# IoT Starter Kit – Part 3:
# Connect to the cloud – IBM Cloud

In this part we will connect an IQRF gateway to IBM Cloud. It is one of the possible clouds that you can get connected to from your IQRF Gateway Daemon using the MQTT channel.

## 1    IBM Cloud and Watson IoT platform

IBM provides developers some free services for a limited time and you don't have to enter any credit card details on the beginning. Create your IBM Cloud account and log into it on console.bluemix.net.

To connect remotely to your IQRF network from IBM cloud, you need to set up some services first.

## 1.1    Internet of Things Platform Starter

Click on the **Catalog** button in the upright corner and find the **Internet of Things Platform Starter**.

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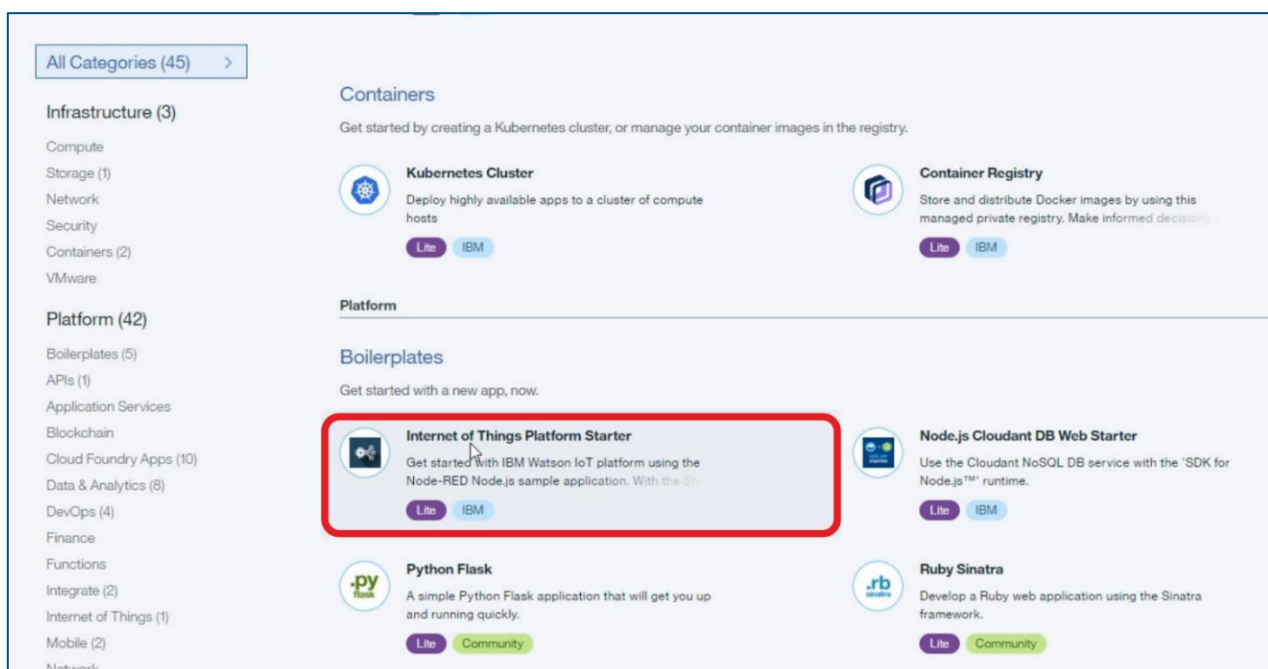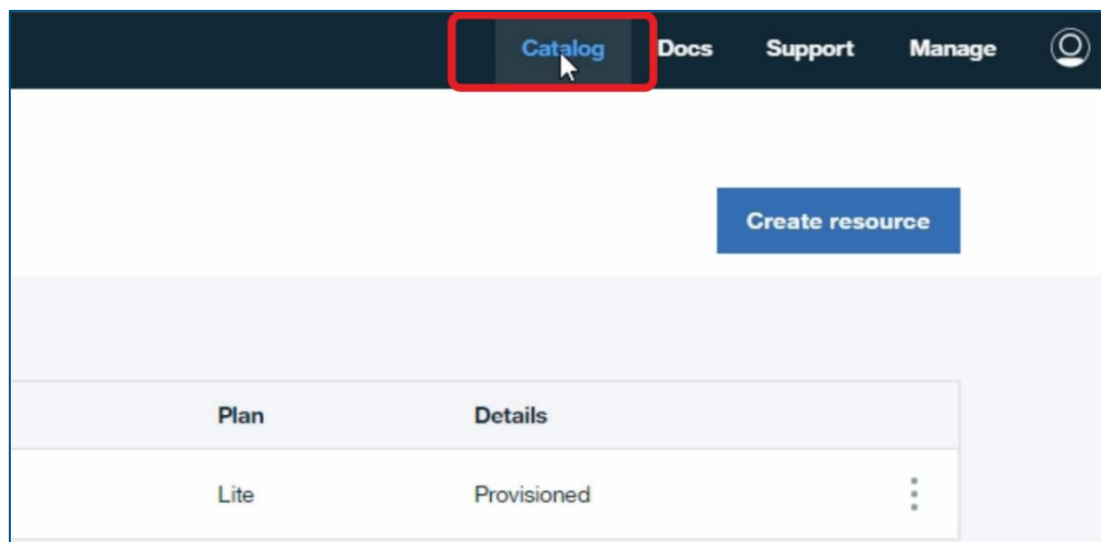
Fill in this form to set up your *cloud application*. Type in a unique **app name**, select your **deployment location** and your **pricing plan** and click on **Create**. Your application will be available at the given address.

## 1.2 Watson IoT Platform

Click on the **Internet of Things** item in the left menu.



Click on the service which was created when you set up your cloud application in the previous step.

