RED HAT SUMMIT

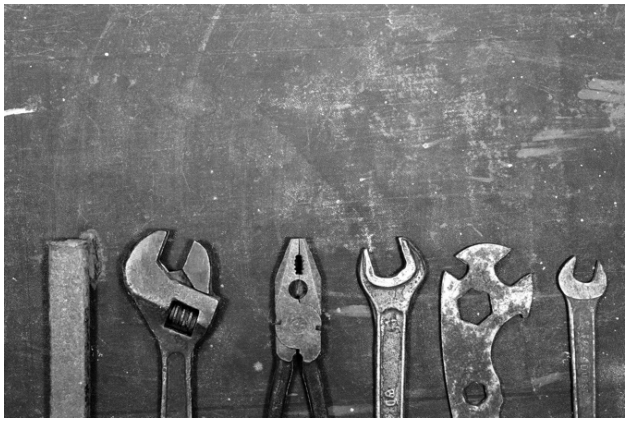
Developing Interoperable Components for an Open IoT Foundation

Red Hat and Eurotech collaboration simplifies Internet of Things integration and accelerates implementations

Marco Carrer – CTO, Eurotech

James Kirkland – Chief Architect for IoT, Red Hat

IoT



Open. **Integrated.** **Managed.**


Come In
WE'RE
OPEN

Open IoT

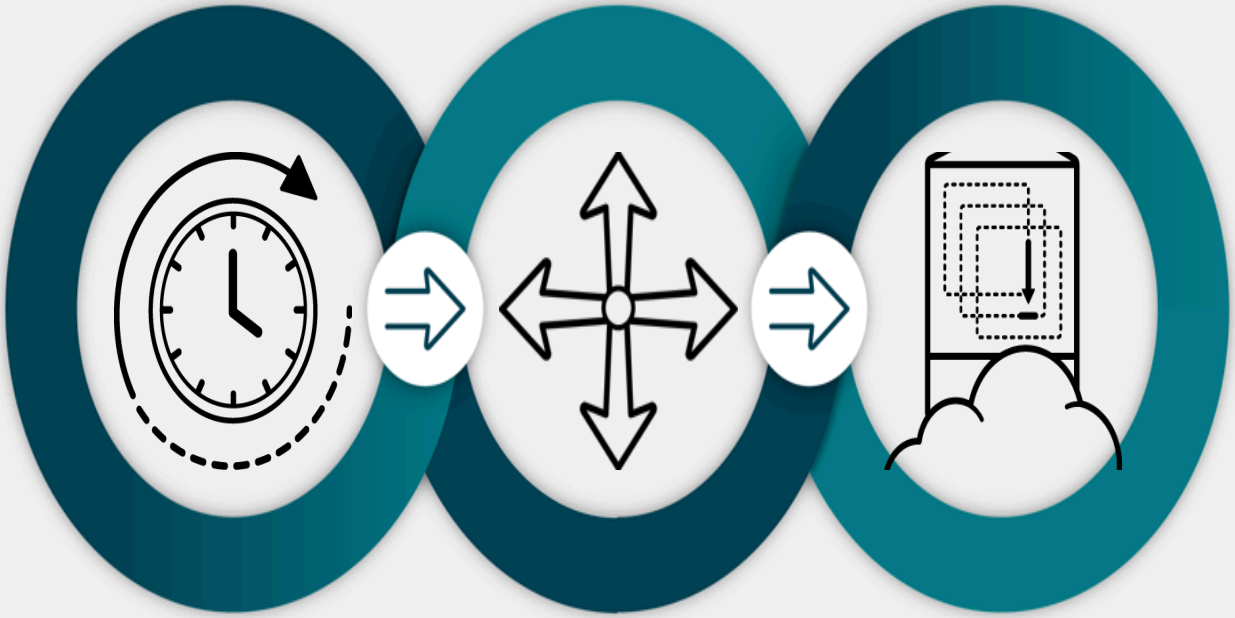
Open Source
Open Standards
Open Hardware

No Vendor Lock-in
Large Eco-system
Interoperability
Simple & Quick Prototyping
Higher Quality

Customers as Partners

Why open source?

Accelerate your business



Bring products to market faster

Expand to new and adjacent markets

Build end-to-end solutions

Why Open Source for IoT?

- Pressure to add value in shrinking timeframes
  - Decomposition of vertically-integrated value add
- Velocity of technology change outstrips staffing
  - Impractical / costly to sustain in-house platforms
- Interoperability trumps exclusive differentiation
  - More devices/protocols “outside” vs. “inside”
- Quest for quality w/o lock-in
  - Main reason for OSS deployment no longer cost
  - OSS defects:LoC provably lower than proprietary
  - Legacy platform differentiation shrinking / vanishing

BLACKDUCK

http://www.slideshare.net/blackducksoftware/io-t-and-open-source

Why Red Hat for IoT?

redhat.

Open source, open standards for IoT market

Tight integration of IoT apps & data with enterprise platforms & services

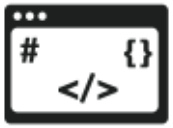
Iterate quickly with low risk, greater flexibility,

OPEN – FLEXIBLE – ROBUST

Why Eurotech for IoT?

- One of the world top players in the global Embedded Computers market
- Behind the products & services of more than 20 Global 500 companies
- 20+ Years of experience in “M2M” and IoT systems
  - 20+ Years experience in OT / embedded / gateway hardware & software
  - 16 Years ago co-developed MQTT with IBM
  - 10+ Years experience with Java in embedded
  - 6+ Years history in M2M/IoT cloud platforms
- Strong vertical market competencies:
  - Industrial & Logistics
  - Transportation
  - Defense & Security
  - Healthcare & Medical

Founded in 2012 by



2.3M lines of code

26 projects

250+ developers

1.3M annual visitors

Middleware for IoT Gateways

Modular IoT Integration Platform

Code base donated by **EUROTECH**

Started Dec 2013, first release Sept 2014

Started Oct 2016, first release May 2017

Commercially Supported Versions by EUROTECH:

