Queen City IoT Day

Particle Weather Station + Azure Event Hub

LAB:

This lab will demonstrate how to use a Particle Photon, in combination with a Particle Photo and DHT11 Temperature / Humidity Sensor and connect it to an Azure Event Hub. It has been adapted from the Channel 9 Photon Weather Station.

HARDWARE:

- Particle Photon
- DHT11 Temperature Humidity Sensor
- Breadboard
- Jumper Wires

SOFTWARE:

- Azure Account (https://azure.microsoft.com/en-us/pricing/free-trial)
- Particle Account (https://build.particle.io/signup)
- Particle CLI Tools & Driver (https://docs.particle.io/guide/getting-started/connect/photon)

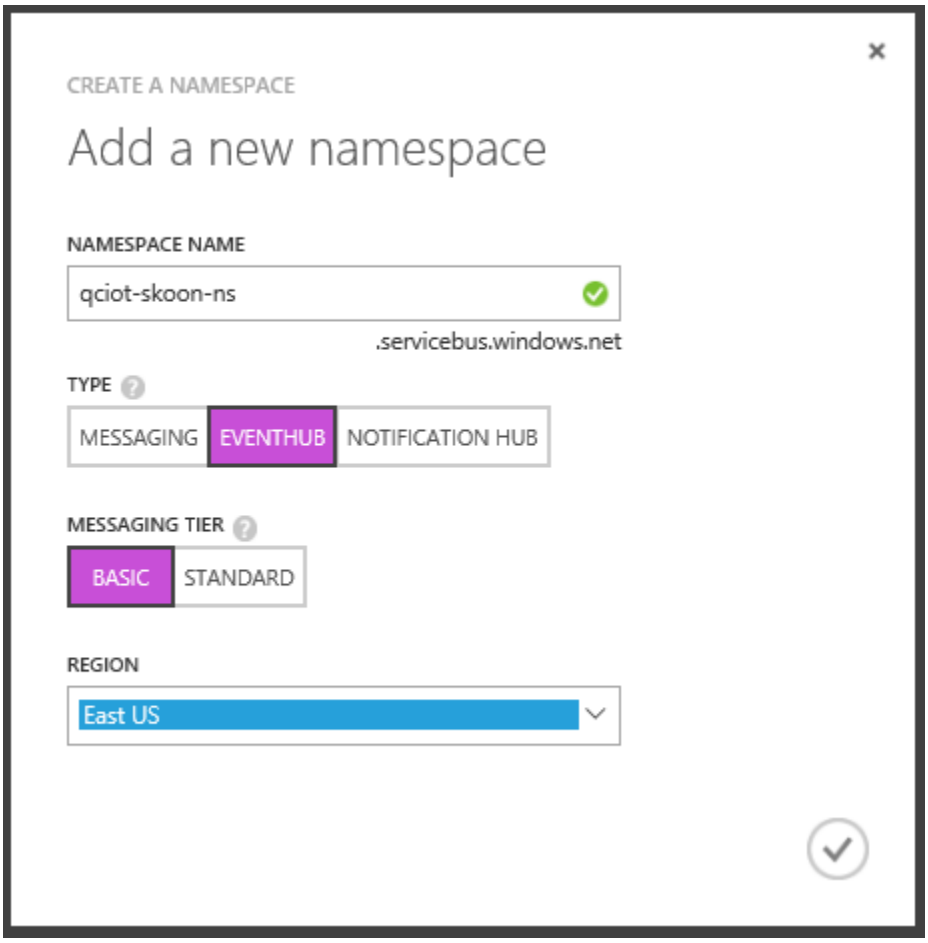
LAB 1 – Setting Up the Azure Event Hub

PRE-REQUISITES:

- Azure Account (https://azure.microsoft.com/en-us/pricing/free-trial)

