
Connecting Virtual Sensor to Azure IoT Hub

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Objectives

This lab will help you to explore IoT Hub, by connecting a virtual sensor to it. You can find the sample code for this Lab at:



<https://github.com/acsug/GIB2018/tree/master/samples/Simulated%20IoT%20Devices%20and%20Azure>

Prerequisites

- Microsoft Azure account and subscription
- Visual Studio 2017

Step by step guide

Create an IoT Hub resource

1. Go to **Azure Portal** (portal.azure.com).
2. Click **+ Create a resource** -> Search for **IoT Hub** -> Select the first **IoT Hub** option -> Click **Create**.
3. Enter the following information:
 - **Name:** The name of your IoT Hub must be globally unique
 - **Pricing and scale tier:** F1 – Free
 - **Subscription:** Choose your subscription
 - **Resource group:** Create a new resource group. Give it a name.
 - **Location:** Australia Southeast

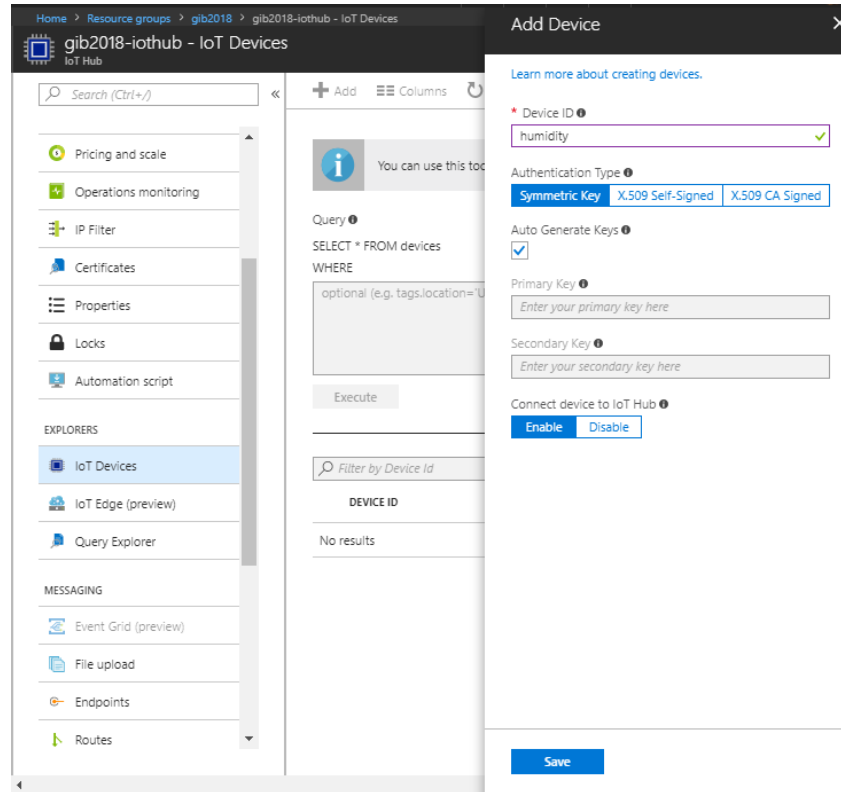
A Resource group is similar to a folder that contains files. In this case, your 'files' are your resources – one of them is your IoT Hub.

Click **Create**.

The image displays two screenshots of the Azure Portal's IoT Hub creation wizard. The left screenshot shows the initial configuration page with the following fields: Name (gib2018-iothub), Pricing and scale tier (F1 - Free), IoT Hub units (1), Device-to-cloud partitions (2), Subscription (Pay-As-You-Go Dev/Test), and Resource group (gib2018). The right screenshot shows the same page with a warning message about the free tier and the Resource group field filled with 'gib2018'.

