# Use of Cloud in Internet of Things

# What is Cloud?

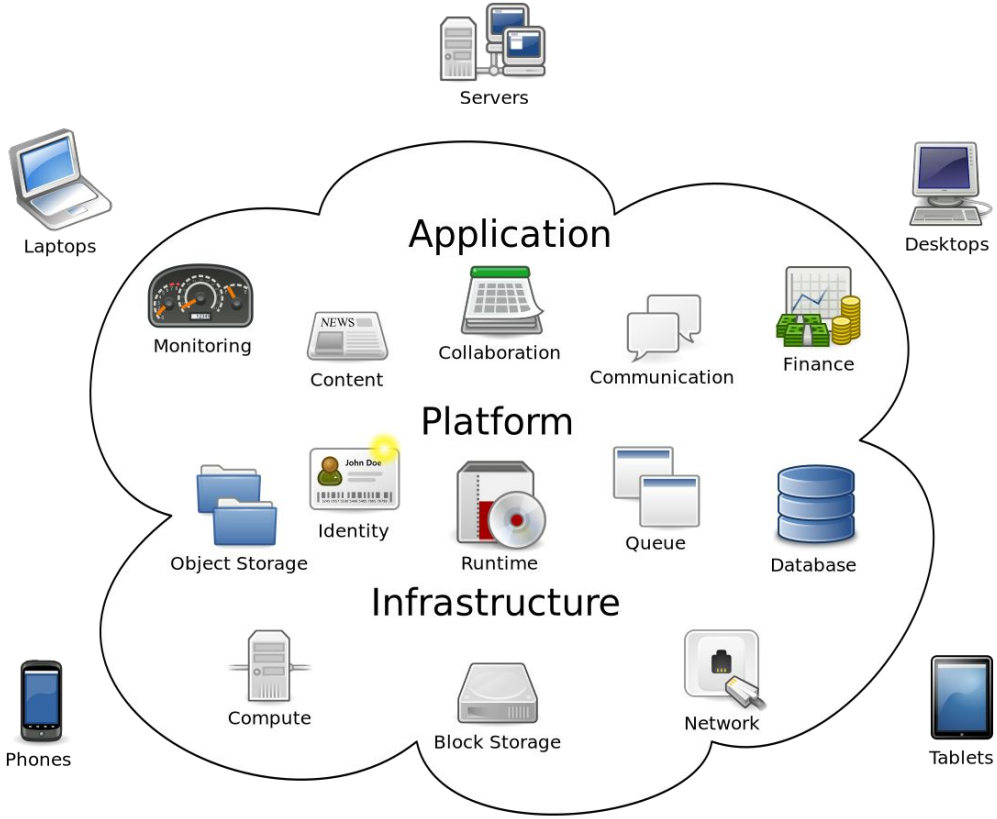
Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. The term is generally used to describe data centers available to many users over the Internet.

# Basics of Cloud

Or in simple terms,

the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer is called cloud computing.

# Basics of Cloud



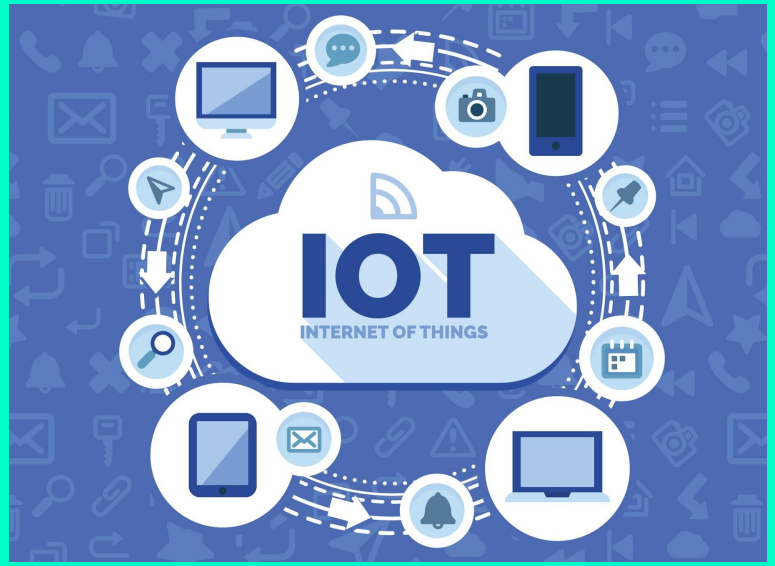

# Cloud computing

The cloud make sit possible for you to access your information from anywhere at any time

Removes the need to be physically present at the same
location as Hardware components.