Launch the **Watson IoT platform**.
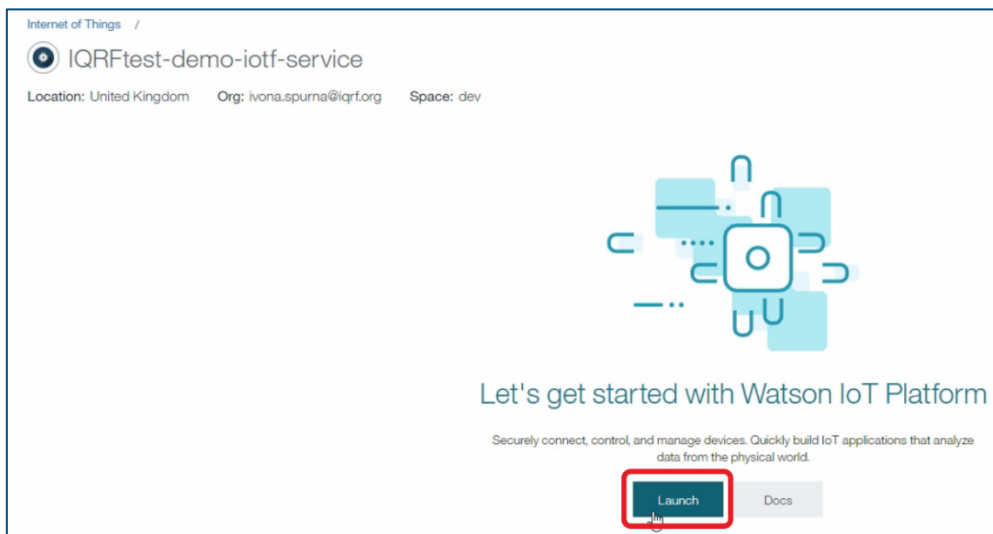


## 1.2.1    Security

Click on the **Security** item in the left menu and check the connection security.
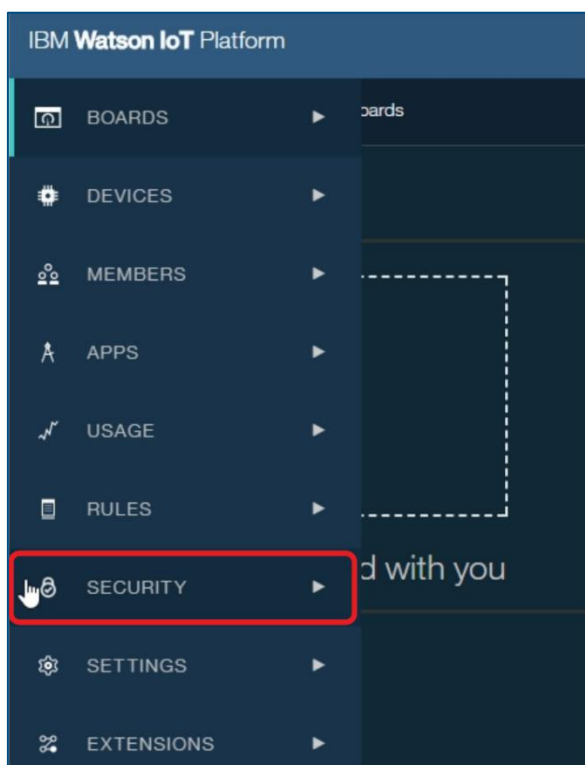
Set up the **Security** level. We have chosen the **TLS Optional**. Save the configuration.





### 1.2.2    Create the device type
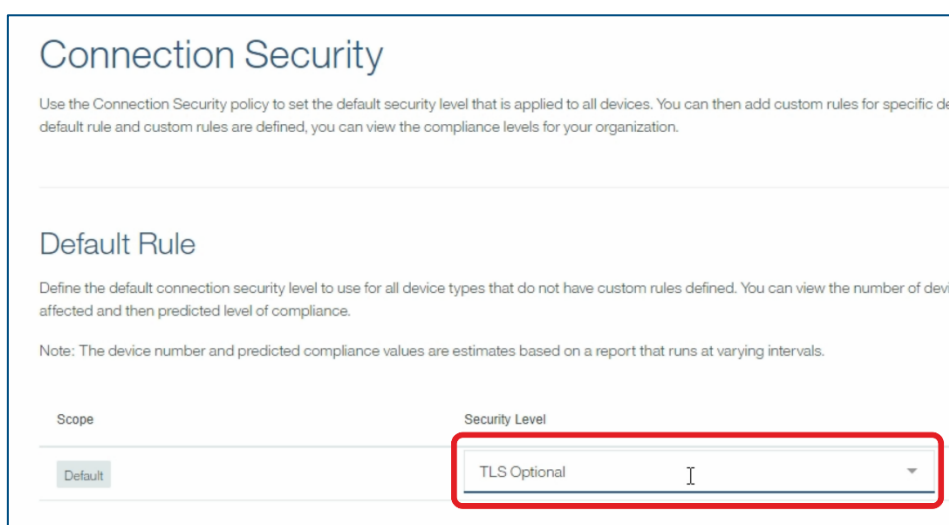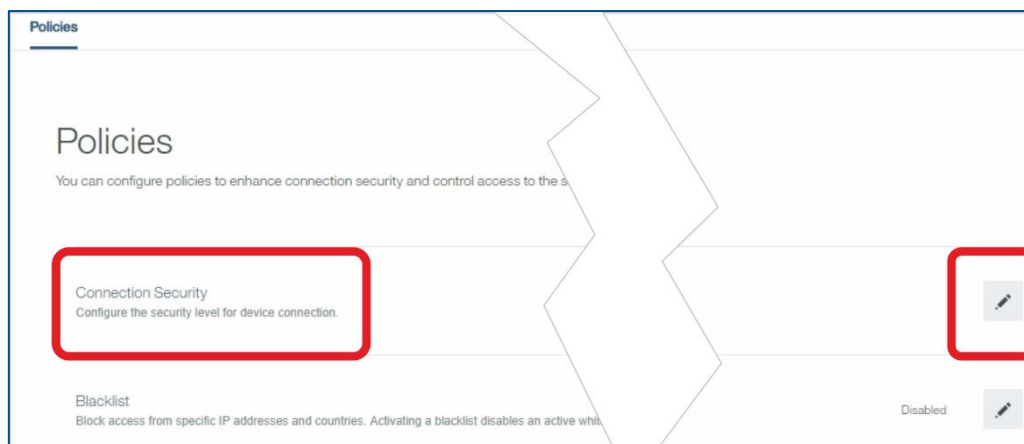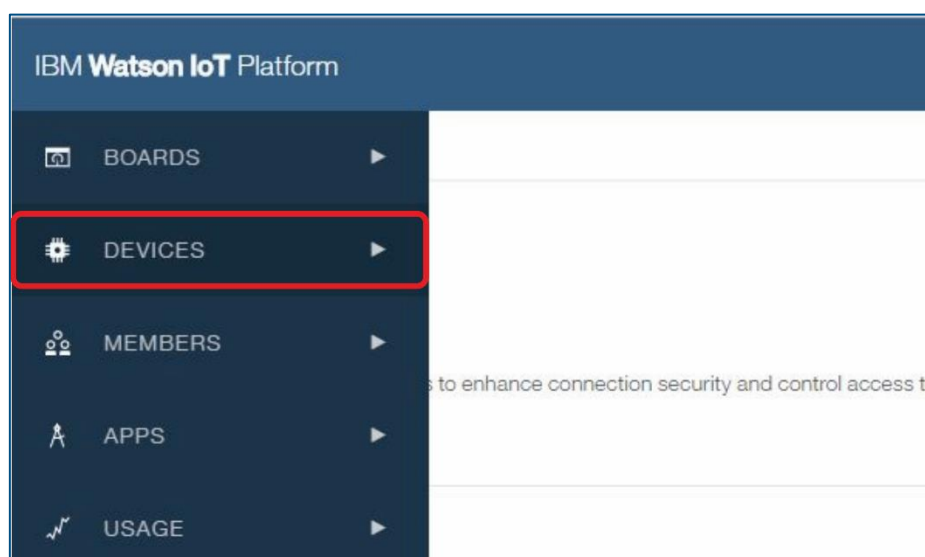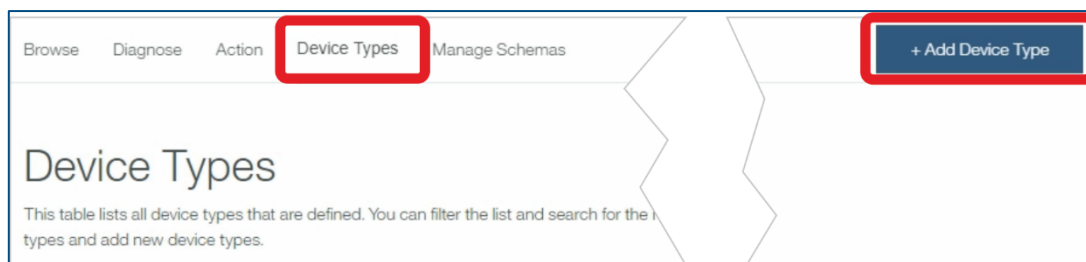
Click on the **Devices** item in the left menu.

