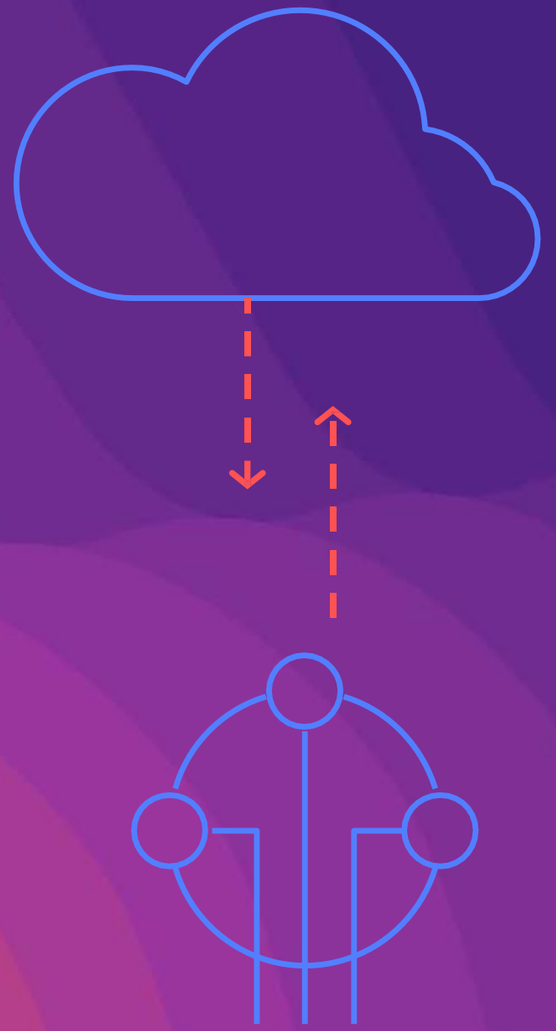
IOT 001

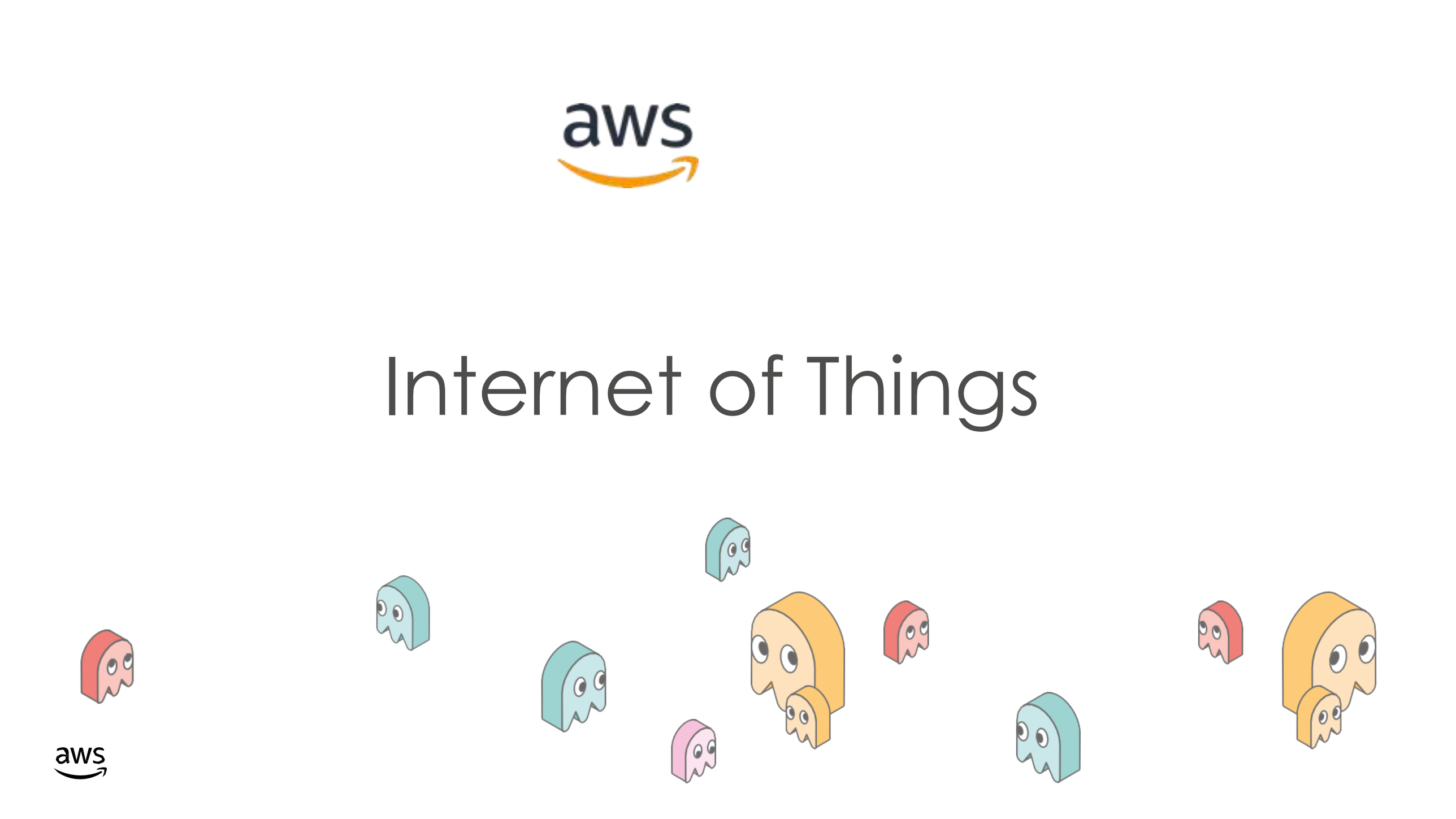
Getting Started with IoT on AWS

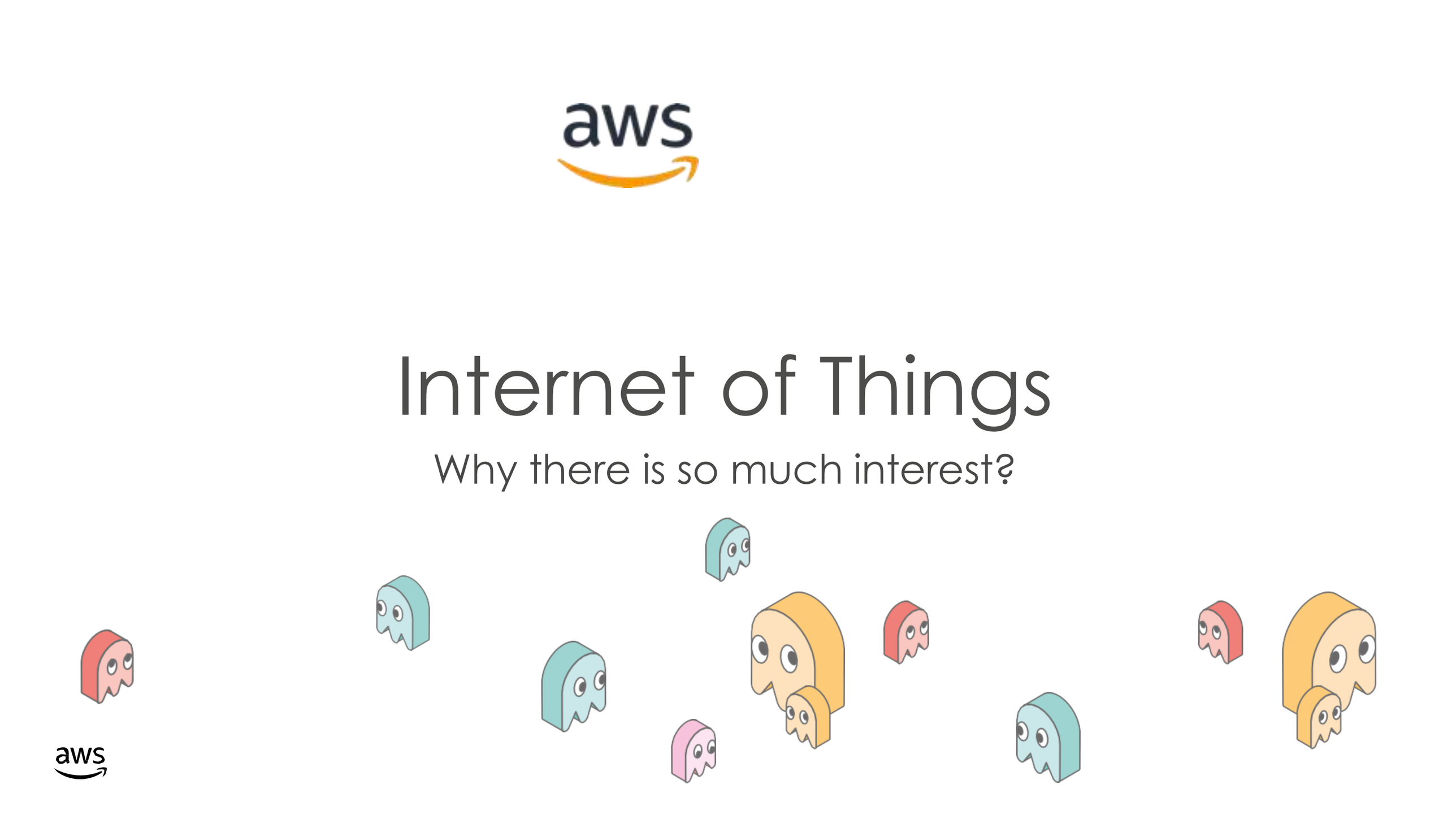


If you knew **the state of every thing** and could **reason on top of that data…**

what **problems** would you solve?

AWS IoT customers solve problems in all sectors


aws
Internet of Things
aws



Internet of Things

Why there is so much interest?

All the music on earth, in every room of your home, wirelessly

SONOS

Sonos is the smart speaker system that streams all your favorite music to any room, or every room.

Control your music with one simple app, and fill your home with pure, immersive sound.

