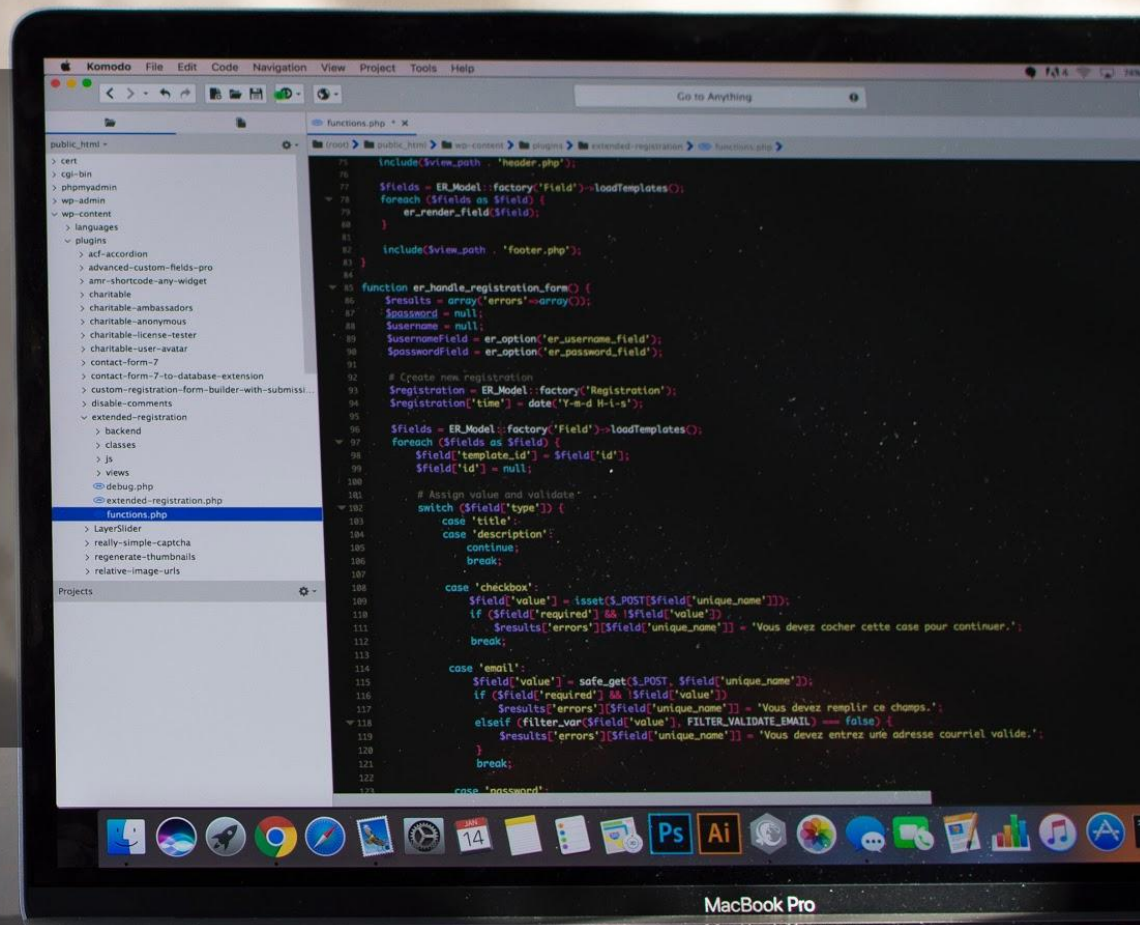
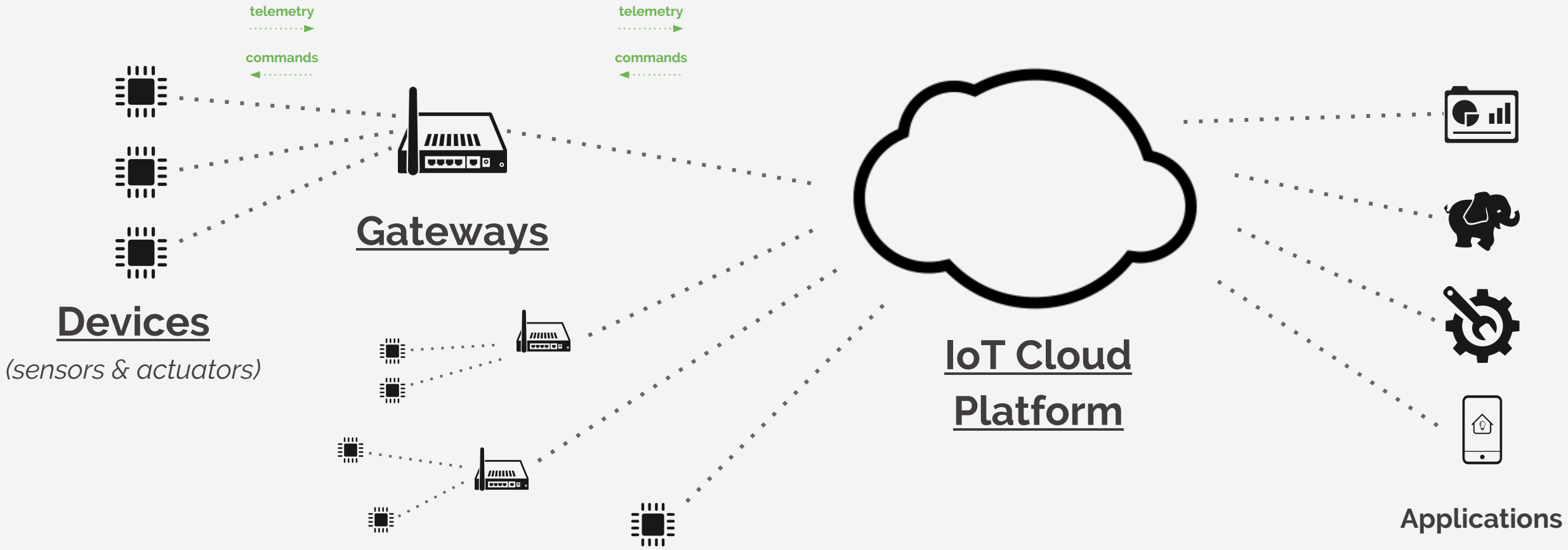
Eclipse IoT State of the Union