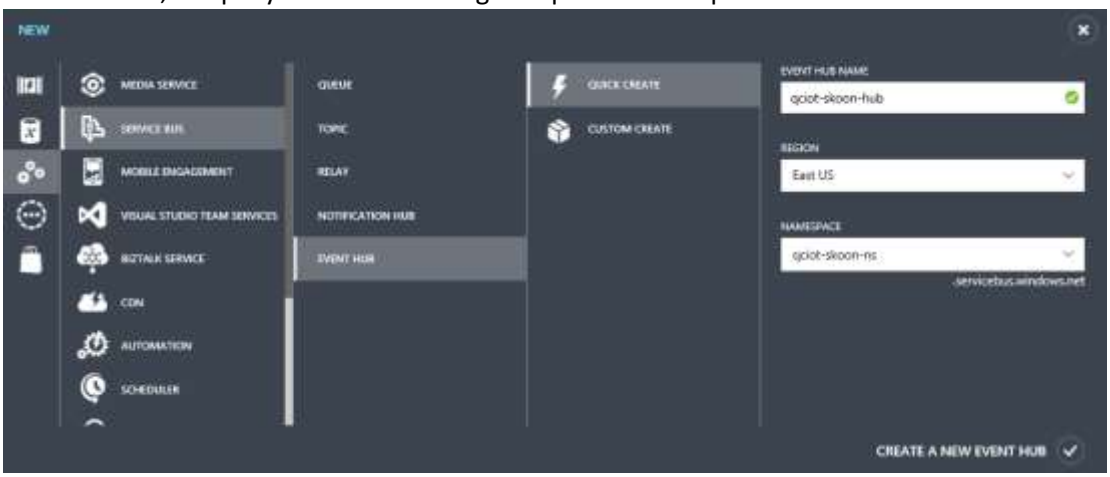
Lab:

1) Log into the legacy Azure Portal (http://manage.windowsazure.com)
2) Click "Service Bus" on left hand menu and then select "Create A New Namespace"
3) Create a new, uniquely named namespace on the service bus which will hold the event hub



4) Open your namespace, and click on the "Event Hubs" tab. Note: you may need to back out of the dashboard, and open the namespace again before the "Event Hubs" tab shows up.
5) Select "Create A New Event Hub"

6) Create a new, uniquely named hub using the quick create option in Azure



7) Open the event hub and select the “Configure” tab
8) Add Shared Access Keys for the types of apps / devices that are going to use the event hub

shared access policies

NAME	PERMISSIONS
MgmtApp	Manage, Send, Listen
StreamAnalytics	Listen
NetClient	Send, Listen
PhotonWebhook	Send
NEW POLICY NAME	

9) Take note of the key generators for the various policies as will need access to these later.

LAB 2 – Setting Up the Photon

PRE-REQUISITES:

- Particle Account (https://build.particle.io/signup)
- Particle CLI Tools & Driver (https://docs.particle.io/guide/getting-started/connect/photon)

LAB:

1) Open up a command prompt
2) Login to the Particle Site

```
C:\>particle login
? Please enter your email address robertvs-msft@outlook.com
? Please enter your password **************
> Successfully completed login!
```

3) Plug the USB cable into the device, and ensure that it is in listening mode (hold down the setup button until it is flashing blue)
4) List all available devices

```
C:\>particle serial list
Found 1 device connected via serial:
COM3 - Photon
```

5) Get Device Id

```
C:\>particle serial identify com3

Your device id is {device id}
Your system firmware version is 0.5.1
```

6) Connect Device To WiFi (See classroom for WIFI settings, or connect via Personal Hotspot)

```
C:\>particle setup wifi
? Should I scan for nearby Wi-Fi networks? No
? SSID
? SSID
? Security Type
? Cipher Type
? Wi-Fi Password
Done! Your device should now restart.
```

7) When it is successfully connected after rebooting, it should pulse cyan
8) Claim the device using your device Id from step #5

```
C:\>particle device add {device id}
Claiming device {device id}
Successfully claimed device {device id}
```

