Enterprise IoT Platforms

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AGENDA

1	Enterprise IoT Platforms
2	IoT on AWS
3	Device Management
4	Let's Build

Enterprise IoT

An Enterprise IoT application is an end-to-end IoT solution built to meet given specifications. It is complex because it involves many parts.

Components

Solutions	CONSUMER APPS (Home, Lifestyle ,Home, Mobility etc)	INDUSTRIAL APPS (Manufacturing, Building, Infrastructure, Energy etc)	**IoT Security & Management**
Cognitive Platform	INTERACTIONS (SPOKEN,GESTURES) INSTANT LEARNING COGNITIVE		Application Management Service Management
Analytics Platform	SERVICES (GEOSPATIAL etc) ACTIONABLE INSIGHTS (EVENTS & REPORTING) MACHINE LEARNING STREAM PROCESSING		Authorization Authentication
Core Platform	DATA STORAGE, DATA AGRREGRATION/ FILTER IOT MESSAGING MIDDLEWARE PROTOCOL GATEWAY		Simulation Device Security
Communication Protocols	MQTT. COAPP, DDS, XAMP... IPV5, IPV6, 6LOWPAN BLUETOOTH, GSM, ZIGBEE, MODBUS,BACNET		Device Management Deployment
Devices	DEVICES & COMPONENTS -Smart Devices -- Sensors / Actuators -- Embedded Devices		Firmware/ Code updates

Commercial IoT Implementations

▪ Writing every application from scratch especially in large scale deployments may be an onerous task.

▪ Large scale deployments (either for individuals or organizations) are more efficiently done when relevant and skilled stakeholders are involved.

▪ **Key stakeholders:**

  ▪ **Manufacturer**:
    ✓ Makers of connected products – proprietary and open source:
    ✓ Key concerns: connectivity, libraries, security and management of products
  ▪ **Network providers**
    ✓ Provides backbone infrastructure and networking components for connectivity (e.g. ISP)
  ▪ **Platform providers**
    ✓ Provides the software backbone as well as all the messaging infrastructure and all IoT software capabilities as services
  ▪ **System integrator:**
    ✓ builds the IoT solution – providing e2e integration, standards, operability, simulation and testing, troubleshooting, performance improvement, device selection.
    ✓ Must have an all-round understanding of IoT
  ▪ **Customers and the IoT ecosystem – government, regulators, etc.**

IoT Platforms

A *platform* is a system that can be programmed and therefore customized by outside developers – users – and in that way, adapted to countless needs and niches that the platform's original developers could not have possibly contemplated, much less had time to accommodate.   *– Marc Andreessen*

IoT PLATFORMS

▪ **Building a platform business is a known phenomenon adopted by technology giants.**

- It allows others to leverage key capabilities to build and grow their businesses

- Speeds up implementation as it knits together complex processes and tasks that cannot be handled easily by suppliers and consumers

- Helps individuals to deploy conveniently and at minimum cost

- It enables users of the platform benefit from advances in technology

- It creates a stronger sustainable competitive advantage

  ✓ Platform provider's products become much harder to replace

  ✓ Users teach you what needs to be improved & usage problems that needs to be fixed

IoT PLATFORMS

All platform providers provide a set of services to enable development of scalable IoT applications. This is a common strategy adopted by all platform providers

IoT platforms cannot succeed without an ecosystem of users

One important decision to make in IoT deployment is whether to build in-house or use a platform

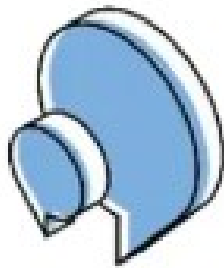*If a platform is to be used, which one and why?*

Popular IoT platforms:

    - AWS

    - Azure

    - GCP

Open Source IoT platforms also exist; they provide support for a wide variety of protocols like MQTT, XMPP and HTTP.
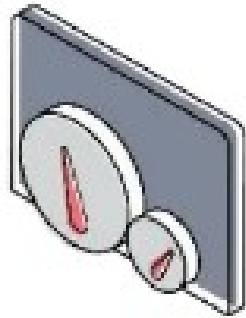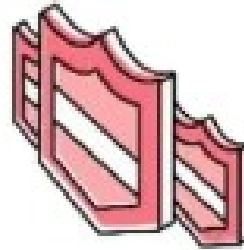
IoT PLATFORMS