SONOS

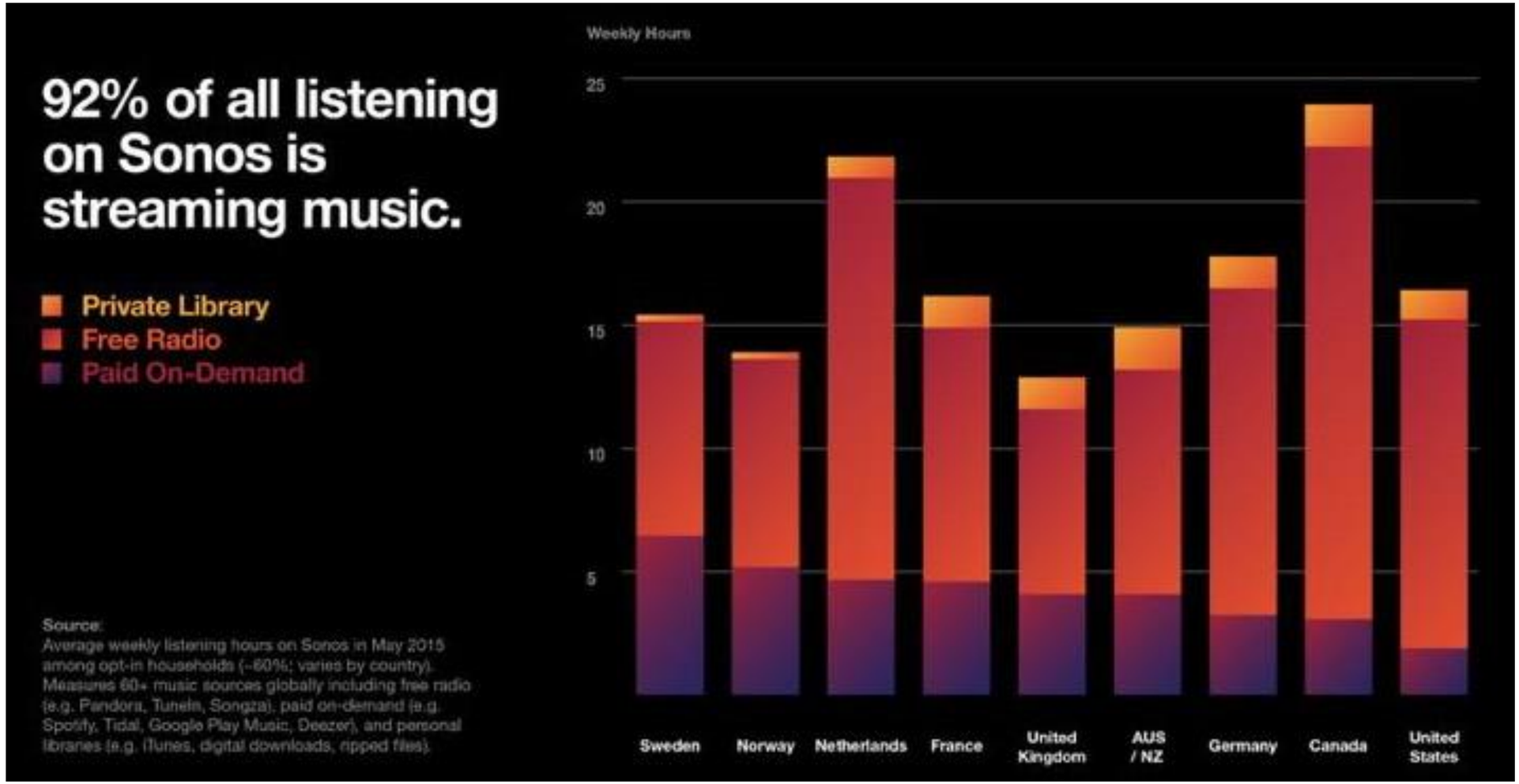
Connected products improve over

SONOS

aws

aws | Pop-up Loft LONDON

Connected products provide unique insights

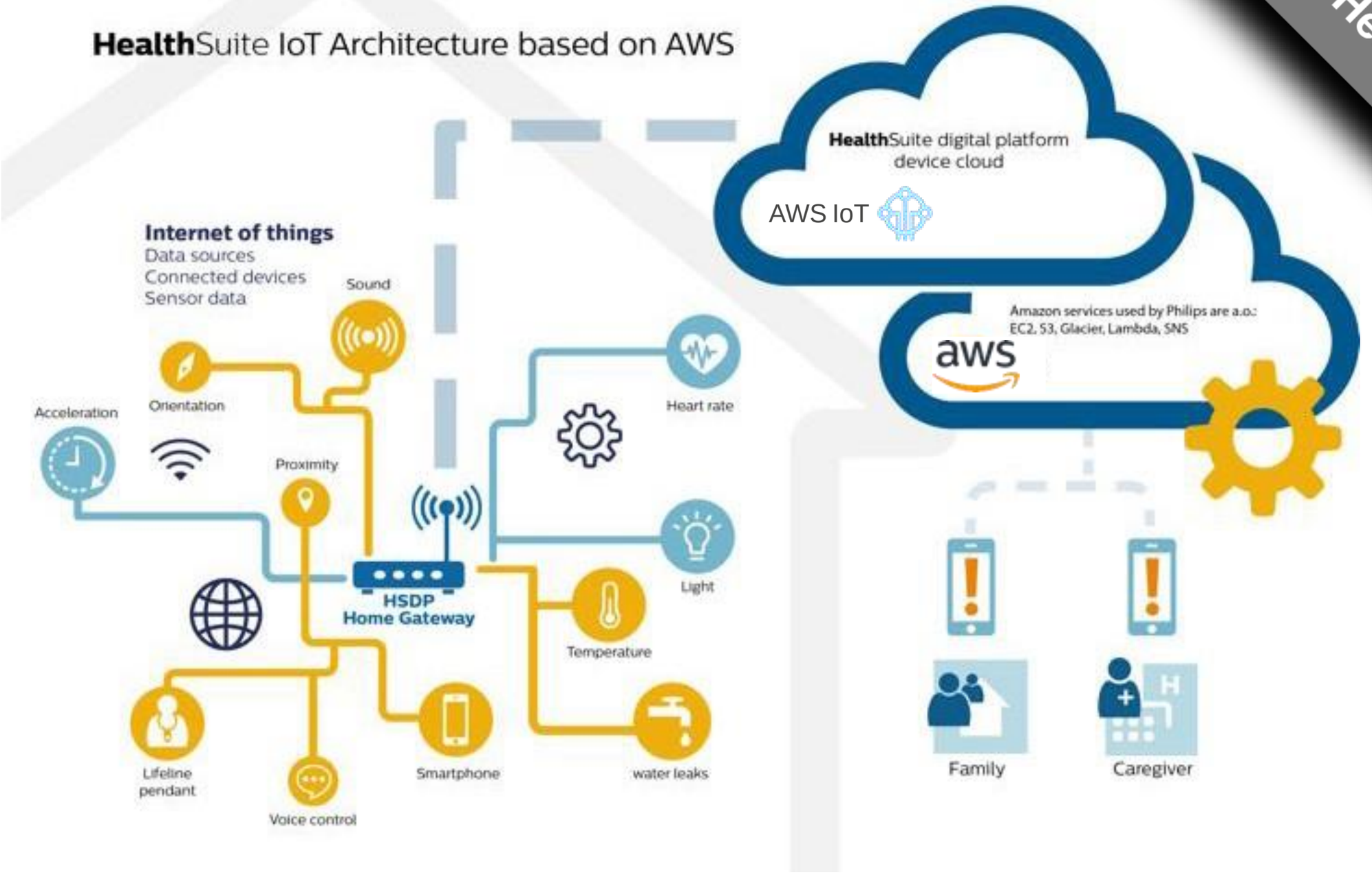


SONOS

aws

aws Pop-up Loft LONDON

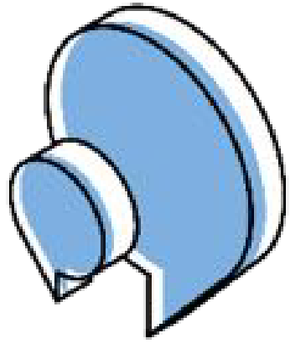
HealthSuite IoT Architecture based on AWS



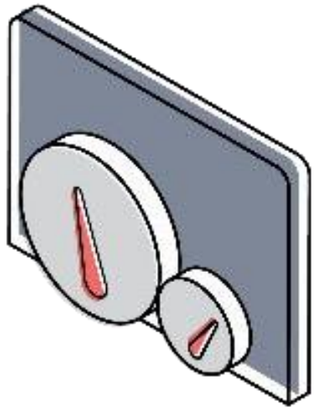
Philips HealthSuite


aws
A Lot of Efforts Are Still Required…
aws

Connecting devices to cloud applications requires undifferentiated heavy lifting.