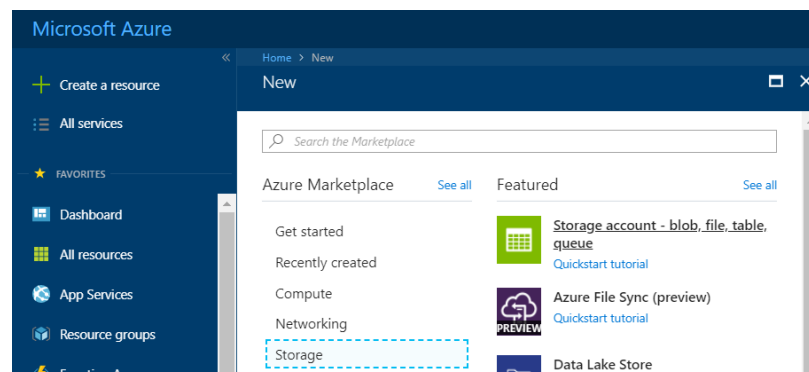
4. Once deployment is finished, go to your IoT Hub. **Resources groups** -> your Resource group -> your **IoT Hub**.

5. Add 2 devices – humidity and temperature. From your **IoT Hub** screen -> Go to **IoT Devices** -> **+ Add**.
 - For the Device ID, enter **humidity**. Click **Save**.
 - Again, click **+ Add**. Do the same as above for **temperature**.



Create a Blob Storage

1. Click **+ Create a resource** -> **Storage** -> **Storage account – blob, file, table, queue**.



2. Give your new storage account the following information:
 - **Name:** The name of the storage account must be globally unique.
 - **Account kind:** Blob storage

- **Subscription:** Choose the same subscription that your IoT Hub uses.
- **Resource group:** Must be the same resource group that your IoT Hub uses.
- **Location:** Australia Southeast

3. Click **Create**.

The image displays two side-by-side screenshots of the 'Create storage account' wizard in the Azure portal. Both screenshots show the same configuration options, but the right screenshot has the 'Hot' access tier selected instead of 'Cool'.

Left Screenshot Configuration:

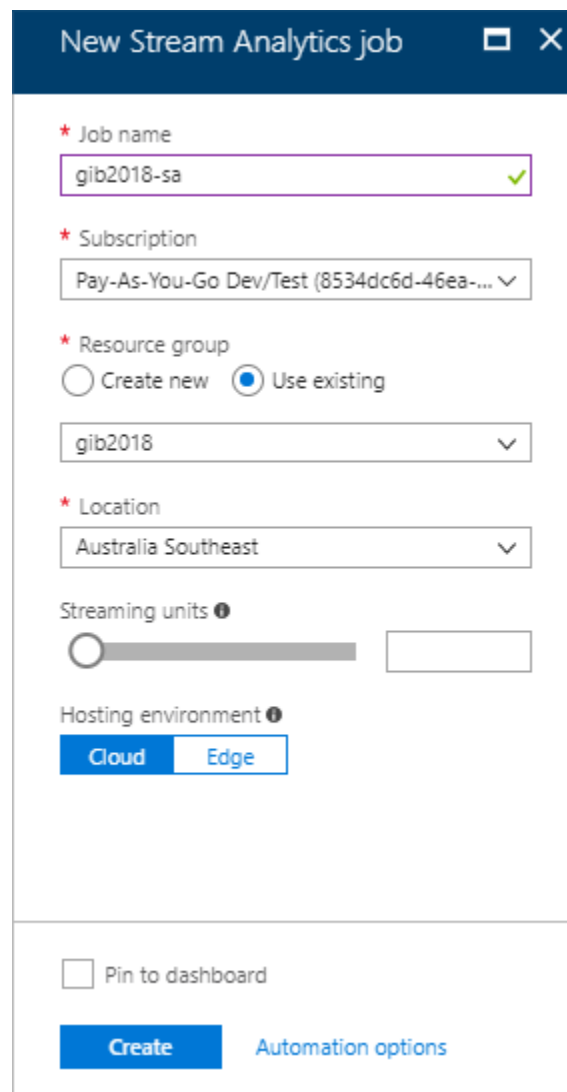
- Name:** gib2018storageaccount
- Deployment model:** Resource manager
- Account kind:** Blob storage
- Performance:** Standard
- Replication:** Read-access geo-redundant storage (R...)
- Access tier (default):** Cool
- Secure transfer required:** Enabled
- Subscription:** Pay-As-You-Go Dev/Test (8534dc6d-46...)
- Resource group:** gib2018

