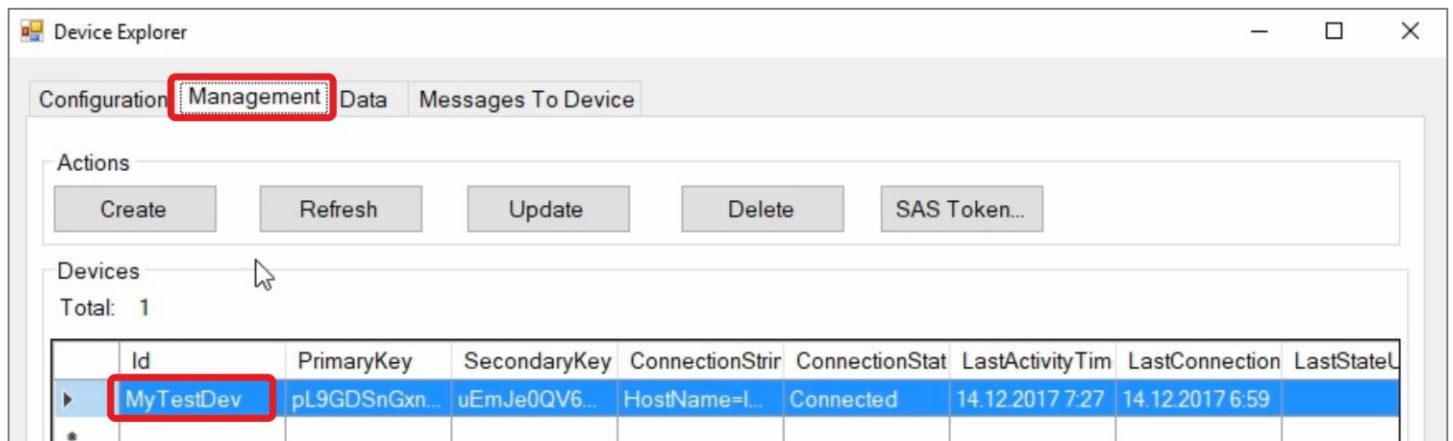
In the IoT Hub find the **Shared access policies** menu. Copy the **Connection string primary key** for the **iothubowner**.



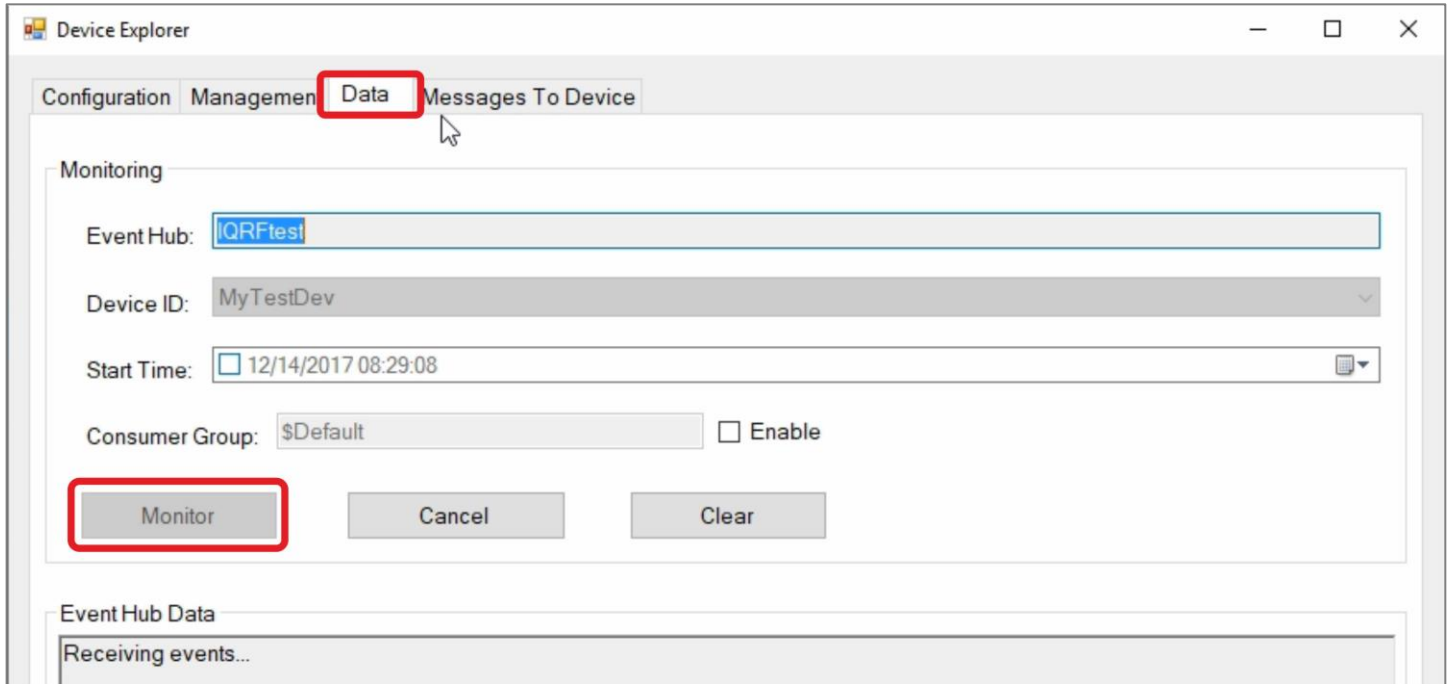
Insert this string into the connection information in **Device Explorer** application. We will use this application for sending DPA packets to our IQRF network. Click on the **Update** button.