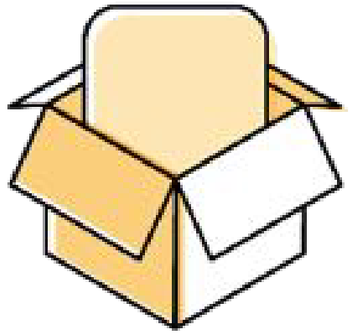
Alternate Protocols



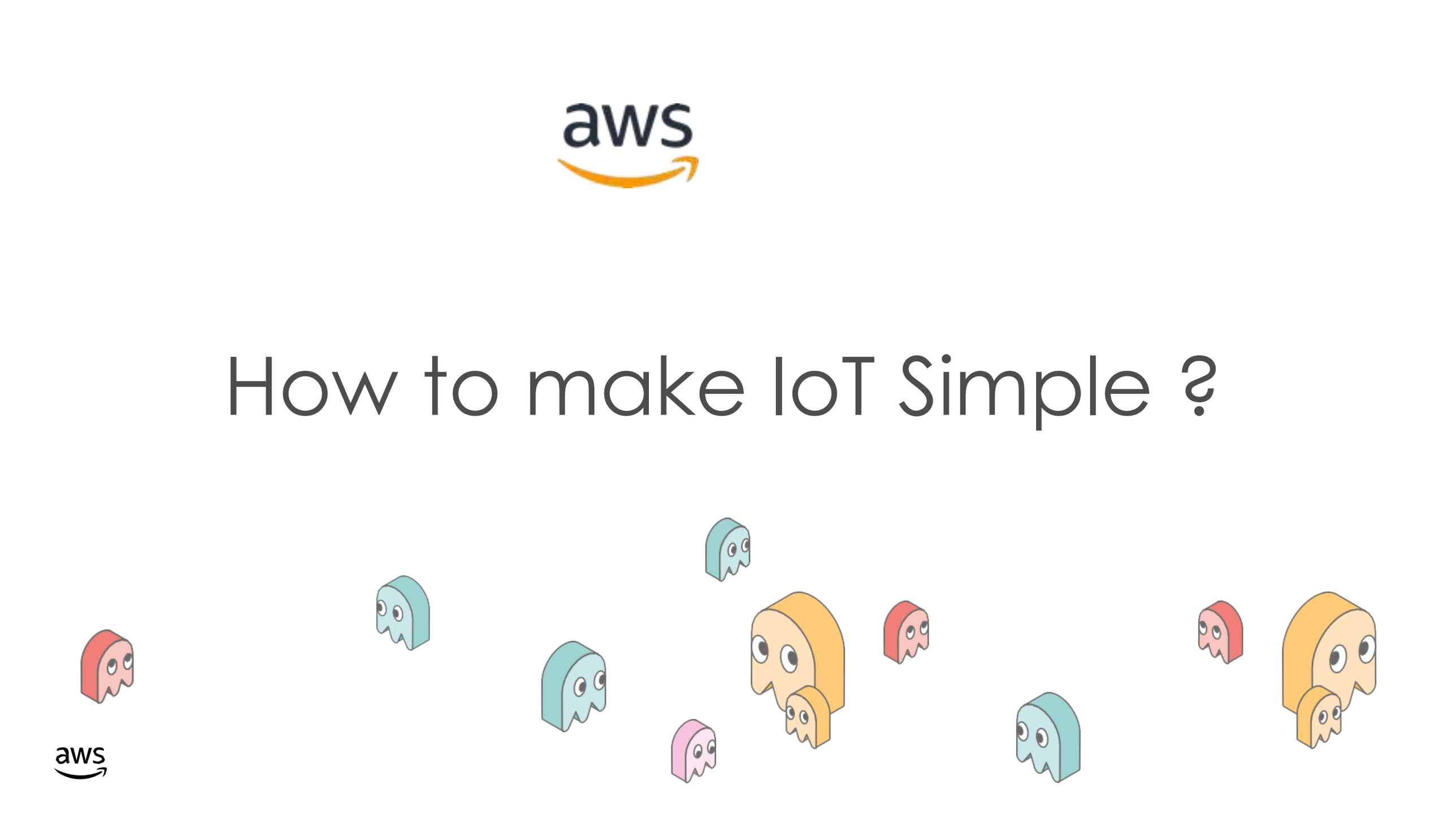
Scalability

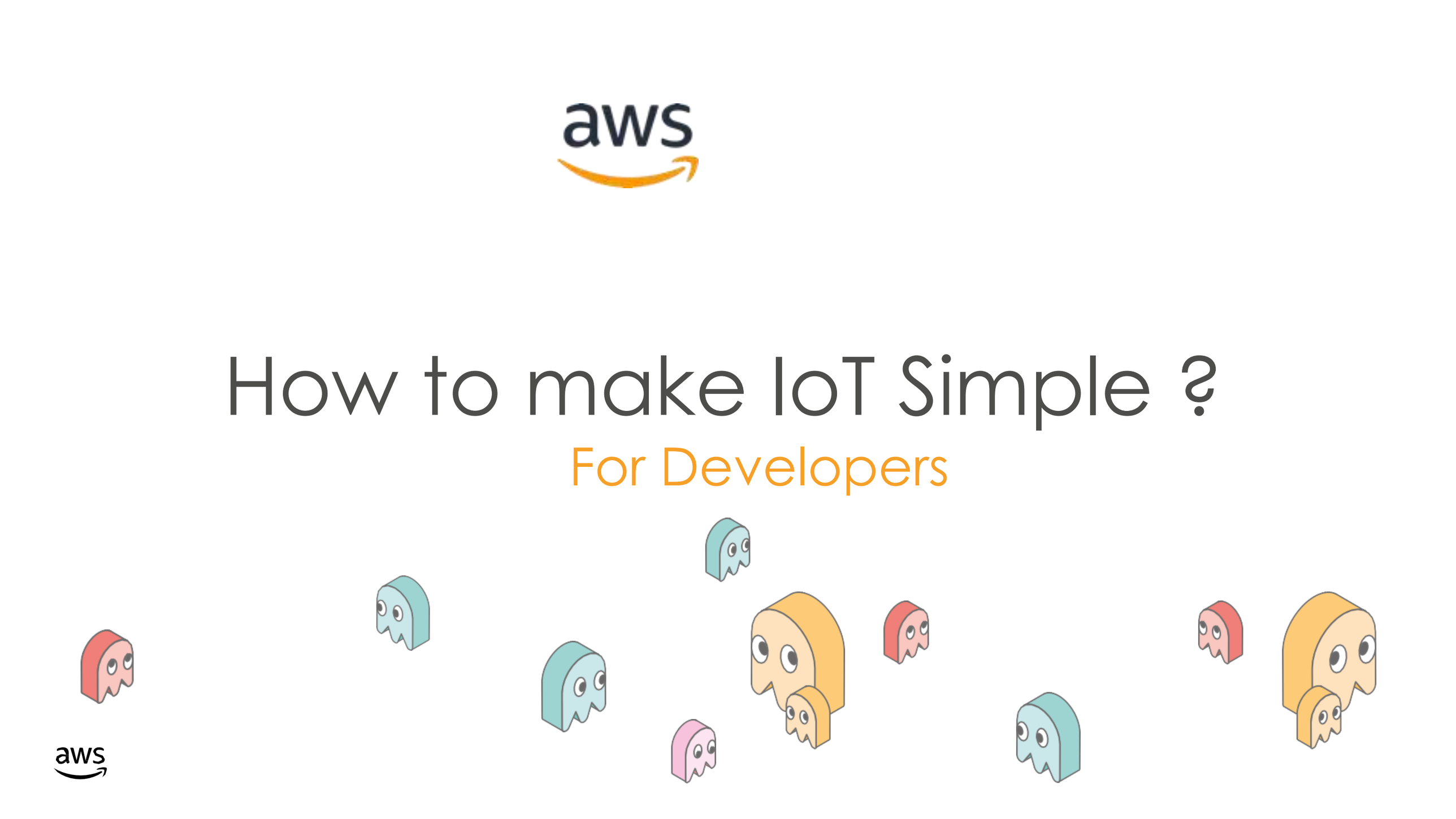
Security & Management

Integration with Cloud and Mobile Applications



Many SDKs & Tools


aws
How to make IoT Simple ?
aws

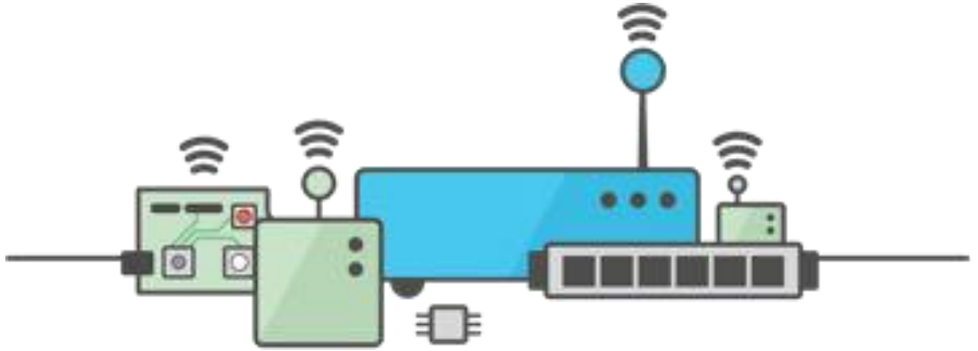


How to make IoT Simple ?

For Developers

Security

Security



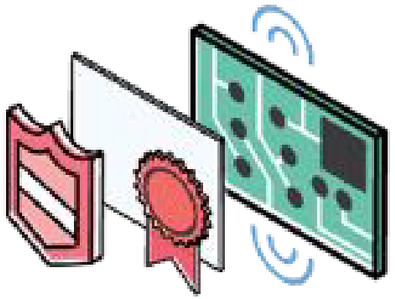
Scalability

Introducing AWS IoT

"Securely connect one or one-billion devices to AWS,
so they can interact with applications and other devices"

1

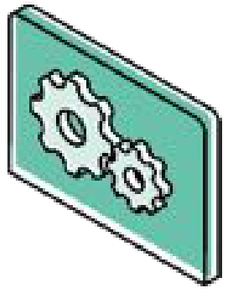
Securely connect any physical device to AWS



Connect any device via MQTT/HTTP securely. Quickly get started with AWS IoT Starter Kits and Scale to billions of messages across millions of devices

2

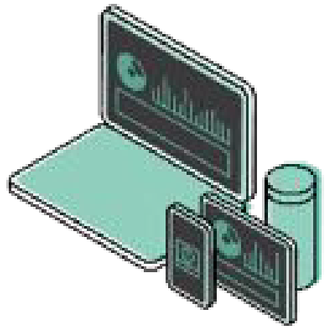
Respond to signals from your fleet of devices and take action with Rule Engine



Shift business logic from device to cloud and route data to AWS service of your choice for storage and analysis using rules engine.

3

Create Web and Mobile Applications that Interact with Devices reliably at any time



Easily build applications on web and mobile that interact with devices, even when they are offline, with AWS SDK and Device Shadow.

AWS IoT Platform

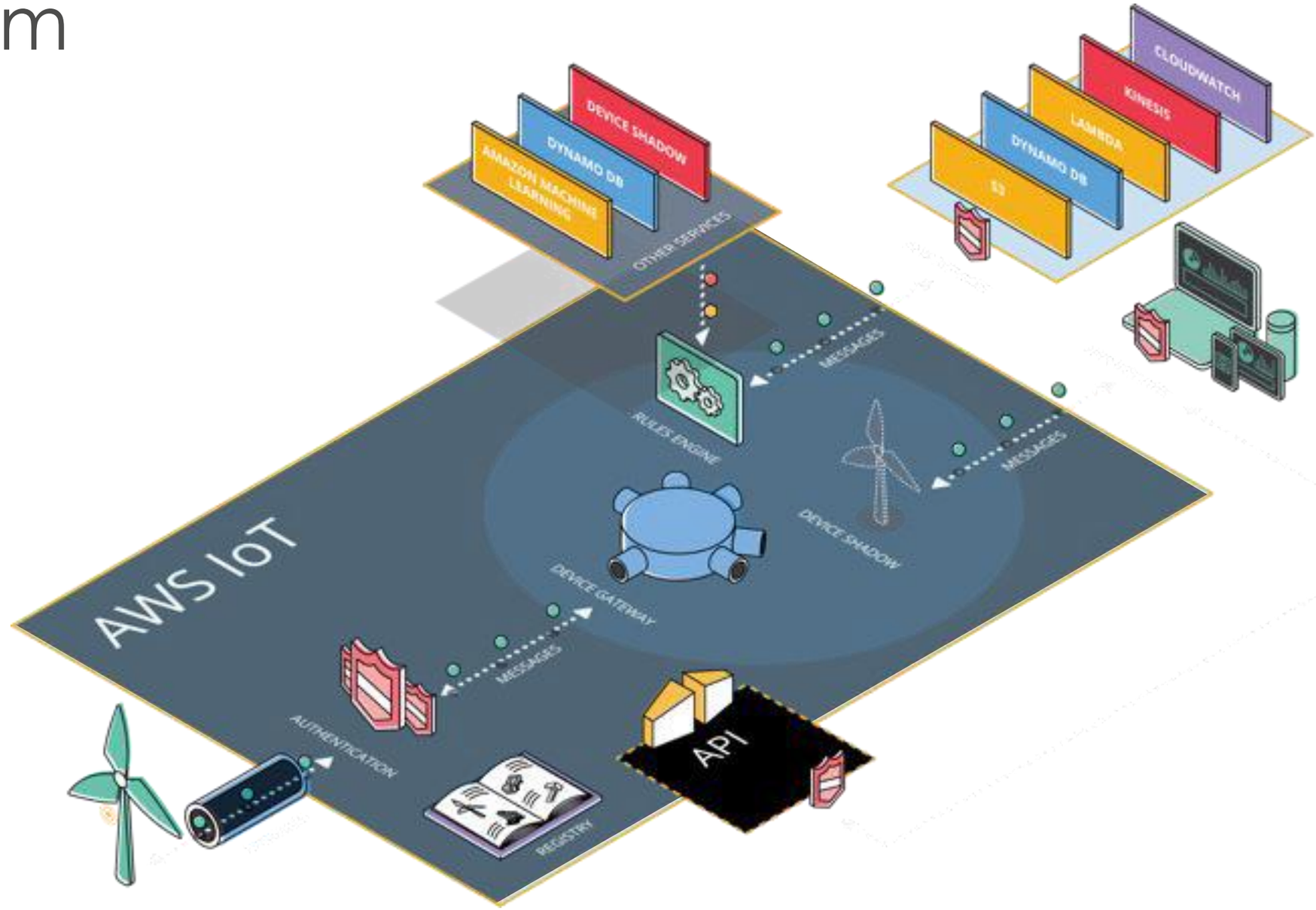
Managed service

- No installation
- Automatic scaling
- No pre-provisioning
- Redundant across AZ
- Pay as you go

All in one service

- Message Broker
- Rules Engine
- Shadow
- Registry

All for $5/M Msg*



* Varies by Region

Publish / Subscribe

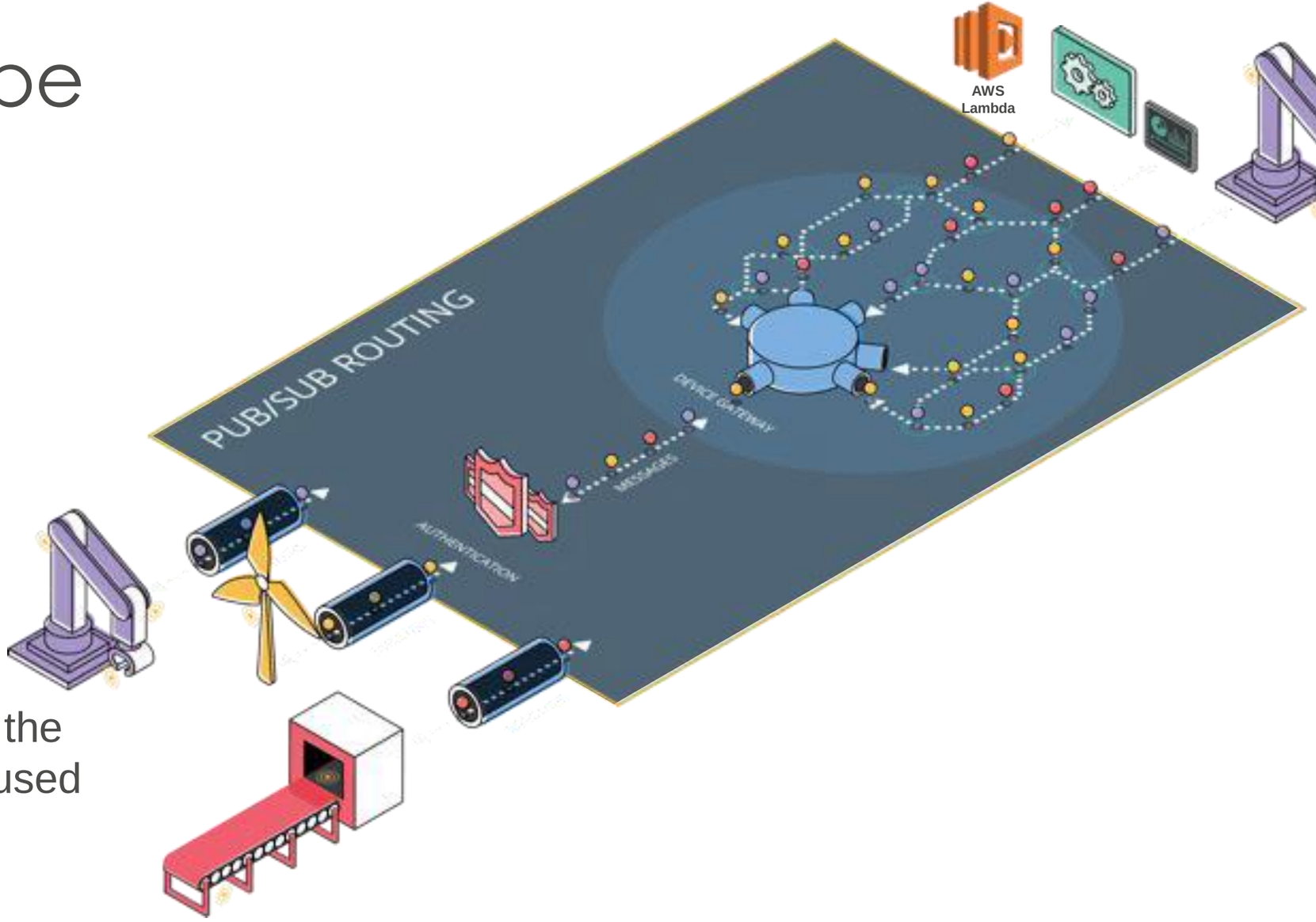
Standard Protocol Support
MQTT, HTTPS, WebSockets

Machine Friendly
Low power, low bandwidth, fast

Long Lived Connections
Receive signals from the cloud

Bidirectional
Communication FROM and TO the devices no matter the protocol used

Device SDK
Open Source – Apache 2.0
Embedded-C, Javascript, Python, Java, Arduino Yún, iOS, Android