First, add the device type.



It's important to select the type "**device**". Then, fill in your name of the device type.



### 1.2.3    Create the device

Click on the **Browse** menu. Create a new virtual device by clicking on **Add Device**.
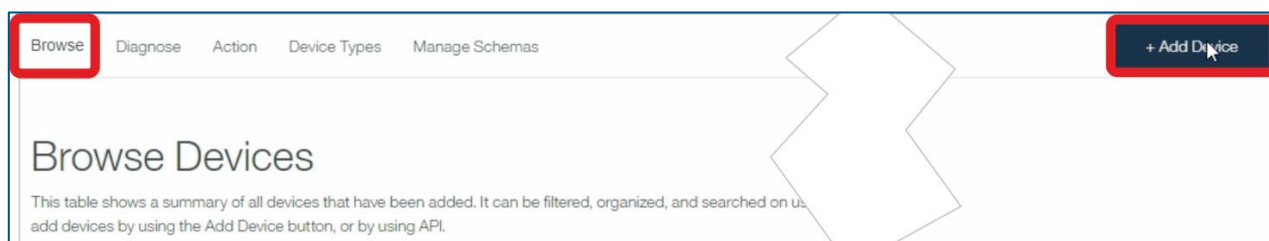
Select the **Device Type** which you created in the previous step, enter the **Device ID** and click on **Next**.
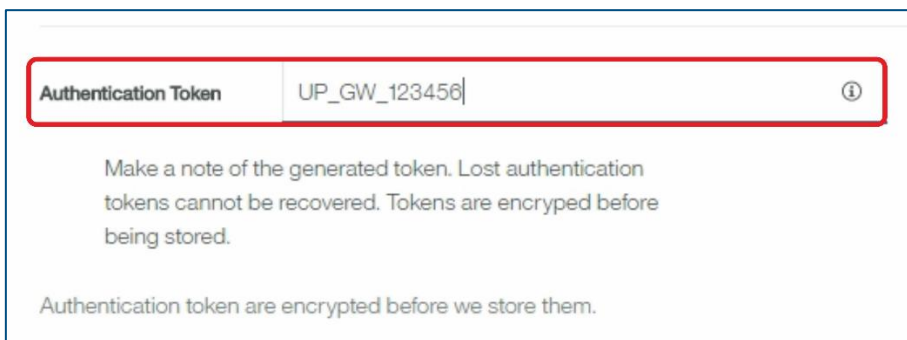


Fill in your **Authentication Token** and click on Next.



**Copy** the device credentials. You will use them in the next steps.

## 2   Set up the MQTT interface on the IQRF Gateway

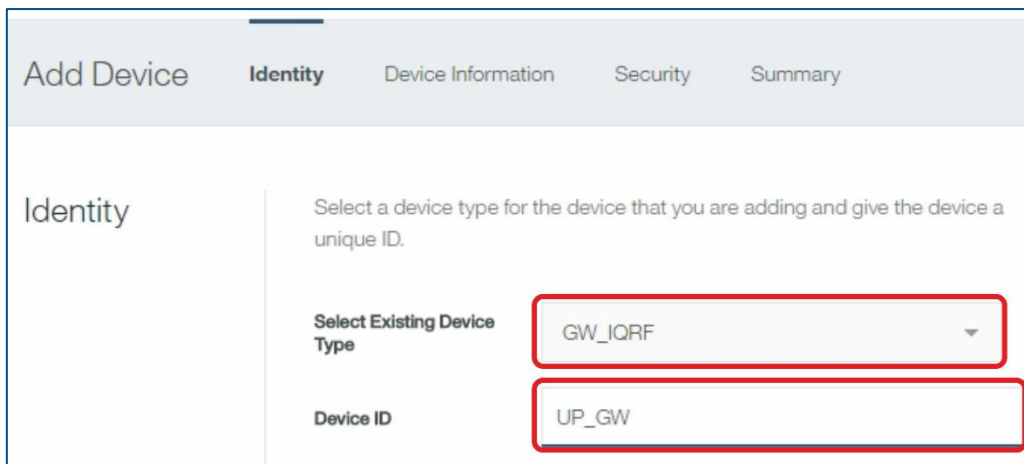Configure the MQTT interface to IBM Cloud. In the web browser on your computer, insert the IP address of your UP board, and login to it as *admin* with password *iqrf*. In the IQRF Gateway Daemon Web application click on the **IBM Bluemix** item in the **Clouds** menu.
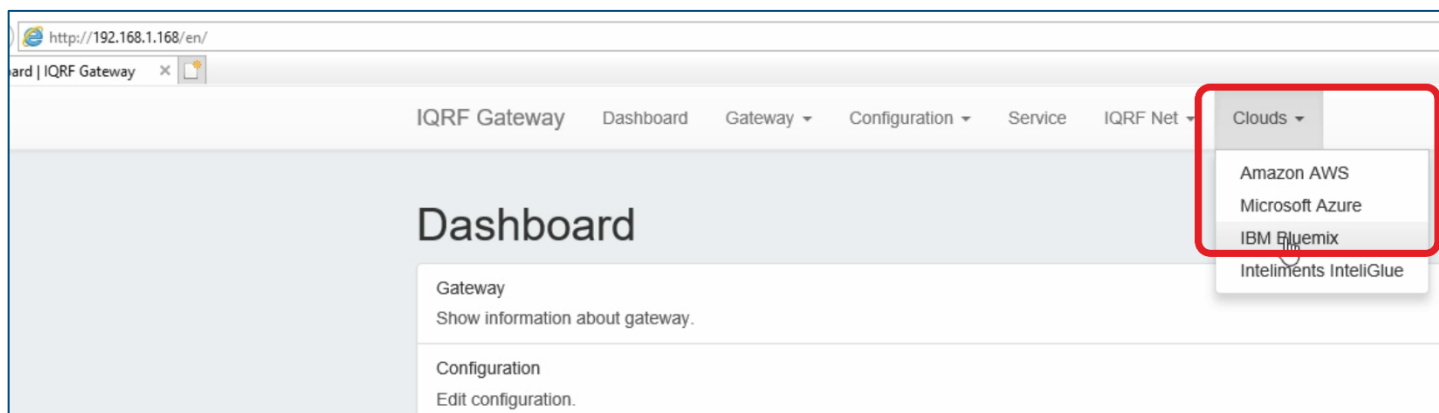