Everyware Software Framework

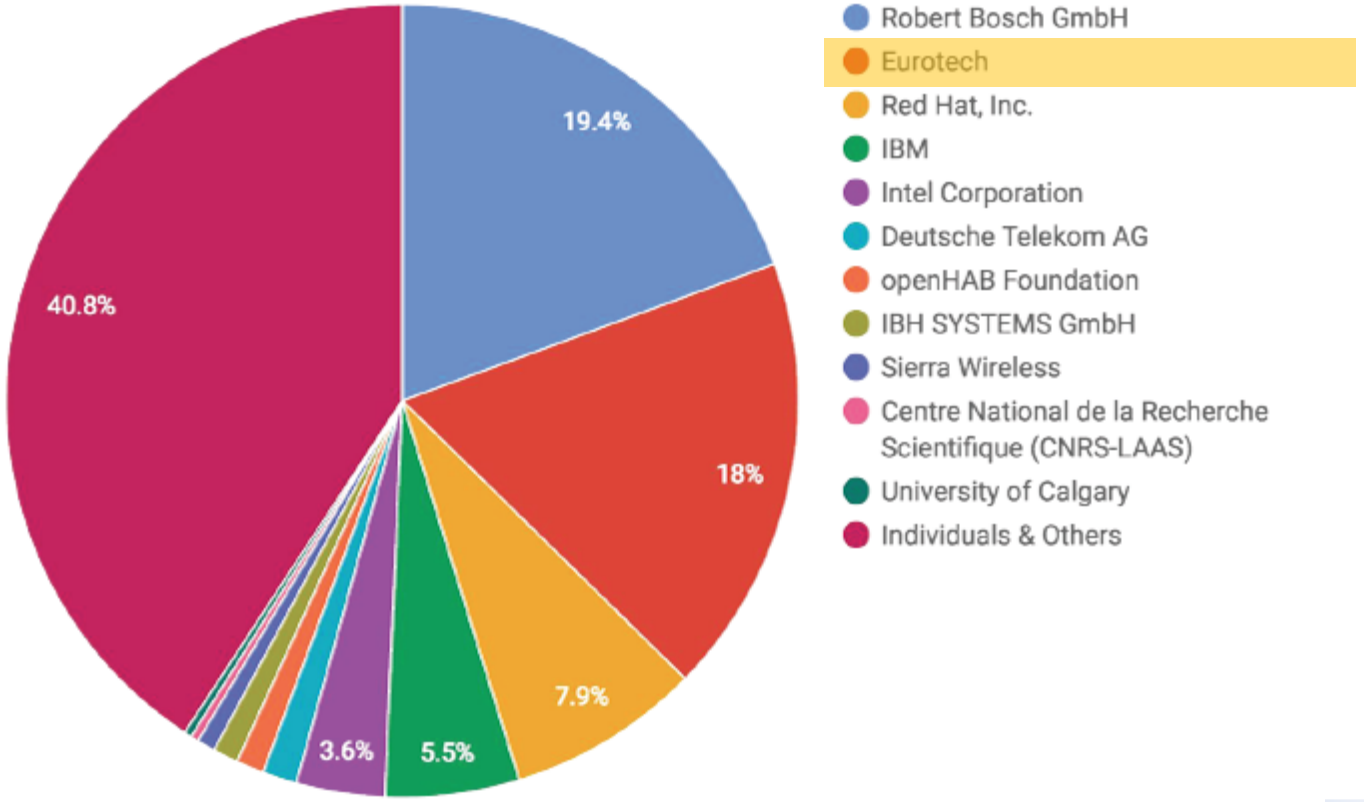
MIDDLEWARE FOR IoT GATEWAYS

Everyware Cloud™

IoT INTEGRATION PLATFORM

eclipse iot
eclipse.org

Contributions by Company in 2016



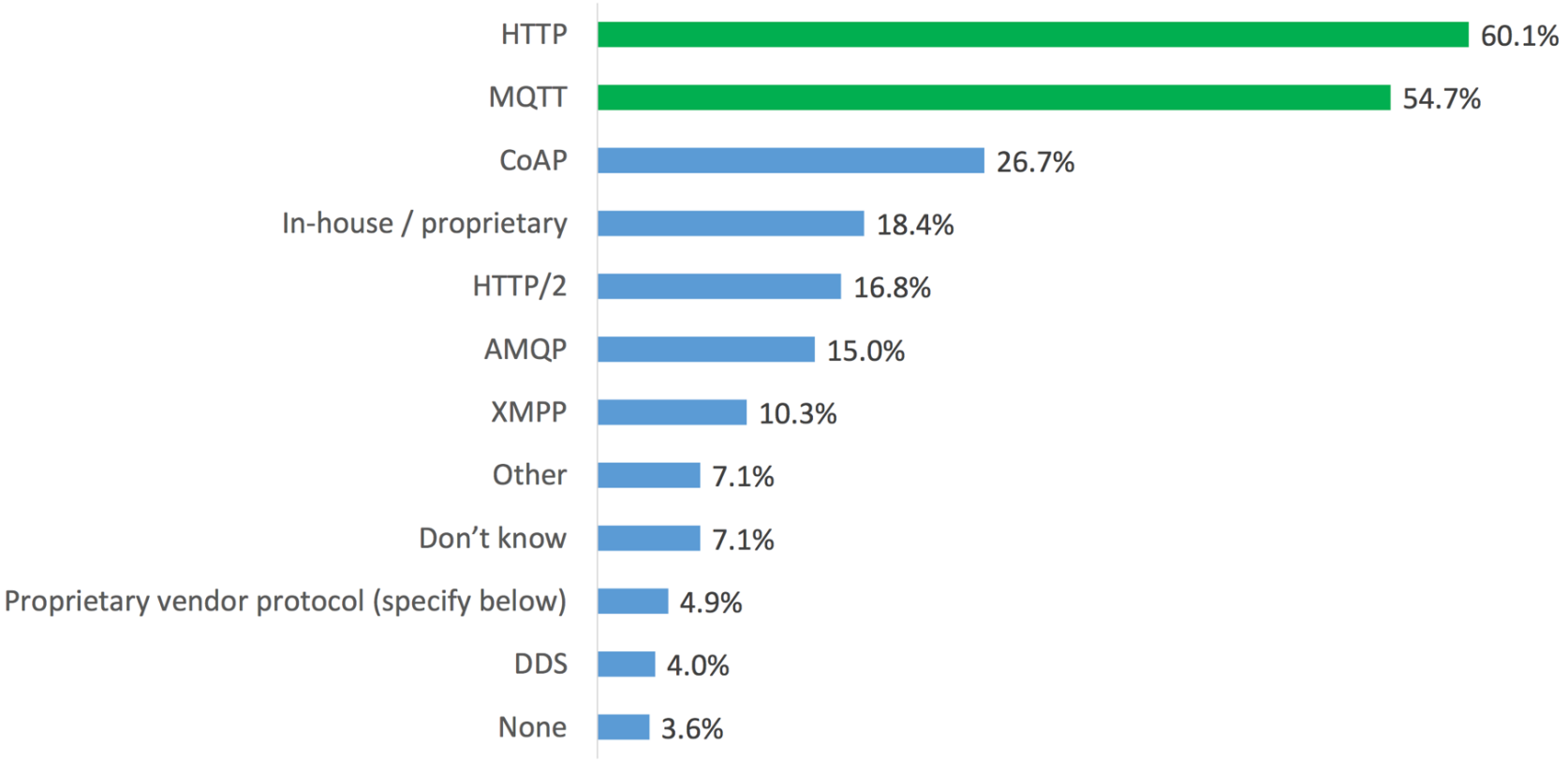
Open Standards

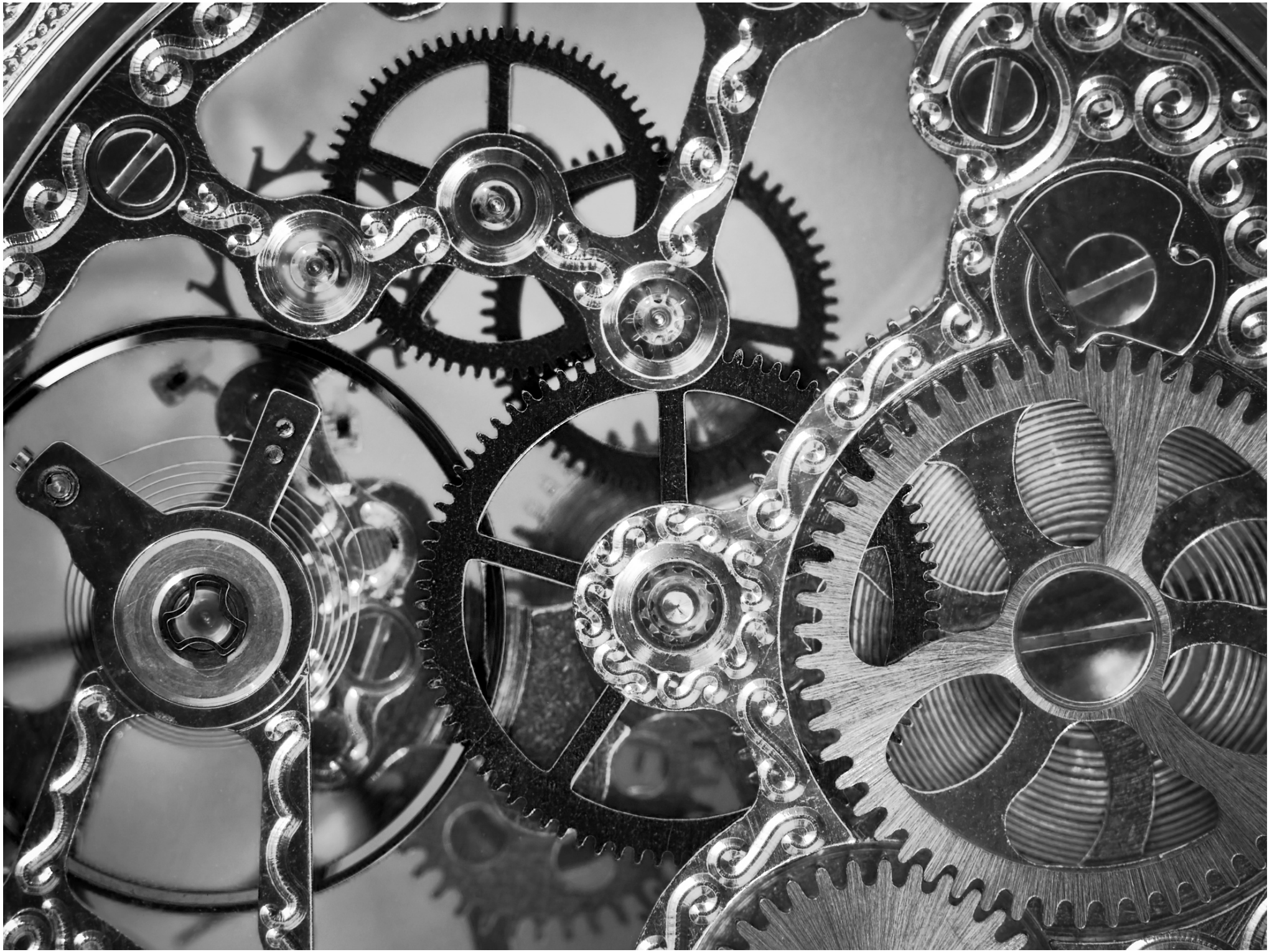
Message Queue Telemetry Transport (MQTT)

- M2M Messaging Protocol
- Low Bandwidth / Low Power
- 2-way Communication
- Publish and Subscribe
- Hierarchical Topic Namespaces
