IBM / ST Micro SensorTile Watson IoT Workshop

Connect the ST Microelectronics SensorTile to IBM Watson IoT

Download this PDF and Node-RED flows at
https://github.com/johnwalicki/SensorTile-WatsonIoT-Workshop

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Getting Started with Watson IoT Platform

This workshop details the Developer experience using the ST Microelectronics SensorTile and IBM Watson IoT Platform. You will create an IBM Bluemix IoT Cloud Foundry application that displays and analyzes ST Micro SensorTile sensor data using Quickstart and Node-RED.
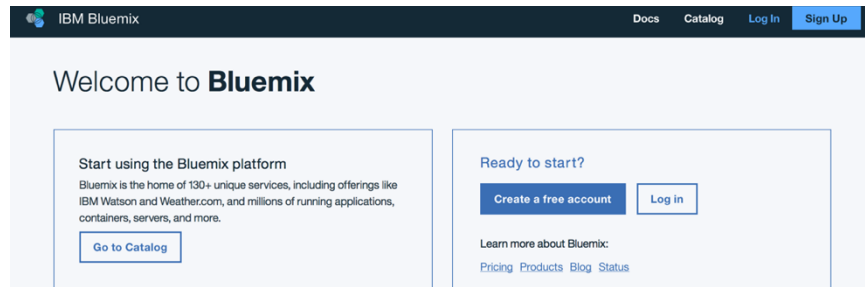
In this workshop, we will connect a ST Micro SensorTile device to IBM Bluemix and Watson IoT Platform. We will send and graph temperature and gesture data to the Watson IoT Quickstart and registered devices. Watson IoT Platform will report the SensorTile gesture events in a Node-RED Dashboard.

Section 1 – Create a Bluemix Trial Account

In this Section, we will create a free trial account on Bluemix.

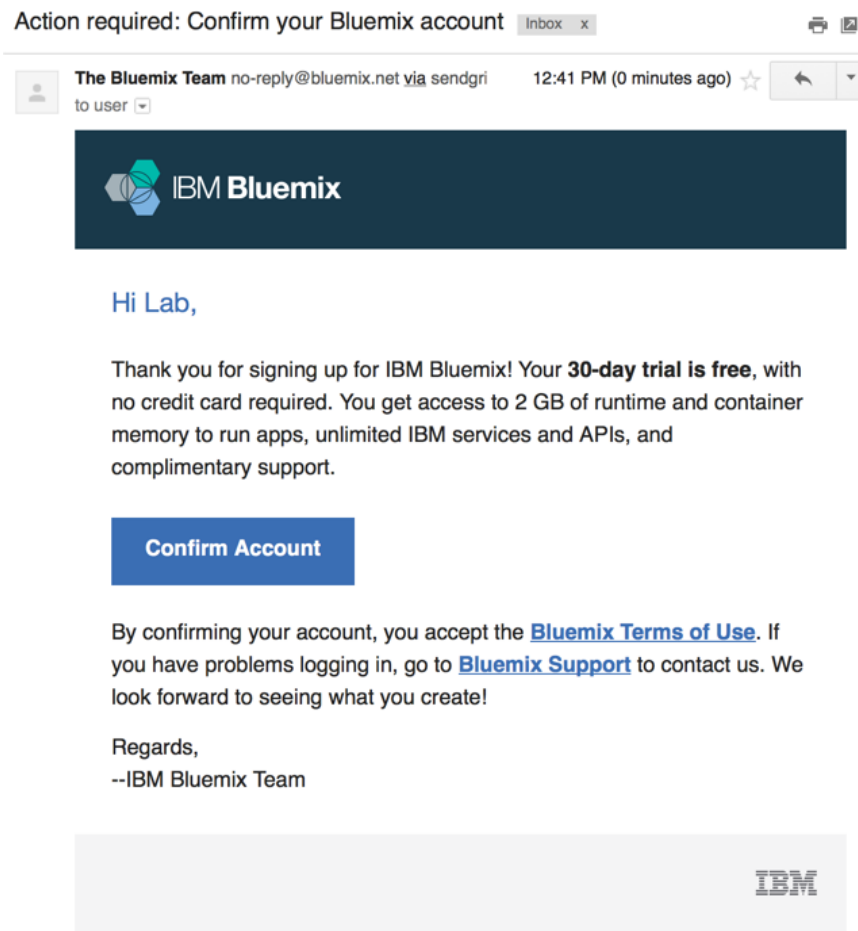## Step 1 – Register for a Free Trial Account on Bluemix

- In a new browser tab, goto http://bluemix.net and click "Create a free account"

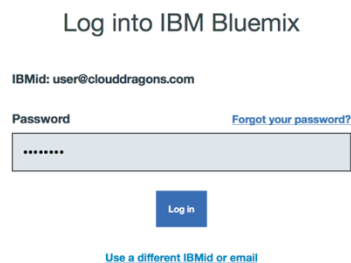- Enter your email, name, phone number and password and click "Create account"

- Check your email and click the "Confirm Account" button.

- Ensure that the resulting screen says "Success!" and log into Bluemix

- Log In to Bluemix

- Create an organization with the same name as your email

- Create a space

- Click "I'm Ready"

Step 2 – Get a Promocode to extend your Bluemix Trial Account

- Workshop attendees can apply a Promocode to their Bluemix account and extend the duration of the Trial period, add additional Services and increase the memory of your Bluemix Cloud Foundry applications.

- Visit **http://promocodes.mybluemix.net**

- Enter **STMicro** as the Event Name (Case sensitive)

- Enter your Bluemix email address / IBM ID and your name.

- Check that you are not a robot and press the Submit button.

- Check your email for the Bluemix Promocode.

- Follow the instructions to apply the Promocode to your account.

Section 2 – Create an Internet of Things Starter App

Step 1 – Create an IoT Starter Application

Earlier in the workshop we sent the ST Micro SensorTile data to Watson IoT Quickstart, in this Section we will create an IoT Starter Application to ingest and analyze the Quickstart data.

- Click on the **Catalog** (1) and search for '**internet of things**' (2)

