IOT with AWS

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What is IoT ?

- The internet of things, or IoT, is a system of interrelated computing devices that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

Examples of IoT

- Smart House
- Agriculture
- Smart Cars
- Wearables
- Smart City

Why AWS for IoT ?

- High IoT Security Standards.
- Serverless Architecture.
- Powerful AWS IoT Analytics Paired With AI and Machine Learning.
- AWS Has a Strong Partner Network of IoT Device Manufacturers.
- Integration Across a Sheer Number of AWS Products and Services.

Hardware and Software Requirements

- Raspberry Pi 3 Model B
- DHT11 - Temperature and Humidity Sensor
- Connecting wires
- WinSCP

AWS Services

1. IoT Core
2. IoT Analytics
3. Amazon SageMaker
4. QuickSight

IoT Core

- AWS IoT Core is a managed cloud service that lets connected devices easily and securely interact with cloud applications and other devices.
- AWS IoT Core can support billions of devices and trillions of messages, and can process and route those messages to AWS endpoints and to other devices reliably and securely.
- With AWS IoT Core, your applications can keep track of and communicate with all your devices, all the time, even when they aren't connected.
- AWS IoT Core provides authentication and end-to-end encryption throughout all points of connection, so that data is never exchanged between devices and AWS IoT Core without proven identity.