- Data Payload Agnostic
- Device Initiated Connection
- Firewall-friendly
- SSL and Authenticated
- Large ecosystem

MESSAGING STANDARDS

What messaging protocol(s) do you use for your IoT solution?





Integrated IoT

Integration @ Edge

Integration @ Data Center

End-to-end Modular IoT Solutions

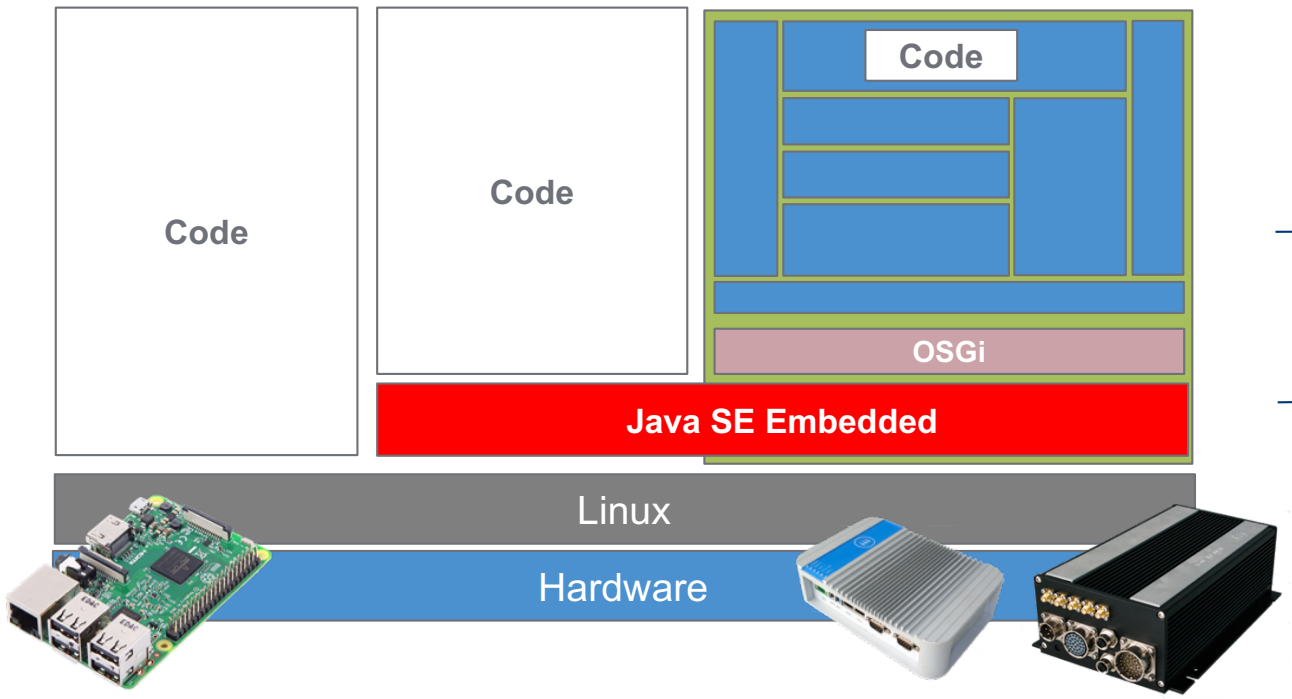
Faster Innovation

Faster Time-to-Market

Integration @ Edge

Eclipse Kura / Everyware Software Framework (ESF)