In the **Management** tab we can see our virtual device that we've just set up.



In the **Data** tab, click on **Monitor**. This will enable you to read received events.



Device Explorer

Configuration Management **Data** Messages To Device

Monitoring

Event Hub: IQRFTest

Device ID: MyTestDev

Start Time: 12/14/2017 08:29:08

Consumer Group: \$Default ☐ Enable

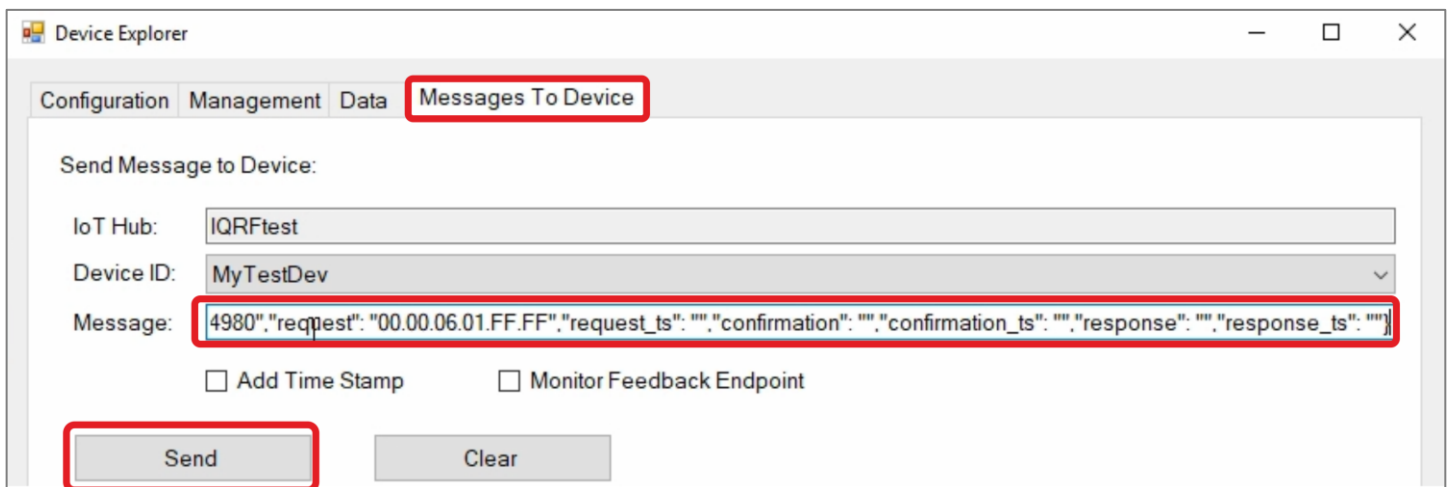
**Monitor** Cancel Clear

Event Hub Data

Receiving events...