# Basics of Cloud

# Use of Cloud in IoT



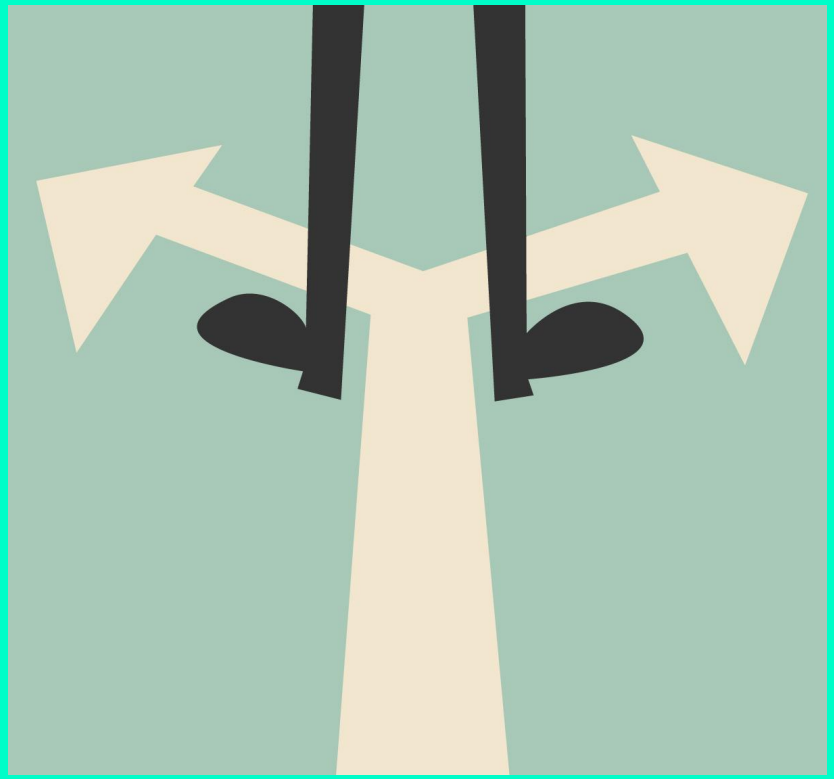
Cloud computing and the IoT both serve to increase efficiency in everyday tasks and both have a complementary relationship.  The IoT generates massive amounts of data, and cloud computing provides a pathway for this data to travel.

# Use of Cloud in IoT

Cloud Computing enables better collaboration which is essential for developers today. By allowing developers to store and access data remotely, developers can access data immediately and work on projects without delay.

# Use of Cloud in IoT

# Use of a Standard IoT platform OR Manual Cloud setup from scratch



## What is an IoT Platform?

A multi-layer technology which is used to manage and automate the connected devices is known as the **IoT platform.** In other words, it is a service which helps you in bringing the physical objects online. This platform will provide you with the services to connect the devices for a machine to machine communication.

# IoT Platforms

## Some facts about these platforms:

- The primary function of the IoT platform is to act as middleware or as plumbing to connect devices or applications to another end. IoT contains a mixture of functions like Sensors & controllers, a gateway device, communication network, data analyzing & translating software, and end application service.

# IoT Platforms

- IoT cloud platform can handle huge data volume from devices, customers, applications, websites, and sensors and take actions to give a real-time response.
- How to select the best Internet of Things platform depends on the requirements of a company for hardware, real-time access, custom reports, budget, development skills, and the business model.