Developer's Productivity, Increasing Value, Minimizing TCO



kura

ESF

OSGi Alliance

Java

Integration @ Edge

From Prototype to Production

Software portability
across HW Platforms

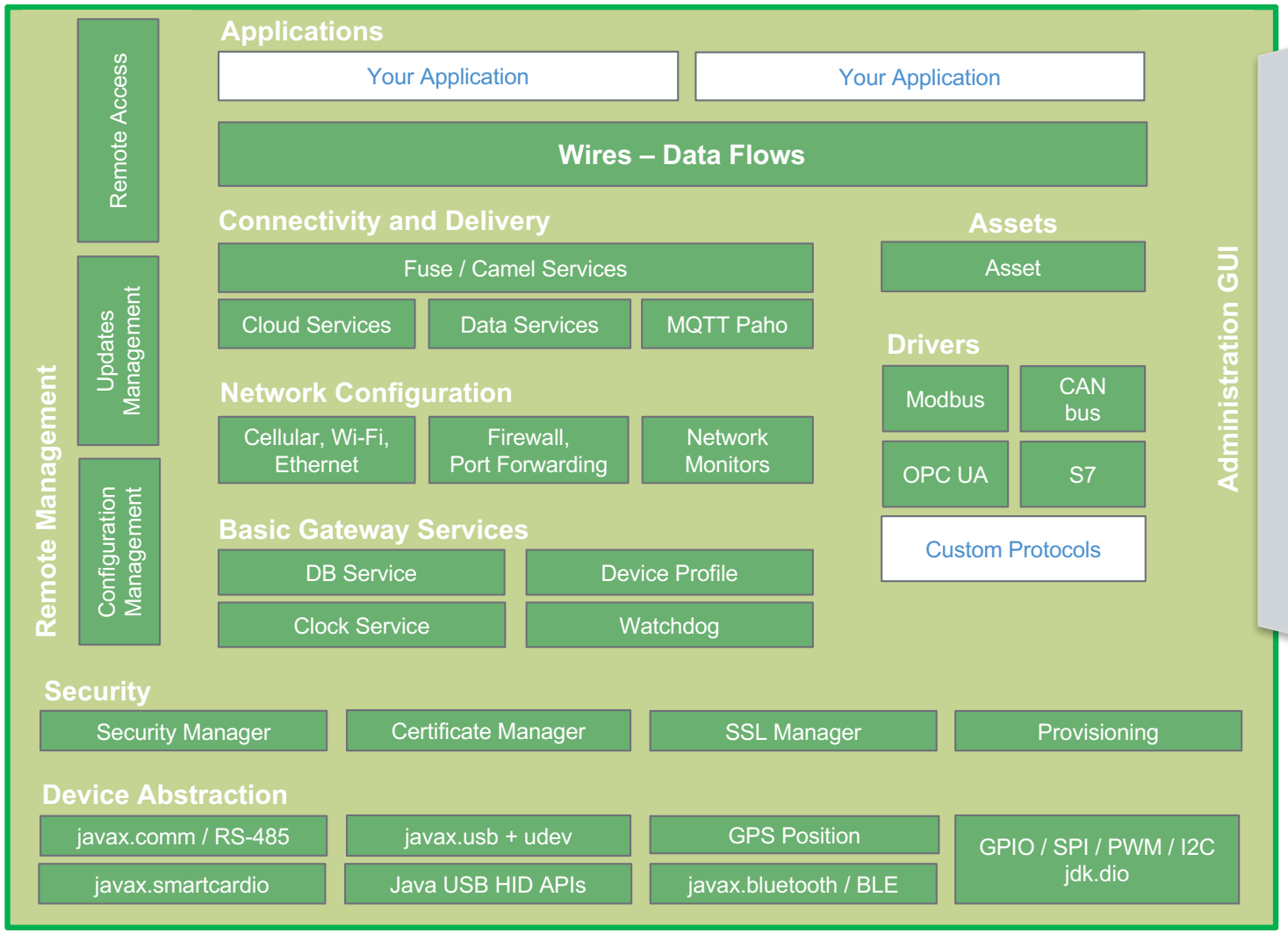
ESF

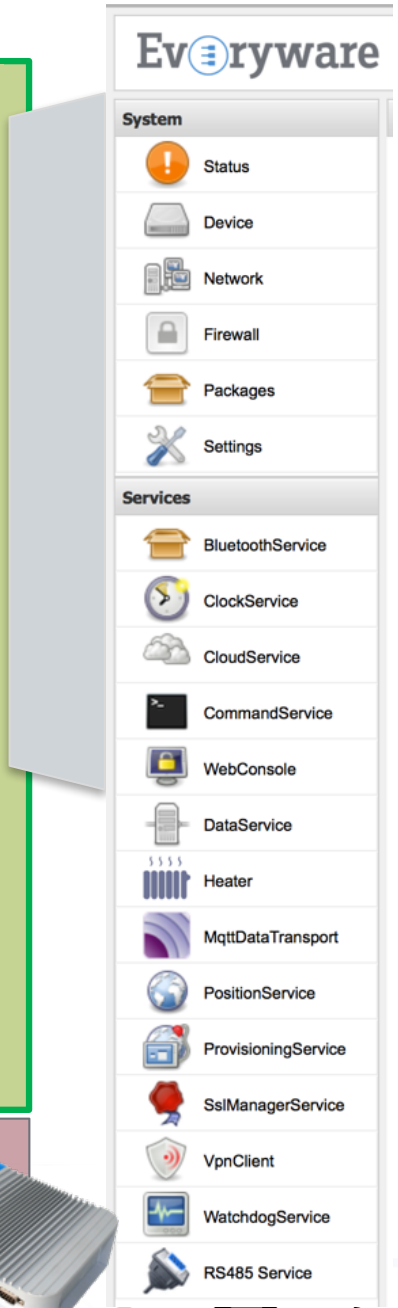
kura

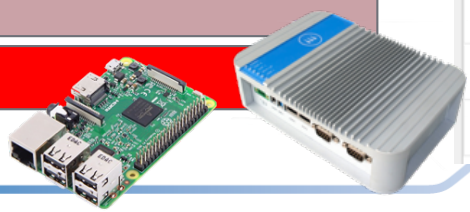
Industrial
IoT Gateways

Open Hardware

Integration @ Edge - Kura / ESF







EUROTECH

redhat.