Click on Add MQTT Interface, fill in the copied information about the virtual device in IBM Cloud and save the configuration.
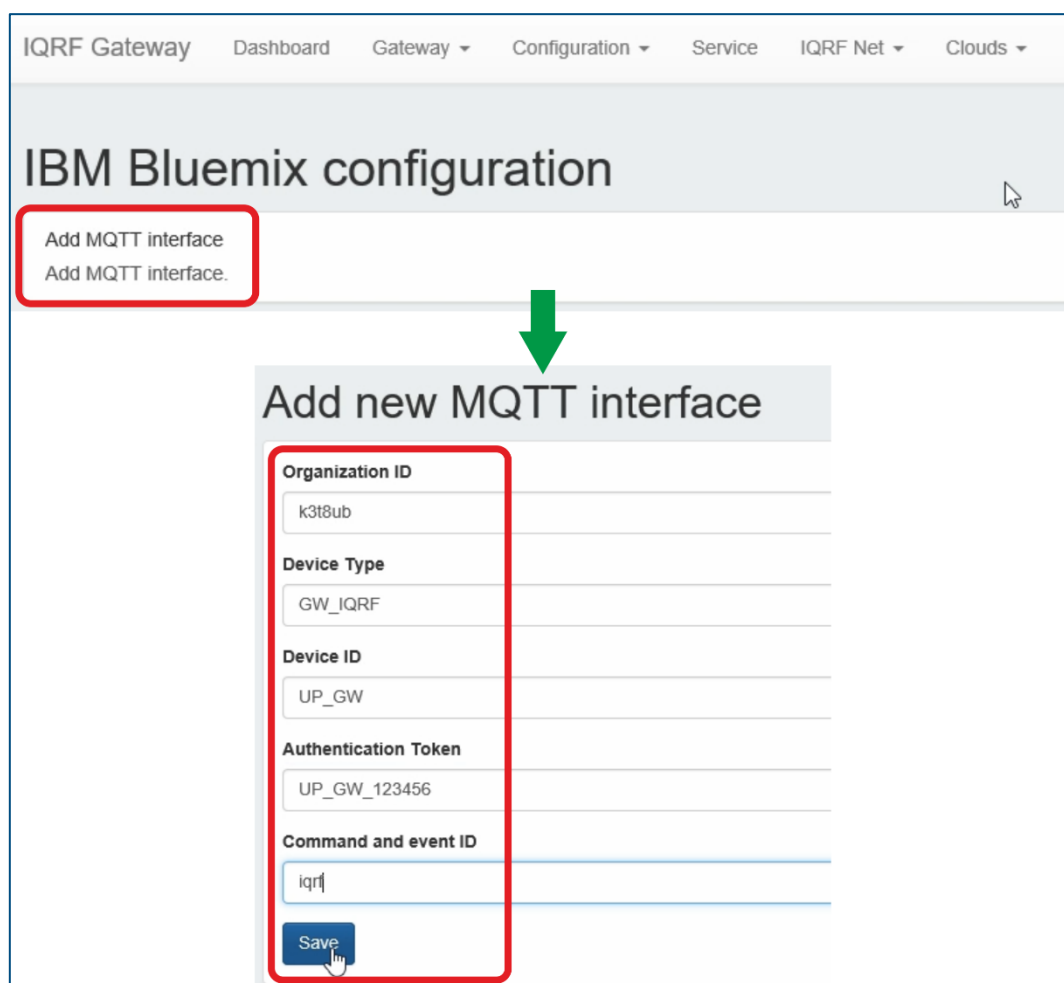
**Restart** the IQRF Gateway Daemon service.
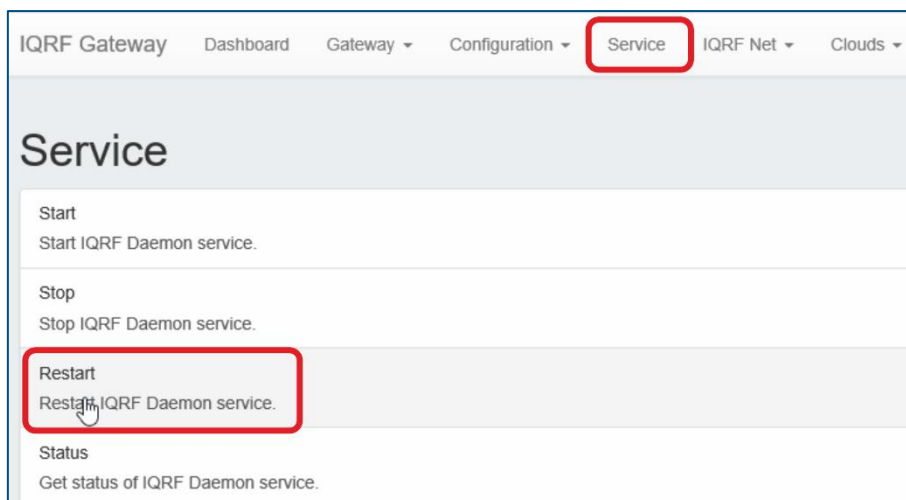


## 3 Node-RED

Find **Cloud Foundry Apps** in the **IBM Cloud** and check the status of your application. It should be running.