- The **Internet of Things Platform Starter** (3) boilerplate is a pattern with pre-assembled services that work together. The Internet of Things Platform Starter includes a Node-RED Node.js web server, Cloudant database to store the sensor data, and the IoT platform service so you can connect devices.
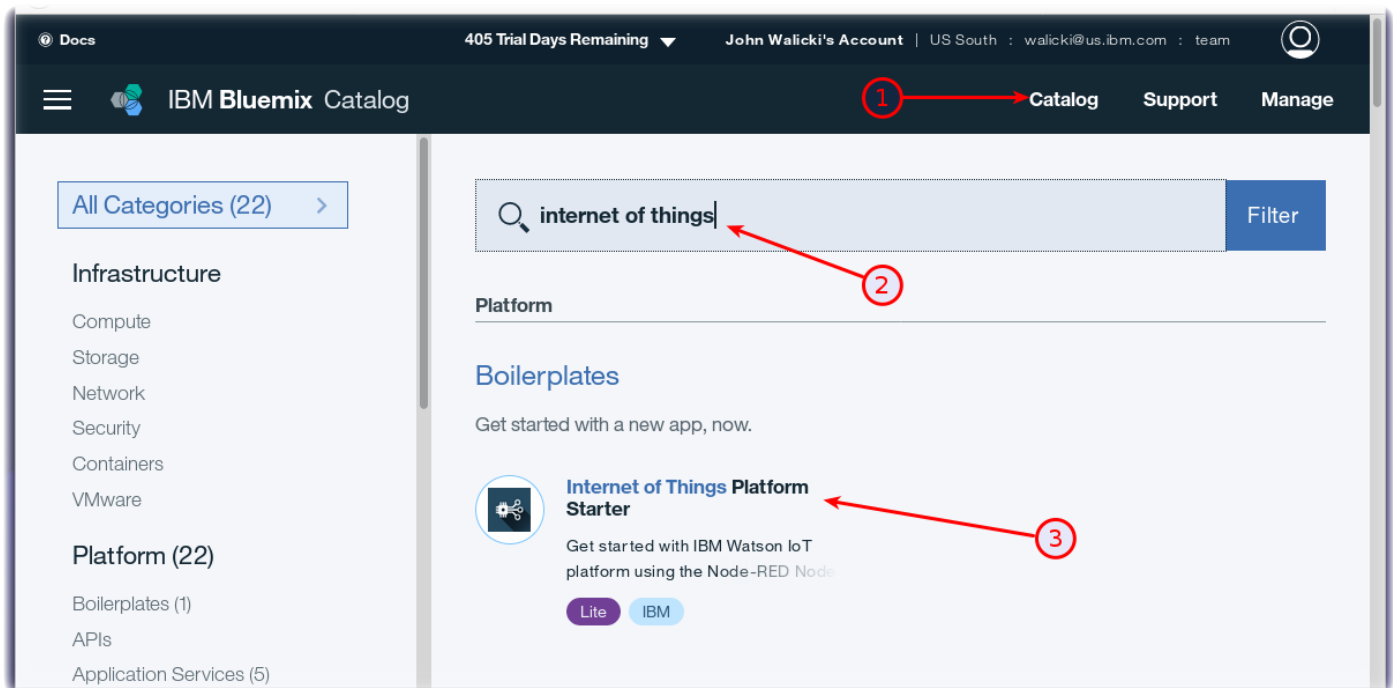
- Name your application something unique. If you choose **myapp**, your application will be located at http://**myapp**.mybluemix.net   There can only be one "**myapp**" application and URL registered in IBM Bluemix.

- Give the application a unique name (4) - eg. **sensortile-yourname**

- Press the Create button (5).

- IBM Bluemix will create an application in your account based on the services in the boilerplate. This is called staging an application. It can take a few minutes for this process to complete. While you wait, you can click on the **Logs** tab and see activity logs from the platform and Node.js runtime.

Step 2 - Launch the IoT Starter Application

- Once the Green "**Running**" icon appears, Click the **Visit App URL** link (6).
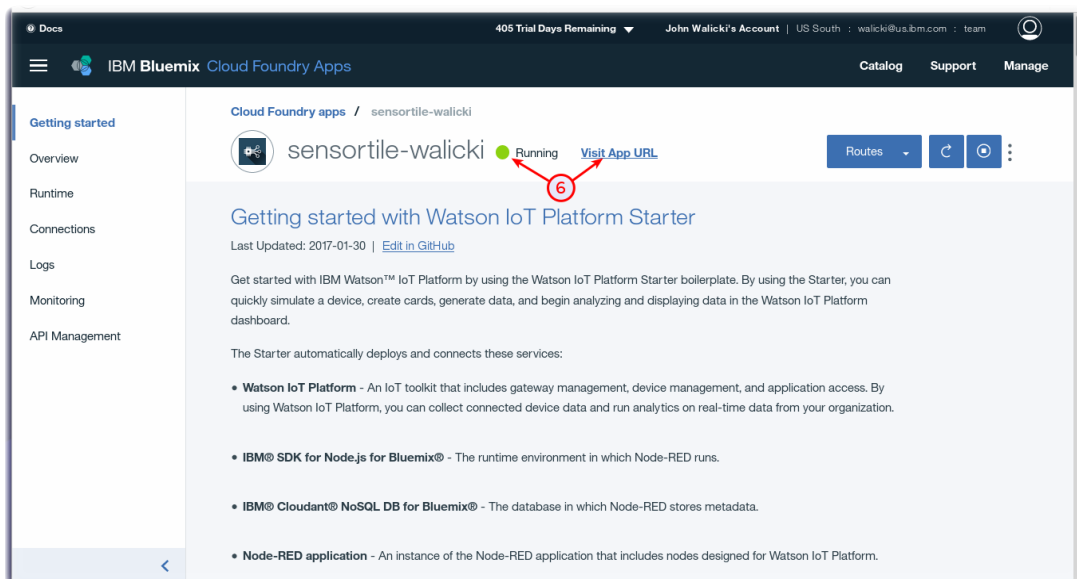
Step 3 – Open the Node-RED visual programming editor

- A new browser tab will open to the Node-RED start page. Node-RED is an open-source Node.js application that provides a visual programming editor that makes it easy to wire together flows. Select a username / password to access the Node-RED editor. Remember your username / password. Click the red button **Go to your Node-RED flow editor** to launch the editor.

Welcome to your Internet of Things Platform (IoTP) boilerplate application on IBM Bluemix

This sample application uses Node RED to help demonstrate the wonderful things you can do with your IoTP service. We know you're eager to check it out, but first there is something important to do:

- Secure your Node-RED editor

Previous | Next

Secure your Node-RED editor

◉ Secure your editor so only authorised users can access it

Username | [   ]

Password | [   ] | Must be at least 8 characters

☐ Allow anyone to view the editor, but not make any changes

○ *Not recommended:* Allow anyone to access the editor and make changes

Previous | Next

Finish the configuration

You have made the following selections:

- Secure your editor so only authorised users can access it

The settings will be persisted in the CloudantDB bound to this application. You can override them at any time by setting the following environment variables via the Bluemix console:

- NODE_RED_USERNAME - the username
- NODE_RED_PASSWORD - the password
- NODE_RED_GUEST_ACCESS - if set to `true`, allows anyone read-only access to the editor

Previous | Finish

Node-RED on IBM Bluemix for IBM Watson IoT Platform

Node-RED
Flow-based programming for the Internet of Things

Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.

The version running here has been customized for the IBM Watson IoT Platform.

More information about Node-RED, including documentation, can be found at nodered.org.

