Device management

April, 2020

Agenda

Introduction

Why do we need device management?

Device management activities

Operational efficiency

Compliance & security

Examples of commercial offerings

Exercises

Introduction

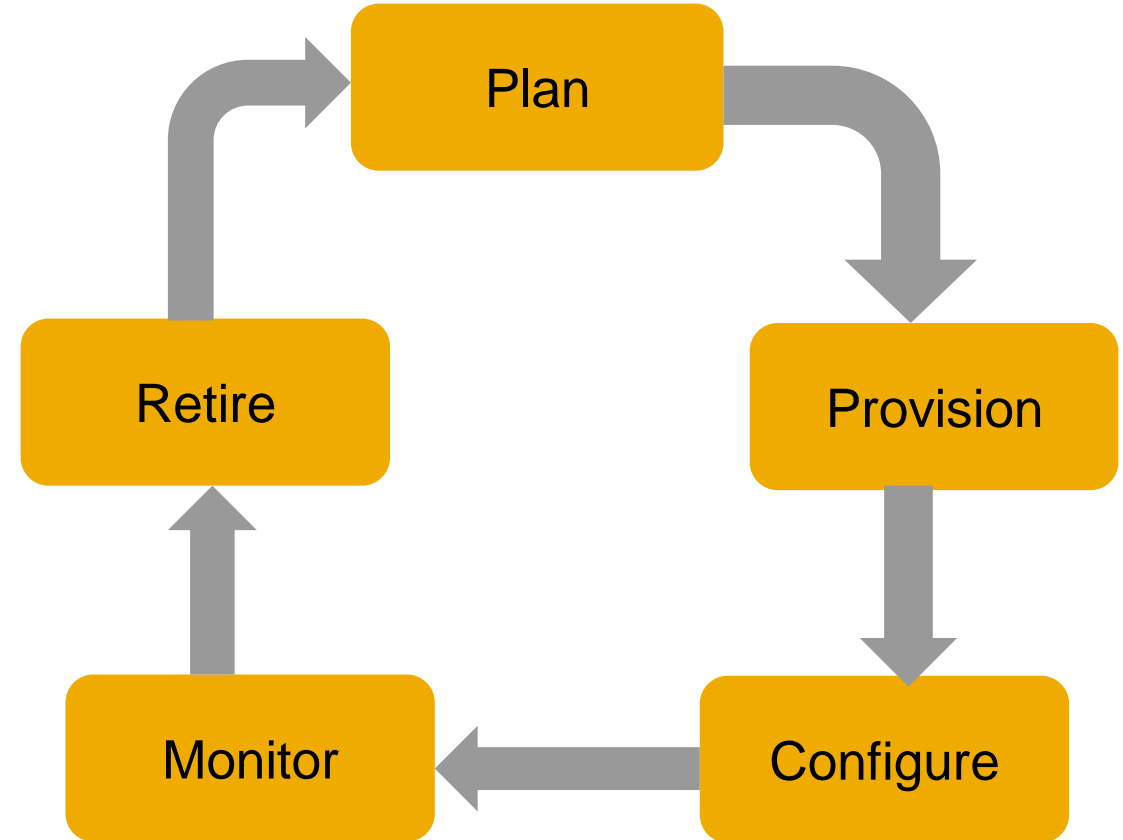# Typical device lifecycle

Devices will …

Come and go

Disappear

Fail

Misbehave

Get compromised

…

And someone has to take care of it ☺

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Plan → Provision → Configure → Monitor → Retire → Plan
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Why device management?

Operational efficiency (less cost)

Improve employees to devices ratio

Reduce travel expenses

Less damage & repair (e.g. predictive maintenance)
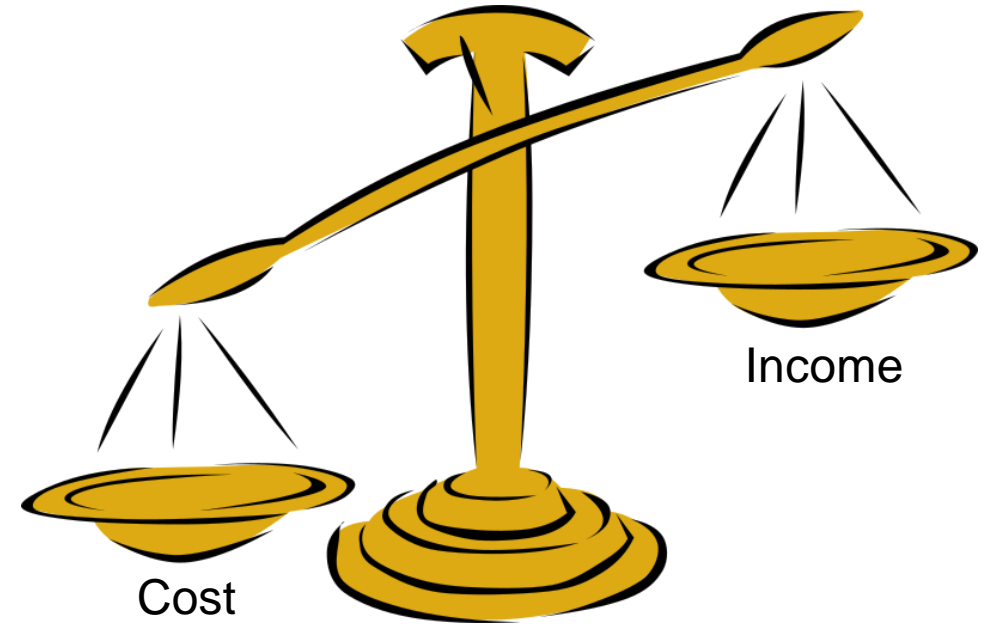
Business agility & QoS (more income)