Right Screenshot Configuration:

- Access tier (default):** Hot
- Secure transfer required:** Enabled
- Subscription:** Pay-As-You-Go Dev/Test (8534dc6d-46...)
- Resource group:** gib2018
- Location:** Australia Southeast
- Virtual networks:** Disabled

Create a Stream Analytics Job

1. Click **+ Create a resource** -> Search for **Stream Analytics** -> Select the first **Stream Analytics** option -> Click **Create**.
2. Enter the following information:
 - **Name:** Name your Stream Analytics job
 - **Subscription:** Same as IoT Hub's
 - **Resource group:** Same as IoT Hub's
 - **Location:** Australia Southeast
3. Click **Create**.

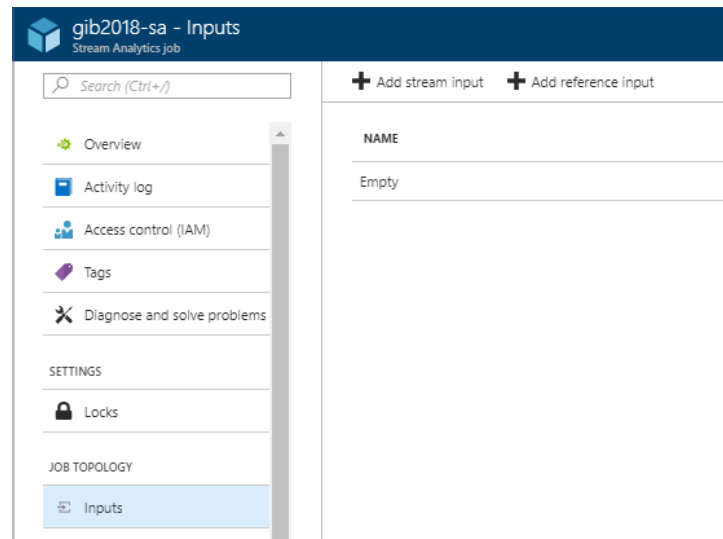


The screenshot shows the 'New Stream Analytics job' configuration window. It includes the following fields and options:

- Job name:** A text box containing 'gib2018-sa' with a green checkmark icon to its right.
- Subscription:** A dropdown menu showing 'Pay-As-You-Go Dev/Test (8534dc6d-46ea-...' with a downward arrow.
- Resource group:** A dropdown menu showing 'gib2018' with a downward arrow. Above it are two radio buttons: 'Create new' (unselected) and 'Use existing' (selected).
- Location:** A dropdown menu showing 'Australia Southeast' with a downward arrow.
- Streaming units:** A slider control with a circular knob and a numerical input box to its right.
- Hosting environment:** Two buttons, 'Cloud' (highlighted in blue) and 'Edge'.
- Pin to dashboard:** A checkbox that is currently unchecked.
- Create:** A blue button.
- Automation options:** A link text.

Set-up Stream Analytics

1. Go to **Stream Analytics**. (Resource groups -> your Resource group -> **Stream Analytics** job created in Part 3).
2. Click **Inputs** -> **+ Add stream input** -> **IoT Hub**.