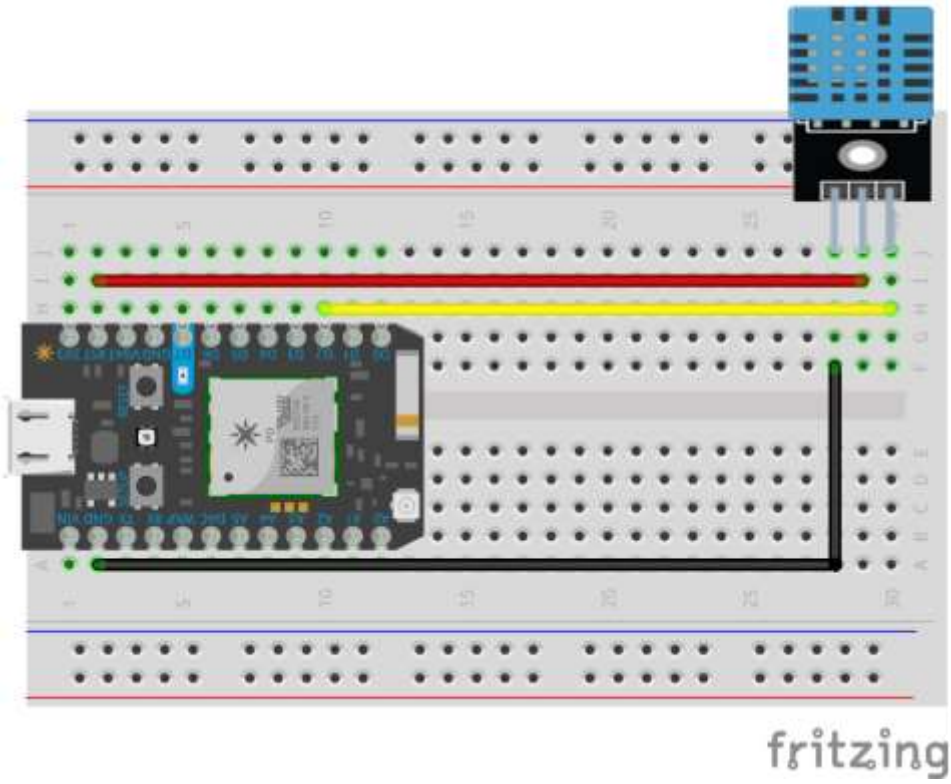
LAB 3 – Circuit & Code

PRE-REQUISITES:

- Code: (https://github.com/SkoonStudios/IoTLabs/QCIoT-PhotonWeather)

LAB:

1) Build the following circuit. Some of the sensors, may have a slightly different pin layout, so ensure you are connecting the following:
    a. RED WIRE: VCC
    b. BLACK WIRE: GROUND
    c. YELLOW WIRE: DATA