Security, Security, Security

Most trusted authentication

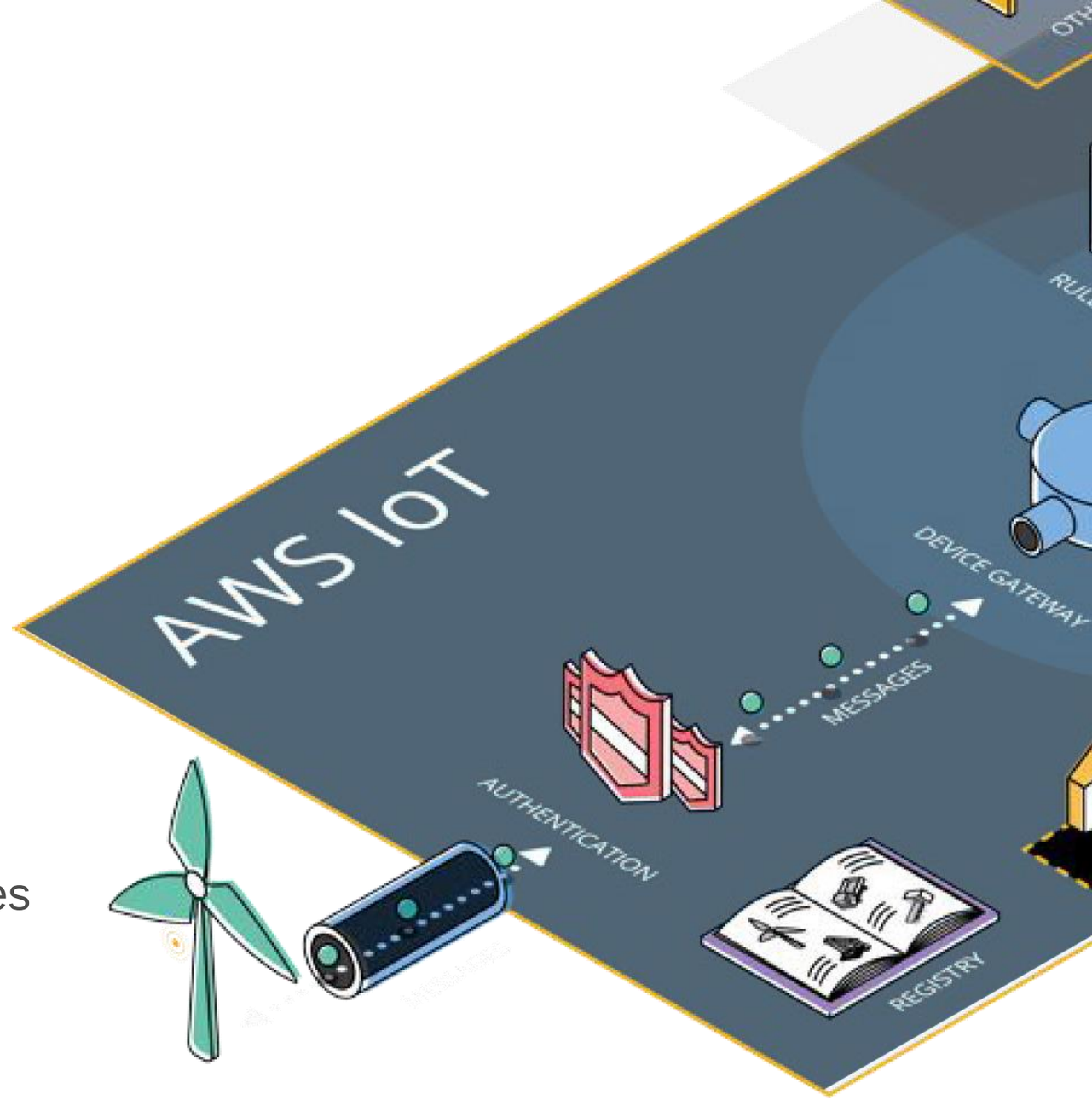
X509 Certificates
Mutual Authentication

Easy onboarding and provisioning

Certificate management
Unlimited amount of Certificates
(Sign your CSR or BYOC)

Policy and Role based access control

Granular access to the message broker for devices and IAM identities
Granular access to backend services via Roles



Rules Engine - Finding the Signals

Easy SQL-Like Syntax

SELECT FROM **TOPIC** WHERE **FILTER**

Bring Context

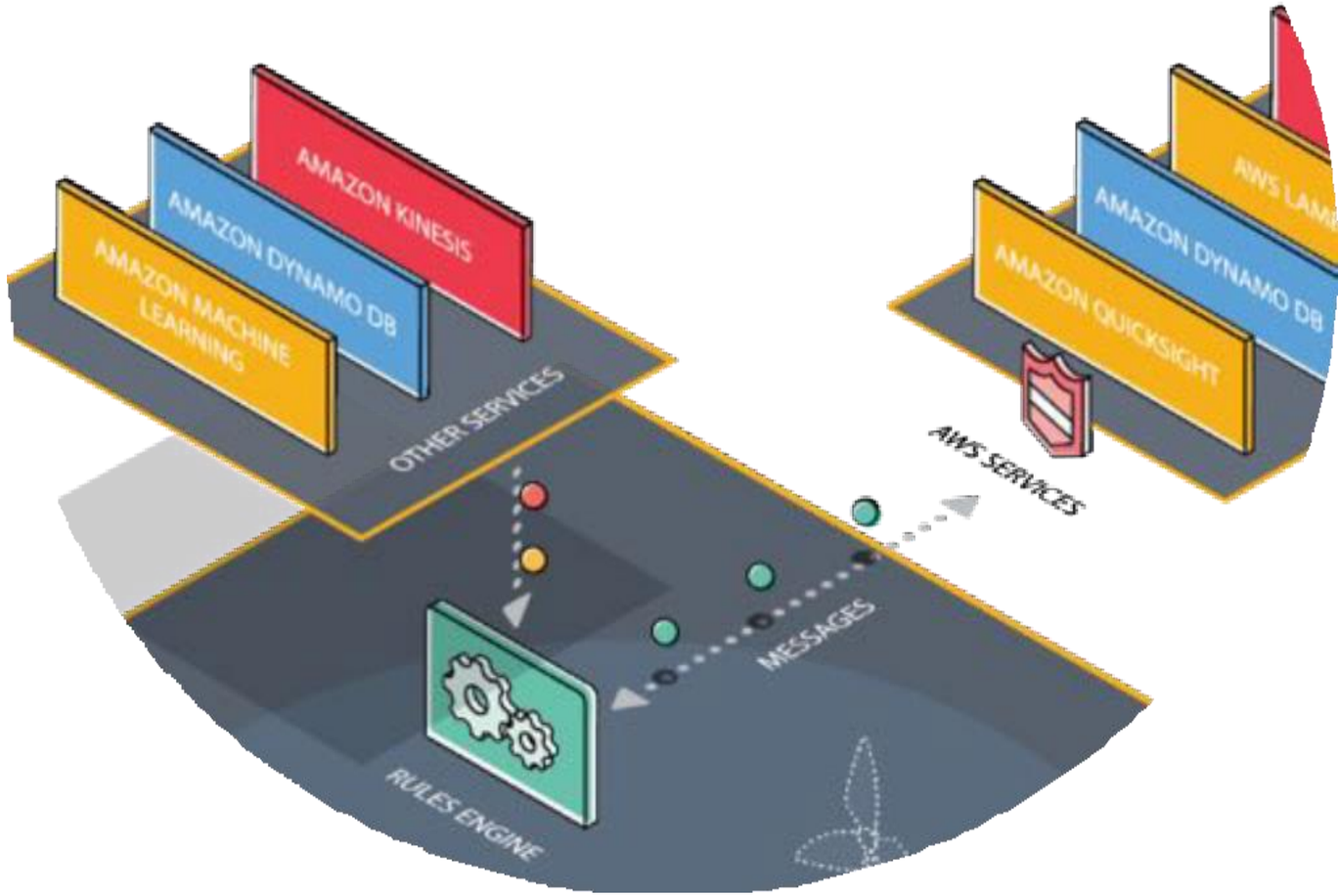
From Amazon Machine Learning, IoT Shadows, DDB

Transforms & Enrich

Math library, JSON parsing and cleansing functions

Route

To multiple AWS Services

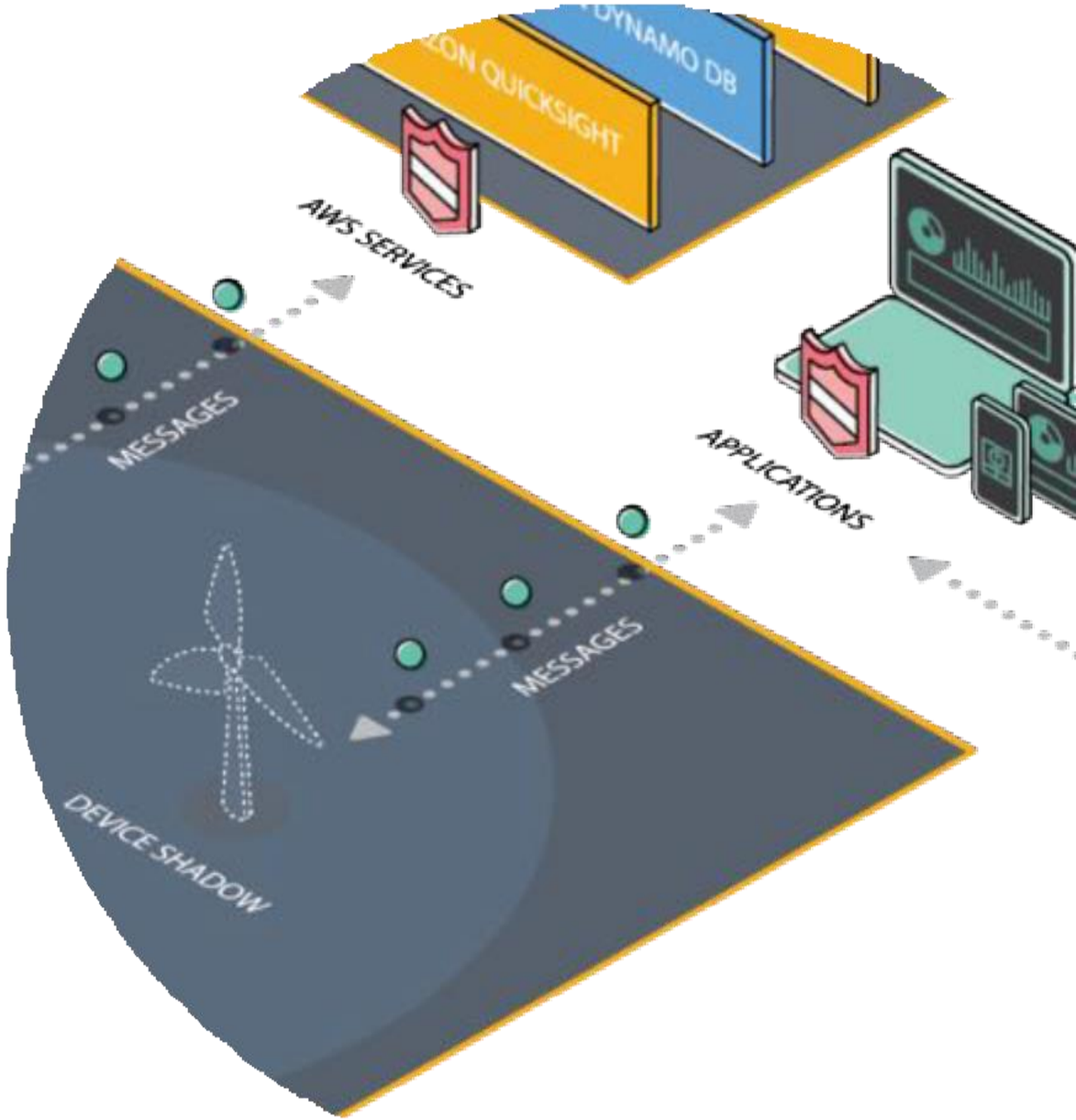


AWS IoT Shadow

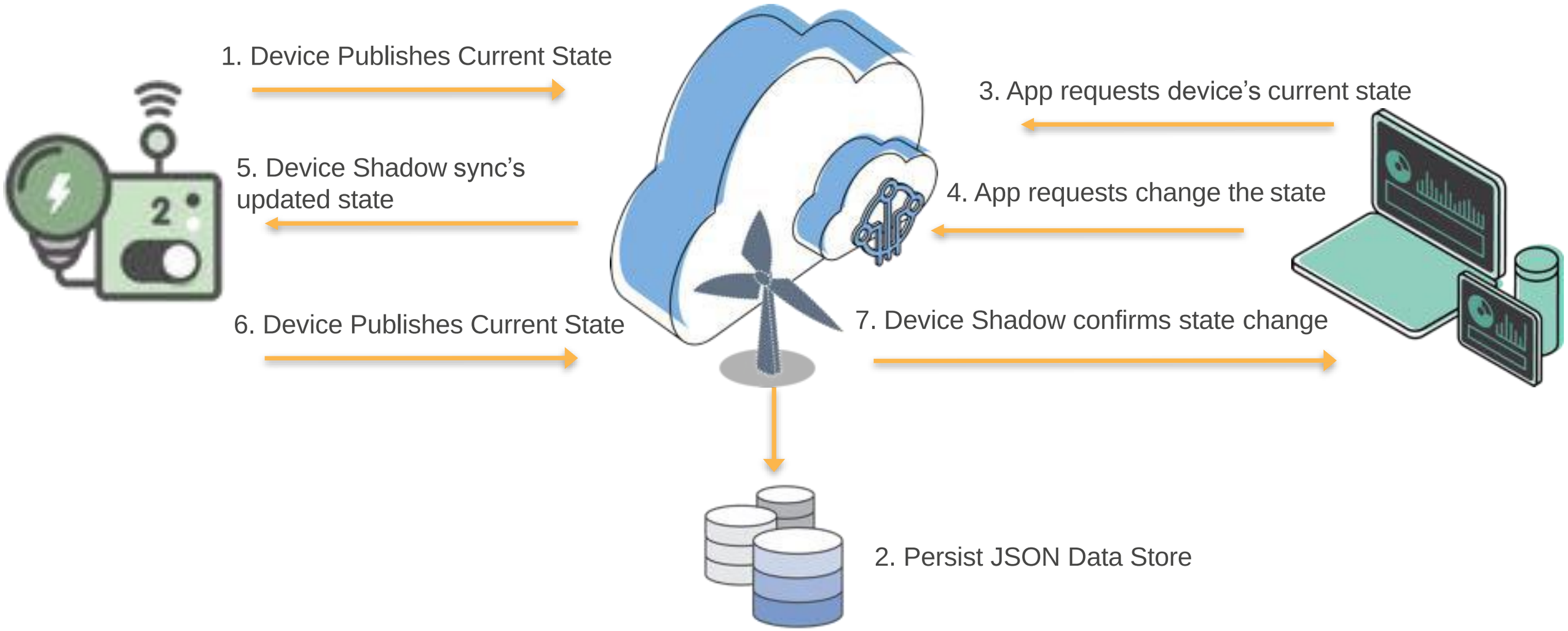
Virtual representation of the device in the Cloud
Always accessible
Holds “states” up to 1 year