Benjamin Cabé, Eclipse Foundation
@kartben



Typical IoT Architecture



In reality...

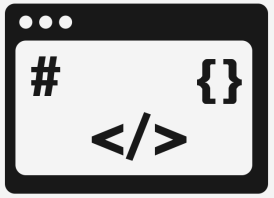
iot
eclipse.org

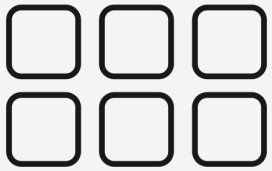
In reality...

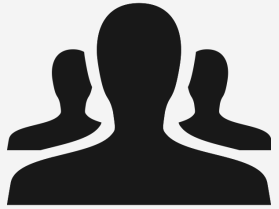
Internet of... Silos!

Eclipse IoT

Eclipse IoT Community







2.4
million
lines of code

30*
projects

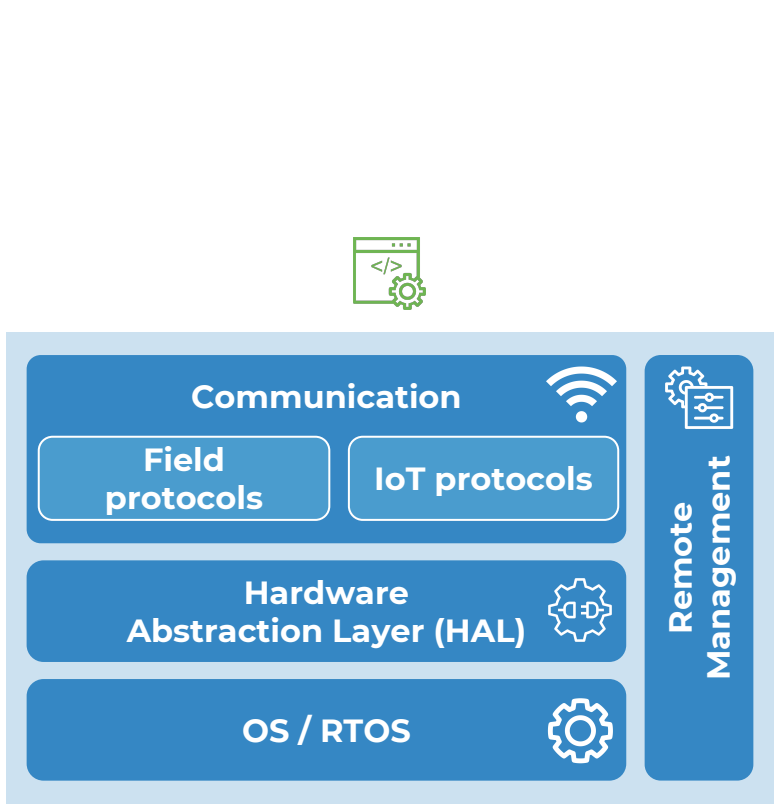
250+
developers