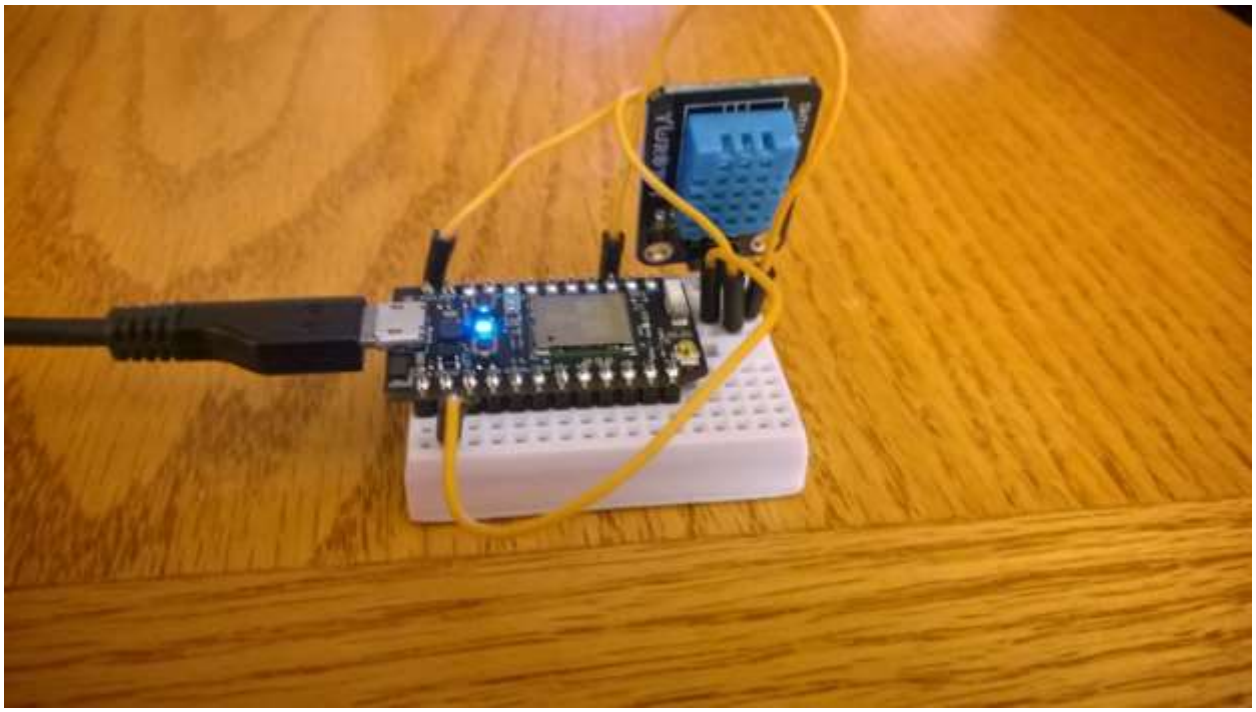


2) Create the webhook. Copy the webhook.json file from the following GITHUB site:
3) Edit the file to specify the names / keys you created in Lab 1
    a. <YOUR_SERVICEBUS_NAME>
    b. <YOUR_EVENTHUB_NAME>
    c. <YOUR_SAS_POLICY_NAME>
    d. <YOUR_SAS_POLICY_KEY>

4) In the logged in command prompt from Lab 2, change to the directory of the JSON file and create the webhook

```
D:\Users\robertvs\Desktop\QCIoT-PhotonLab\Code\WebhookAndPhotonCode>particle webhook create webhook.json
Using settings from the file webhook.json
Sending webhook request  { uri: '/v1/webhooks',
  method: 'POST',
  json:
   { event: 'PublishToEventHub',
     url: 'https://qciot-ss-ns.servicebus.windows.net/qciot-ss-hub/messages',
     deviceid: undefined,
     requestType: 'POST',
     mydevices: true,
     json:
      { subject: '{{s}}',
        unitofmeasure: '{{u}}',
        measurename: '{{m}}',
        value: '{{v}}',
        organization: '{{o}}',
        displayname: '{{d}}',
        location: '{{l}}',
        timecreated: '{{SPARK_PUBLISHED_AT}}',
        guid: '{{SPARK_CORE_ID}}' },
     azure_sas_token:
      { key_name: 'PhotonWebhook',
        key: 'fJ0mtafhB2XfRiXyEGv9/0dhQfM9PI8rGiY83VCpLjQ=' } },
  headers: { Authorization: 'Bearer 987bc195dfa50397fd992ace93f4287cbe7a3cc1' } }
Successfully created webhook with ID 57561874316aa2ac0b70cda2
```

5) Sign into the Particle site (http://build.particle.io) and create a new app
6) Copy the particlephotonweatherstation.c code into the IDE
7) Click the library icon on the side and insert ensure the “Adafruit_DHT” library is added
8) Substitute appropriate vales for Org, Disp, Locn
9) Verify and Flash the device with the application. The status light on the particle should go magenta while code is being uploaded and then reboot.
10) At this point, when the Photon reboots, it should be uploading data to your Azure Event Hub (the D7 LED will blink each time data is uploaded) The Azure Hub may take 10-15 minutes before the dashboard starts showing data.



http://www.skoonstudios.com

Last Revised: June 6, 2016