Integration @ Edge

Eclipse Kura 3 / Everyware Software Framework (ESF) 5

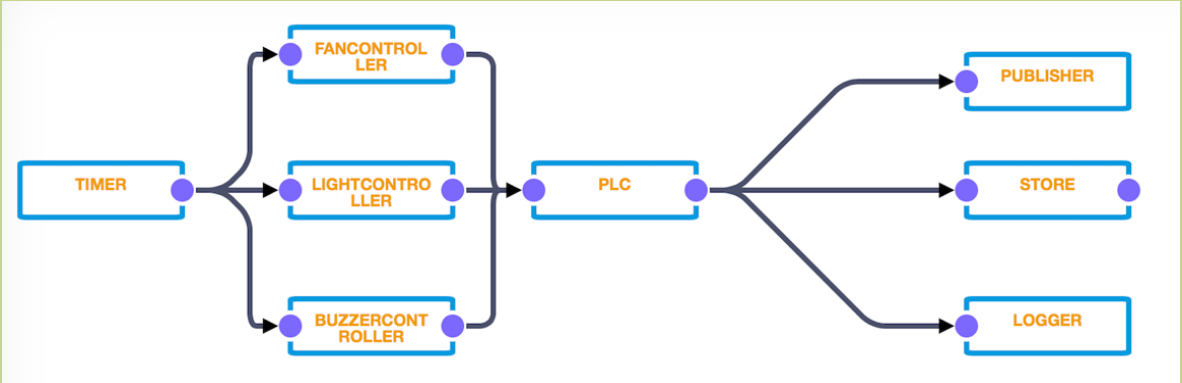
Connect to IoT Cloud Services

Multiple Connections
Message Routing
Digital Twins

Everyware Cloud
Eclipse Kapua
AWS IoT
Azure IoT
Apache Camel

Develop IoT Edge Computing Apps

Wires Data Flow
SQL Database
Full Java APIs



Connect to Field Devices

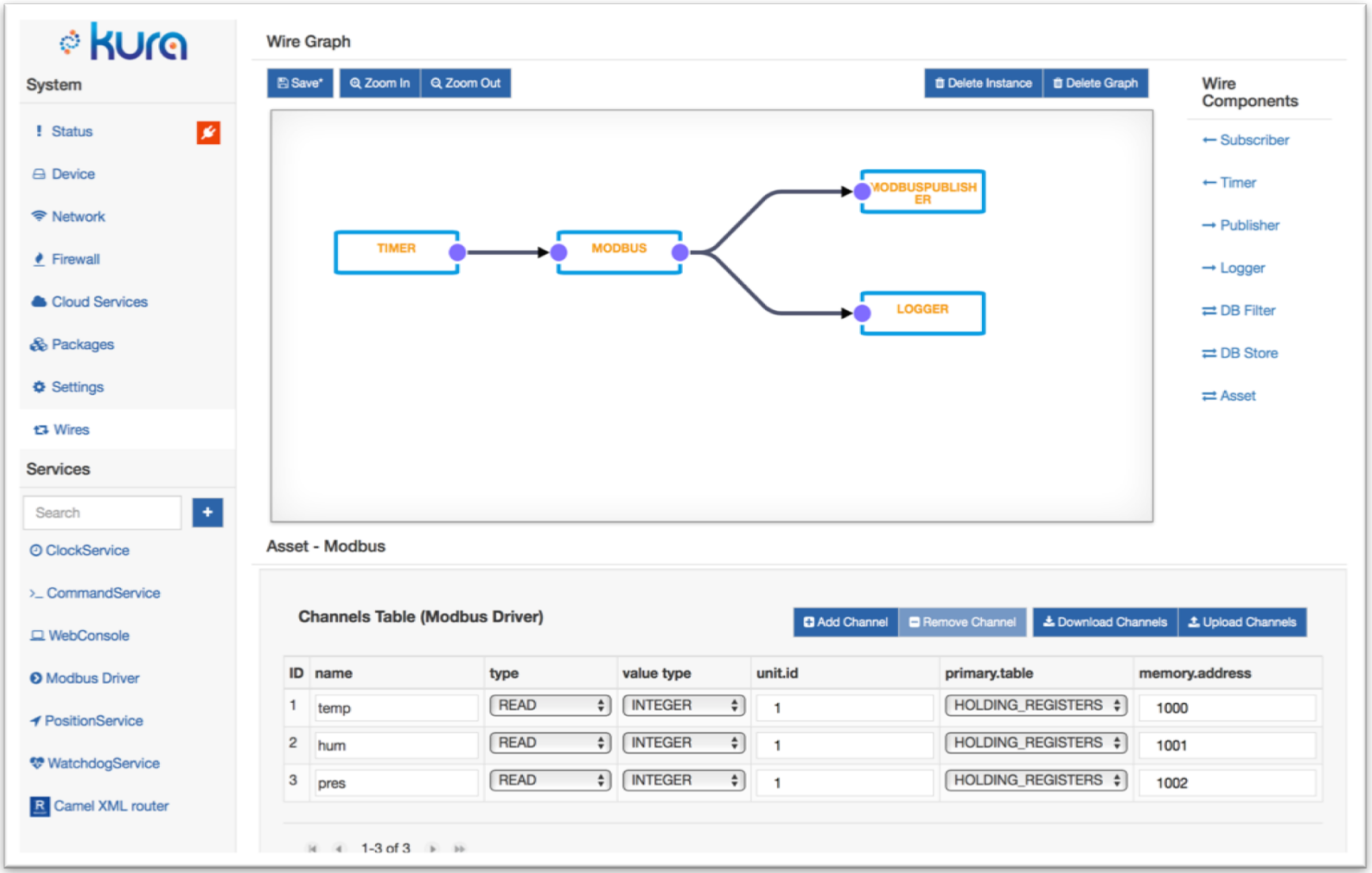
Industrial Protocols
Modular Drivers

RS 232/485
Bluetooth Low Energy
USB
CAN bus
GPS/GNSS
GPIO/I2C/PWM

Modbus
OPC UA
PROFINET
S7 PROTOCOL

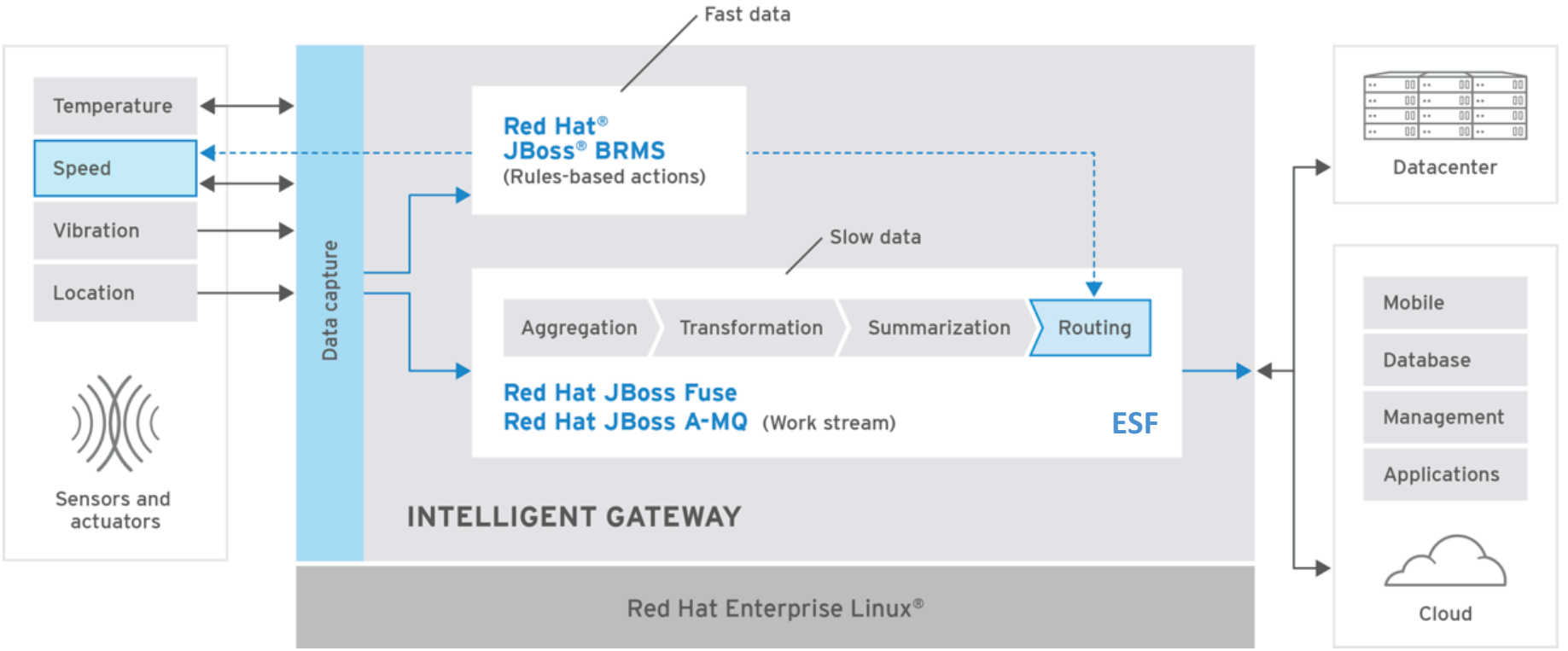
Integration @ Edge

Wires



Integration @ Edge