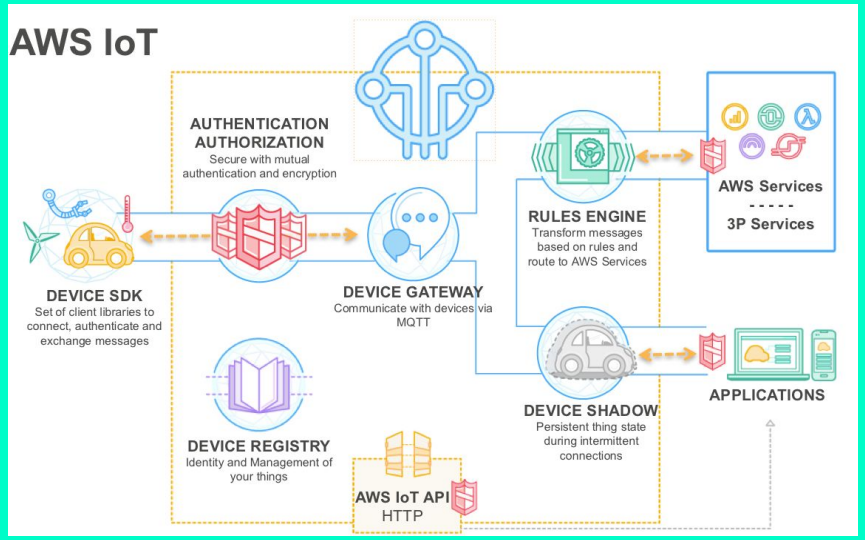
# IoT Platforms

## Some popular IoT platforms:

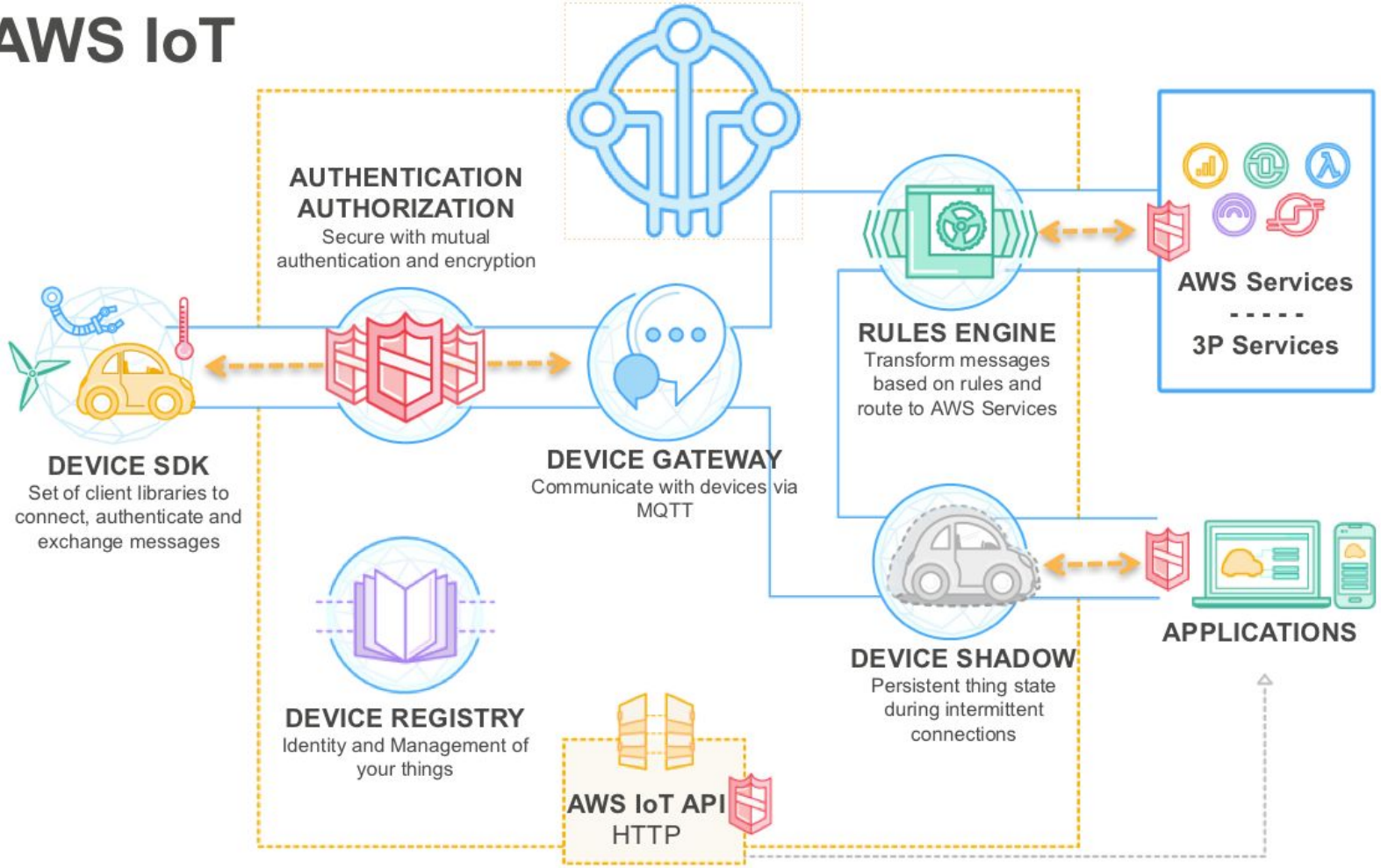
- Google Cloud Platform
- Salesforce IoT Cloud
- IBM Watson IoT
- Amazon AWS IoT Core
- Microsoft Azure IoT Suite