Go to the **Messages To Device** tab, insert a DPA packet in JSON format into the **Message** textbox and click on **Send**. We've just sent a command for turning on the red LED on the IQRF coordinator.

```
{
  "ctype": "dpa",
  "type": "raw",
  "msgid": "1510754980",
  "request": "00.00.06.01.FF.FF",
  "request_ts": "",
  "confirmation": "",
  "confirmation_ts": "",
  "response": "",
  "response_ts": ""
}
```



Device Explorer

Configuration Management Data **Messages To Device**

Send Message to Device:

IoT Hub: IQRFTest

Device ID: MyTestDev

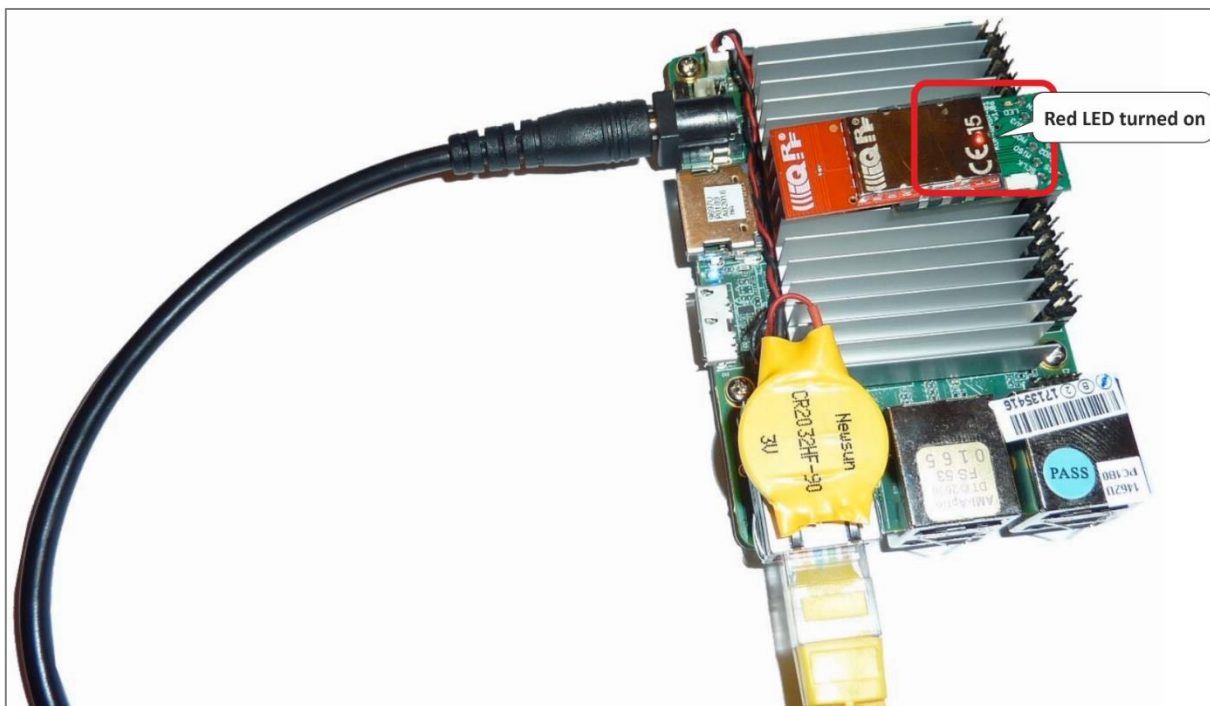
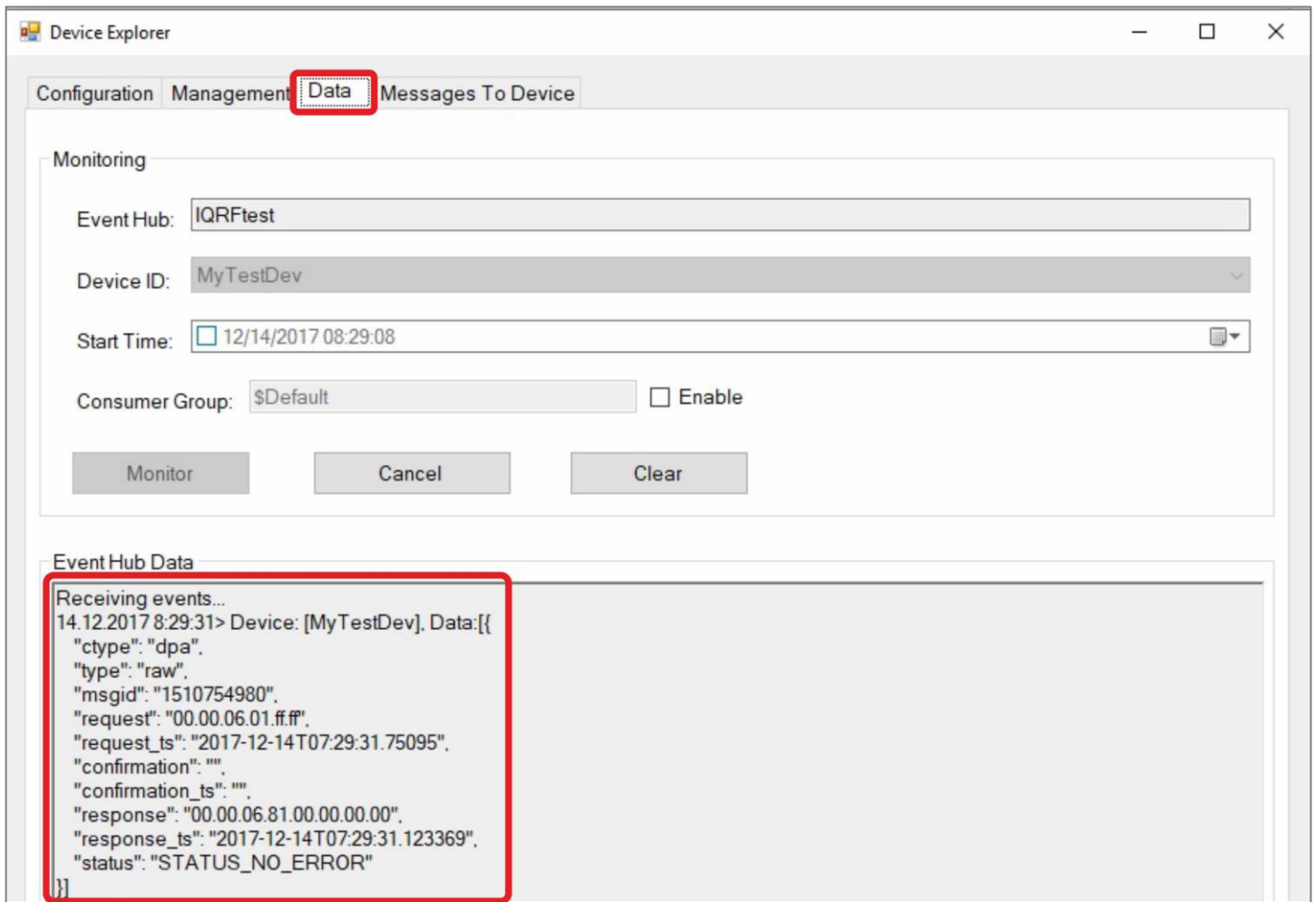
Message: 4980,"request": "00.00.06.01.FF.FF","request\_ts": "", "confirmation": "", "confirmation\_ts": "", "response": "", "response\_ts": ""

☐ Add Time Stamp ☐ Monitor Feedback Endpoint

**Send** Clear



In the **Data** tab, you can see the incoming communication from the UP board. You can easily double check that the command has been executed.



In the same way, you can turn the red LED off as well as send any other DPA command to your network.