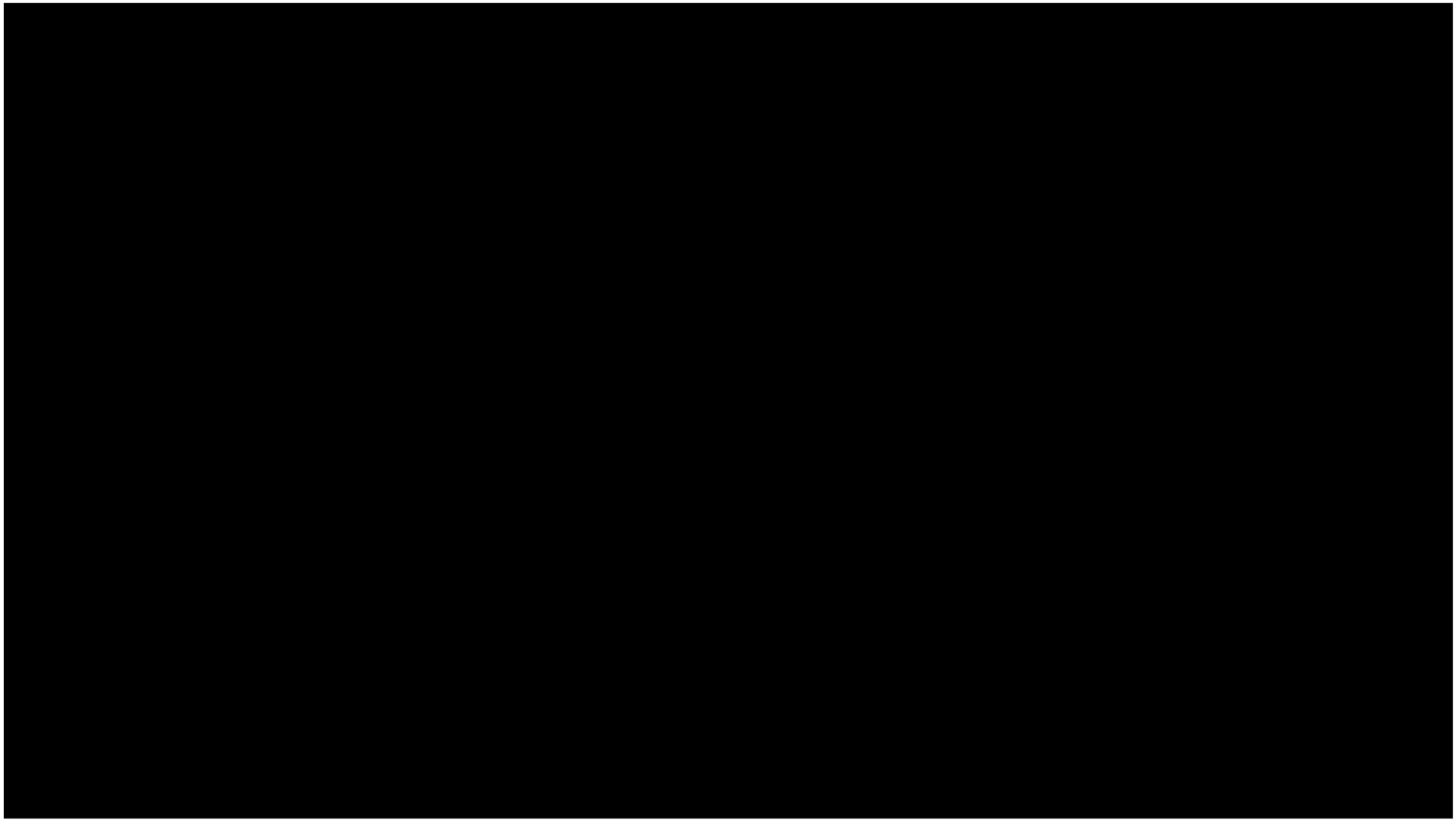
AWS IoT Core

IoT Analytics

- AWS IoT Analytics is a fully-managed service that makes it easy to run and operationalize sophisticated analytics on massive volumes of IoT data without having to worry about the cost and complexity typically required to build an IoT analytics platform

- It is the easiest way to run analytics on IoT data and get insights to make better and more accurate decisions for IoT applications and machine learning use cases.

IoT Analatics Video



Amazon SageMaker

- Amazon SageMaker is a fully-managed service that enables data scientists and developers to quickly and easily build, train, and deploy machine learning models at any scale.

- Amazon SageMaker includes modules that can be used together or independently to build, train, and deploy your machine learning models.

- Amazon SageMaker manages all of the underlying infrastructure for you and can easily scale to train models at petabyte scale.

Amazon SageMaker

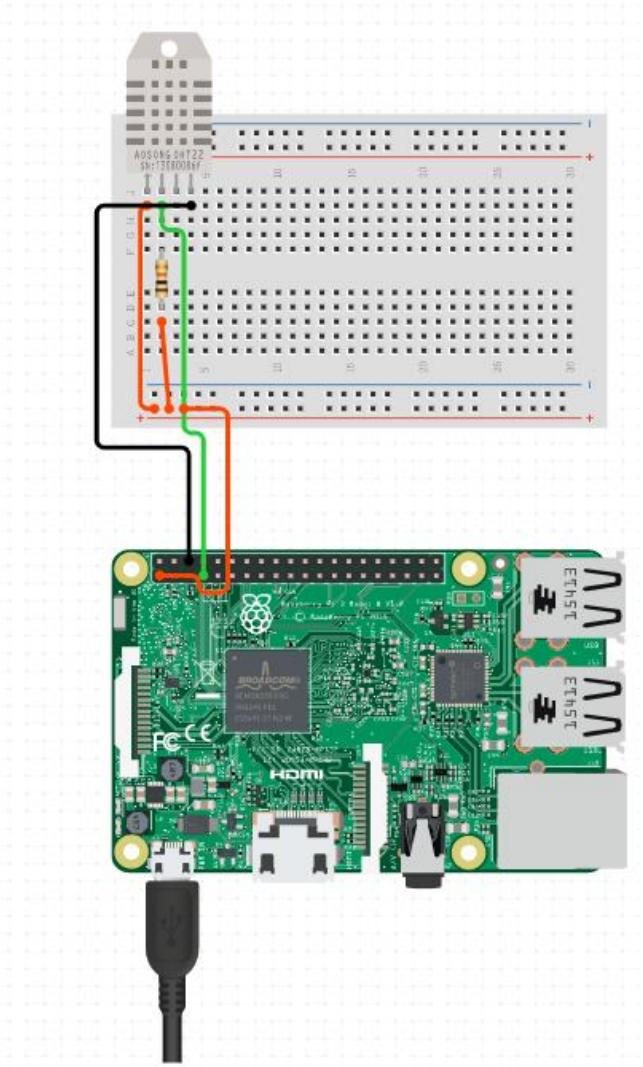
Amazon QuickSight

- Amazon QuickSight is a fast, cloud-powered business intelligence service that makes it easy to deliver insights to everyone in your organization.

