

Microsoft Azure portal showing the IoT Hub creation process. The page displays the pricing and configuration details for the IoT Hub, including the subscription, resource group, and region.

IoT hub

Basics Networking Management Add-ons Tags **Review + create**

Pricing

IoT hub: \$0 USD per month

Add-ons total: Change add-ons

Basics

Subscription	Azure for Students
Resource group	cs18916
IoT hub name	RideauloTHub
Region	Canada Central
Disaster recovery enabled	Yes
Tier	Free
Daily message limit	8,000 (\$0/month)

Networking

Connectivity configuration	Public access
Private endpoint connections	None
Allow public network access	Enabled

Management

Create < Previous: Tags Next > Automation options

Microsoft Azure portal showing the RideauloTHub-12118364 Overview page. The page displays the deployment status, which is currently in progress.

RideauloTHub-12118364 | Overview

Deployment

Search < > Delete Cancel Redeploy Download Refresh

Overview

Inputs Outputs Template

Deployment is in progress

Deployment name: RideauloTHub-12118364 Start time: 12/1/2024, 6:36:08 PM
Subscription: Azure for Students Correlation ID: 6caed25d-eab3-494a-b203-581edb706766
Resource group: cs18916

Deployment details

Resource	Type	Status	Operation details
No results.			

Give feedback

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Use IoT Hub message routing to send device-to-cloud messages to different endpoints
Understanding the device identity registry
Understanding IoT Hub quotas and throttling

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Microsoft Azure portal showing the RideautoTHub IoT Hub. The page displays a list of devices connected to the hub, including DowsLakeSensor, NACSensor, and FifthAvenueSensor. The interface includes a sidebar with navigation options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Events, Device management, IoT Edge, Configurations + Deployments, Updates, Queries, Hub settings, Security settings, Defender for IoT, Monitoring, Automation, and Help.

Device ID	Type	Status	Last status update	Authentication type	C2D messages queued	Tags
DowsLakeSensor	IoT Device	Enabled	--	Shared Access Signature	0	
NACSensor	IoT Device	Enabled	--	Shared Access Signature	0	
FifthAvenueSensor	IoT Device	Enabled	--	Shared Access Signature	0	

Visual Studio Code editor showing the simulation of the IoT Hub. The file explorer displays the project structure, including the simulate_iot.py file. The code defines a function to send telemetry data to the IoT Hub. The terminal output shows the execution of the script, displaying the simulated data for the three sensors (DowsLake, FifthAvenue, NAC) and their respective temperature, ice thickness, and timestamp.