Click on the link of your web application. Go through the wizard and set up the **Node-RED** application. Go to your Node-RED flow editor and log in to it.



## 3.1 Node-RED flow

Create a **new flow** and **delete** the example. You will do it by double-clicking on the Flow 1 tab. Then press delete.
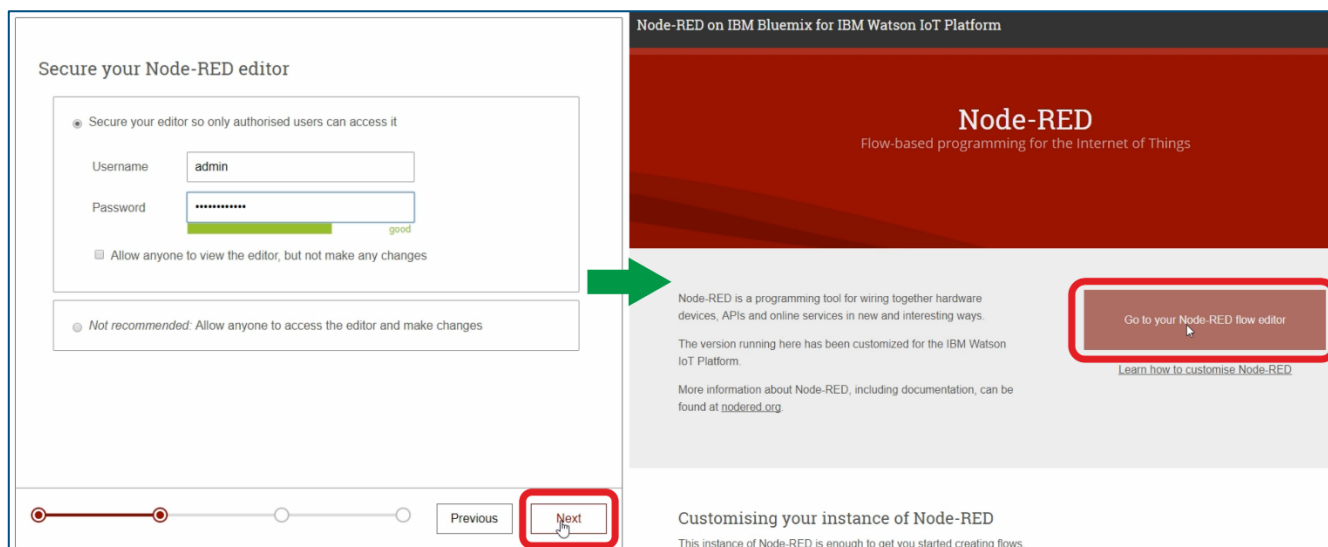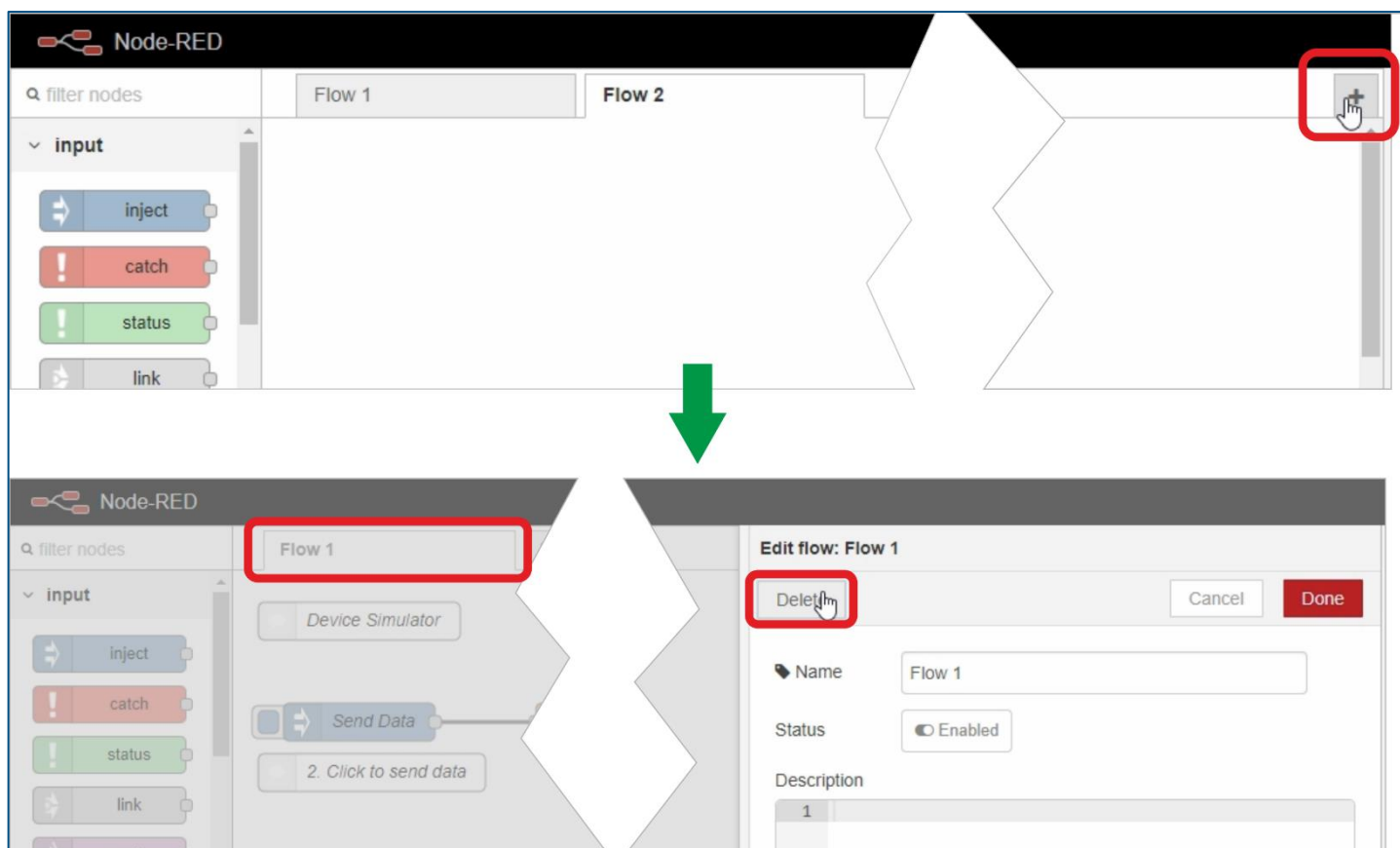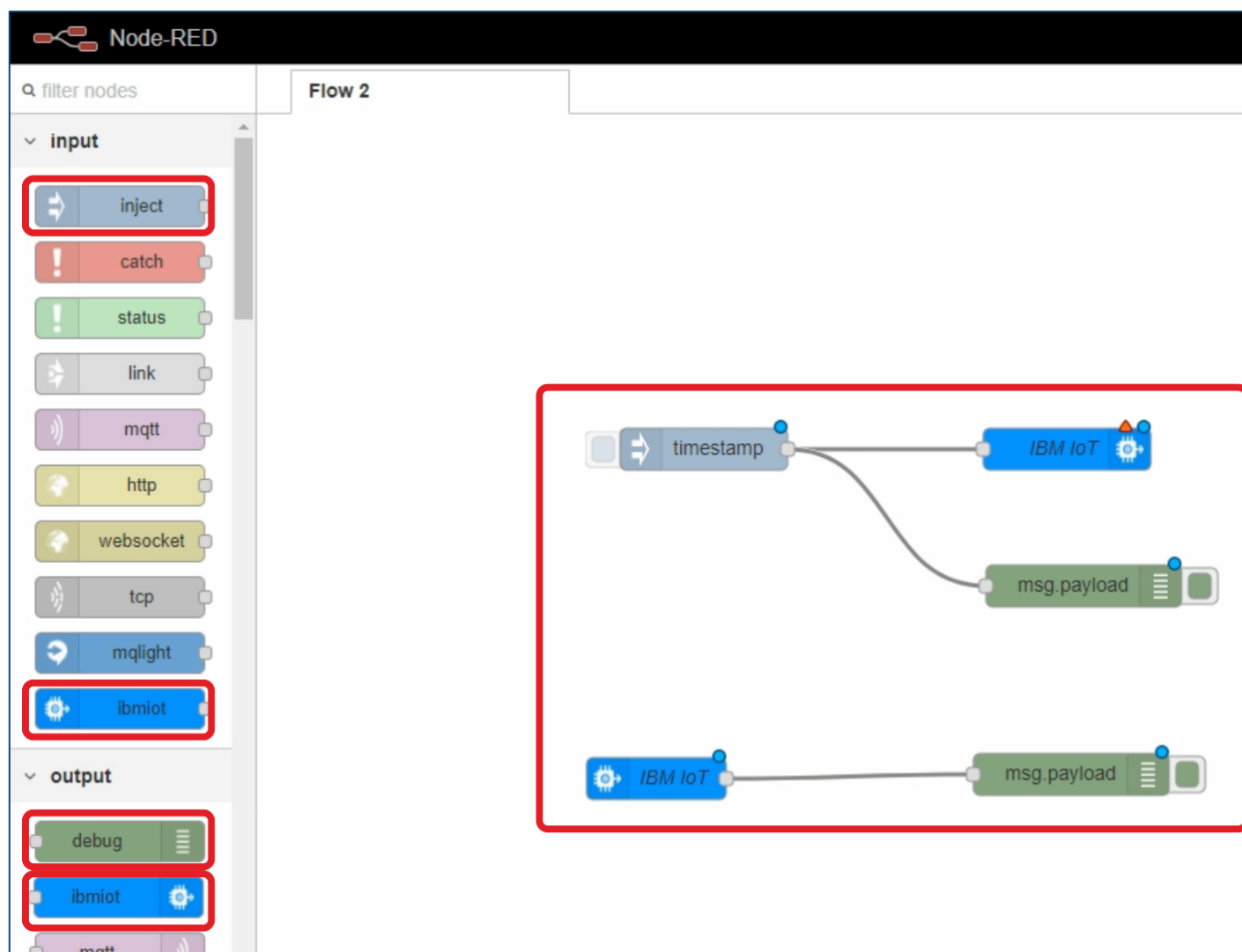
Insert **ibmiot input**, **ibmiot output**, two **debug outputs** and **inject input**. Connect the objects like this.