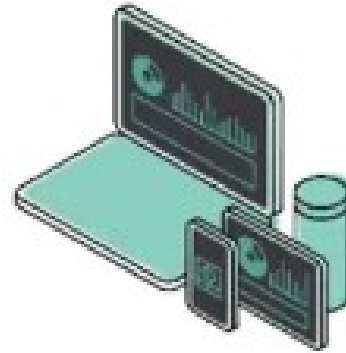Connecting devices to cloud applications requires undifferentiated heavy lifting.
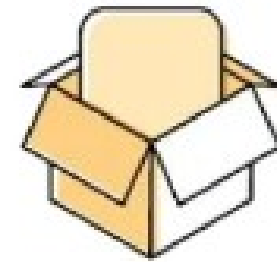
Alternate Protocols

Scalability

Security & Management

Integration with Cloud and Mobile Applications
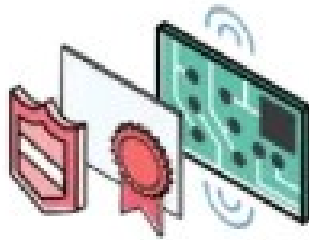
Many SDKs & Tools

IoT made simple and easy

Introducing AWS IoT

"Securely connect one or one-billion devices to AWS,
so they can interact with applications and other devices"
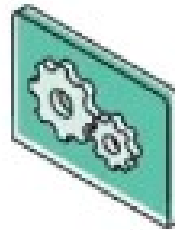
1

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
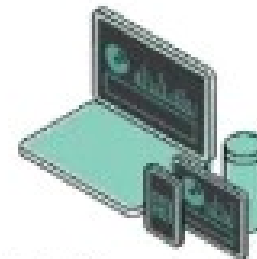
2

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.
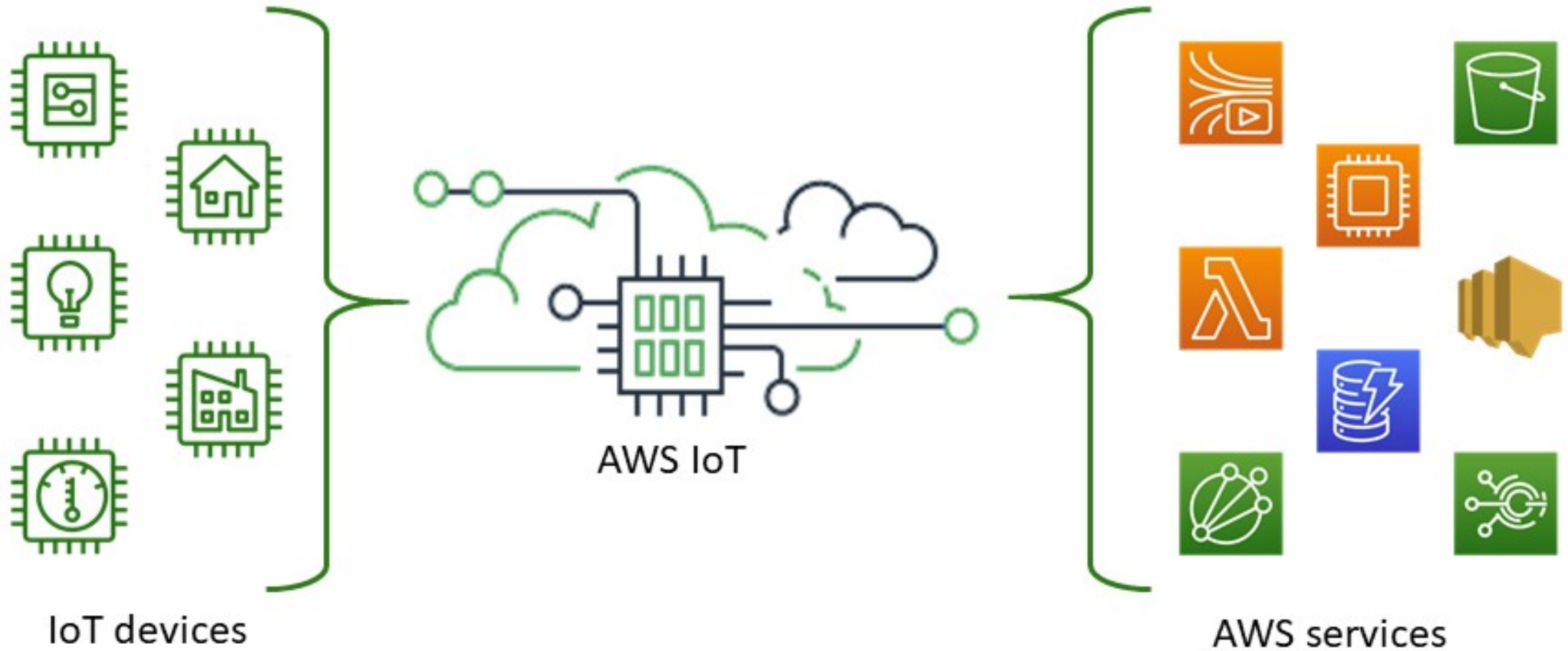
3