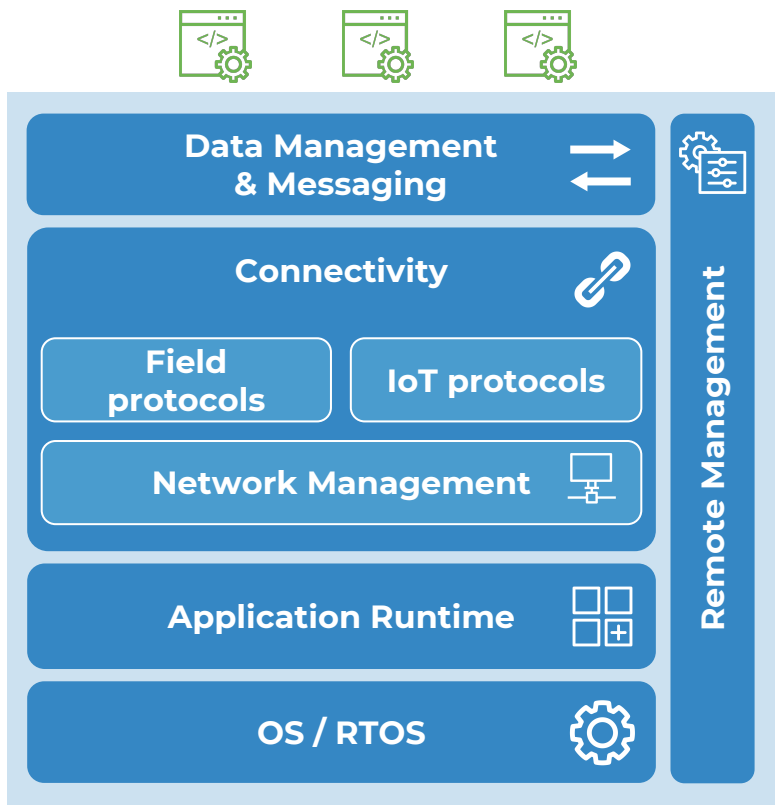
140K
monthly
visitors

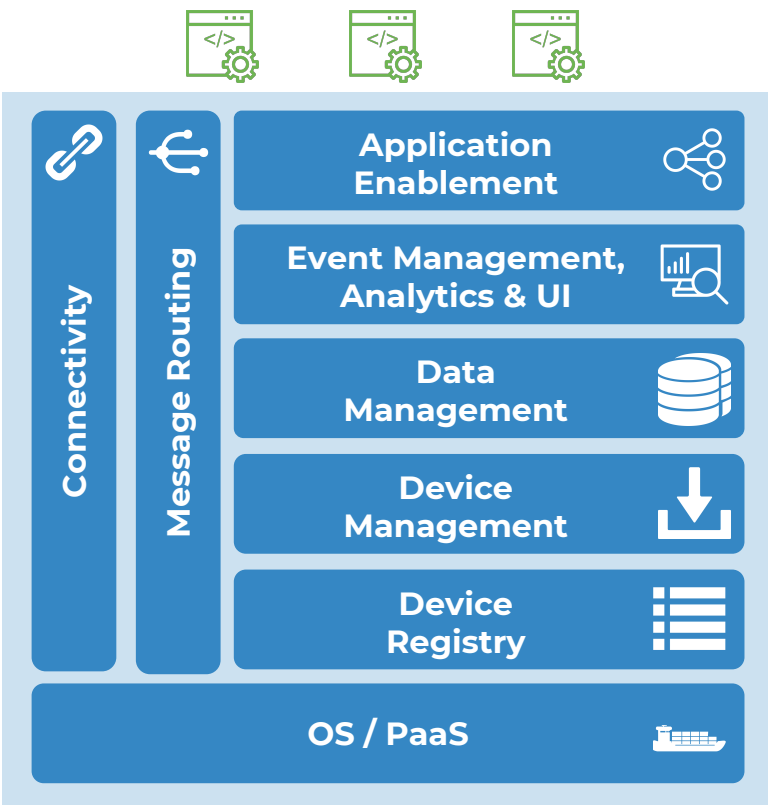
The 3 IoT Software Stacks

iot eclipse.org

SECURITY | ONTOLOGIES | TOOLS & SDKs





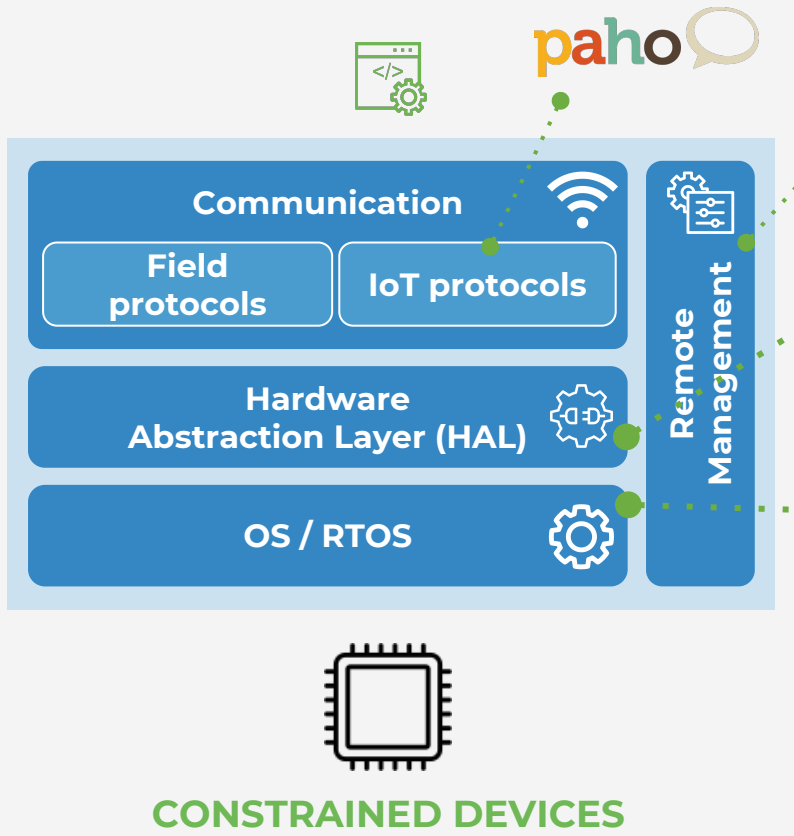


CONSTRAINED DEVICES

GATEWAYS AND SMART DEVICES

IOT CLOUD PLATFORM

OS Stack for IoT Devices



JAVA API for MCUs

"Android for IoT"

High performance JVM

Fast, small, … open source!

