AWS customers are connecting physical things to the cloud in every industry imaginable.

- Healthcare and Life Sciences
- Municipal Infrastructure
- Smart Home
- Retail
- Manufacturing, Logistics & Supply Chain
- Agriculture
- Education
- Automotive
IoT connects things, but what is a “thing”? 

- iPads are “things”
- Laptops are “things”
- Sensors and actuators are “things”
- Embedded devices are “things”

- If it has a Cert, MQTT, and an IP address then it can be a “connected thing”
AWS IoT is a fully managed cloud platform that lets connected devices easily and securely interact with cloud applications and other devices.

1. Securely connect and manage any physical device across multiple networks and protocols
2. Extract and Filter data from your devices and take action with custom Rules
3. Create Web and Mobile Applications that Interact with Devices reliably at any time

- Device SDK
- Device Security and Policy Management
- Device Gateway
- Registry
- Rules Engine
- Shadow
AWS IoT Overview

**DEVICE SDK**
Set of client libraries to connect, authenticate and exchange messages

**DEVICE GATEWAY**
Communicate with devices via MQTT and HTTP

**AUTHENTICATION**
Secure with mutual authentication and encryption

**RULES ENGINE**
Transform messages based on rules and route to AWS Services

**SHADOW**
Persistent thing state during intermittent connections

**REGISTRY**
Identity and Management of your things

**AWS IoT API**

**APPLICATIONS**

**AWS Services**

**3P Services**
Example: Connected Farm

Sensors

Actuators

AWS IoT

Control automation

Data storage & analytics

Administration
Basics of IoT Telemetry & Analytics

1. Connect devices
2. Send data
3. Collect & store the data
4. Do something with the data
AWS IoT Components

- **Device**
  - IoT certificate
  - IoT policies

- **AWS Cognito Identity**
  - Auth provider token + AWS security credentials
  - IAM Role policy
  - IoT policies

- **AWS User**
  - AWS security credentials
  - IAM policies

- **IoT Rules Engine**
  - AWS IAM Roles
  - AWS security credentials
  - IAM Role policy

- **AWS Users**
  - AWS security credentials
  - IAM policies

- **DynamoDB**
- **Kinesis**
- **Lambda**
AWS IoT: Front Door to AWS

**Registry**
Establishes an identity for devices and manages metadata such as the devices’ attributes and capabilities

**Shadows**
Apps and devices can access “RESTful” Shadow (Thing’s State) that is in sync with the device

**Rules and Actions**
Match patterns and take actions to send data to other AWS services or republish

{Thing Name, Sensor Temp, GetTemp(), Output LED}
AWS IoT: Securely Connect Devices

**Multi-protocol Message Gateway**
Millions of devices and apps can connect over MQTT or HTTP.

**Elastic Pub Sub Broker**
Go from 1 to 1-billion long-lived connections with zero provisioning

**Secure by Default**
Connect securely via X509 Certs and TLS v1.2 Client Mutual Auth
Enforce Security and Policies End to End
Sample IoT Architecture

- Mobile app/device
- API Gateway
- Lambda
- EC2 Instances
- AWS IoT
- Amazon SQS
- Amazon SNS
- DynamoDB
- RDS
- AWS Cognito
- IAM
AWS IoT Rules Engine

Rules Engine connects AWS IoT to External Endpoints and AWS Services.

1. AWS Services (Direct Integration)
   - S3
   - DDB
   - Kinesis
   - SNS
   - Lambda
   - SQS

2. Rest of AWS (via Kinesis, Lambda, S3, and more)
   - RDS
   - Glacier
   - Redshift
   - EC2

3. External Endpoints (via Lambda and SNS)
AWS IoT Shadows

**Thing**
- Report its current state to one or multiple shadows
- Retrieve its desired state from shadow

**Shadow**
- Shadow reports delta, desired and reported states along with metadata and version

**Mobile App**
- Set the desired state of a device
- Get the last reported state of the device
- Delete the shadow

```json
{
  "state": {
    "desired": {
      "lights": { "color": "RED" },
      "engine": "ON"
    },
    "reported": {
      "lights": { "color": "GREEN" },
      "engine": "ON"
    },
    "delta": {
      "lights": { "color": "RED" }
    }
  },
  "version": 10
}
```
Increase The Value of A Product Over Time with Data

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Telemetry and Usage Data → Data Filtering and Routing Rules → Ordered Stream to Kinesis Firehose → Storage and Offline Analysis

Customization, New Capabilities → Online Monitoring
AWS: The Full Platform For IoT

SDKs & Tools
Connecting To The Cloud
Data Ingestion
Security & Management
Cloud Powered Apps
Big Data & Analytics
Prediction
Thank You!