With the inject input we will send **DPA commands** to the MQTT broker on the IBM Cloud and our UP board will collect them from there. We will send the commands to the debug window as an output, as well. We will receive all messages from the MQTT broker and they will be displayed in the debug window.

### 3.1.1 Modify the inject input

Double-click on the **inject input**, change the payload type to JSON and insert the DPA command in JSON format here.
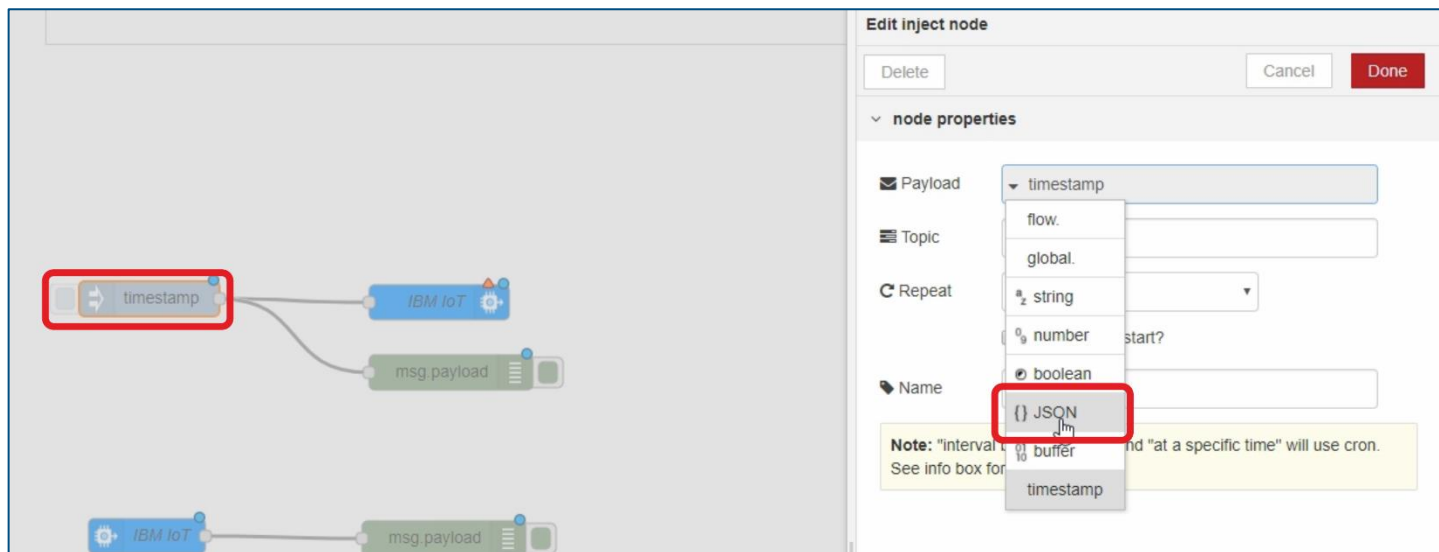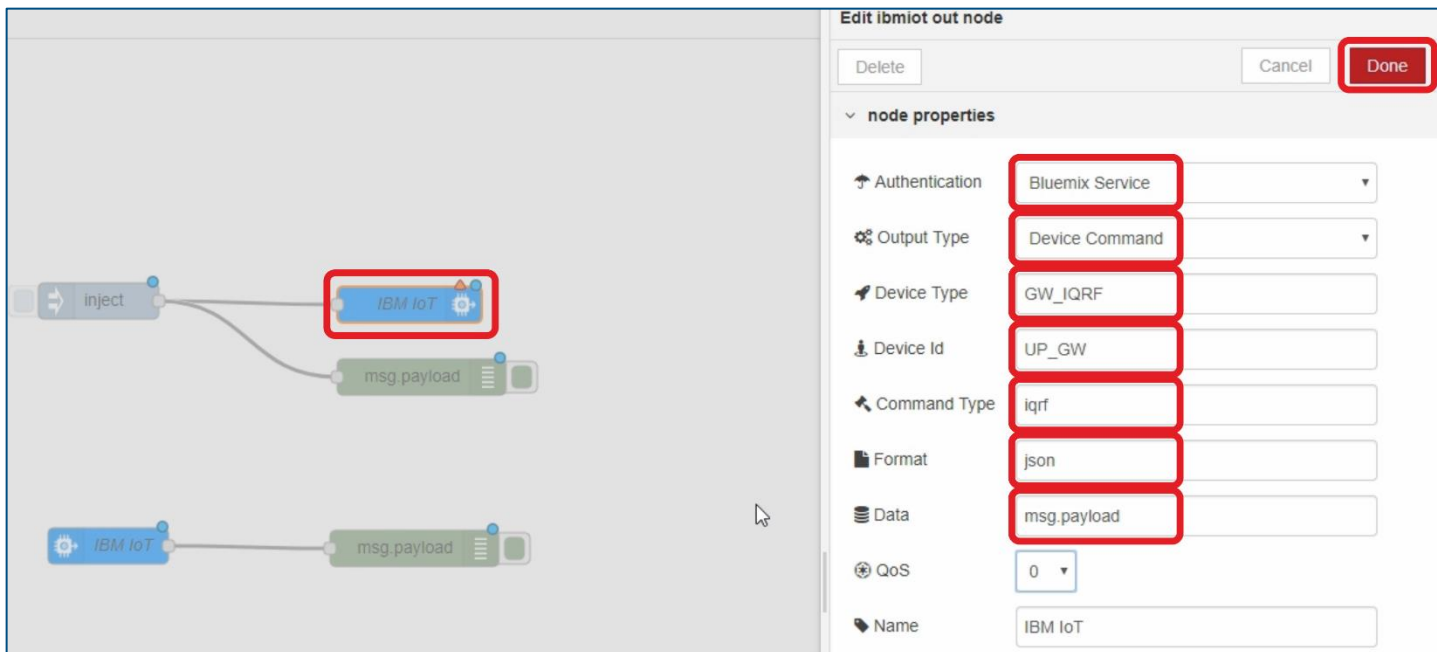


We used the command which turns on the red LED on the IQRF coordinator. You need to modify the command to one-line form.  Click on **Done**.

```
{
"ctype": "dpa",
"type": "raw",
"msgid": "1510754980",
"request": "00.00.06.01.FF.FF",
"request_ts": "",
"confirmation": "",
"confirmation_ts": "",
"response": "",
"response_ts": ""
}
```
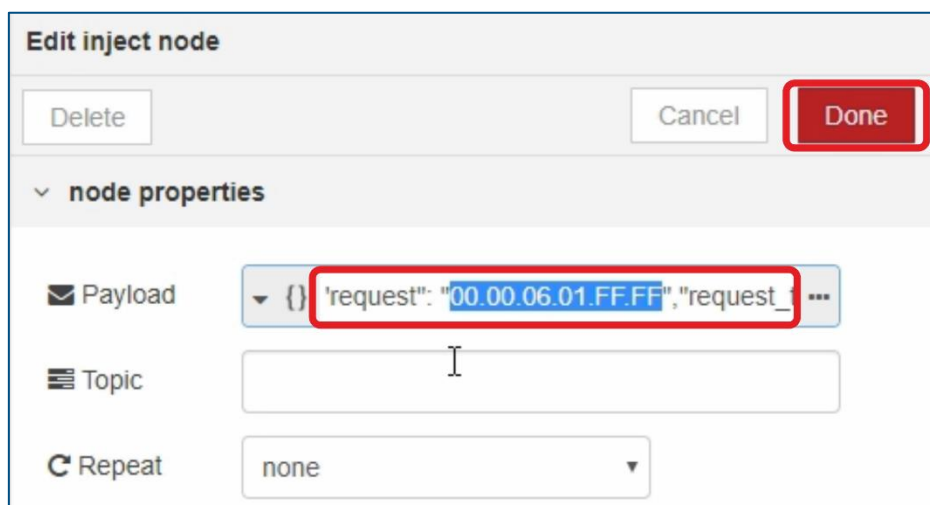
### 3.1.2    Modify the ibmiot output