- QuickSight lets you easily create and publish interactive dashboards that include ML Insights. Dashboards can then be accessed from any device, and embedded into your applications, portals, and websites.

Amazon QuickSight

Connections



Setup the Thing

Setup the Thing

- Step 1 : Search for IoT Core in AWS Services.
- Step 2 : Click on manage.
- Step 3 : Click on Register a thing.
- Step 4 : Click on Create a single thing.
- Step 5 : Enter Name : DHT11 and click on Next.
- Step 6 : Click on Create certificate of One-click certificate creation(recommended) option.
- Step 7 : After the certificate creation page gets redirected.

Setup the Thing

- Step 8 : Download certificate.pem, private.key and root CA for AWS.
- Step 9 : Click on Activate.
- Step 10 : Click on Done.
- Step 11 : Click on Secure —> Policies —> Create a ploicy.
- Step 12 : Enter Name : DHT11, Action : iot:*, Resource ARN : *, Effect : Allow.
- Step 13 : Click on Create.
- Step 14 : Click on Certificates —> Options.

Setup the Thing

- Step 15 : Click on Attach a policy.
- Step 16 : Click on Act —> Create.
- Step 17 : Enter Name : DHT11, Rule query Statement : SELECT * FROM 'DHT11/data'.
- Step 18 : Click on Add action.
- Step 19 : Select Send a message to IoT Analytics and click on Configure action.
- Step 20 : Select Quick create IoT Analytics resources and enter Resource Prefix : DHT11 and click on Quick create.
- Step 21 : Click on Add action and Create rule.

Setup the Raspberry Pi

Setup the Raspberry Pi

- Step 1 : To install the SDK on your Pi, open the terminal and type the following command :
  >git clone https://github.com/aws/aws-iot-device-sdk-python.git

- Step 2 : This should have installed the *aws* directory on your Pi, now navigate into it using the following command :
  >cd aws-iot-device-sdk-python
  Step 3 : Inside the directory install the setup file using the line below :
  >python setup.py install
  Step 4 : Create a folder “DHT11” in your home directory.

- Step 5 : Using WinSCP connect to your Raspberry Pi and place the certificate.pem.crt, private.pem.key, rootCA.pem, aws.py and place them inside your DHT11 folder.

Setup the Raspberry Pi

- Step 6 : Edit the aws.py file and update the endpoint configuration which can be found when you click on

  DHT11 —> Interact —> HTTPS

- Step 7 : Save the aws.py after making the changes.

- Step 8 : To run the program, open the terminal and type the following code :

  >python aws.py

- Step 9 : Once the program starts executing, click on AWS IoT —> Test —> Subscribe to a topic.

- Step 10 : In Subscription topic enter DHT11/data and click on subscribe to topic.

Setup the Amazon SageMaker

Setup the Amazon SageMaker

- Step 1 : Search for Amazon SageMaker in AWS Services.
- Step 2 : Click on Create notebook instance.
- Step 3 : Enter Notebook instance name : DHT11 and click on Create notebook instance.
- Step 4 : Once your newly created notebook instance is ready click on Open Jupyter.
- Step 5 : Click on New and select conda_python3.

Setup the QuickSight

Setup the QuickSight

- Step 1 : Search for QuickSight in AWS Services.
- Step 2 : Click on New analysis.
- Step 3 : Select your dht11_dataset created in IoT Analytics.
- Step 4 : Click on Create analysis.

Any Questions??

Thank You