3. Enter the following details:
Use your own subscription and select the IoT Hub you created in Part 1.
Click **Save**.

IoT Hub
New input

* Input alias
IoTHub ✓

☐ Provide IoT Hub settings manually
☒ Select IoT Hub from your subscriptions

Subscription
Pay-As-You-Go Dev/Test (8534dc6d-46ea-4607-b150-131a... ▼

IoT Hub ●
gib2018-iotHub ▼

Endpoint ●
Messaging ▼

Shared access policy name ●
iothubowner ▼

Shared access policy key ●

Consumer group ●
\$Default ▼

* Event serialization format ●
JSON ▼

Encoding ●
UTF-8 ▼

Event compression type ●
None ▼

Save

4. Click **Outputs** -> **+ Add** -> **Blob storage**.
5. Enter the following details:

Use your own subscription and select the Blob Storage you created in Part 2.

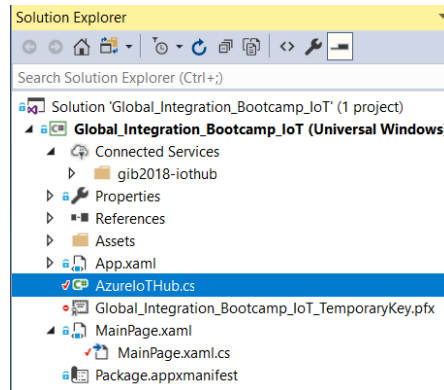
Click **Save**.

- Go to **Query**. Replace **[YourOutputAlias]** with **[BlobStorage]** and **[YourInputAlias]** with **[IoTHub]**. Click **Save**.

- Go to **Overview** -> click **Start**.

Connecting Simulated Devices to IoT Hub using UWP (Universal Windows Platform).

- Open the **Global_Integration_Bootcamp_IoT.sln** file.
- Open **AzureIoTHub.cs**.



3. Go to **Azure Portal** (portal.azure.com) -> your **IoT Hub** -> **IoT Devices** -> **humidity** -> Copy the **primary key connection string**.

Go back to **AzureIoTHub.cs** -> replace **{Humidity Connection String}** with the connection string you just copied.

```

30
31     const string deviceConnectionString = "{Humidity Connection String}";
32     const string deviceConnectionString2 = "{Temperature Connection String}";
33

```

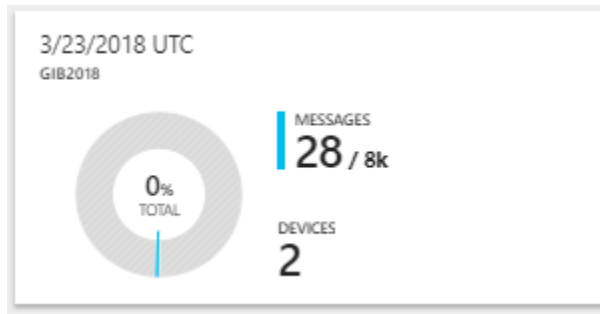
Repeat for temperature. Replace **{Temperature Connection String}**.

4. Click **Local Machine** to run the application.
5. Press either one of **Send** the buttons to send the current value of a specific sensor device to IoT Hub.