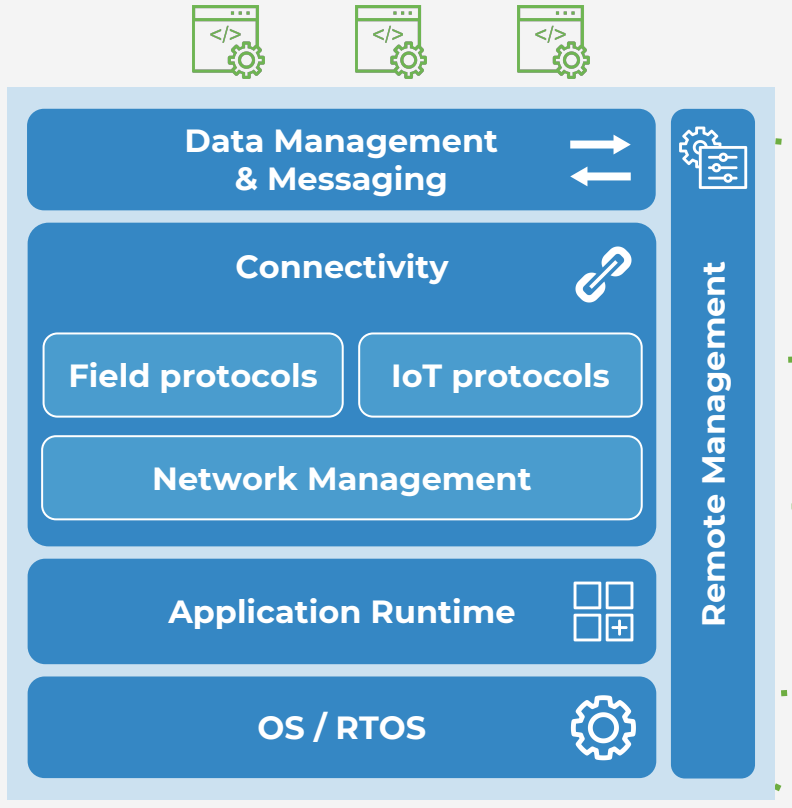
GPU acceleration

Daytrader 3 Benchmark

- 60% less footprint after startup
- 40% less footprint during ramp up
- 2× faster startup time
- Comparable throughput