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.

IoT made simple and easy

IoT devices

AWS IoT

AWS services

WHY AWS IoT Platform?

- **Fully managed service**
    - **No installation**
    - **Auto-scaling**
    - **Redundant across AZ**
    - **Pay as you go**

- **All in one service**
    - **Message broker**
    - **Rules Engine**
    - **Registry**
    - **Shadow**

- **Security**
    - **Certificates and Mutual Authentication**
    - **Policy and role-based access control**
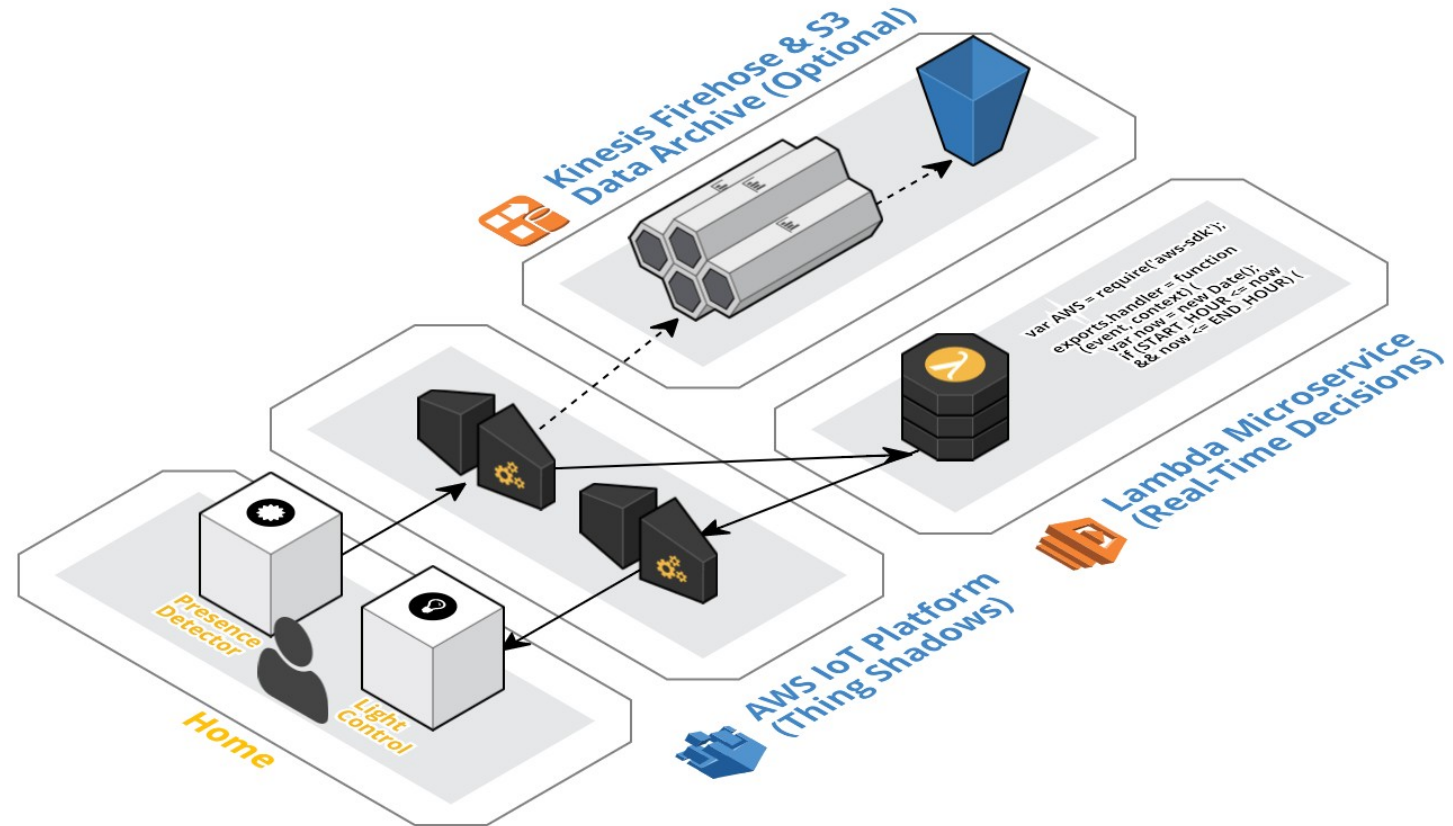
IoT made simple and easy