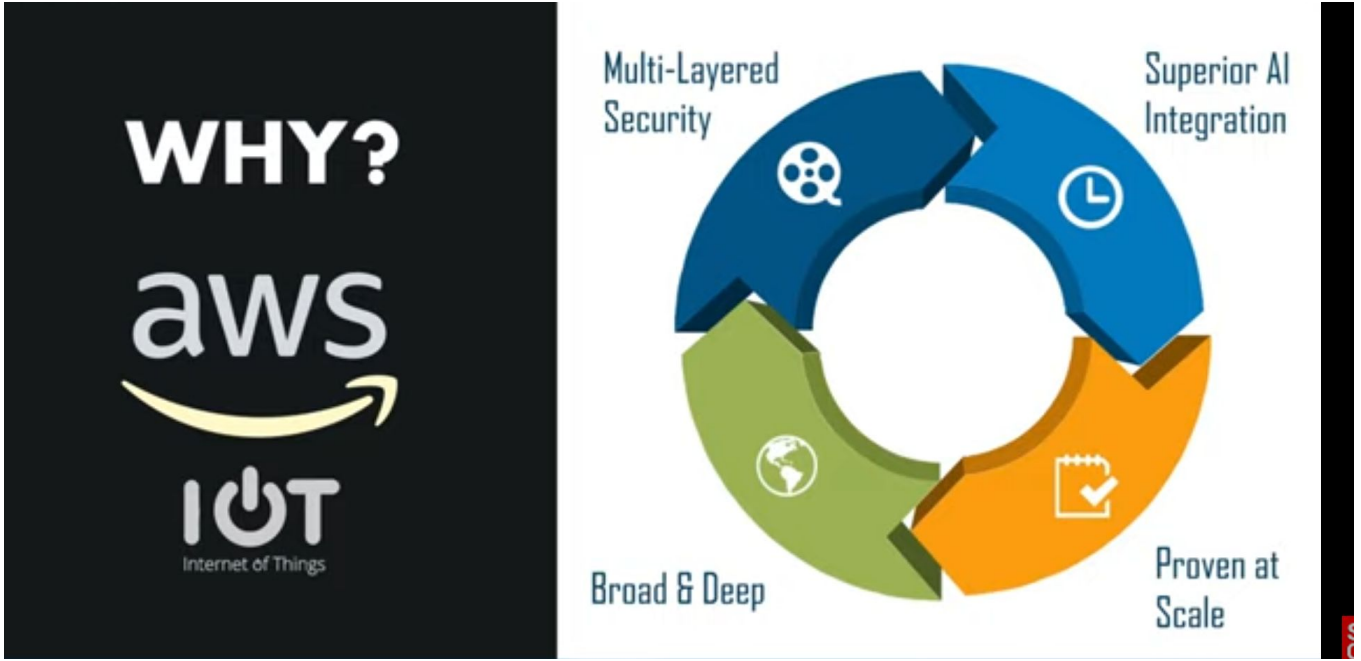
# IoT Platforms

# AWS as a platform

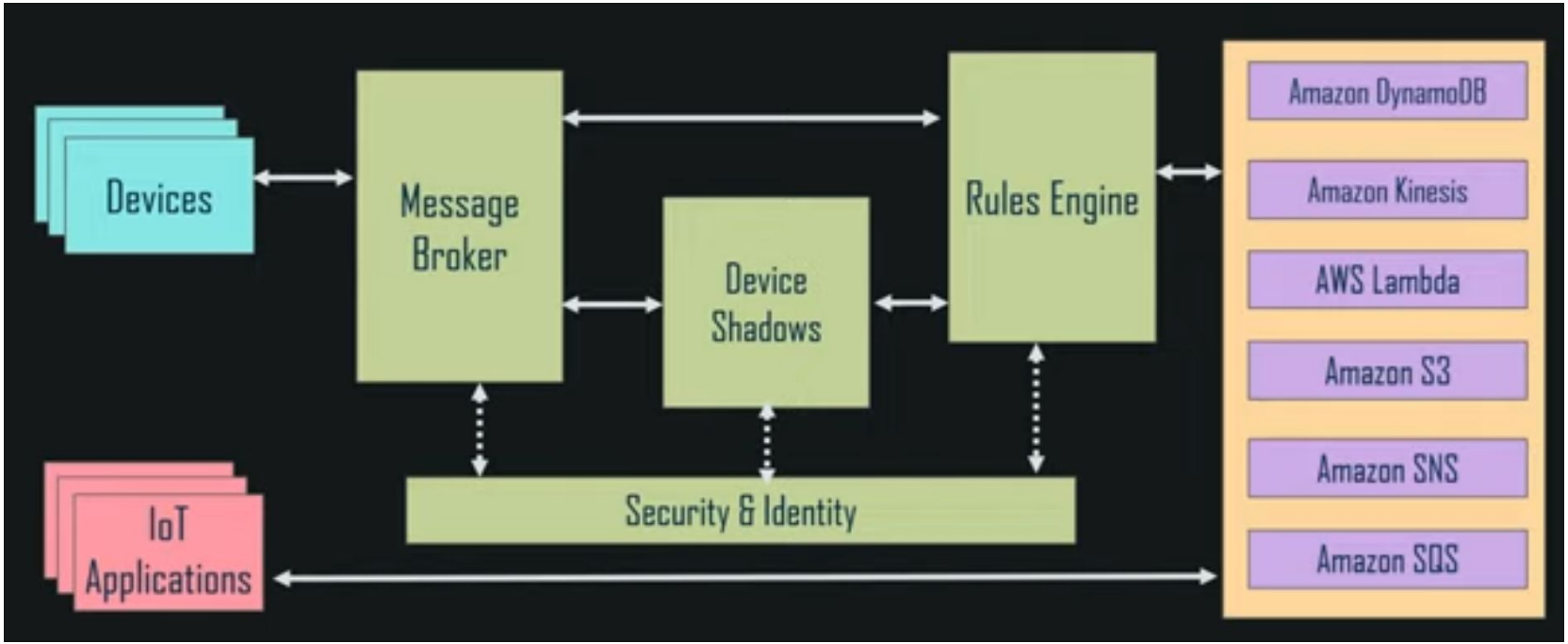


# AWS IoT


AUTHENTICATION
AUTHORIZATION
Secure with mutual authentication and encryption
RULES ENGINE
Transform messages based on rules and route to AWS Services
AWS Services
- - - - -
3P Services
DEVICE SDK
Set of client libraries to connect, authenticate and exchange messages
DEVICE GATEWAY
Communicate with devices via MQTT
DEVICE SHADOW
Persistent thing state during intermittent connections
APPLICATIONS
DEVICE REGISTRY
Identity and Management of your things
AWS IoT API
HTTP