See https://www.eclipse.org/openj9/oj9_performance.html

OS Stack for IoT Gateways



kura

Native support for MQTT paho

Serial, RS-485, BLE, MODBUS, OPC-UA, CAN Bus, … milo

NAT, firewall, modem configuration, …

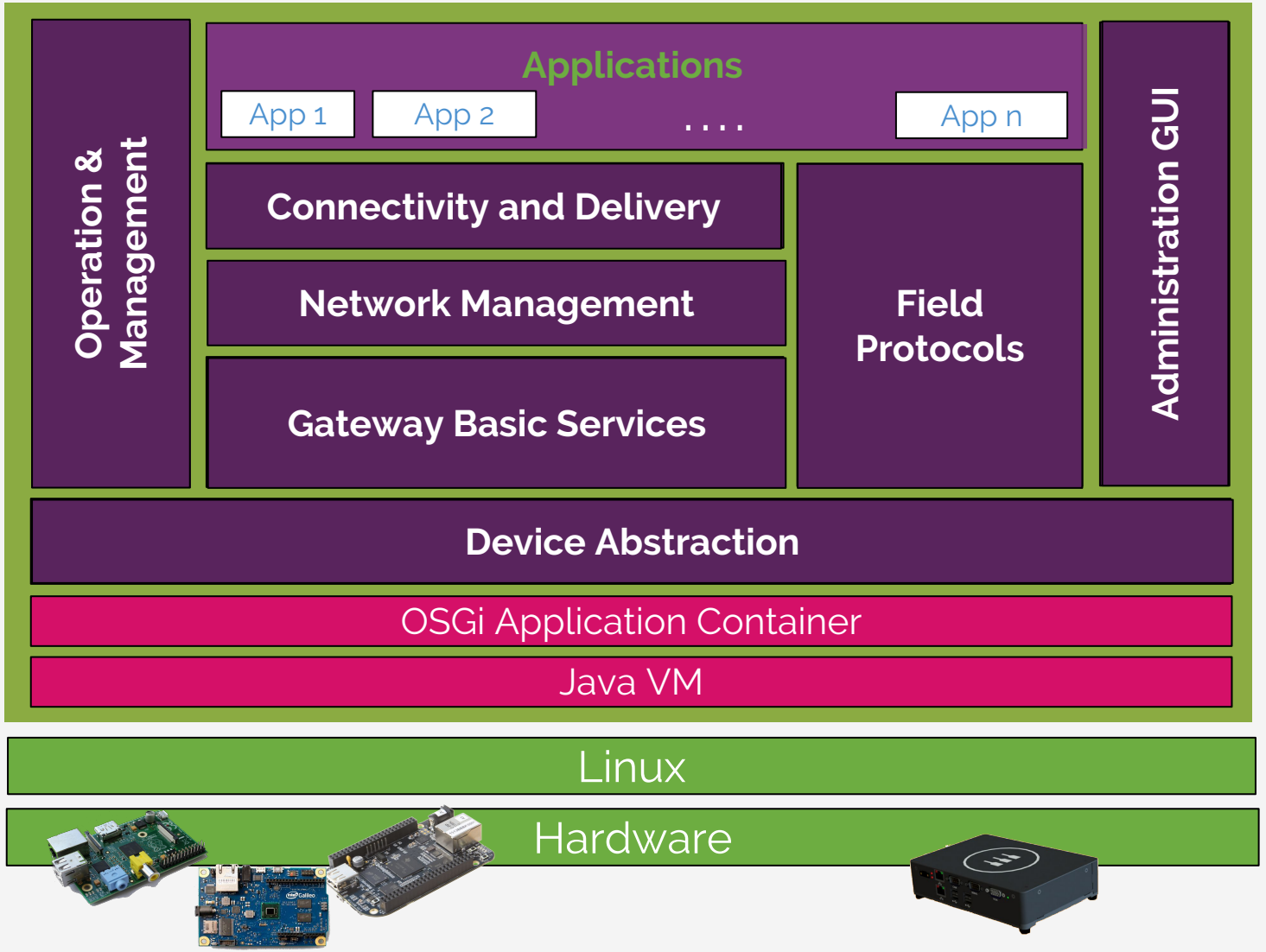
Remote Management over MQTT

equinox OSGi

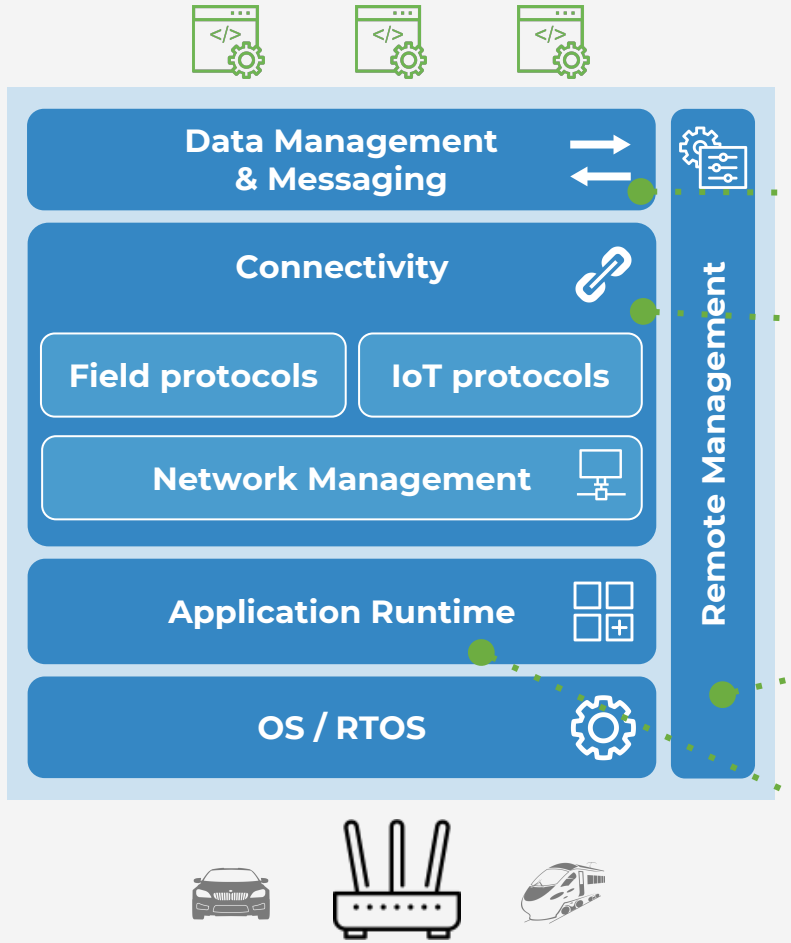
concierge

OSGi implementation

Eclipse Kura



OS Stack for Home Automation



eclipse smarthome

Rule engine to orchestrate “things”