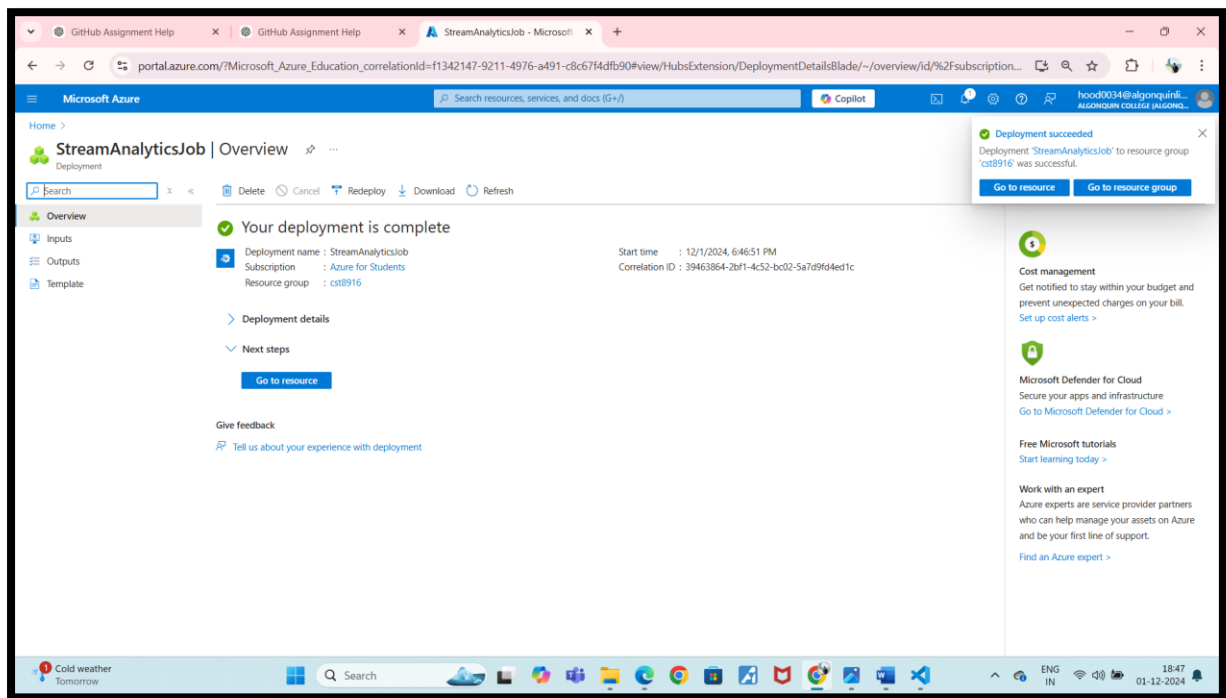
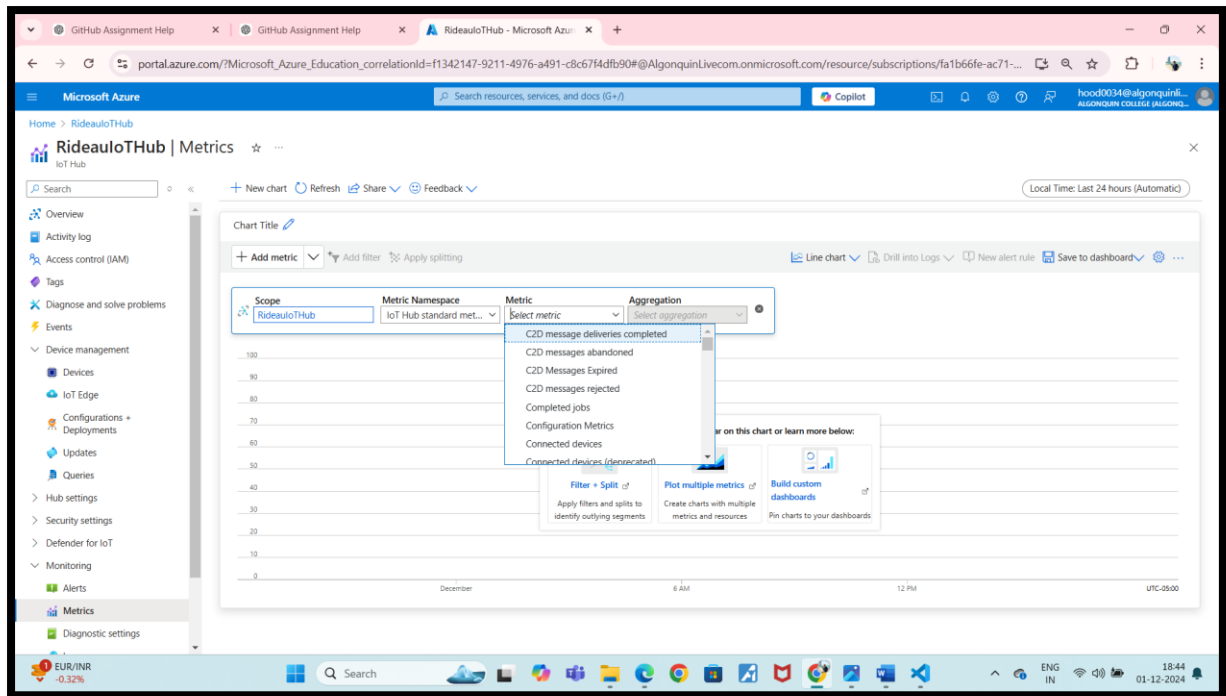
```
def send_telemetry(device_client, telemetry_data):
    print(f"Sent: {telemetry_data}")
except Exception as e:
```

Requirement already satisfied: janus in c:\users\lenovo\appdata\local\programs\python\python312\lib\site-packages (from azure-iot-device) (1.1.0)
Requirement already satisfied: pysocks in c:\users\lenovo\appdata\local\programs\python\python312\lib\site-packages (from azure-iot-device) (1.7.1)
Requirement already satisfied: typing-extensions in c:\users\lenovo\appdata\local\programs\python\python312\lib\site-packages (from azure-iot-device) (4.12.2)
Requirement already satisfied: packaging in c:\users\lenovo\appdata\local\programs\python\python312\lib\site-packages (from deprecation3.0.0, >=2.1.0->azure-iot-device) (24.2)
Requirement already satisfied: charset-normalizer4, >=2 in c:\users\lenovo\appdata\local\programs\python\python312\lib\site-packages (from requests3.0.0, >=2.32.3->azure-iot-device) (3.4.0)
Requirement already satisfied: idna4, >=2.5 in c:\users\lenovo\appdata\local\programs\python\python312\lib\site-packages (from requests3.0.0, >=2.32.3->azure-iot-device) (3.10)
Requirement already satisfied: certifi3-2017.4.17 in c:\users\lenovo\appdata\local\programs\python\python312\lib\site-packages (from requests3.0.0, >=2.32.3->azure-iot-device) (2024.8.30)

[notice] A new release of pip is available: 24.2 -> 24.3.1
[notice] To update, run: python.exe -m pip install --upgrade pip

PS C:\Users\LENOVO\IoT_Simulation> python simulate_iot.py
Simulating IoT sensors at three key locations (Dow's Lake, Fifth Avenue, NAC)...