Respond to business demand

Identify & resolve issues faster

Compliance & Security (manage risk)

Don't break the law

Spot and handle security incidents efficiently

Income

Cost

Risks

Images from https://openclipart.org

Device management activities

Efficiency (the business side)

Provisioning, replacement & retirement

Reduce personnel cost (e.g. customer self service)

Optimize field ops schedules

Integrate with existing systems (e.g. CRM, ERP)

Handle heterogeneity (anticipate different hardware)

Warranty & claims management

Optimize device specific workflows (e.g. serial numbers …)

Analyze statistic to identify root causes

Images from https://openclipart.org

Efficiency (the tech side)

Monitoring

Battery, network, storage and other resources

Performance (e.g. faulty sensor)

Context awareness (geo location, environment)

Maintenance

Configurations & updates

- OTA updates (with safe mode)
- Bulk operations
- Scheduled in maintenance windows (minimize downtime)
- Rolling updates (exp. rollout, health check, retry & rollback)

Minimize downtime (automatic failure recovery)

Smart alerting (that doesn't flood ☺)

Images from https://openclipart.org

Compliance & Security

Compliance

Restricted change management

- Who is allowed to push an update or reconfigure a device?

Data privacy

- Who is allowed to look at device/customer data?

Auditing

- Who did the above things, when and why?

Security

Secure provisioning

Intrusion detection & Device blacklisting

User reset & safe update for compromised devices

…

Examples of commercial offerings

Big cloud

AWS IoT services

FreeRTOS (MCUs) & IoT Greengrass (Linux)