Home automation protocols such as Belkin WeMo, LIFX, Philips Hue, …

Remote firmware update through the GW

Web UI and API for remote control

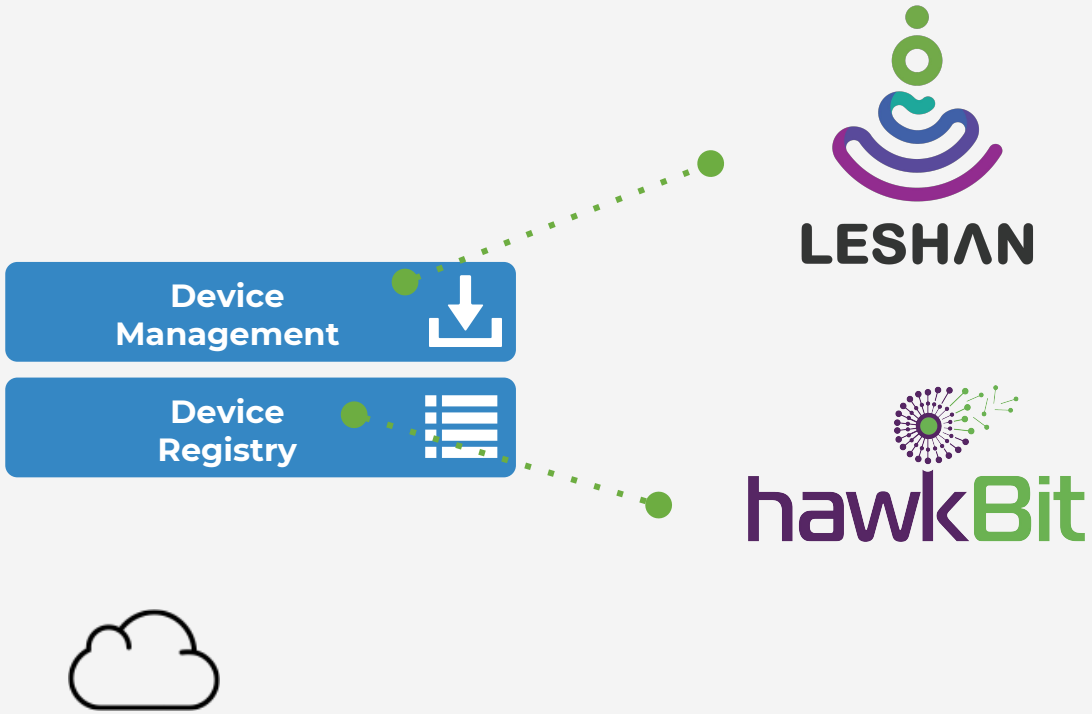
equinox OSGi

concierge

OSGi implementation

OS Stack for IoT Cloud

OS Stack for IoT Cloud



OMA LWM2M implementation in Java built on top of Eclipse Californium (CoAP)

Manage software upgrade campaigns independently of the actual DM protocol

Eclipse hawkBit

IoT Business Solutions

Graphical User Interface

Management API

hawkBit – Update Server

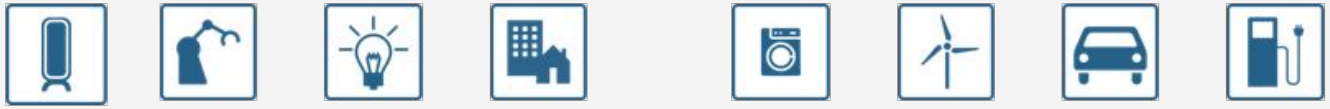
- Device and Software Repository
- Artifact Content Delivery
- Software Update and Roll out Management

Direct Device Integration API

Device Management Federation API

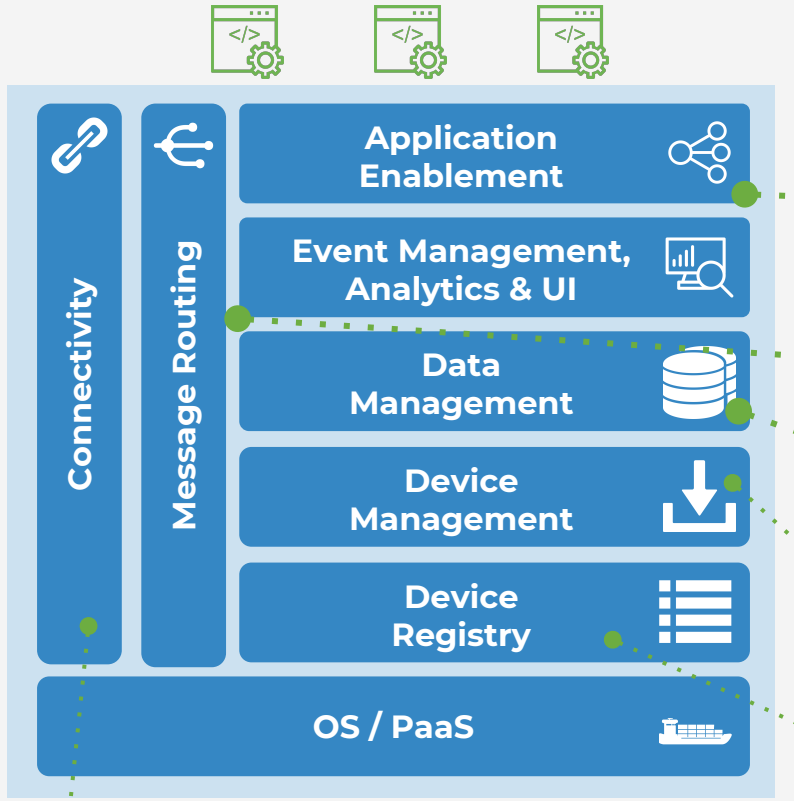
Device Managements

OMA-DM | LWM2M | *Custom*



hawkBit

OS Stack for IoT Cloud Platform



Kapua

An Integration Platform for IoT Services

REST API / Digital Twin — ditto

HONO

Abstract the actual communication protocols via “protocol adapters”