More efficient programming
Familiar REST APIs for read/write
Hide complexity of device connectivity (developers do not need to know what protocol the device uses)

Mindful of device constraints
Holds the commands until device is ready
Can be queried anytime
Very fast (~120ms round trip)



AWS IoT Device Shadow Flow



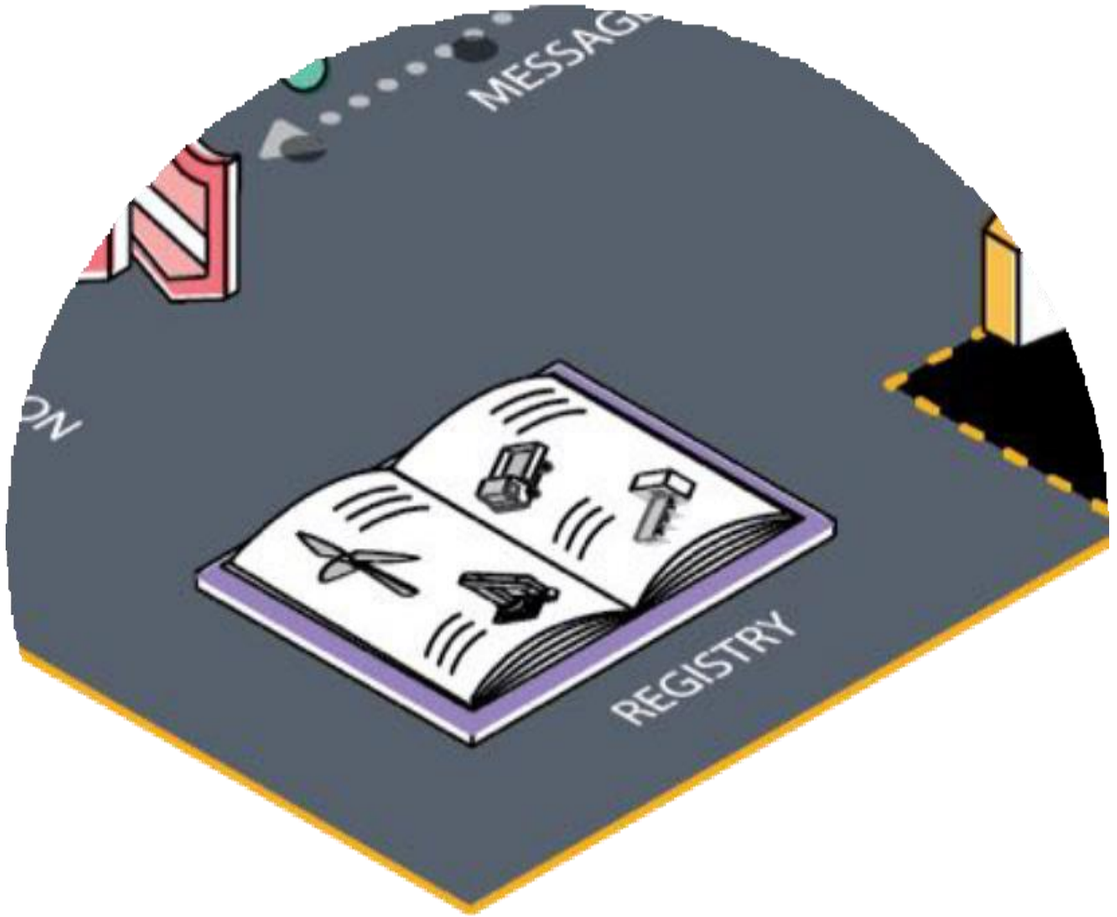
AWS IoT Registry

Device Metadata store

Unlimited registry entries for devices
Mostly used for Metadata

Enforce Schema

Can define Thing Types with set schema
Define up to 50 attributes per Thing



Simple Pay as you go and Predictable Pricing

AWS IoT

- Pay as you go. No minimum fees
- **$5 per million** messages published to, or delivered in US East (N. Virginia, Ohio), US West (Oregon), Ireland, Germany, UK. $6/M in Korea, Australia. $8/M in Asia Pacific (Tokyo, and Singapore)