Transforming device data into actionable information



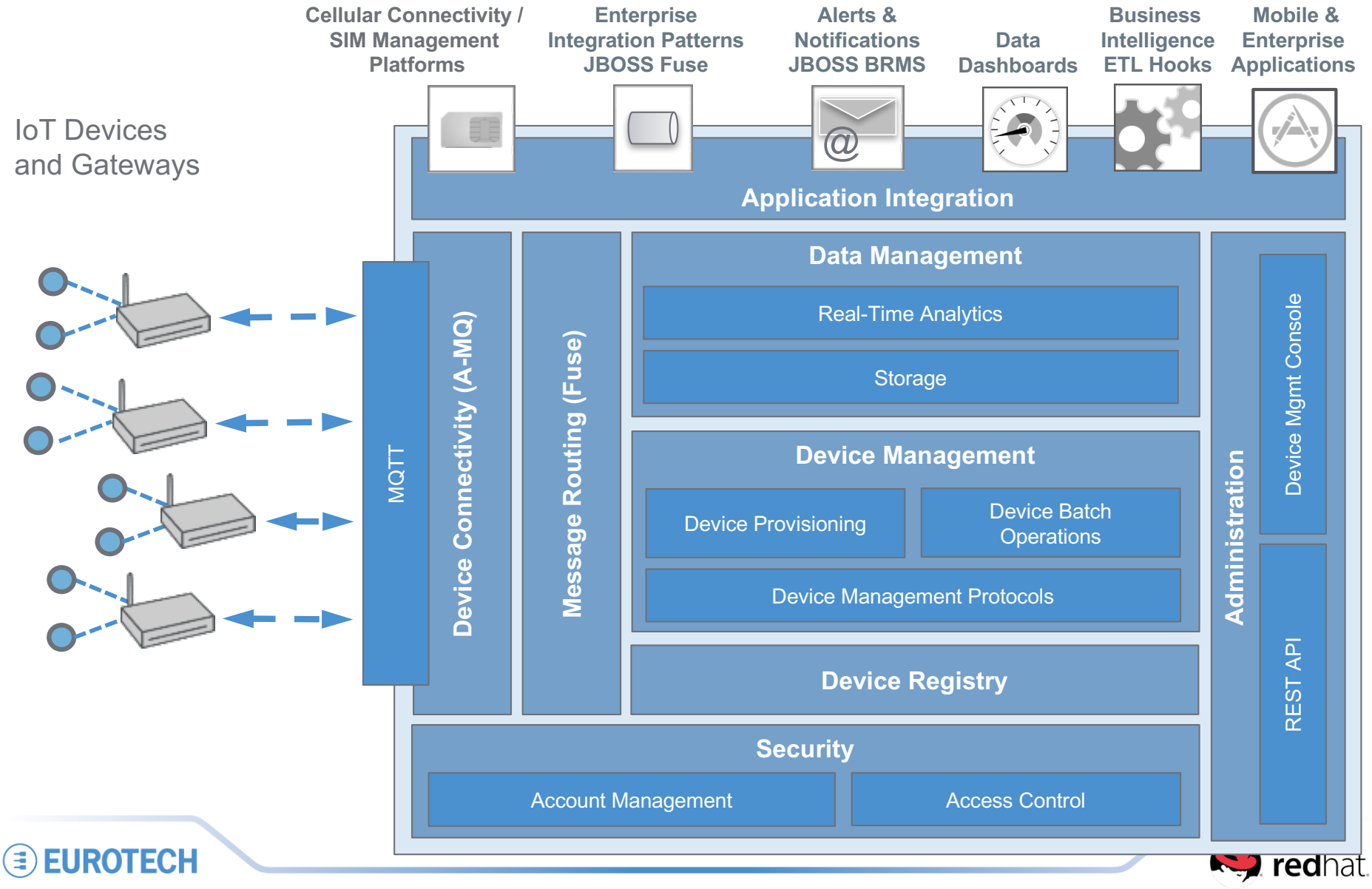
Integration @ Edge

Developer's Experience

Emulate on PC	Deploy on Target	Cloud Managed
		
Start developing your IoT /M2M application in the comfort of your PC. • Full Eclipse Integration • Target Platform Definition • Emulated Services • Run/Debug from Eclipse • Support Mac/Linux Hosts	When you are ready, deploy your application on the gateway. • One-click Deployment • Eclipse Plugin • Remote Debugging	Provision and manage your applications in field devices from the Cloud. • Remote OSGi Management via MQTT • Web-based Console