LESHAN

NoSQL data store

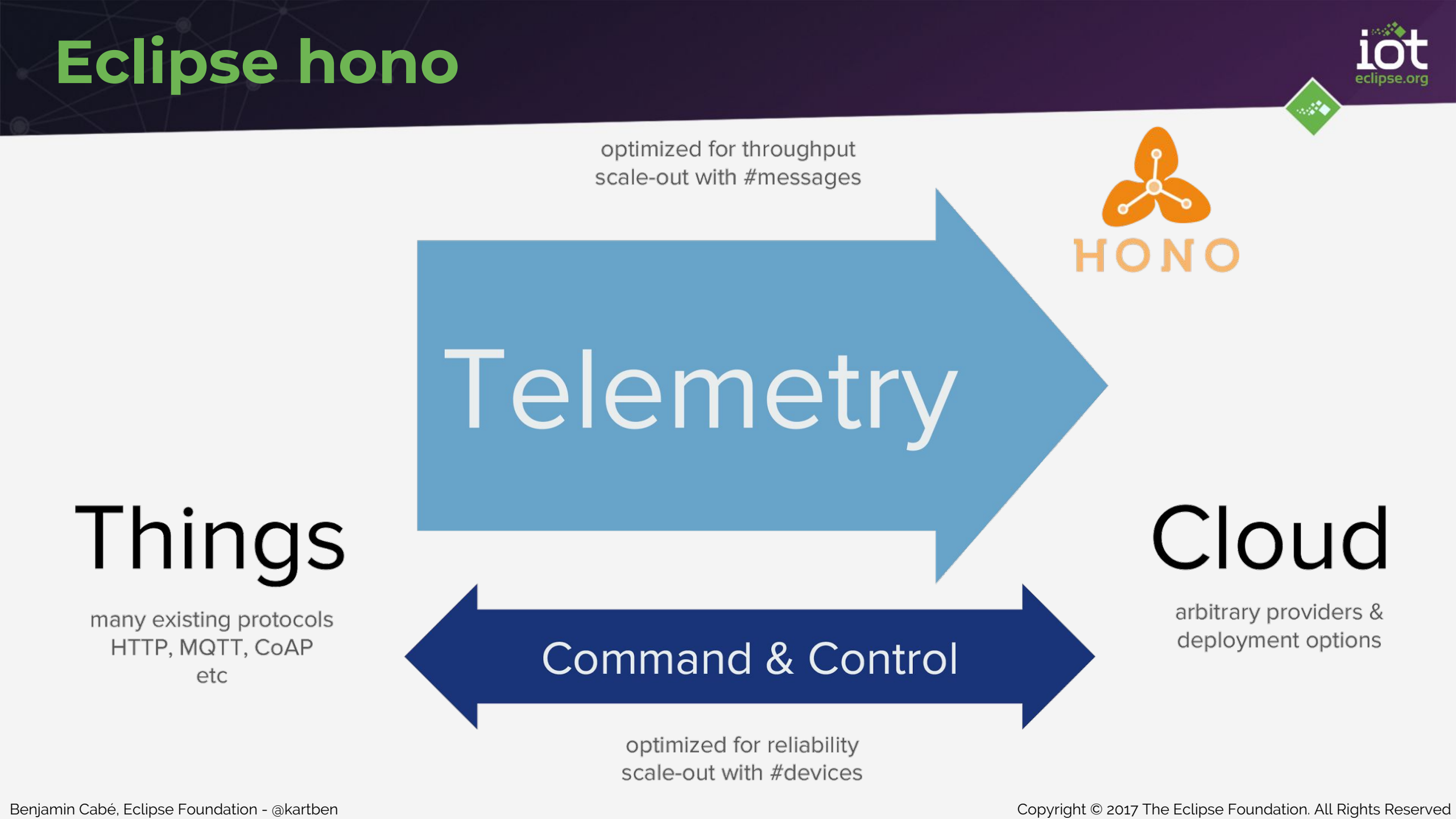
hawkBit

Deploy on:

OPENSHIFT

CLOUD FOUNDRY

Eclipse hono



The 3 IoT Software Stacks

tinyDTLS
Keti
SECURITY
Vorto
ONTOLOGIES
unide
TOOLS & SDKs
C++
Eclipse Che

Data Management & Messaging
Connectivity
Field protocols
Network Management
Hardware Abstraction Layer (HAL)
OS / RTOS
Remote Management
Milo
paho
equinox OSGi
Application Runtime
Message Routing
Application Enablement
Event Management, Analytics & UI
Data Management
Device Management
Device Registry
OS / PaaS
HONO
LESHAN
hawkBit
mosquitto
eclipse smarthome
kura
4diac
Kapua