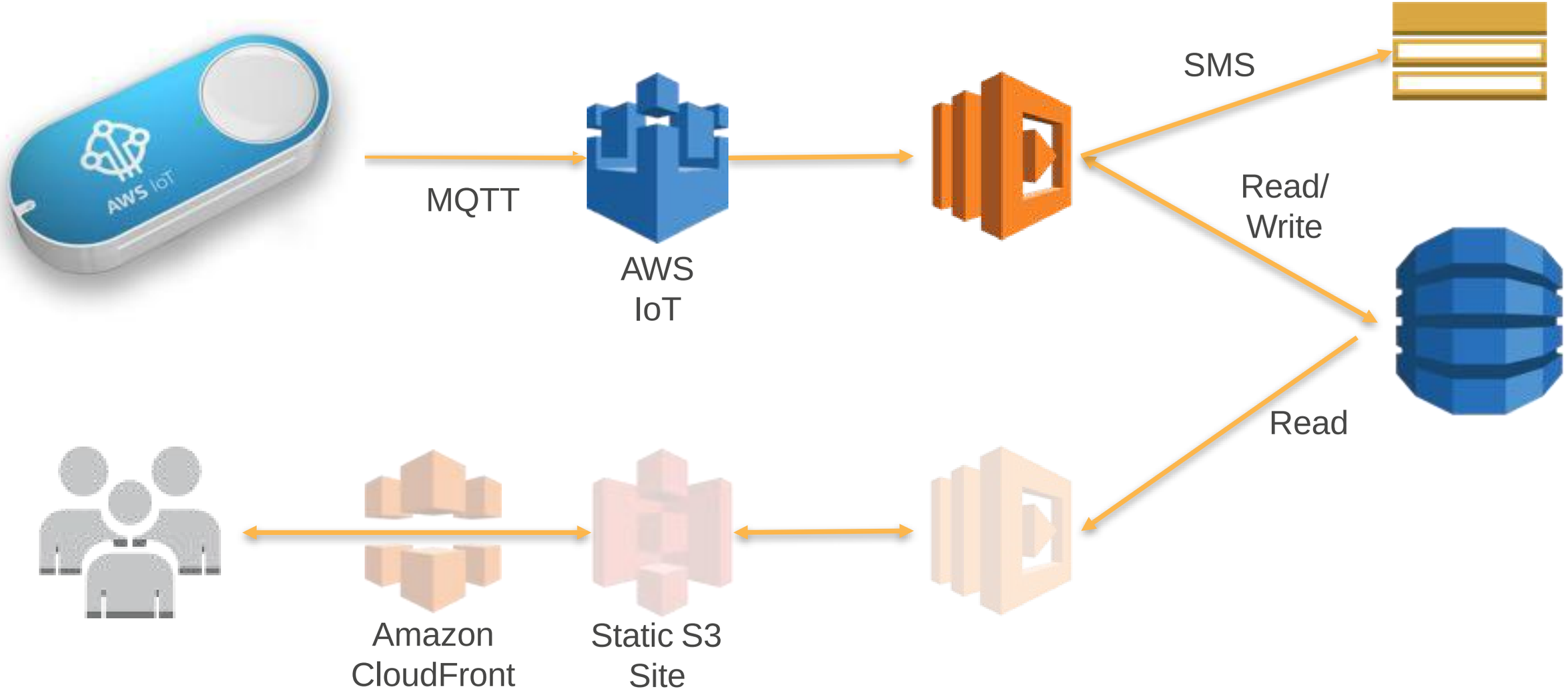
Free Tier

250,000 Messages Per Month Free for first 12 Months

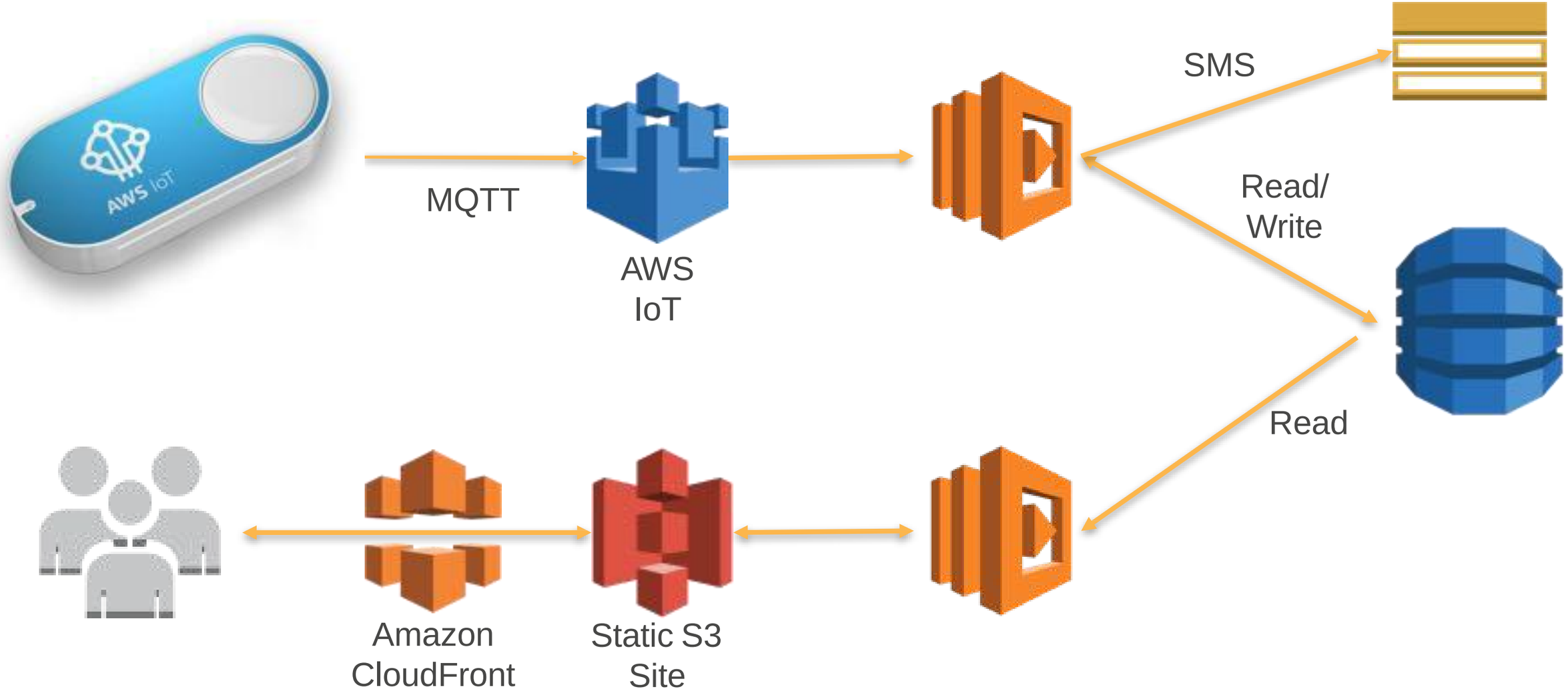
Enterprise Discounts Available

For large volumes our Enterprise Sales team is engaged

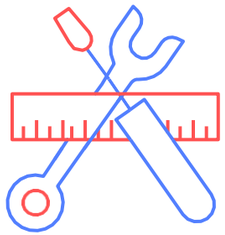
IoT – Simple Demo



IoT – Simple Demo



What customers are doing with AWS IoT



Predictive maintenance

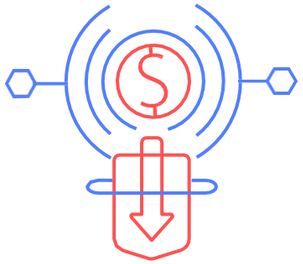
Wellness and health solutions

Productivity and process optimization

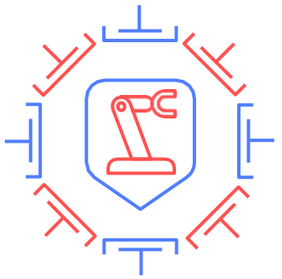
Connected buildings and city systems

Device fleet maintenance

Energy efficiency monitoring



Payment, insurance and connected commerce



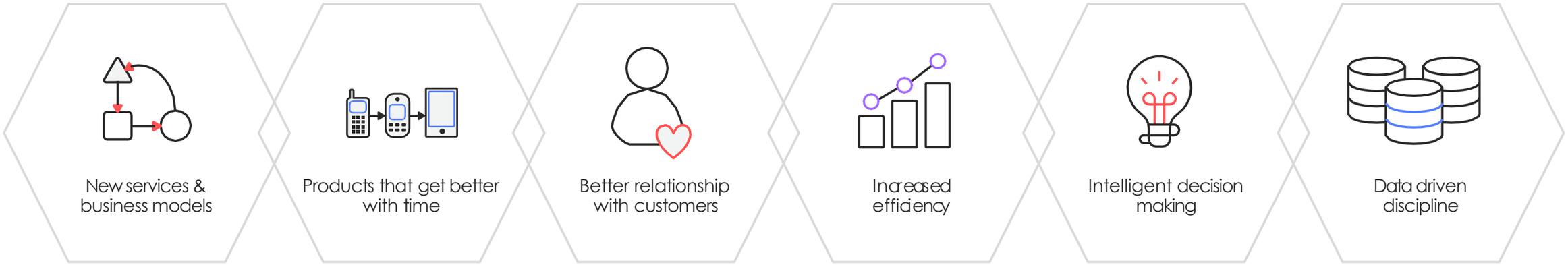
Safeguard manufacturing facilities

aws SUMMIT

Nobody just buys IoT technology…

they seek business outcomes

Business outcomes with IoT



Revenue growth

IoT data drives business growth

Operational efficiency

IoT data decreases OpEx

IoT solutions are complex & multidimensional

What are the fundamentals of AWS IoT?

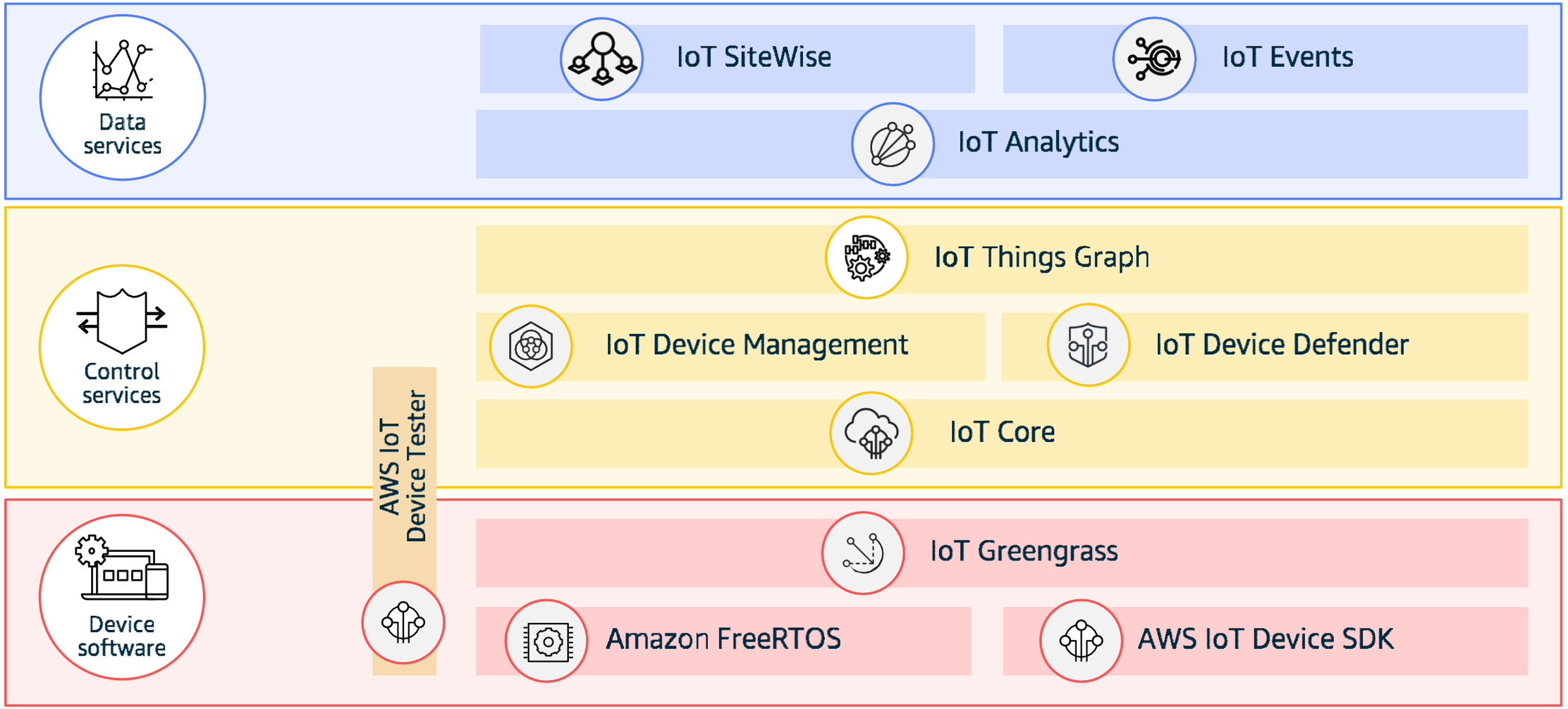
AWS IoT Architecture

How do I extract value from my IoT data?

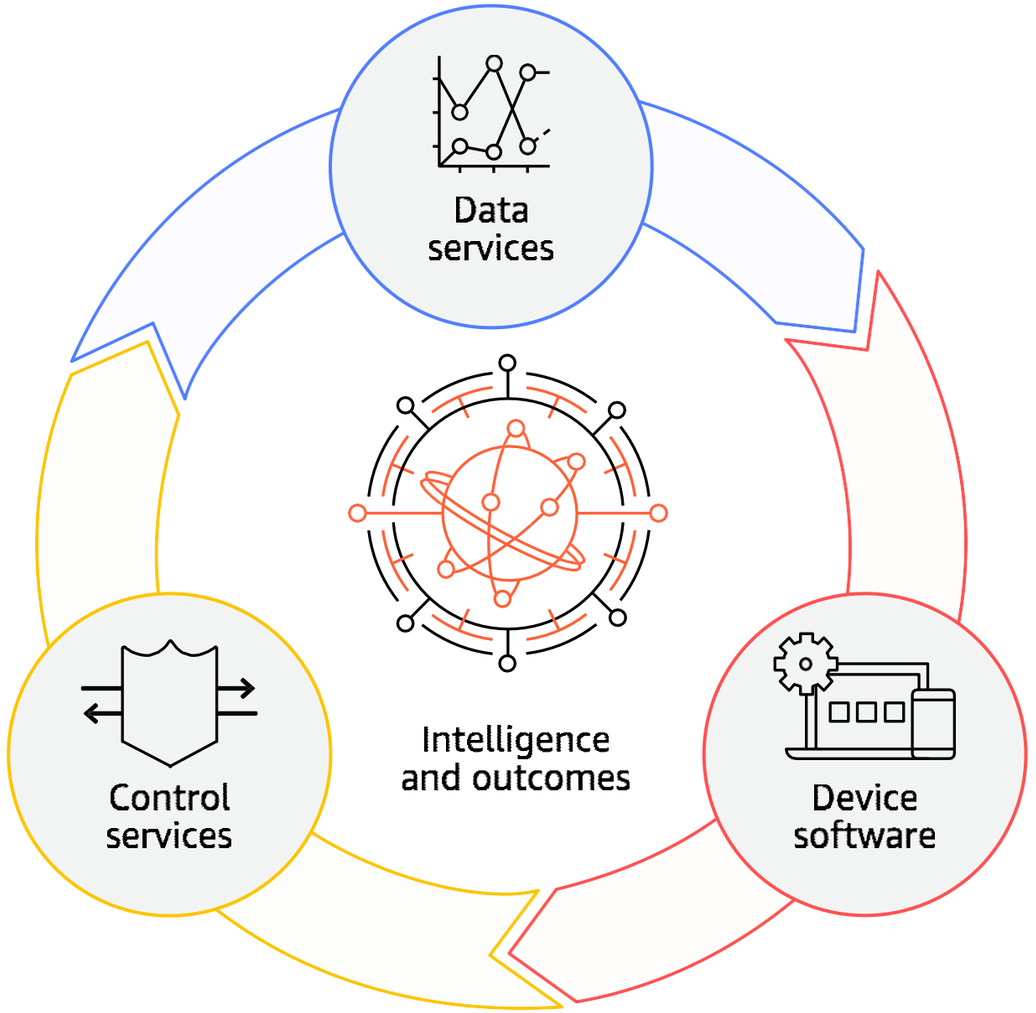
How can I control, manage, and secure my devices?

How can I connect my devices and operate at the edge?