Go to your Node-RED flow editor

Learn how to customise Node-RED

Customising your instance of Node-RED

This instance of Node-RED is enough to get you started creating flows.

https://sensortile-walicki.mybluemix.net/red/

- The Node-RED Visual Programming Editor will open with a default flow.
- On the left side is a palette of nodes that you can drag onto the flow.
- You can wire nodes together to create a program.
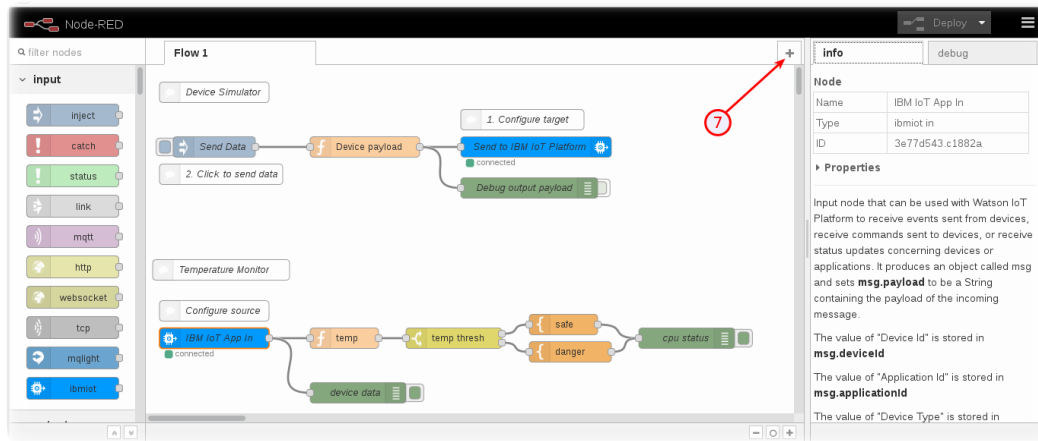
- The sample IoT Starter flow is not applicable to this workshop and can be deleted.
- Click the **+** icon (7) to add a new tab. Click on the **Flow 2** tab header (8).
- Rename this tab from **Flow 2** to **SensorTile with Quickstart** (9)
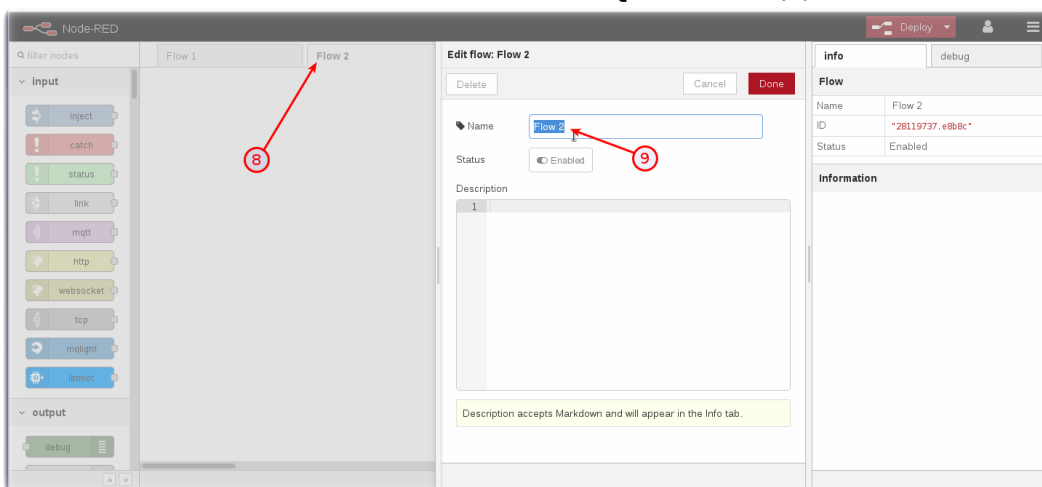
- Click on the **Flow 1** tab header (10). Press the Delete button. (11)
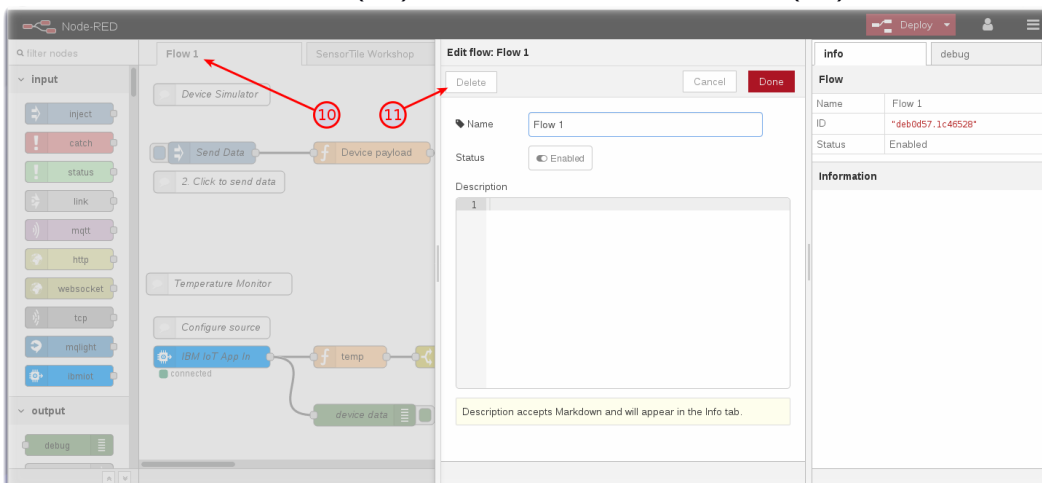
Section 3: Receive SensorTile data sent to QuickStart

Step 1 – Receive SensorTile data sent to Quickstart

Earlier in the workshop we sent the ST Micro SensorTile data over Bluetooth to your mobile phone and then used the ST BlueMS mobile app to send the data to Watson IoT Quickstart. In this Section we will use the IoT Starter Application we just created to ingest and display the Quickstart data.

- In the **input** category of your Node-RED palette, find the **ibmiot node** and drag it onto your flow (1)
- Double click on the **IBM IoT in** node and configure the node with your SensorTile **Device Id** (2) You can find the Device Id in the ST BlueMS mobile application if you do not remember it.
- Click on the **Done** button.
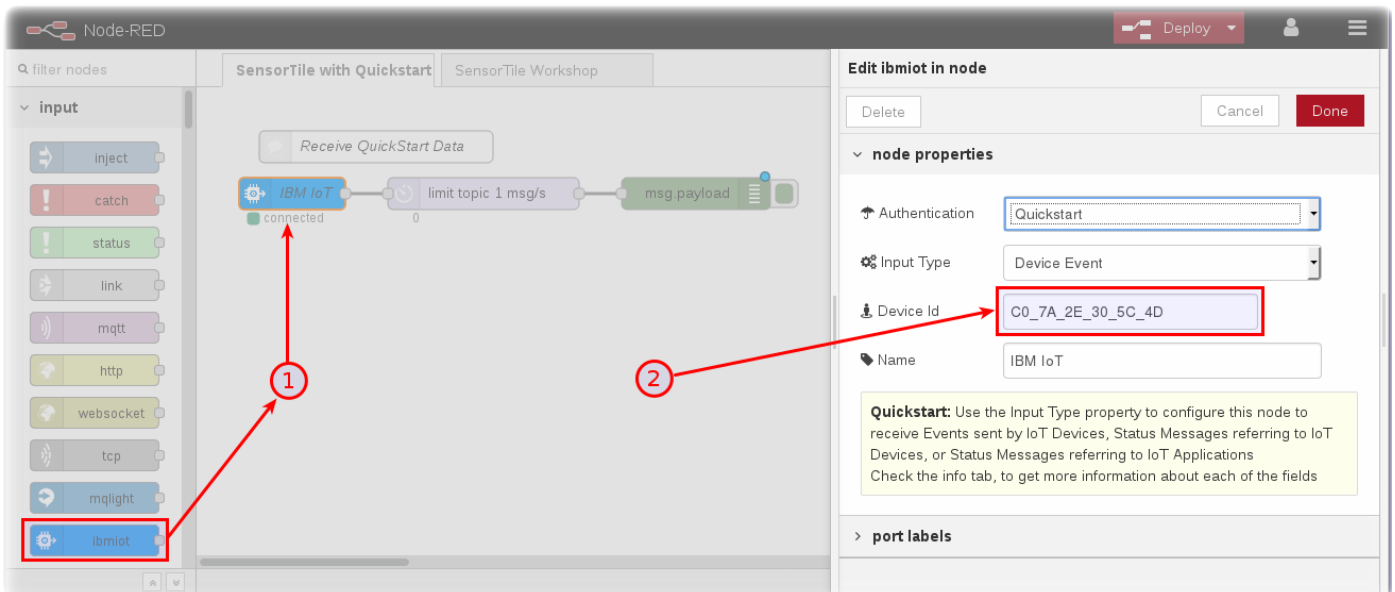
- In the **function** category of your Node-RED palette, find the **delay node** and drag it onto your flow (3).