CONSTRAINED DEVICES
GATEWAY DEVICES
IOT CLOUD PLATFORM

Eclipse IoT Adoption

Eclipse IoT Programs

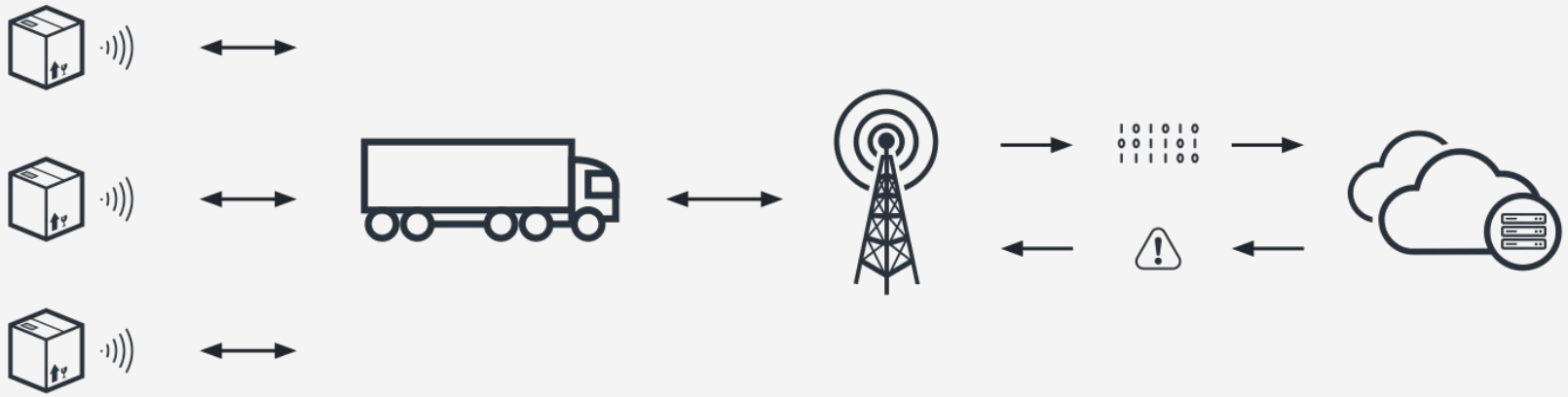
Virtual IoT

Open IoT Challenge

IoT Marketplace

Testbeds

Asset Tracking



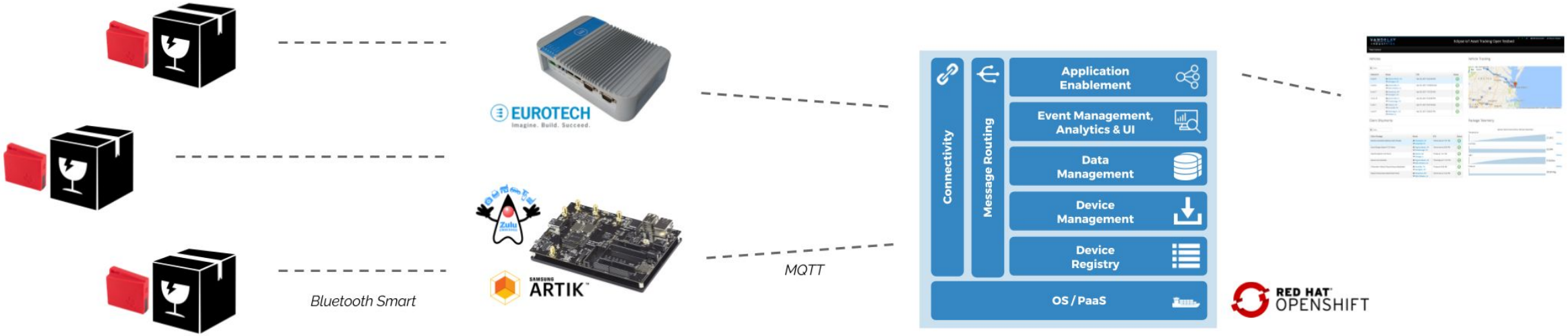
Track condition and location of cargo and goods in real time

Optimize the transport and delivery of inventory and goods

Reduce product spoilage, damage, delay, and theft

Participants

The solution



kura

Kapua

Eclipse Che

IoT Devices

e.g TI Sensor Tag

IoT Gateways

IoT Cloud

IoT Dev Tools

What is available?

- https://iot.eclipse.org/testbeds/asset-tracking
  - Webpage describing the solution (architecture, partners' contributions)
  - Source code (EPL)
    - Gateway code (Eclipse Kura)
    - Web dashboard (AngularJS app using Kapua API, running on OpenShift)
    - Data Simulator
    - https://github.com/eclipselabs/eclipseiot-testbed-assettracking
  - Live demo system
    - https://iot.eclipse.org/testbeds/asset-tracking/demo

Integration

Integration?

Integration!

One more thing...

Eclipse Enterprise for Java (EE4J)

Moving Java EE to Eclipse Foundation

Technology

IBM

ORACLE

redhat

Community and Vendors

Sponsorship

eclipse

Enterprise for Java

- ✓ Agile
- ✓ Flexible
- ✓ Open
- ✓ Compatible

Join the discussion at ee4j-community@eclipse.org

Eclipse Enterprise for Java (EE4J)

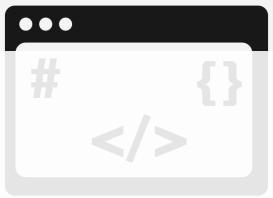
Project Overview

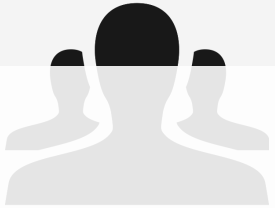
- Open process
- Collaboration: community, vendors, Eclipse
- Transition to EE4J in CY2018
  - GlassFish 5.0/Java EE 8 RIs, TCKs, product docs
  - Process for existing and new specs
  - Compatibility process
- Technology evolution, MicroProfile integration
- Oracle Java EE Support through Java EE 8
  - Continuity for Java EE community

Eclipse Deeplearning4j

- Java-based Machine Learning Framework
  - Toolkit for building, training and deploying Neural Networks
- Distributed training
  - GPU or Hadoop/Spark
- Use cases:
  - network intrusion detection, predictive maintenance, recommender systems in e-commerce, image recognition, …

Join us!






https://iot.eclipse.org

2.4 million lines of code

30* projects

250+ developers

110K monthly visitors

* and counting!

Join us!

- **Check out the projects**
  - Contribute ideas, bug fixes, use cases…
- **Participate on the mailing lists**
- **Virtual IoT Meetup**
  - https://www.meetup.com/virtual-iot
- **Propose your project!**

iot
eclipse.org

Thank you!

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https://blog.benjamin-cabe.com