Simple Pay as you go and Predictable Pricing

- 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)

AWS IoT

Free Tier
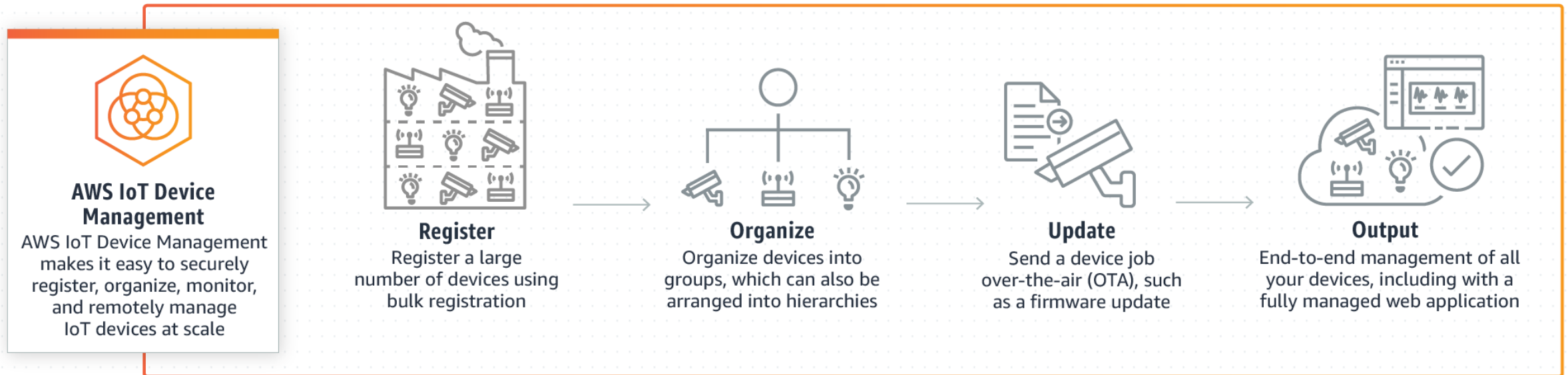250,000 Messages Per Month Free for first 12 Months

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Device Management

- Essential to track, monitor and manage devices as you are scaling

- Ensure all devices work properly after deployment

- Things to monitor
    - all devices
    - health statuses
    - problems
    - configurations
    - code builds
    - software updates
    - firmware updates

- **AWS IoT Device Management –** *makes it easy to securely register, organize, monitor and remotely manage IoT devices at a scale.*

AWS IoT Device Management

AWS IoT Device Management
AWS IoT Device Management makes it easy to securely register, organize, monitor, and remotely manage IoT devices at scale

Register
Register a large number of devices using bulk registration

Organize
Organize devices into groups, which can also be arranged into hierarchies

Update
Send a device job over-the-air (OTA), such as a firmware update

Output
End-to-end management of all your devices, including with a fully managed web application

References

→ Enterprise IoT – A Definitive Handbook *by Naveen Balani*

→ *https://docs.aws.amazon.com/iot/latest/developerguide/what-is-aws-iot.html*

→ *https://aws.amazon.com/iot-device-management/*

→ https://www.slideshare.net/AmazonWebServices/intro-to-aws-iot-80291679

Demo