- Double click on the **delay** node and configure the node Action to **Rate Limit** and then change **All messages** to **For each msg.topic** and finally change **Send each topic in turn** to **Send all topics**. (4)

- Click on the **Done** button.
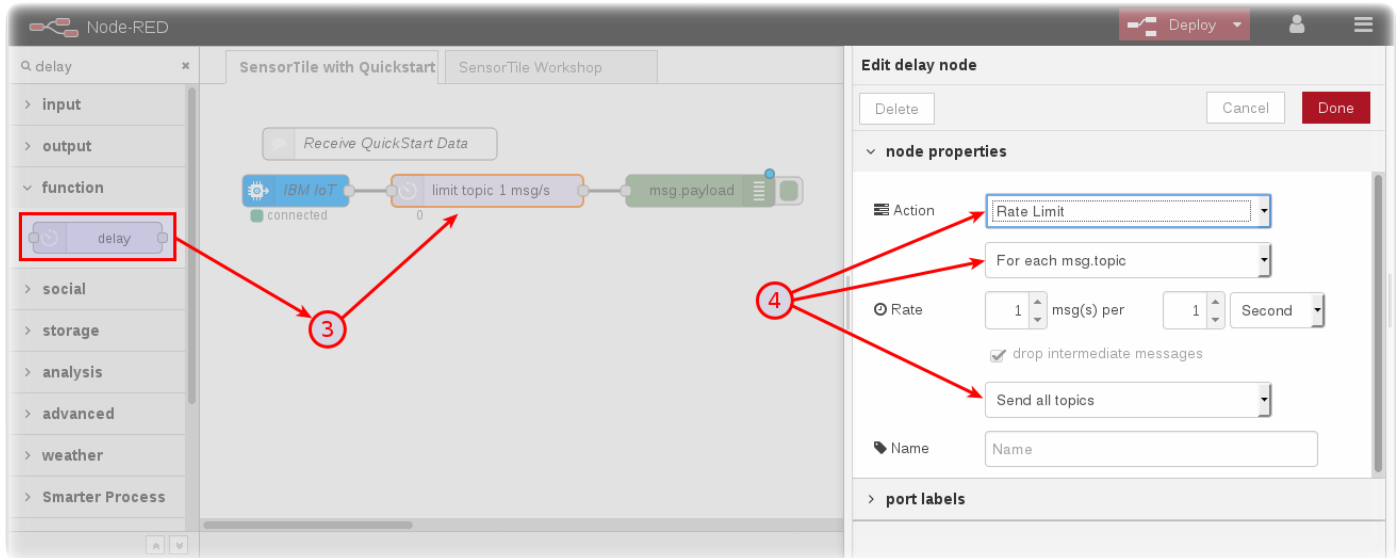
- Click on the **Done** button.

- In the **output** category of your Node-RED palette, find the **debug** node and drag it onto your flow.

- Wire the three nodes together as shown.

- Click the Deploy ▱ Deploy ▾ button on the top of menu bar to deploy the Node-RED flow.

- Turn to the **debug tab** on the right sidebar of your Node-RED flow.

- You should observe Quickstart data arriving from the SensorTile and the ST BlueMS application into your Bluemix application.

Section 4: Create a Watson IoT Node-RED Dashboard

Step 1 – Install the Node-RED Dashboard nodes

Since configuring Node-RED nodes and wiring them together requires many steps to document in screenshots, there is an easier way to build a flow by importing a prebuilt flow into your IoT Starter Application

- Before importing the flow, you need to add the **Node-RED Dashboard** nodes to your Internet of Things Starter Application.

- Click on the Node-RED Menu (1), then **Manage palette** (2)
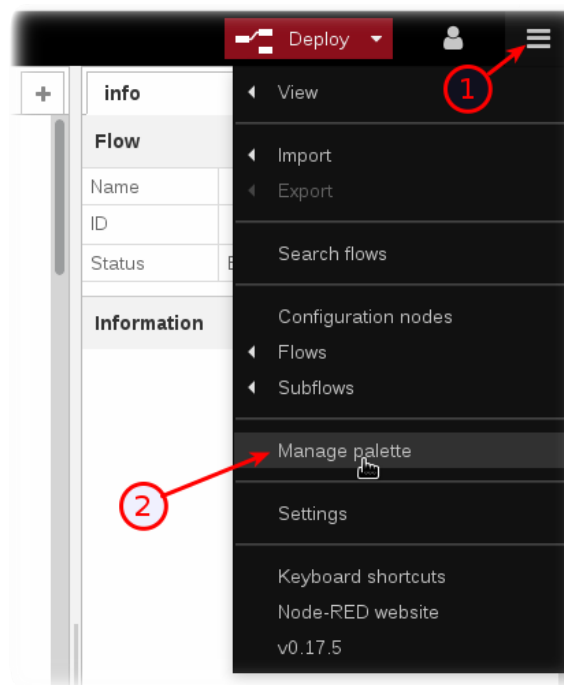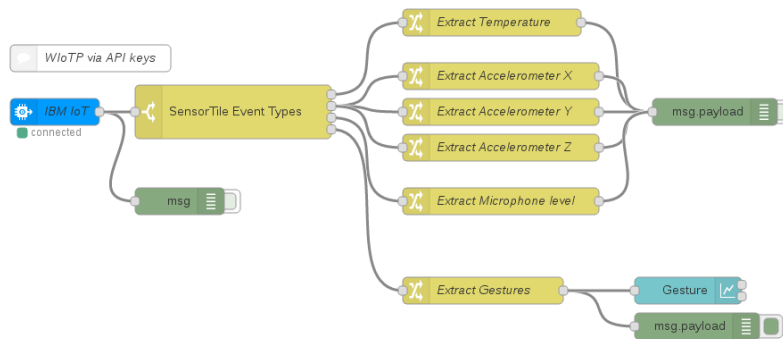

- Turn to the **Install** tab (3), type **node-red-dashboard** (4) and press the **Install** button (5).
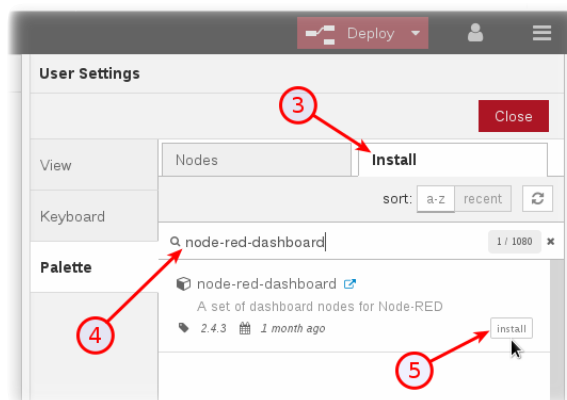
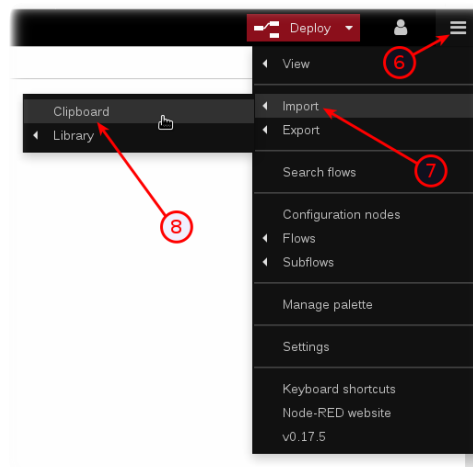- Press the **Install** button in the next dialog.