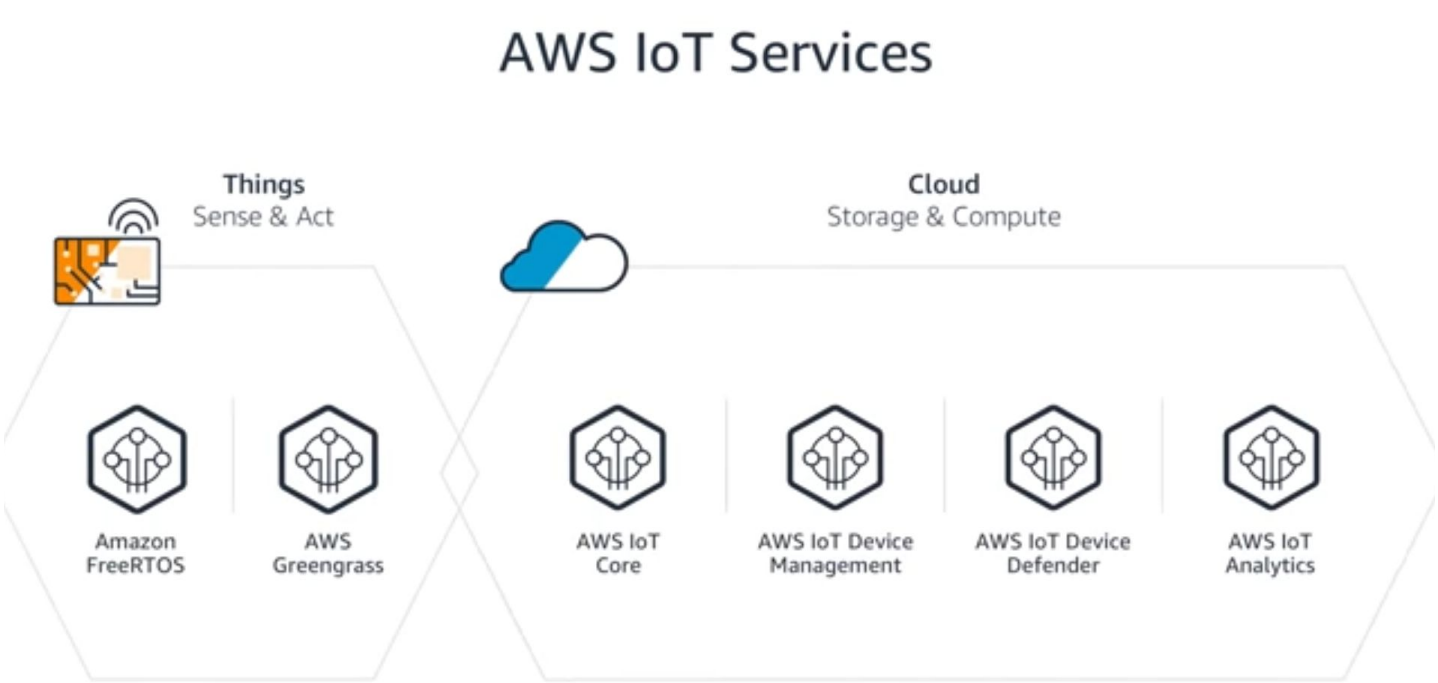

WHY?
aws
IOT
Internet of Things
Multi-Layered Security
Superior AI Integration
Broad & Deep
Proven at Scale

# AWS IoT




# Working of AWS IoT

# AWS IoT Services




# AWS IoT Services

- FreeRTOS is an open source, real-time operating system for microcontrollers that makes small, low-power edge devices easy to program, deploy, secure, connect, and manage.
- Distributed freely under the MIT open source license, FreeRTOS includes a kernel and a growing set of software libraries suitable for use across industry sectors and applications.