IoT Core
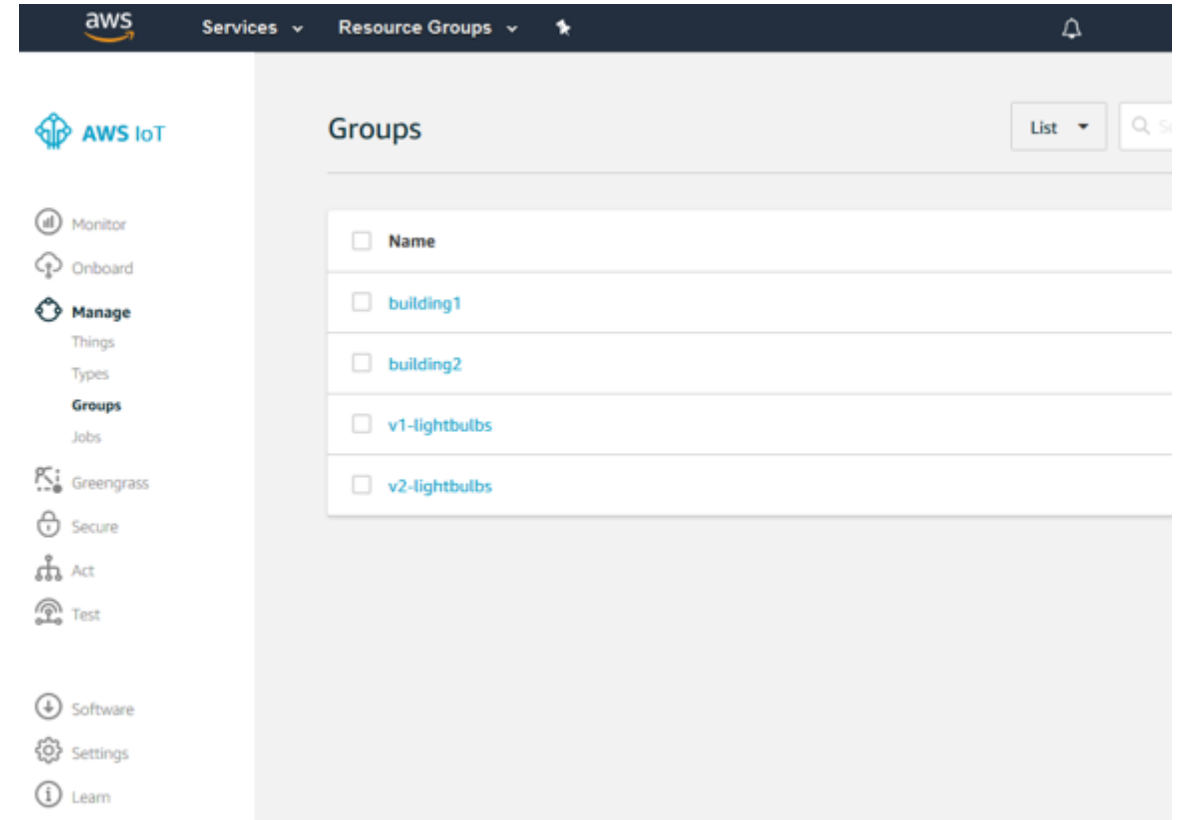
IoT Device management …

IoT Analytics, IoT Events …

GCP, Azure

Similar IoT offerings

Price and features may differ between providers

https://aws.amazon.com/iot-device-management/features/

Mongoose OS / mDash

Mongoose OS

Open source RTOS (Apache license)

Onboarding & OTA support

RPC, Device config, Debugging …

mDash
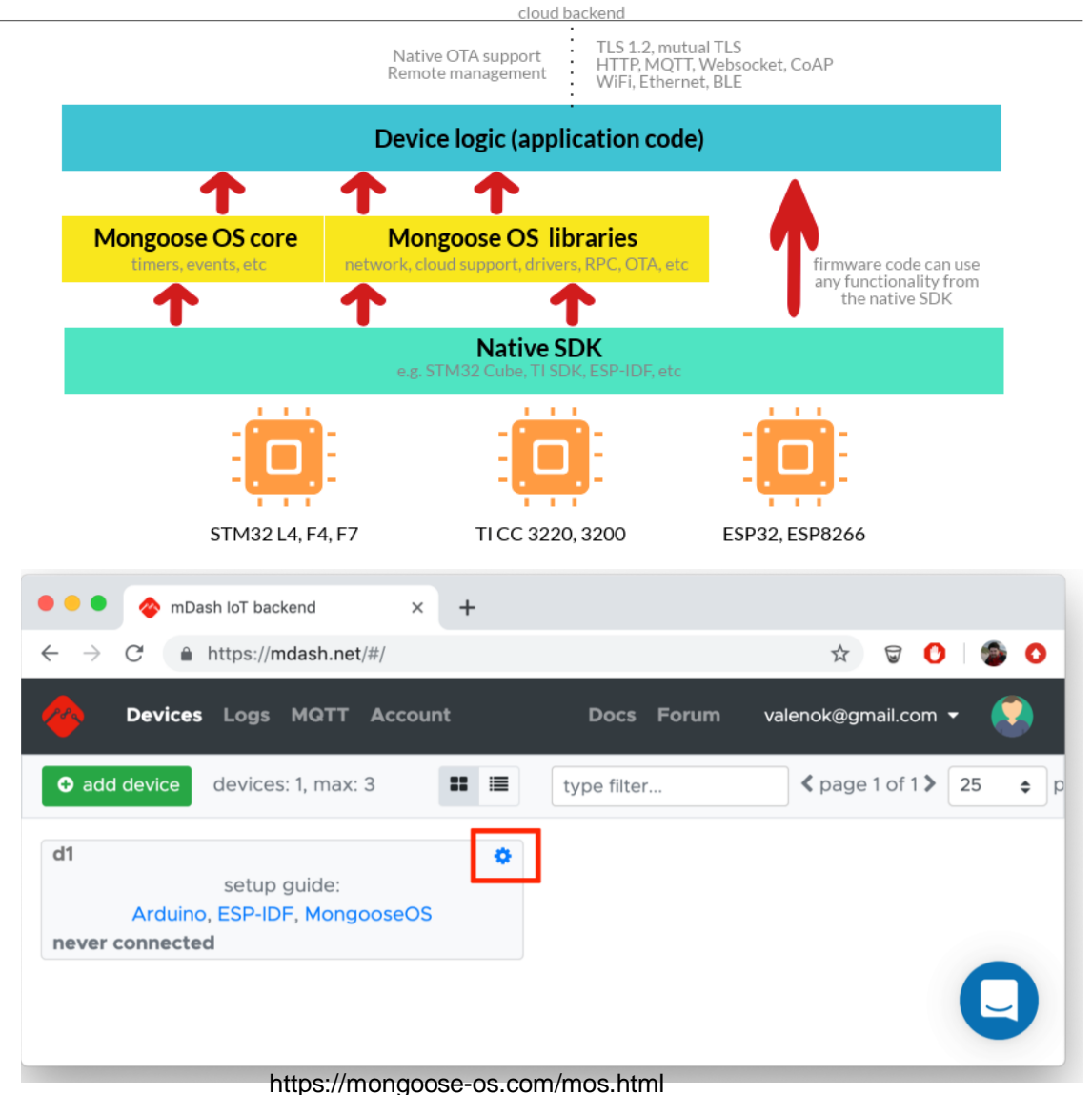
Development (JS)

Metrics, Logs, Alerts

Device management, OTA

…

https://mongoose-os.com/mos.html

Thank you