Step 2 – Import a prebuilt flow from GitHub

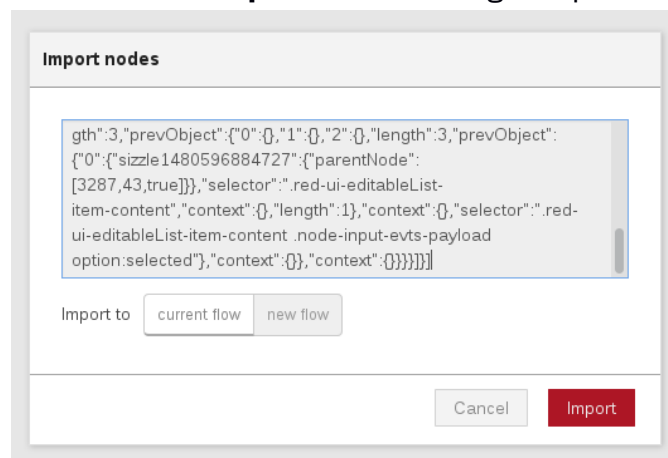- This flow can now be copy / pasted into Node-RED.

Get the Code:
http://ibm.biz/sensortile-nodered

- First, open the **"Get the Code"** github URL listed above, select all of the text, and copy the text for the flow to your Clipboard.

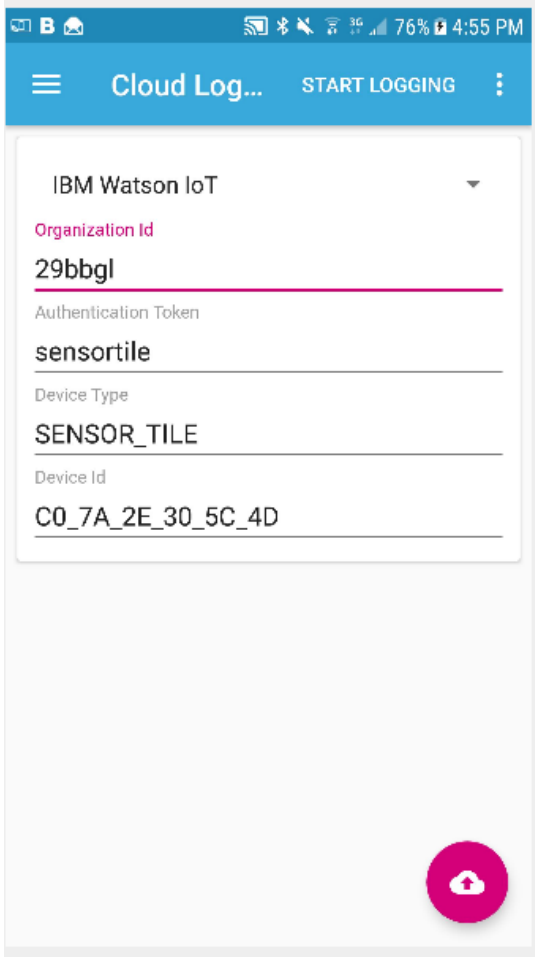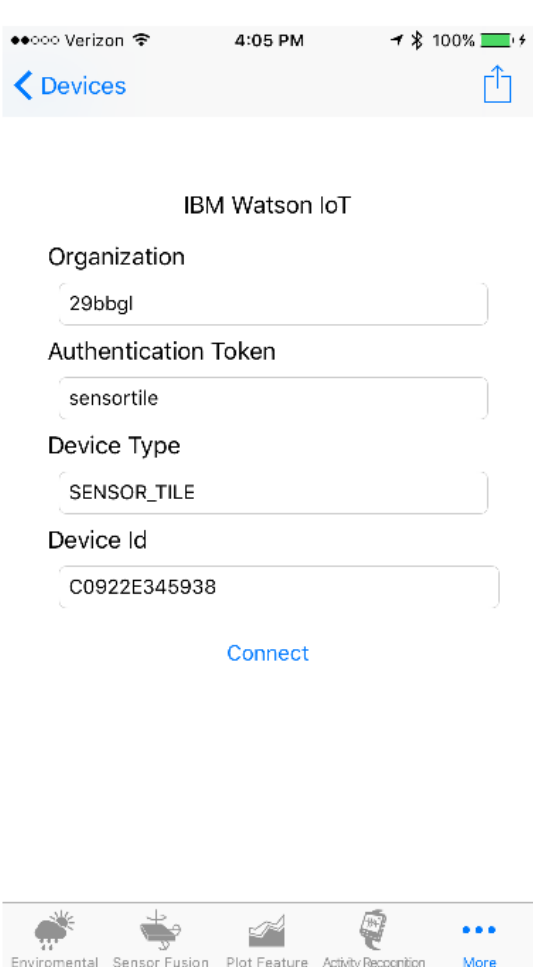- Next, click on the Node-RED Menu (6), then Import (7), then Clipboard (8).

- Paste the text of the flow into the **Import nodes** dialog and press the red **Import** button.

- The new flow will be imported into a **SensorTile Workshop** tab.

Step 3 – Configure the ST BlueMS Mobile Application to send data to Watson IoT

- To speed the limited time allocated to the workshop, all of the SensorTile Device Ids have been pre-registered into a single Watson IoT Platform instance. Normally, you would step through the Watson IoT Device Type and Device Id creation steps to register your SensorTiles.

- Open the ST BlueMS Mobile Application, connect to your SensorTile and turn to the **Cloud Logging** menu.   Choose the **IBM Watson IoT** option from the dropdown.

- Enter **29bbgl** for the **Organization** Id

- Enter **sensortile** (in lowercase) as the **Authentication Token**

- The **Device Type** should already be prefilled with **SENSOR_TILE** (uppercase).

- The **Device Id** should already be prefilled with the MAC address of your SensorTile.
  REMOVE any _ underscores from the Device Id

Android	iOS

- Press the **Connect** icon (Android) or Connect word (iOS)

Step 4 – Connect your SensorTile to your IoT Starter Node-RED application

- Click on the **ibmiot in** node (1) and the configuration panel will open. To speed the limited time allocated to the workshop, all of the SensorTile Device Ids have been pre-registered into a single Watson IoT Platform instance. Normally, you would step through the Watson IoT Device Type and Device Id creation steps to register your SensorTiles.   After the workshop, you can review those steps in Appendix A.   You will use an API Key and API Token to receive your SensorTile data into your IoT Starter application.