AWS IoT Architecture

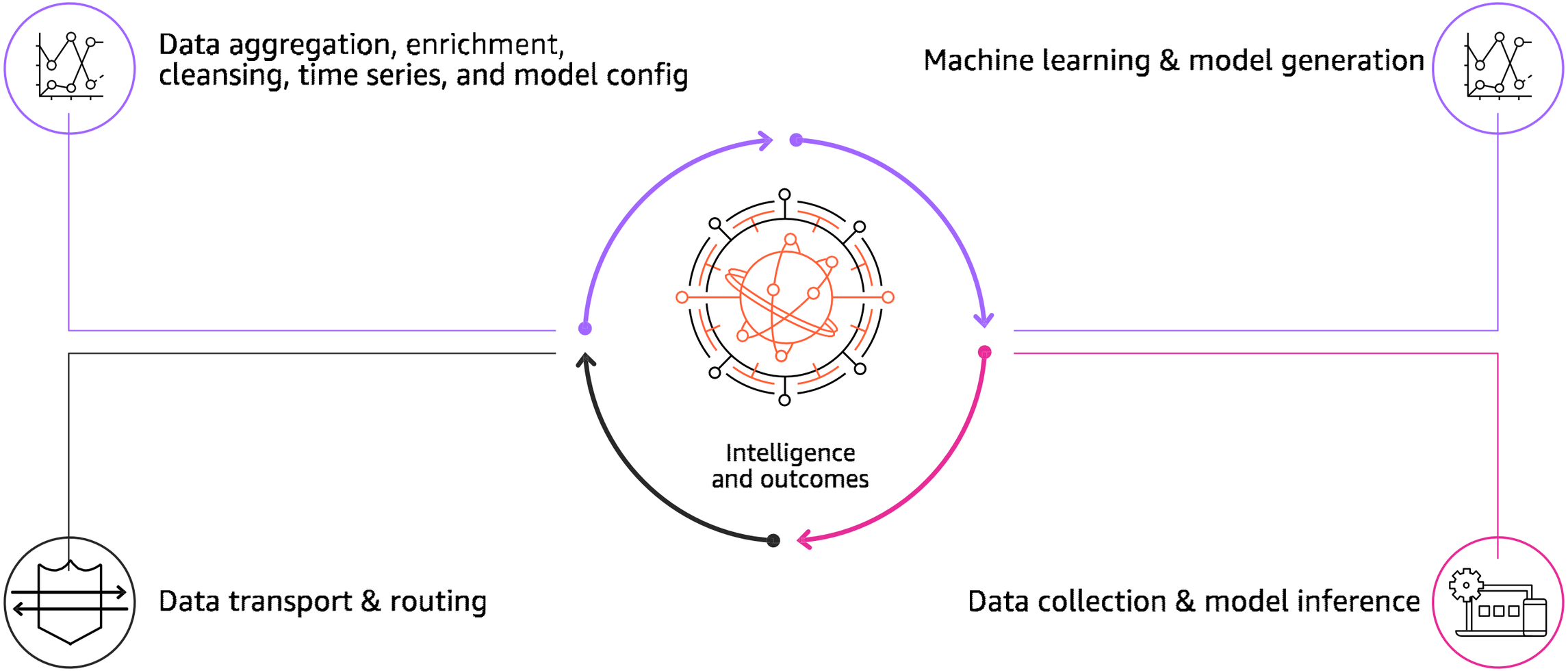


IoT Virtuous Cycle



"AIoT" (AI and IoT) — ML at Edge trend

ML: Train in the cloud, infer at the edge



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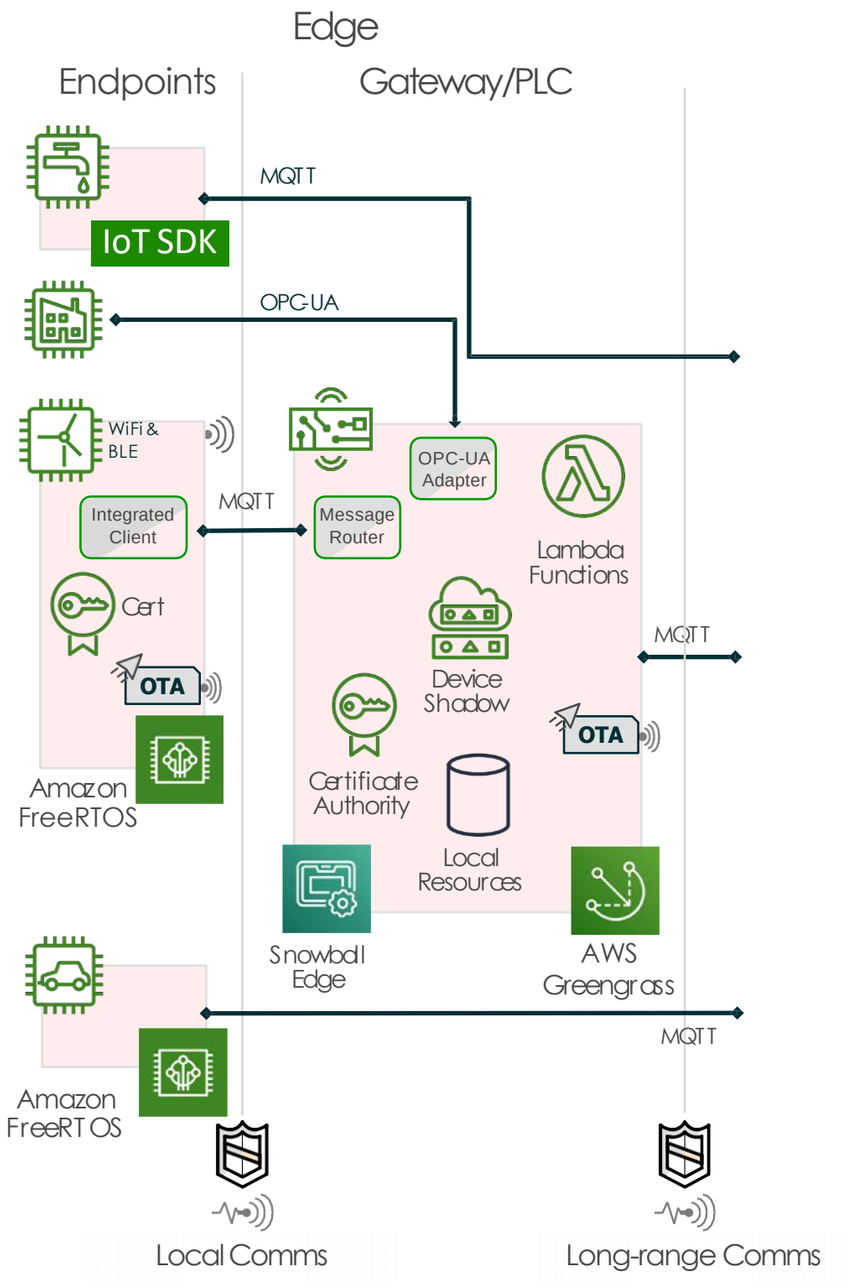
IoT with AWS



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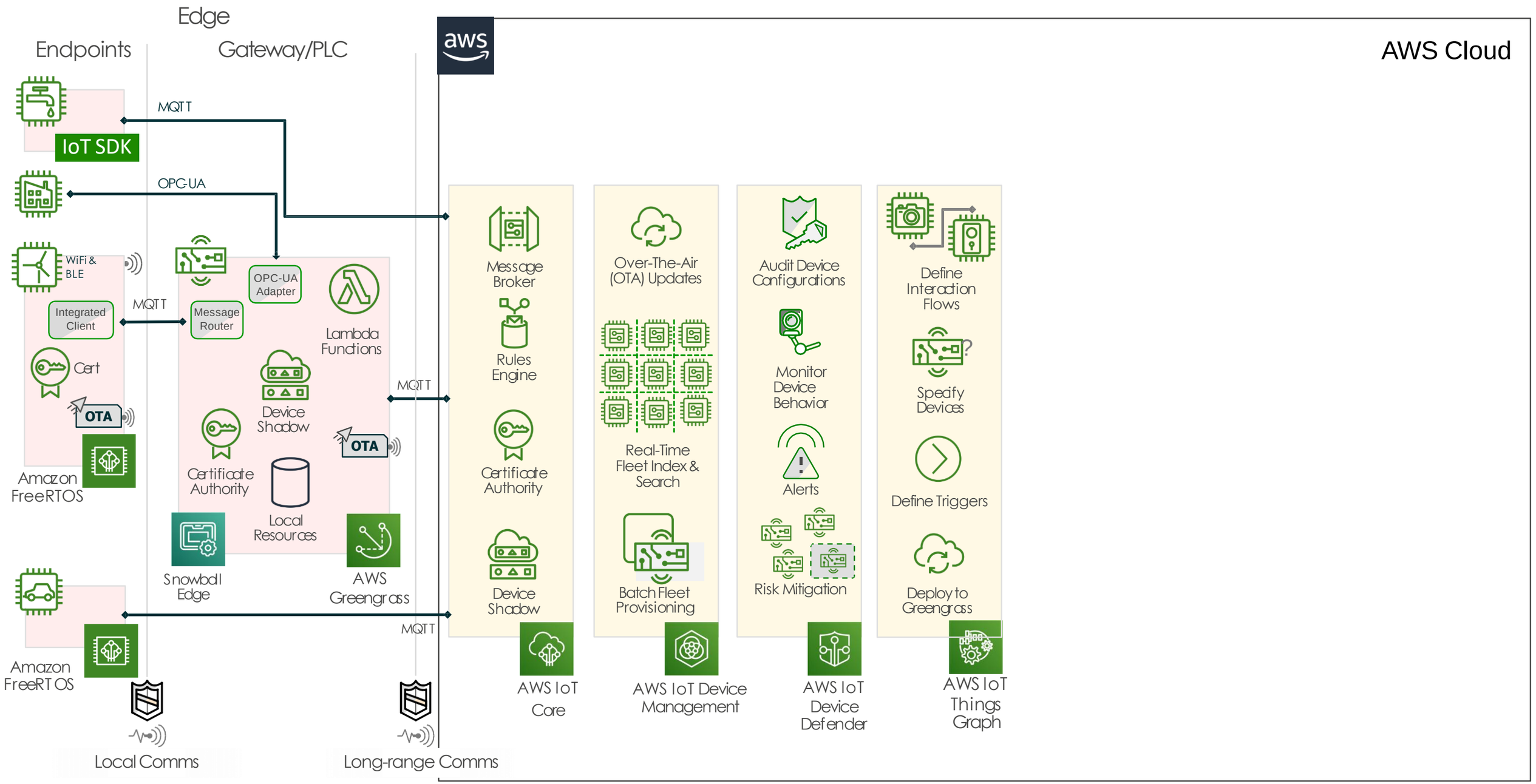
IoT with AWS



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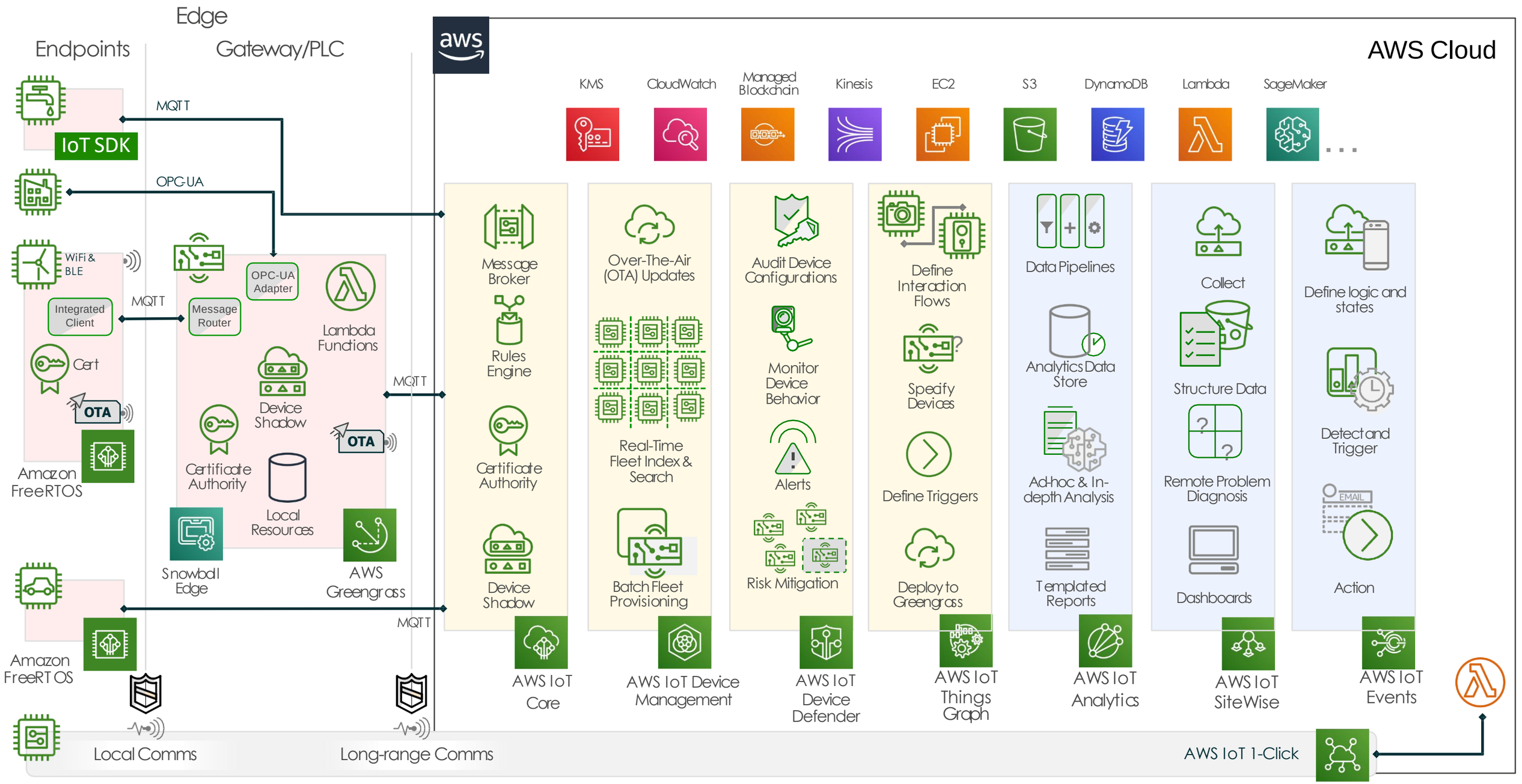
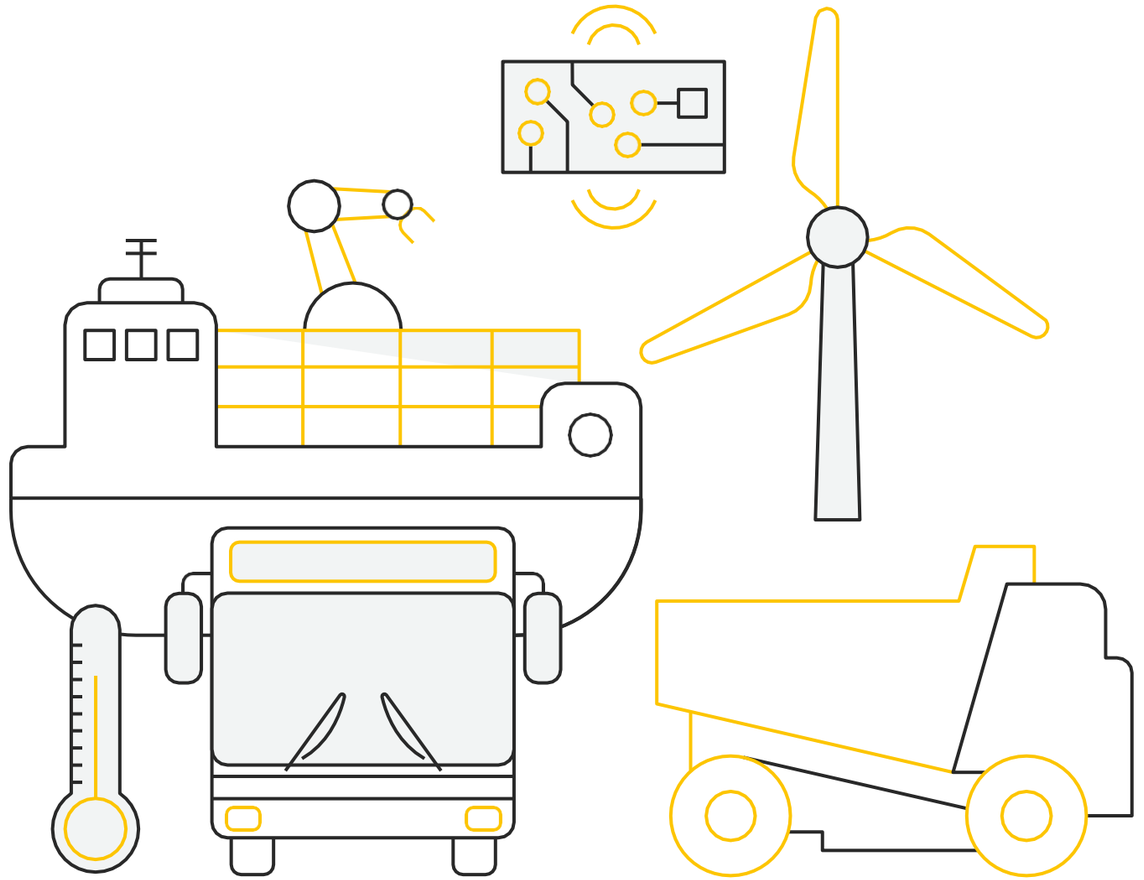
IoT with AWS



What happens when you combine AI and IoT?