# FreeRTOS


Amazon FreeRTOS
Free, open source, IoT operating system for microcontrollers
Local connectivity libraries
Cloud connectivity libraries
Security libraries
OTA & code signing

# FreeRTOS

- AWS IoT Greengrass seamlessly extends AWS to edge devices so they can act locally on the data they generate, while still using the cloud for management, analytics, and durable storage.
- With AWS IoT Greengrass, connected devices can run AWS Lambda functions, Docker containers, or both, execute predictions based on machine learning models, keep device data in sync, and communicate with other devices securely – even when not connected to the Internet.

# Greengrass


AWS Greengrass
Software runtime that extends AWS IoT functionality to the edge
Local actions
Local resource access
Route local messages
Data & state sync
Security
Over-the-air-updates

# Greengrass

- 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


AWS IoT Core
Secure device connectivity & messaging
Securely connect
Route, process, and act on the data
Control & interact with devices

# AWS IoT Core

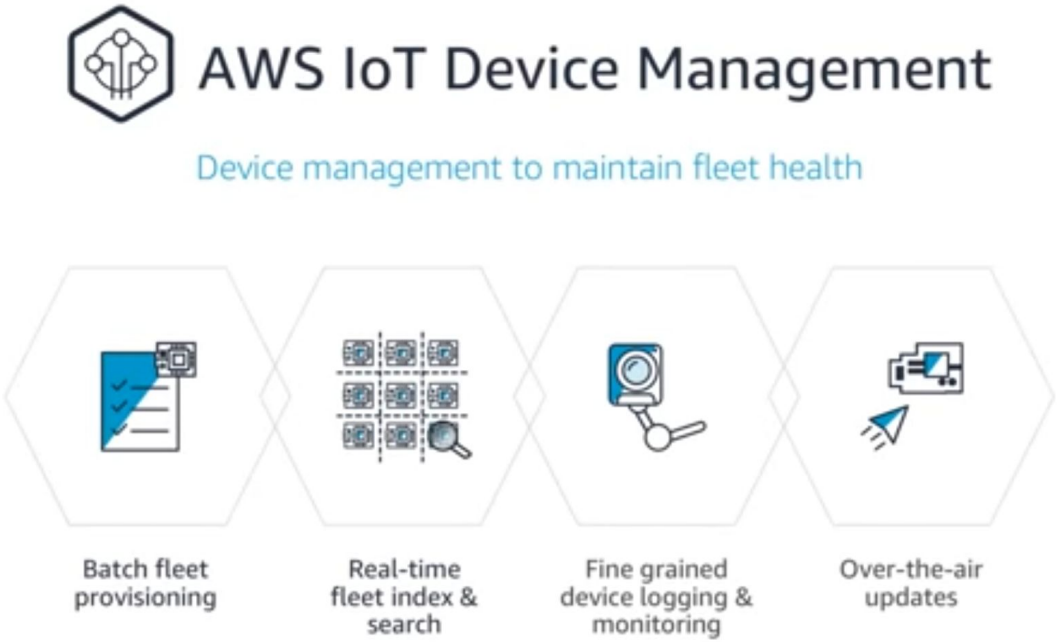
- AWS IoT Device Defender is a fully managed service that helps you secure your fleet of IoT devices. AWS IoT Device Defender continuously audits your IoT configurations to make sure that they aren't deviating from security best practices. A configuration is a set of technical controls you set to help keep information secure when devices are communicating with each other and the cloud.