- The ibmiot Authentication property should be set to **API Key** (2)

- Click on the **Edit** icon (3) to input the API Key and API Token.

- The ST BlueMS mobile application provided your individual **SensorTile Device Id**. (4)   Enter the DeviceId (without _ underscores!)

- The API Key (5) should already be entered as seen in the screenshot. If not, type in

a-29bbgl-wbvluztjur

- Since the Workshop materials are posted on the public Internet, the instructor will display the API Token on the projector for you to enter manually (6)
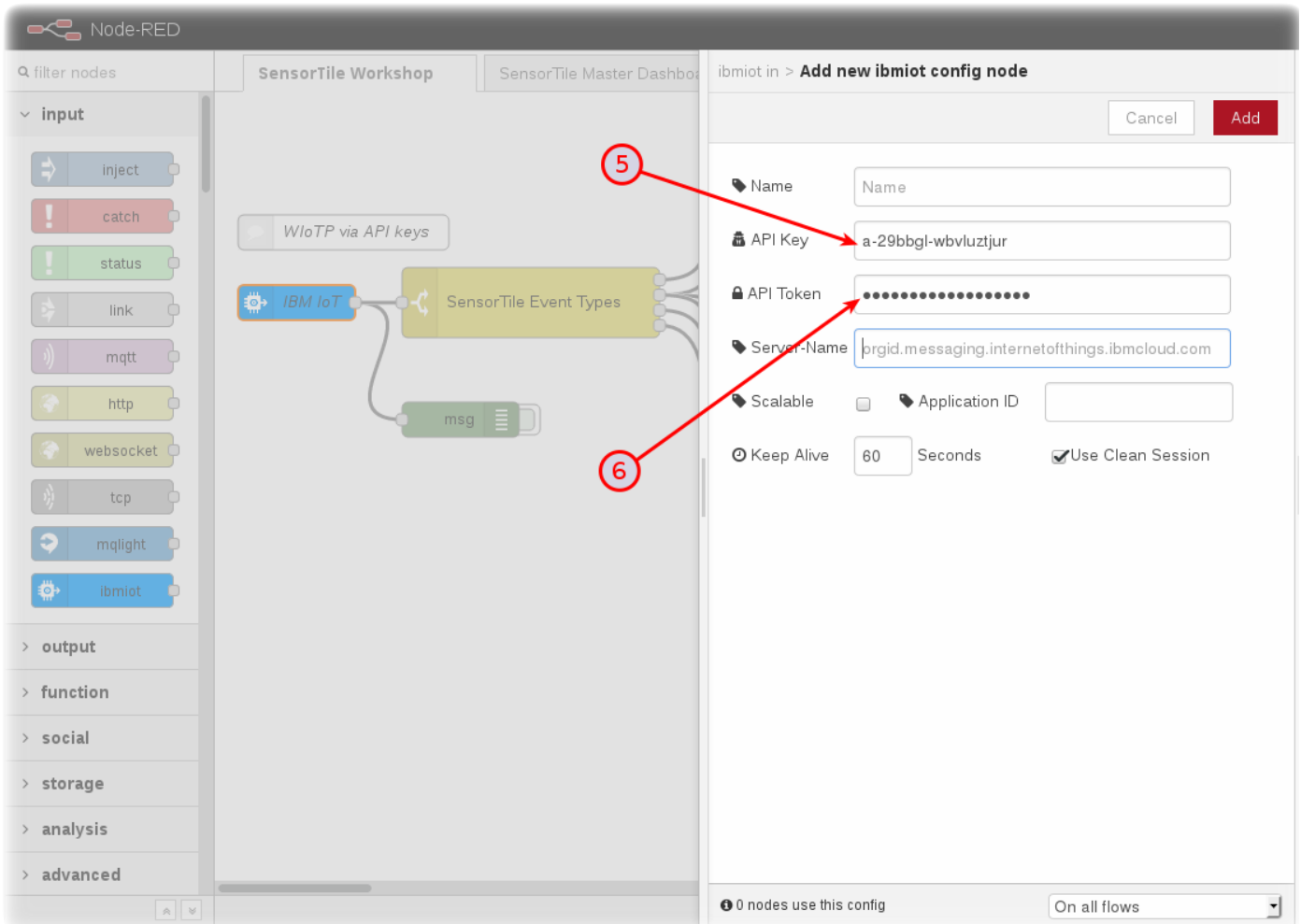
- Click on the red **Add** button.

- Click on the red **Done** button.

- Click the Deploy [Deploy] button on the top of menu bar to deploy the Node-RED flow.

- Turn to the "debug" tab to see the SensorTile data flowing through your Node-RED application. You can turn on/off the debug (7) of the full messages (8) as seen in the debug panel.
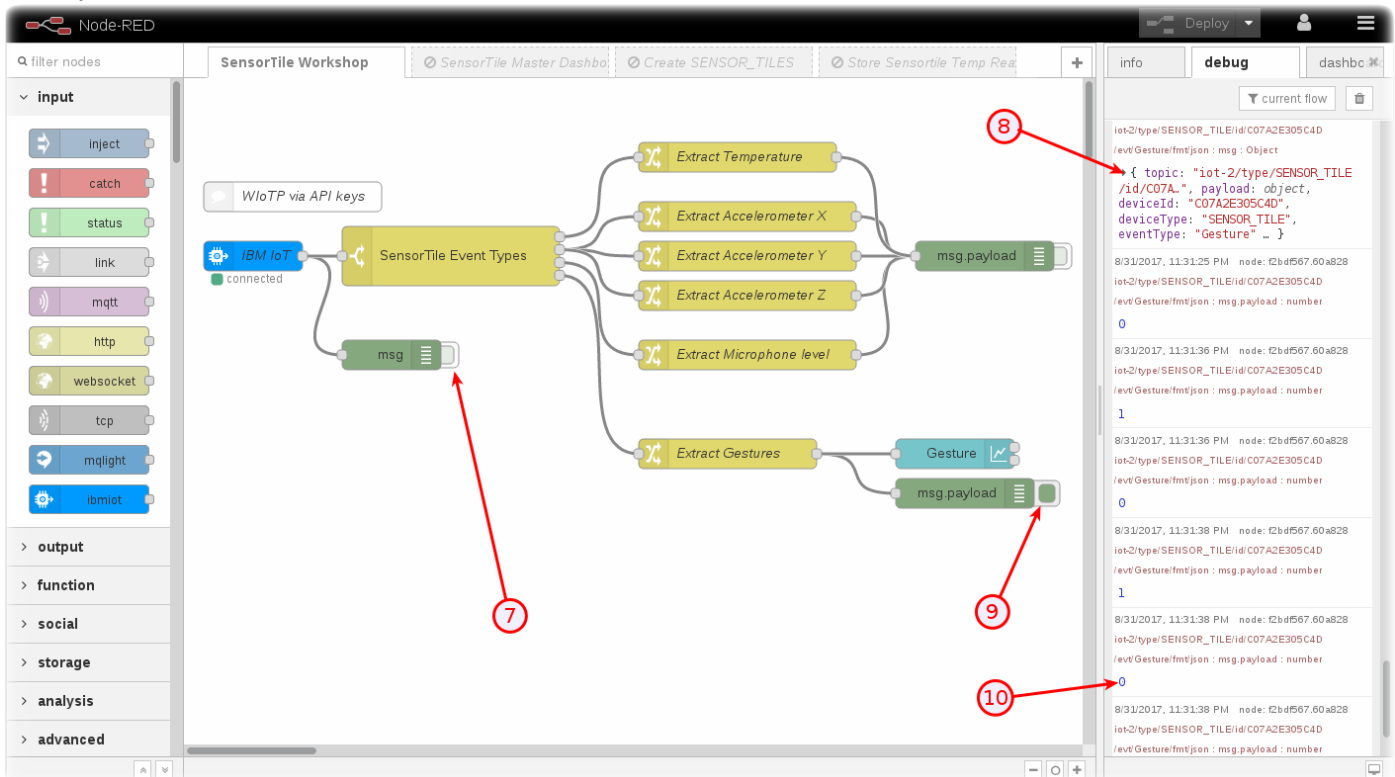