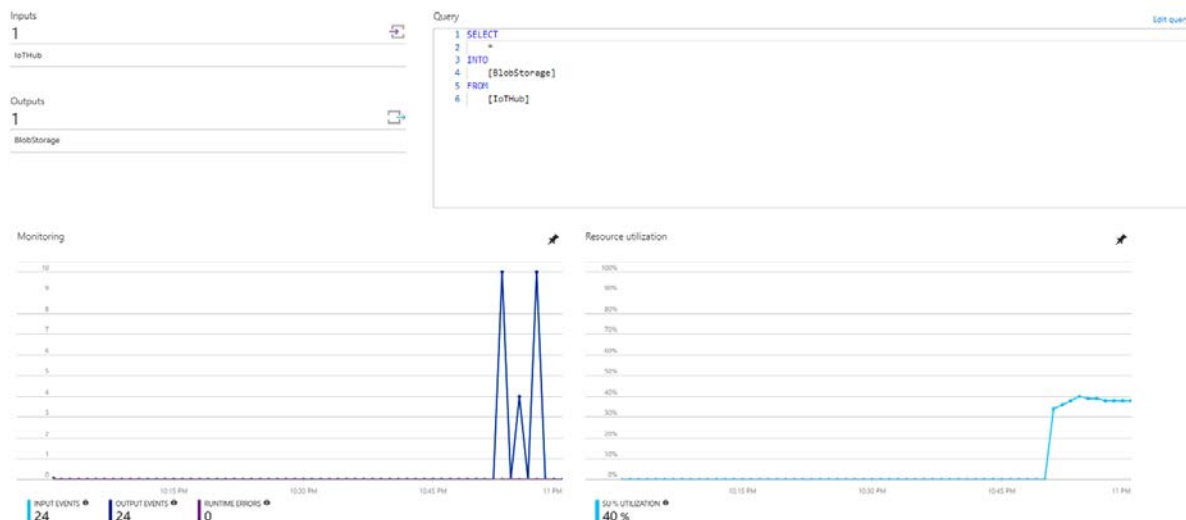
Checking IoT Hub and Blob Storage.

Go to **Azure Portal** (portal.azure.com) and open your **IoT Hub**.

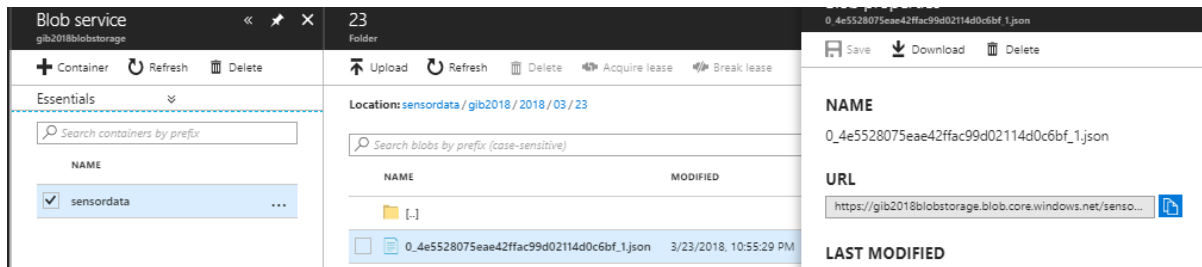
If you clicked **send** in Part 5, you should be able to see how many messages you have sent so far. (You might need to wait a bit just in case there's any delay.)



Now, go to **Stream Analytics** and see the Input and Output spikes in the **Monitoring** section/graph. (Again, the messages from IoT Hub might take a few minutes to arrive just like below). Once you see that there is at least one output event, go to your **Blob storage**.



From your **Blob storage** page -> Click **Blobs** -> **sensordata** -> **gib2018** -> **2018** -> **03** -> **23** (or **24**) -> click on the **.json** file -> **Download**.



```
1 {"deviceId":"humidity","messageId":1,"value":"84%","EventProcessedUtcTime":"2018-03-23T09:51:15.9256707Z","PartitionId":
2 "CorrelationId":null,"ConnectionDeviceId":"humidity","ConnectionDeviceGenerationId":"636573953602620482","EnqueuedTime":
3 {"deviceId":"temperature","messageId":1,"value":"22.1?C","EventProcessedUtcTime":"2018-03-23T09:51:16.1262228Z","Partiti
: null,"CorrelationId":null,"ConnectionDeviceId":"temperature","ConnectionDeviceGenerationId":"636573953768167488","Enque
{"deviceId":"temperature","messageId":1,"value":"22.8?C","EventProcessedUtcTime":"2018-03-23T09:51:17.4074719Z","Partiti
: null,"CorrelationId":null,"ConnectionDeviceId":"temperature","ConnectionDeviceGenerationId":"636573953768167488","Enque
```

Finally, don't forget to stop your Stream Analytics when not in use to prevent charges.