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Predict Failure Before Business Operations are Impacted

Reduce costs

Avoid unplanned production outages

Plan optimal maintenance work schedule

Predict Failure Before Business Operations are Impacted

Requirements

Ingest sensor data from devices in plants and offsite

Securely connect billions of devices to the cloud and manage trillions of messages

AWS IoT Capabilities

Run edge software and services like Amazon FreeRTOS and AWS Greengrass for local triggers, actions, and data sync

Securely connect to AWS IoT Core

AWS IoT Device Defender fleet audit and protection

Predict Failure Before Business Operations are Impacted

Requirements

Build and train predictive models based on device data

Deploy models on devices

Detect anomalies

Trigger alerts

Predict failures

AWS IoT Capabilities

AWS IoT Analytics collects, processes, and analyzes IoT data. Use built-in templates for predictive maintenance

Run predictive models on devices using AWS Greengrass

Use AWS Greengrass Machine Learning Inference to take local action even without cloud connectivity

Predict Failure Before Business Operations are Impacted

Requirements

Visualize and explore IoT data

Share insights across teams

AWS IoT Capabilities

AWS IoT Analytics lets you visualize and explore data and share insights across teams

The AWS IoT Analytics interface enables collaboration and fast delivery of analytics

Detect Anomalies to Predict Pump Failure

1. Run Amazon FreeRTOS on vibration sensors to securely collect data and connect to AWS IoT Greengrass enabled device

2. The AWS IoT Greengrass enabled device runs the predictive model locally to identify when vibrations hit dangerous levels. AWS IoT Greengrass triggers alert to maintenance staff when anomalies are detected. When Internet connectivity is available, the AWS IoT Greengrass device sends data to the cloud for analytics filtering out "normal" data

3. AWS IoT Analytics analyzes vibration data and adds time stamp and device information such as serial number pulling from AWS IoT Core. Sends updated model to the AWS IoT Greengrass enabled device

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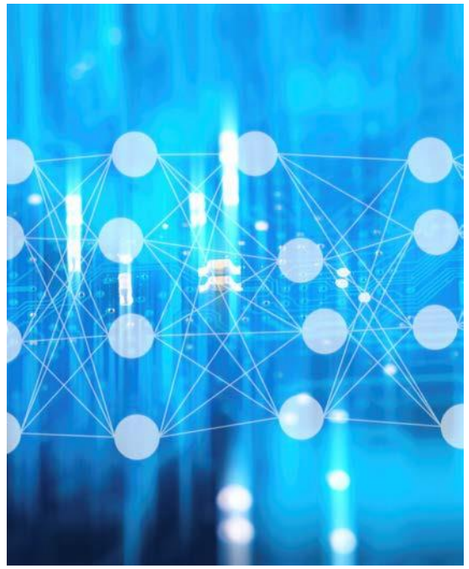
Home Security & Monitoring

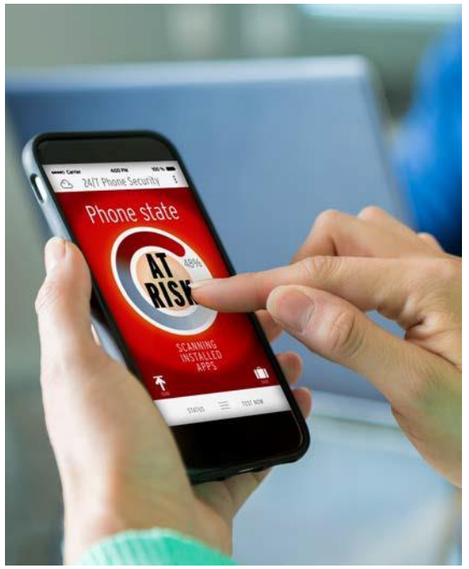
Key Trends & Opportunities

Audio and image recognition



Machine learning

Home surveillance



Quick response time

Energy management

Why use AWS IoT for Home Security & Monitoring?

Machine learning inference at the Edge

Offline communication

Quick response time

Intelligent insights

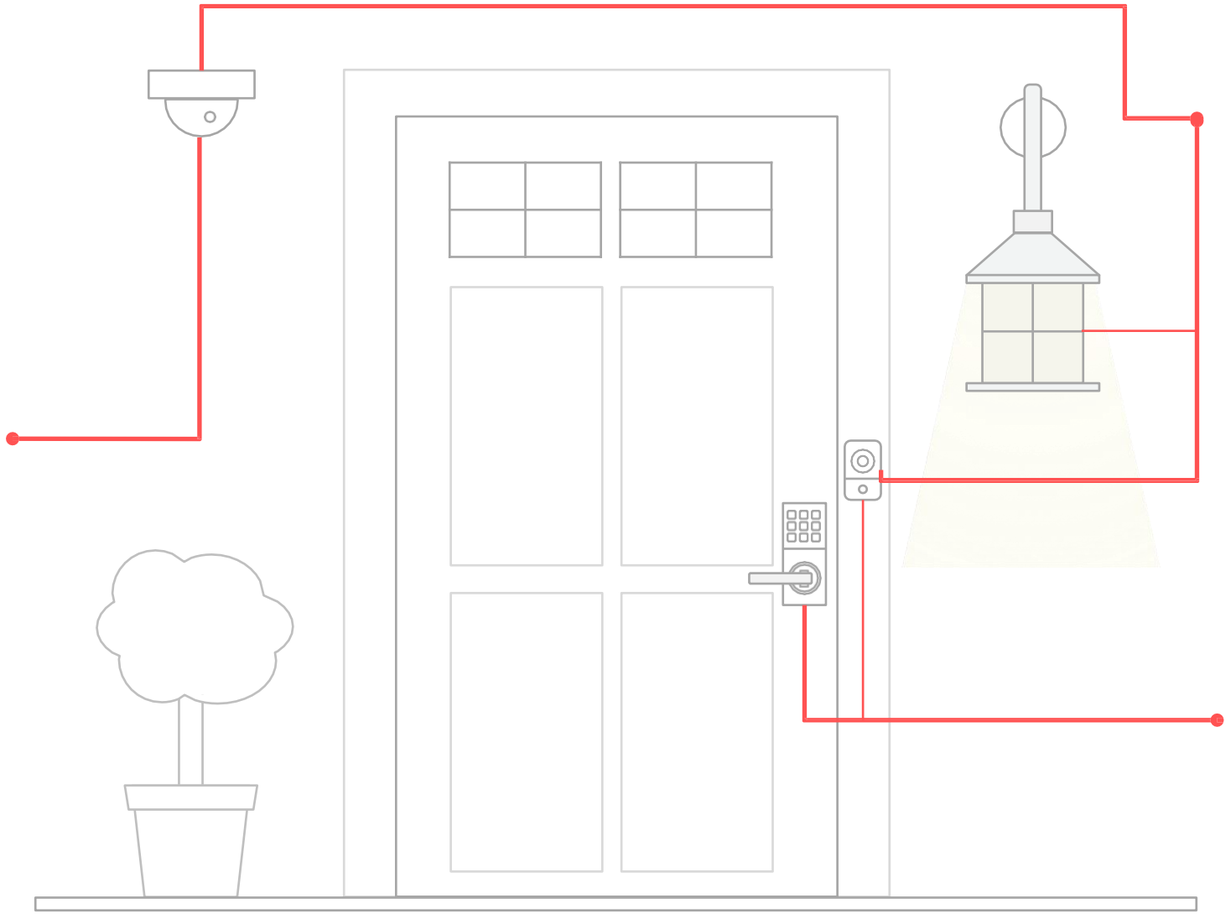
AWS Greengrass gives you the ability to train ML models in the cloud and deploy them on the device for inference—so the model can run without a direct cloud connection.

Home Security & Monitoring

Example

AWS IoT Device Management, AWS IoT Device Defender, and AWS IoT Analytics provide added benefits such as remote device management, monitoring, security, and insights into device usage.

AWS Greengrass ML Inference brings machine learning capabilities to a camera, like being able to detect an intruder as it's happening.

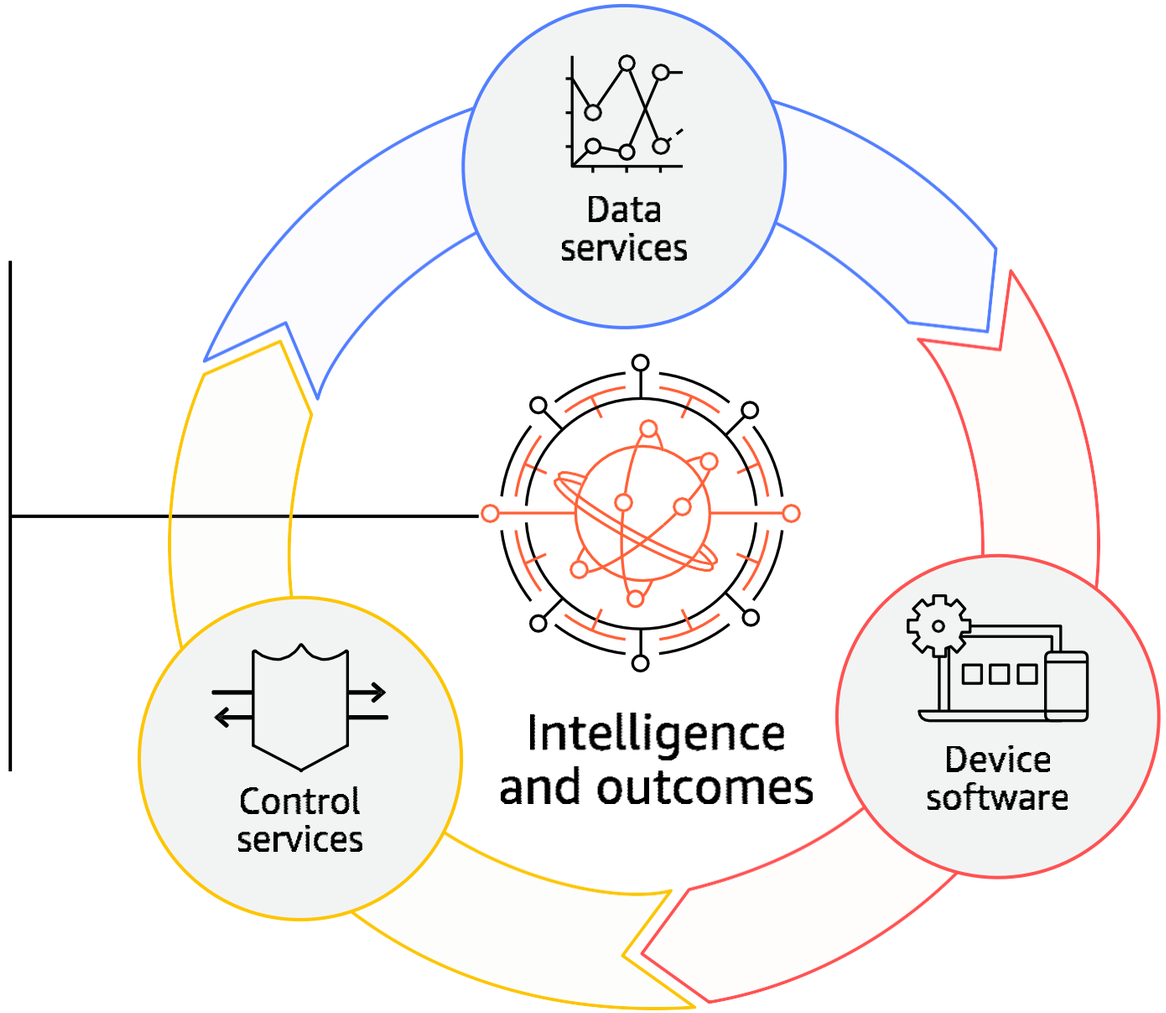


AWS Greengrass allows the security camera, door lock, and even outdoor lighting to continue operating even when cloud connection is lost. It can also take actions locally, avoiding a costly and timely round trip to the cloud.

Amazon FreeRTOS provides security, connectivity, and updateability for devices running on microcontrollers, like a connected door lock or video door bell.

Now that you know the state of every thing, and can reason on top of that data, what problems would you solve?

aws.amazon.com/IoT



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