- The Node-RED flow is programmed to extract and plot several of the SensorTile sensor data. Within the ST BlueMS mobile application you can send Temperature, Acceleration and Microphone Level.   You can add additional SensorTile sensors by modifying to the **SensorTile Event Types** switch node.
- The workshop will plot the Gesture events as you move the SensorTile. Observe the Gesture values (10) printed by the debug node (9).

Step 5 – Launch the Node-RED Dashboard

- At the beginning of this Section, we added the Node-RED Dashboard nodes. This set of nodes can quickly create live data dashboards. To launch the Node-RED dashboard, turn to the **dashboard** tab (12) in the Node-RED sidebar.   Launch the Node-RED dashboard by clicking on the **launch** button (13).
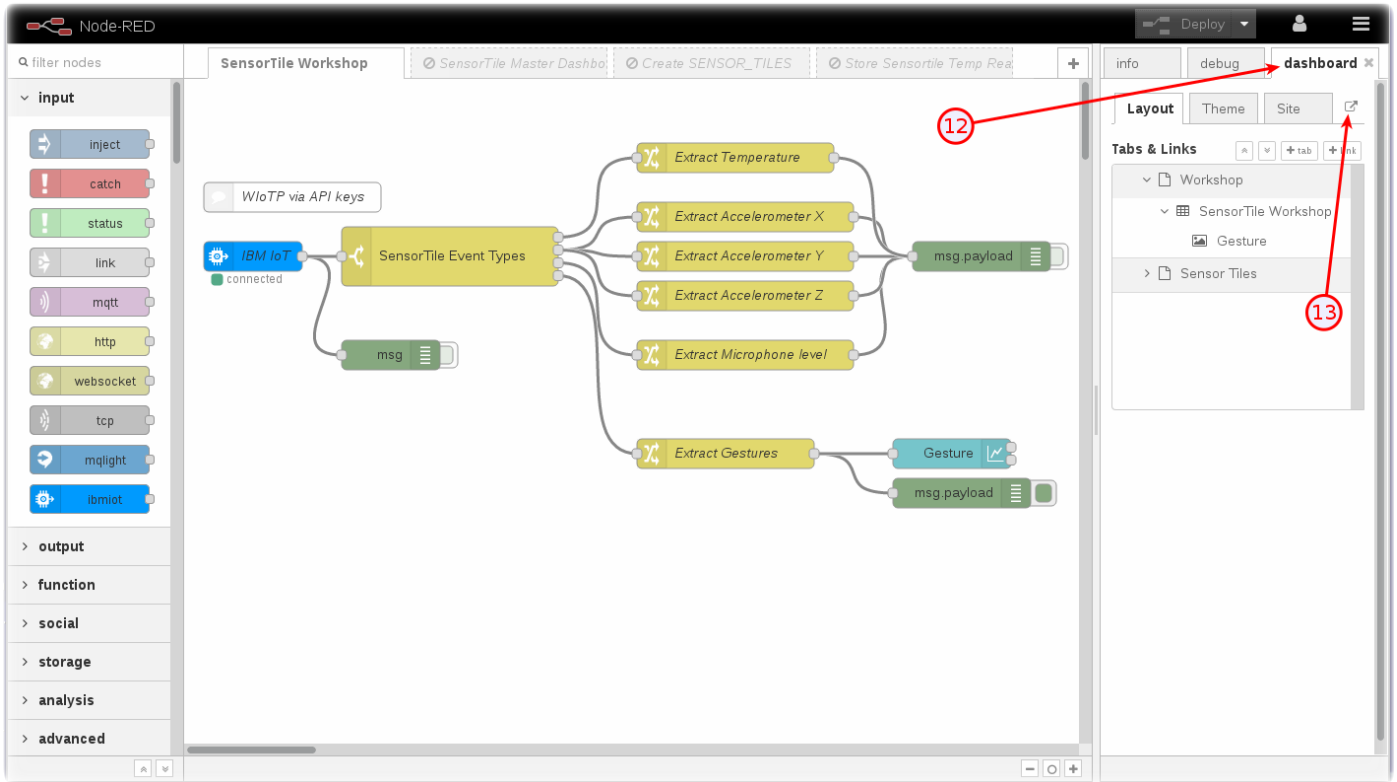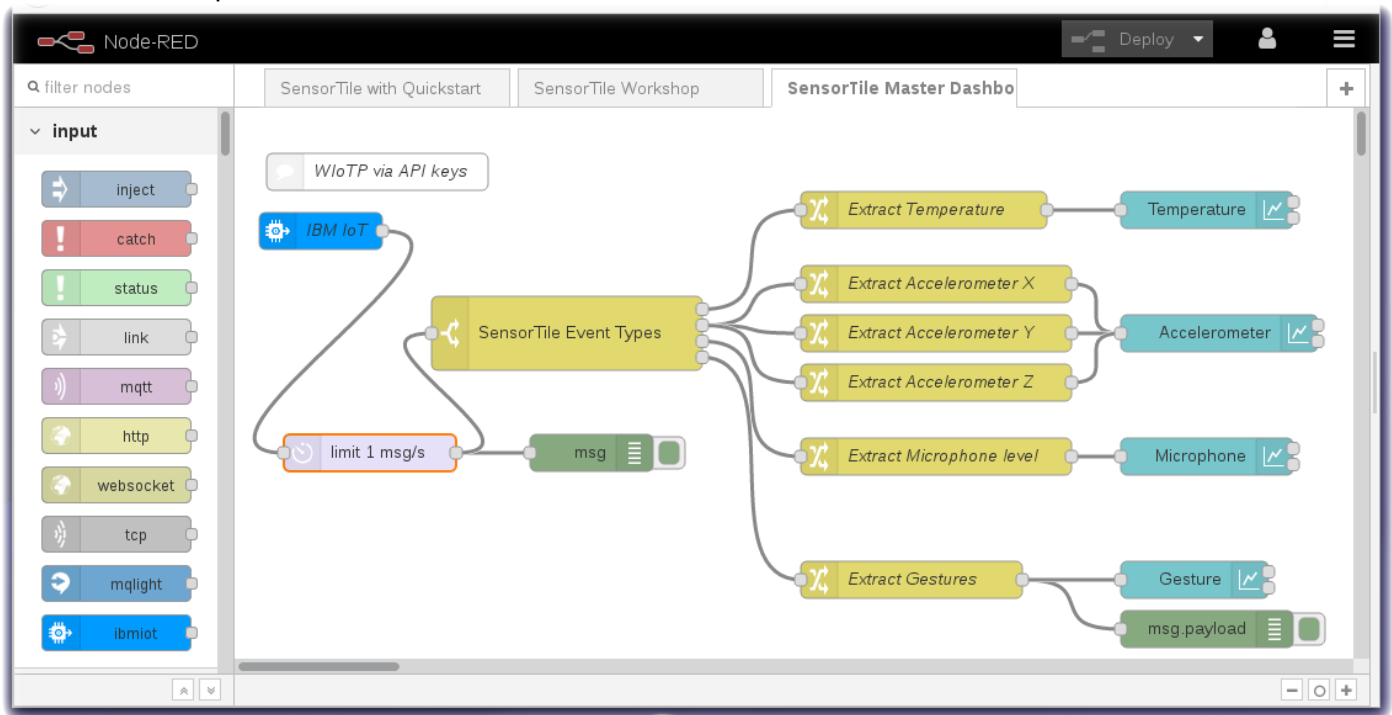