Sent: {'location': 'DowsLake', 'temperature': -16.56, 'icethickness': 24.71, 'timestamp': '2024-12-01T23:43:32Z'}
Sent: {'location': 'FifthAvenue', 'temperature': -18.61, 'icethickness': 48.09, 'timestamp': '2024-12-01T23:43:33Z'}
Sent: {'location': 'NAC', 'temperature': -4.04, 'icethickness': 46.8, 'timestamp': '2024-12-01T23:43:34Z'}
Sent: {'location': 'DowsLake', 'temperature': -13.23, 'icethickness': 36.9, 'timestamp': '2024-12-01T23:43:39Z'}
Sent: {'location': 'FifthAvenue', 'temperature': -10.88, 'icethickness': 48.47, 'timestamp': '2024-12-01T23:43:39Z'}
Sent: {'location': 'NAC', 'temperature': -8.65, 'icethickness': 45.04, 'timestamp': '2024-12-01T23:43:40Z'}



Microsoft Azure portal interface showing the configuration of a Stream Analytics job named "RideauStreamJob". The left sidebar lists various management options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Job topology, Inputs, Functions, Query, Outputs, No-code editor (preview), Settings, Developer tools, Monitoring, Logs, Job diagram (preview), Metrics, Alert rules, and Diagnostic settings. The "Inputs" section is selected, displaying a table with one input configuration:

Alias	Source type	Type	Authentication mode	R...
IoT HubInput	Stream	IoT Hub	Connection string	

The bottom of the screen shows a Windows taskbar with various application icons and a system tray displaying the date and time as 01-12-2024, 18:48.

Microsoft Azure portal interface showing the "Create a storage account" wizard. The page includes a description of Azure storage and a "Project details" section where the user selects the subscription and resource group. The "Instance details" section contains the following configuration:

- Subscription: Azure for Students
- Resource group: cst8916
- Storage account name: rideaustorage
- Region: (Canada) Canada Central
- Primary service: Azure Blob Storage or Azure Data Lake Storage Gen 2
- Performance: Standard (Recommended for most scenarios (general-purpose v2 account))
- Redundancy: Locally-redundant storage (LRS)

Navigation buttons at the bottom include "Previous", "Next", and "Review + create". A "Give feedback" link is also present. The Windows taskbar at the bottom shows the date and time as 01-12-2024, 18:49.

Microsoft Azure portal interface showing the 'rideaustorage' storage account. The left sidebar lists navigation options: Overview, Activity log, Tags, Diagnose and solve problems, Access Control (IAM), Data migration, Events, Storage browser, Storage Mover, Partner solutions, Data storage, Containers, File shares, Queues, Tables, Security + networking, Data management, Storage tasks (preview), Redundancy, and Data protection. The main content area displays the 'Containers' section with a table of storage containers.

Search containers by prefix:

Show deleted containers: ☐

Name	Last modified	Anonymous access level	Lease state
<input type="checkbox"/> \$logs	12/1/2024, 6:50:11 PM	Private	Available
<input type="checkbox"/> rideau-output	12/1/2024, 6:50:35 PM	Private	Available

Taskbar: 3°C Mostly clear, Search, and system tray icons.

Microsoft Azure portal interface showing the 'RideauStreamJob' Outputs section. The left sidebar lists navigation options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Job topology, Inputs, Functions, Query, Outputs, No-code editor (preview), Settings, Developer tools, Monitoring, Logs, Job diagram (preview), Metrics, Alert rules, and Diagnostic settings. The main content area displays the 'Outputs' section with a table of output configurations.

Search: Add output Refresh

Alias 1	Type	Authentication mode	Resource
rideau-output	Blob storage/ADLS Gen2	Connection string	rideaustorage

Taskbar: 3°C Mostly clear, Search, and system tray icons.

Microsoft Azure portal interface showing the RideauStreamJob configuration and query editor.

Query Editor:

```
1 SELECT
2     location,
3     AVG(temperature) AS avgTemperature,
4     MIN(iceThickness) AS minIceThickness,
5     System.Timestamp AS processedTimestamp
6
7 INTO
8     [rideau-output]
9 FROM
10    [IoTHubInput]
11 GROUP BY
12    TumblingWindow(Duration, 300)
```

Input preview:

Showing sample events from 'IoTHubInput':

location	temperature	iceThickness	timestamp	EventProcessedUtcTime	PartitionId	EventEnqueuedUtcTime
"DowsLake"	-16.56	24.71	"2024-12-01T23:43:32Z"	"2024-12-01T23:51:59..."	1	"2024-12-01T23:43:33..."
"FifthAvenue"	-18.61	48.09	"2024-12-01T23:43:33Z"	"2024-12-01T23:51:59..."	1	"2024-12-01T23:43:34..."
"NAC"	-4.04	46.8	"2024-12-01T23:43:34Z"	"2024-12-01T23:51:59..."	0	"2024-12-01T23:43:35..."

Microsoft Azure portal interface showing the IoTdata container overview.

Authentication method: Access key (Switch to Microsoft Entra user account)

Location: iotdata / iotdata / Dows%20Lake / 2024 / 11 / 27 / 17 / output.json

Search blobs by prefix (case-sensitive): ☐ Show deleted blobs

Table:

Name	Modified	Access tier	Archive status	Blob type	Size	Lease state
[...]						...
0_e7c550d9dad3462f81a44d3397924f80_1.json	27/11/2024, 12:25:03	Hot (Inferred)		Block blob	233 B	Available