Click on the **ibmiot output**. Change the authentication **to Bluemix service**, set the output type to **Device** command, and fill in the information of your virtual device you have created earlier. Enter "**iqrf**" as the command type. Enter "**msg.payload**" as the Data and click on **Done**.
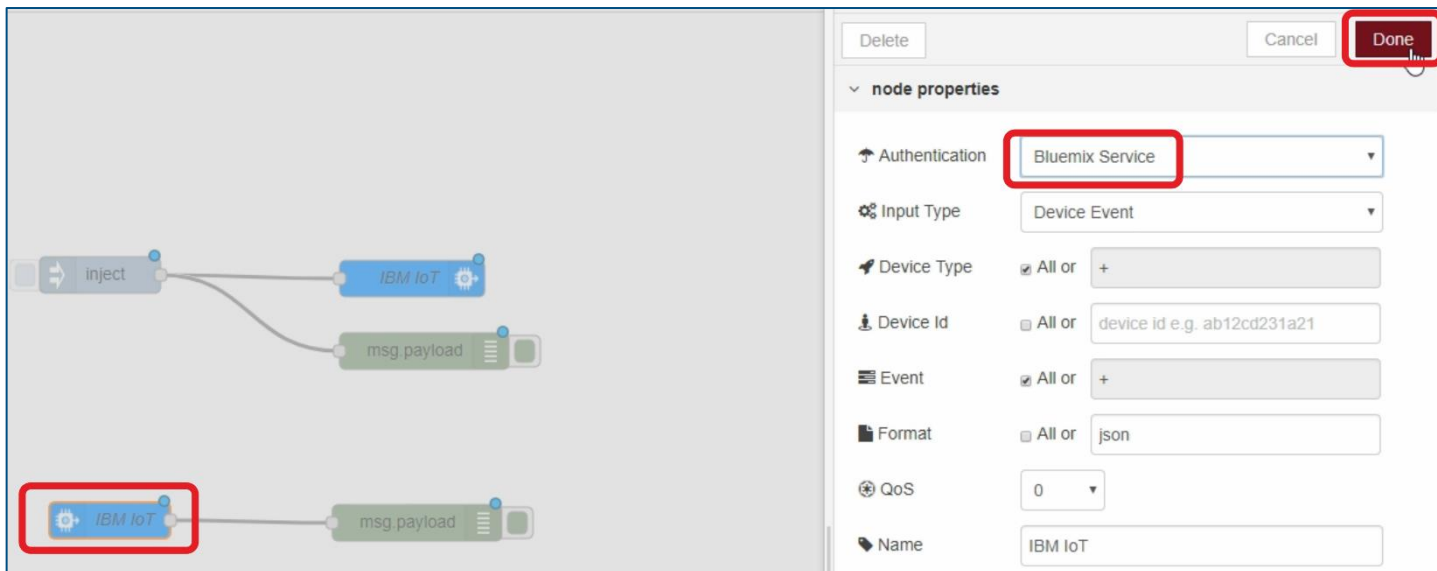


### 3.1.3    Modify the ibmiot input

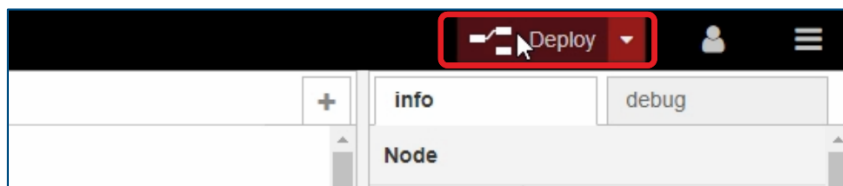Click on the **ibmiot input** and select **Bluemix service** as the authentication type. **Save** the configuration.

## 4   Test the connection

Click on the **Deploy** button.



Show the **Debug** tab.
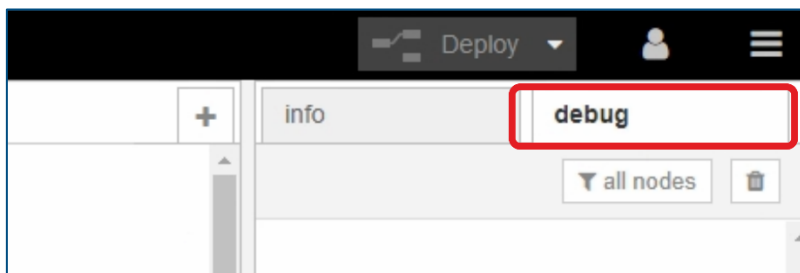


Click on the left corner of the **Inject** button. You will send the prepared command to the MQTT broker and to the debug output as well.

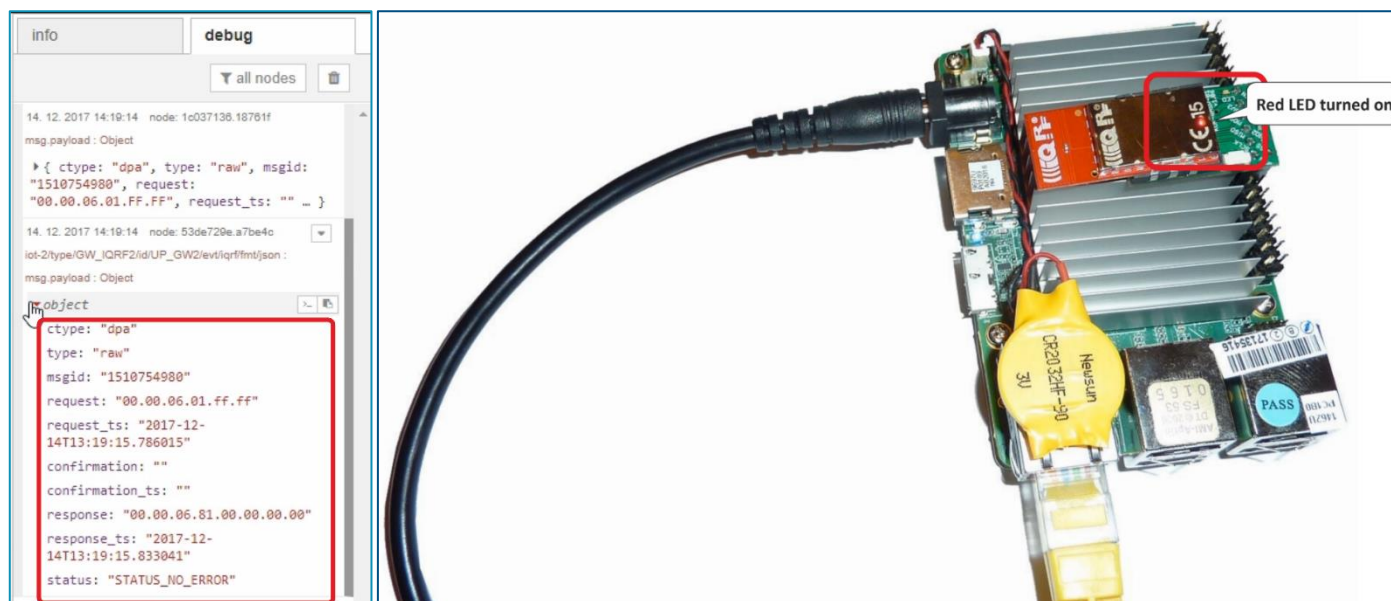In the **Debug** tab, you can see the ongoing communication between IBM Cloud and the UP board. You can easily double check that the command has been executed.



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

# 5    Summary

The bidirectional communication between IQRF network and the IBM Cloud is up and running. Now it's just up to you to use it for your own IoT solution.