- A new browser tab will open and plots the Gesture events. Shake your SensorTile in various directions.
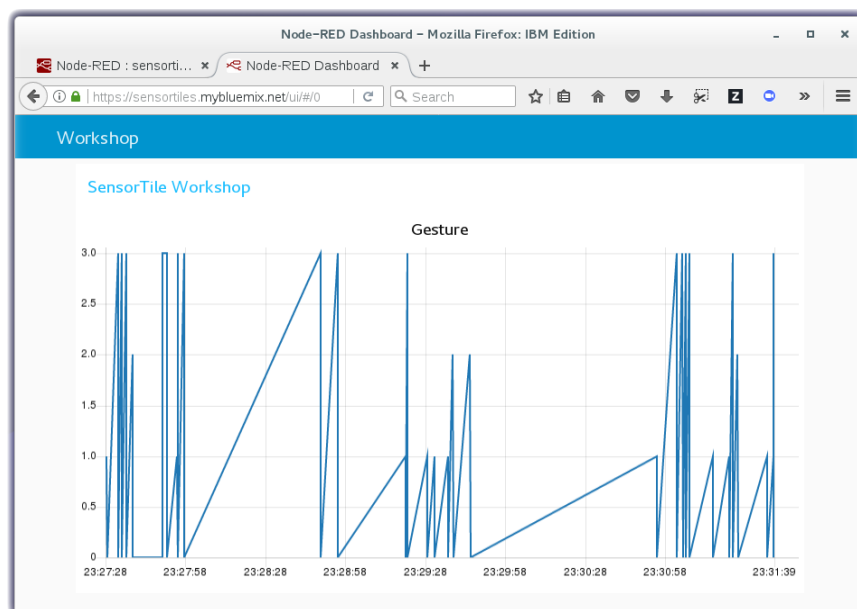
Step 6 – Extra Credit

- The SensorTile workshop time is limited. The remaining section will be Extra Credit for further exploration. Additional Node-RED Dashboard charts can been added.

- Get the Code – http://ibm.biz/sensortile-workshop-extra
- Import the Node-RED flow into your IoT Starter Application
- Configure the IBM IoT node with the API Key / API Token

- Click the Deploy button on the top of menu bar to deploy the Node-RED flow.

- Turn to the Node-RED Dashboard and switch to the new SensorTiles tab by pressing the menu in the upper left corner.
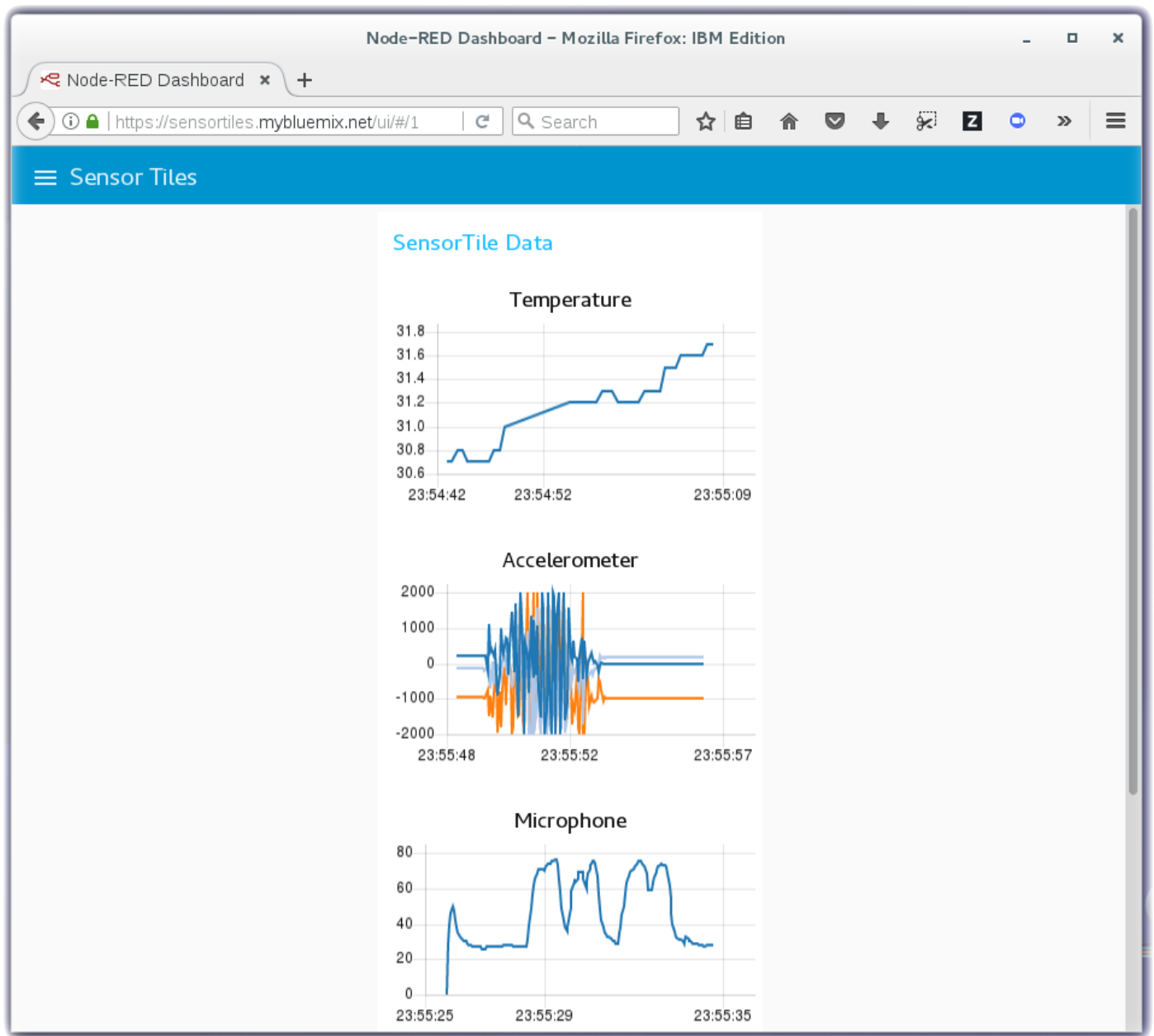
- Congratulations! You have completed the workshop.

References

In this final section, we will challenge the workshop attendee to implement other projects using Watson IoT Platform, the Watson IoT Real Time Insights rules engine and alerts.

There are many recipes available at:

https://developer.ibm.com/recipes