# Device Defender


# Device Defender

- AWS IoT Device Management makes it easy to securely register, organize, monitor, and remotely manage IoT devices at scale. With AWS IoT Device Management, you can register your connected devices individually or in bulk, and easily manage permissions so that devices remain secure. You can also organize your devices, monitor and troubleshoot device functionality, query the state of any IoT device in your fleet, and send firmware updates over-the-air (OTA)

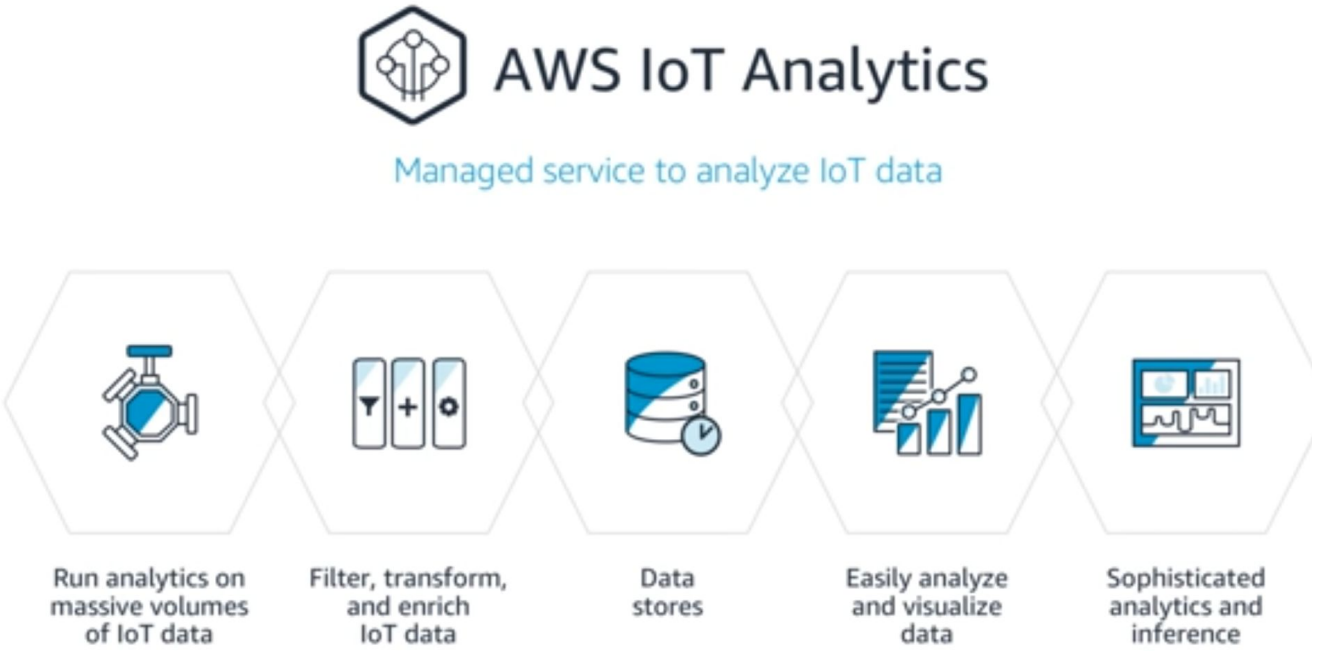
# Device Management




# Device Management

- AWS IoT Analytics is a fully-managed service that makes it easy to run and operationalize sophisticated analytics on massive volumes of IoT data.
- AWS IoT Analytics automates each of the difficult steps that are required to analyze data from IoT devices. AWS IoT Analytics filters, transforms, and enriches IoT data before storing it in a time-series data store for analysis.

# AWS IoT Analytics




# AWS IoT Analytics

# Shadow Topics

- The Device Shadow service uses reserved MQTT topics to enable applications and devices to get, update, or delete the state information for a device (shadow).
- Publishing and subscribing on shadow topics requires topic-based authorization. AWS IoT reserves the right to add new topics to the existing topic structure. For this reason, we recommend that you avoid wild card subscriptions to shadow topics.

# Shadow Topics

- /update
- /update/accepted
- /update/documents
- /update/rejected
- /update/delta
- /get
- /get/accepted
- /get/rejected
- /delete
- /delete/accepted
- /delete/rejected

# Shadow Topics

- www.freepik.com
- https://www.youtube.com/watch?v=WAp6FHbhYCk
- https://www.youtube.com/watch?v=etrELgrffrc

# Image Attributions

# Thank You!