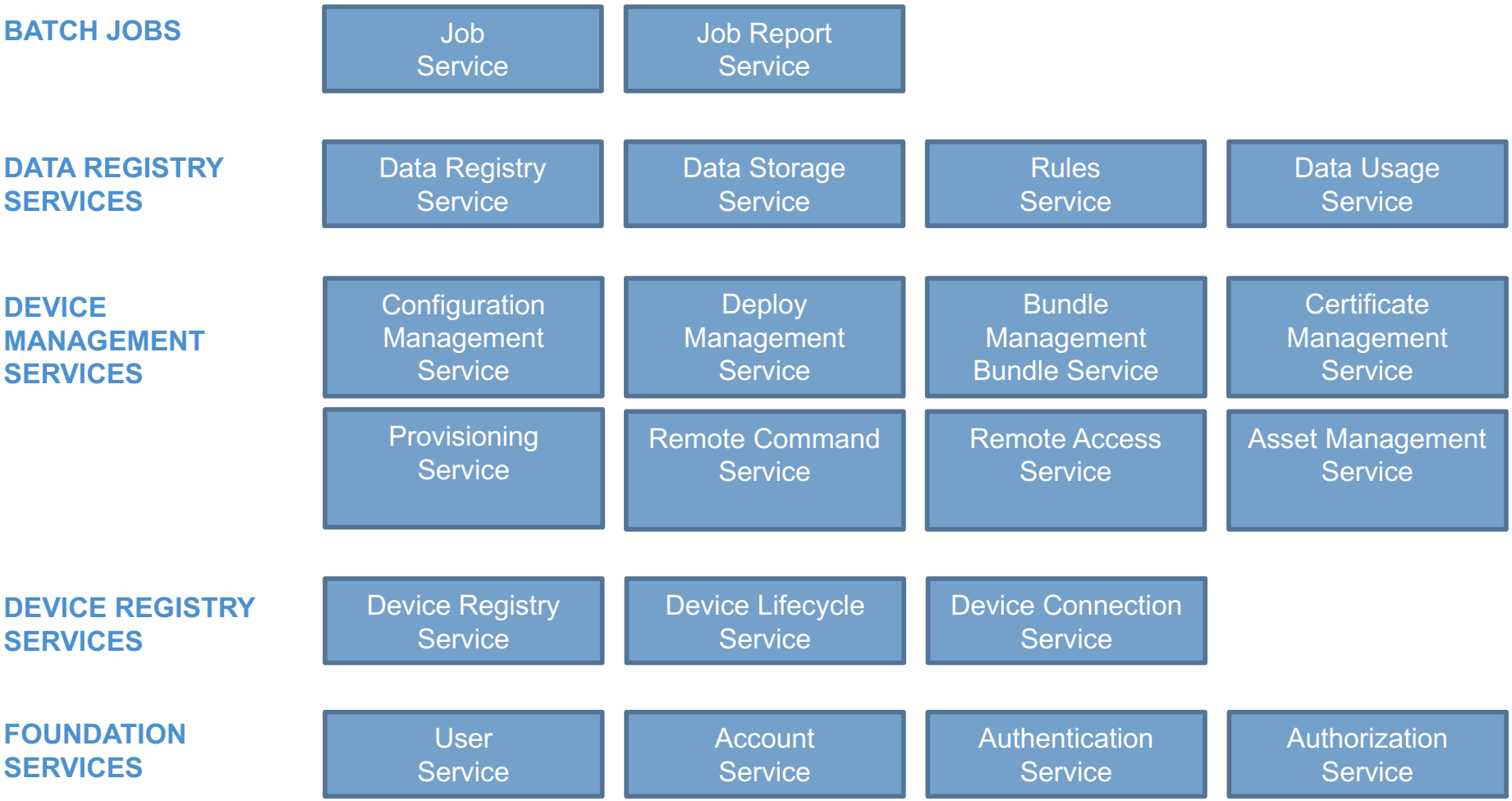
Integration @ Data Center

Eclipse Kapua / Everyware Cloud



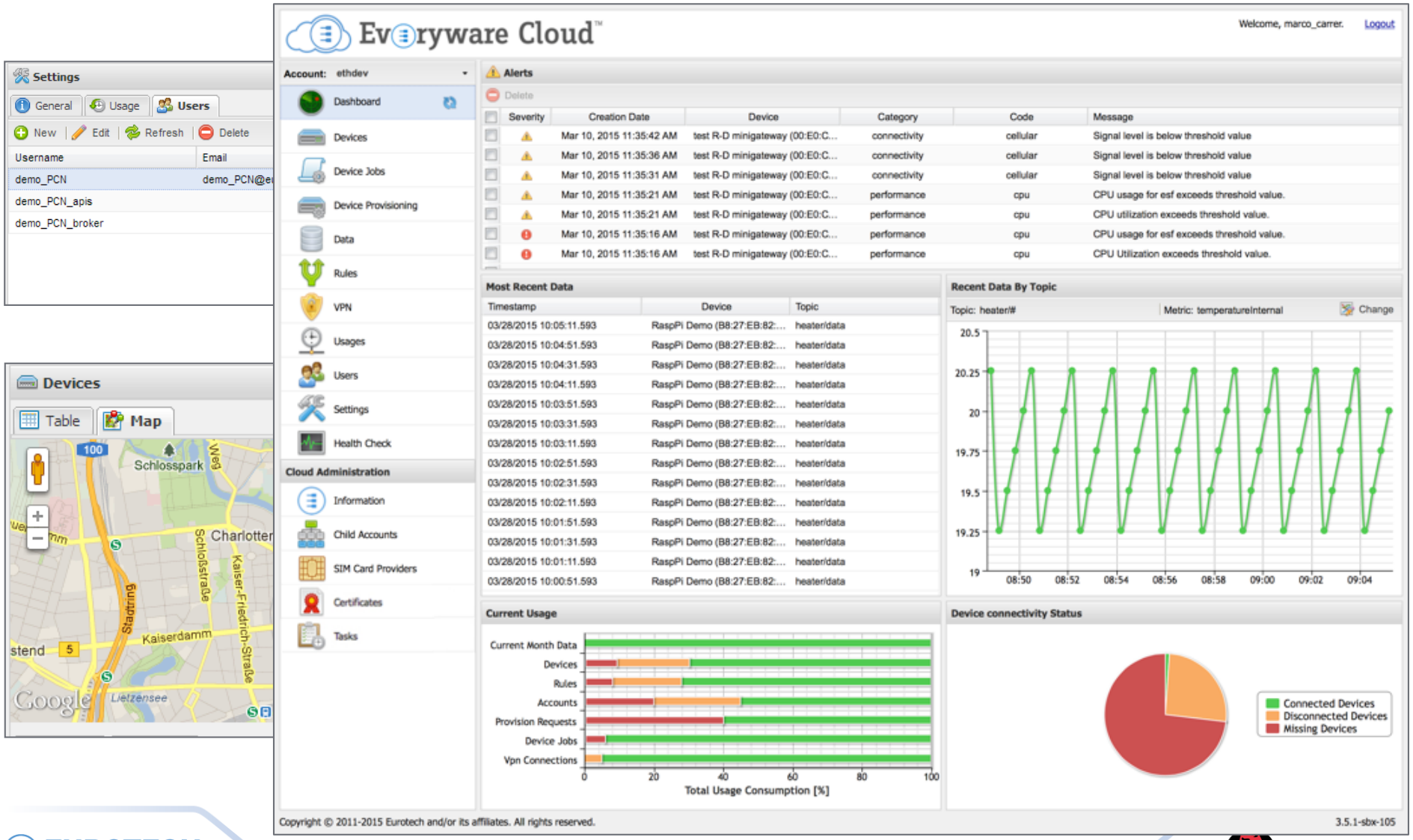
Integration @ Data Center

Eclipse Kapua Core IoT Services

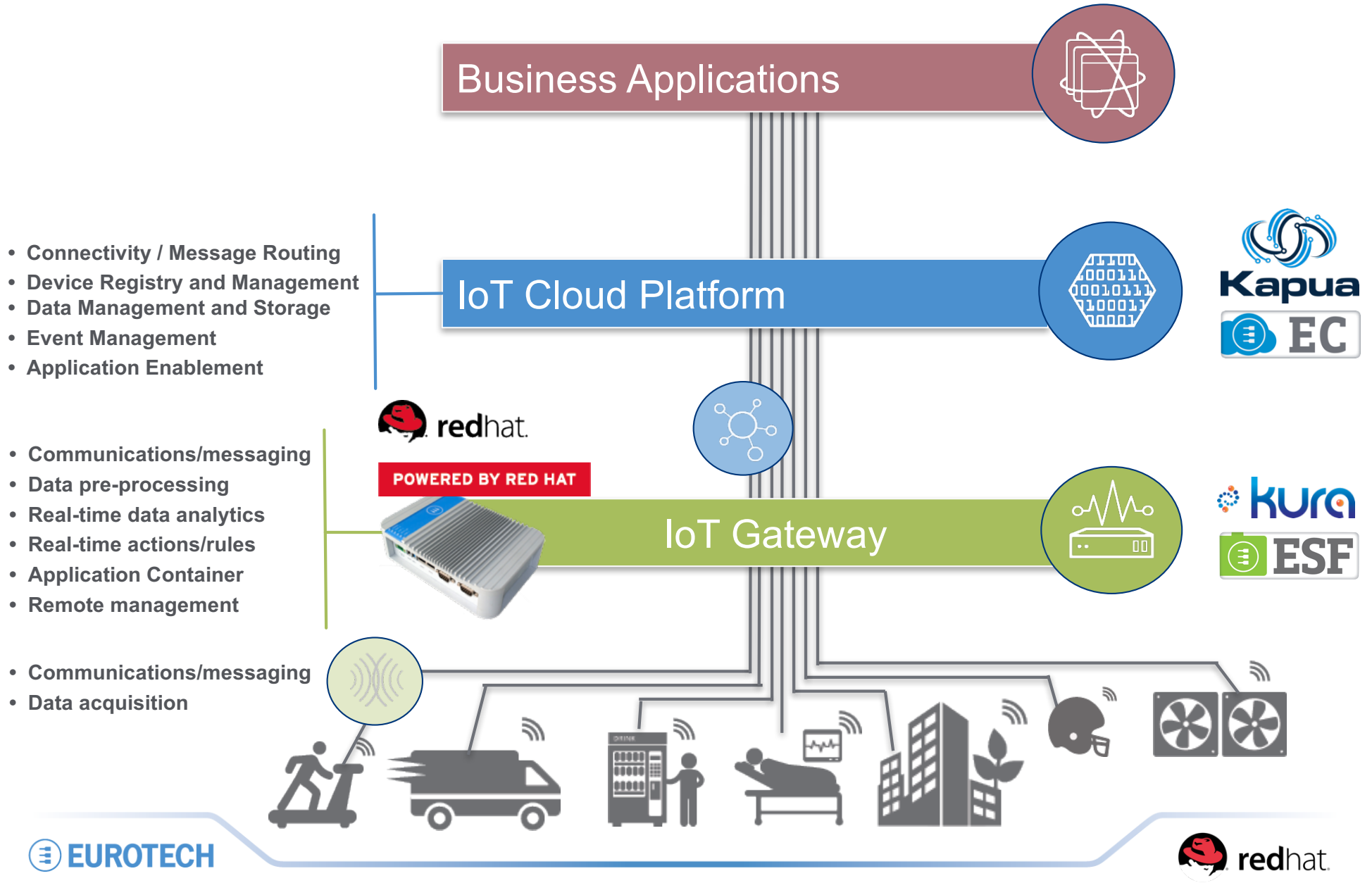


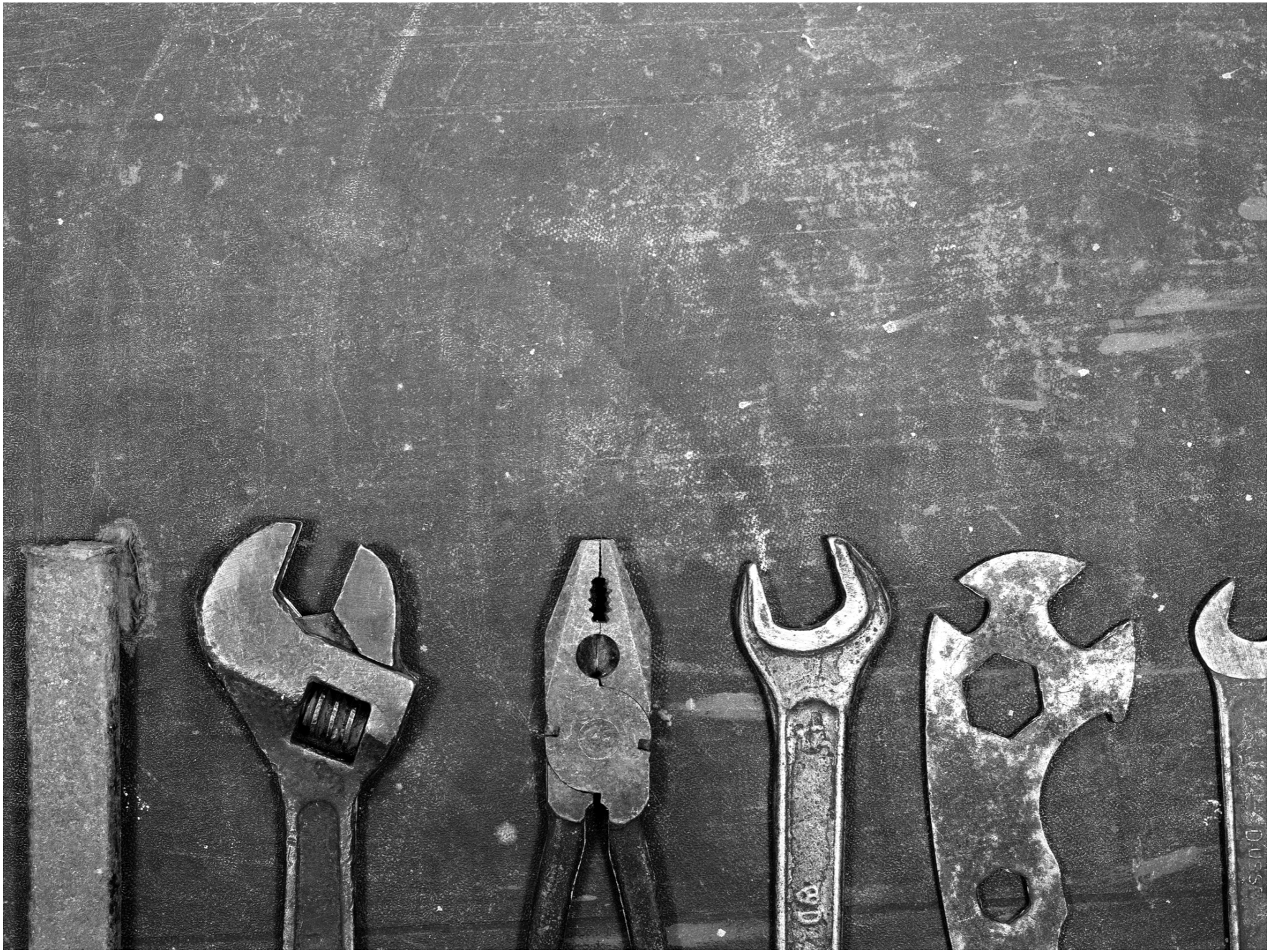
Everyware Cloud

Administrator / Web Console



Open End-to-end Modular IoT Solution





Managed IoT

IT Management

OT Management

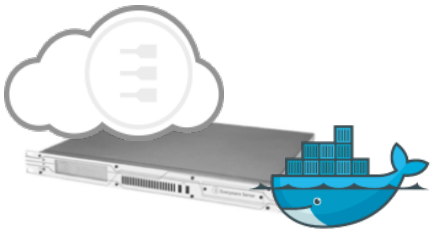
IT-OT Security

IT Management

Everyware Cloud™
IoT INTEGRATION PLATFORM

Kapua

Appliance



On-premise Appliance

Private and On Premise

Software Appliance

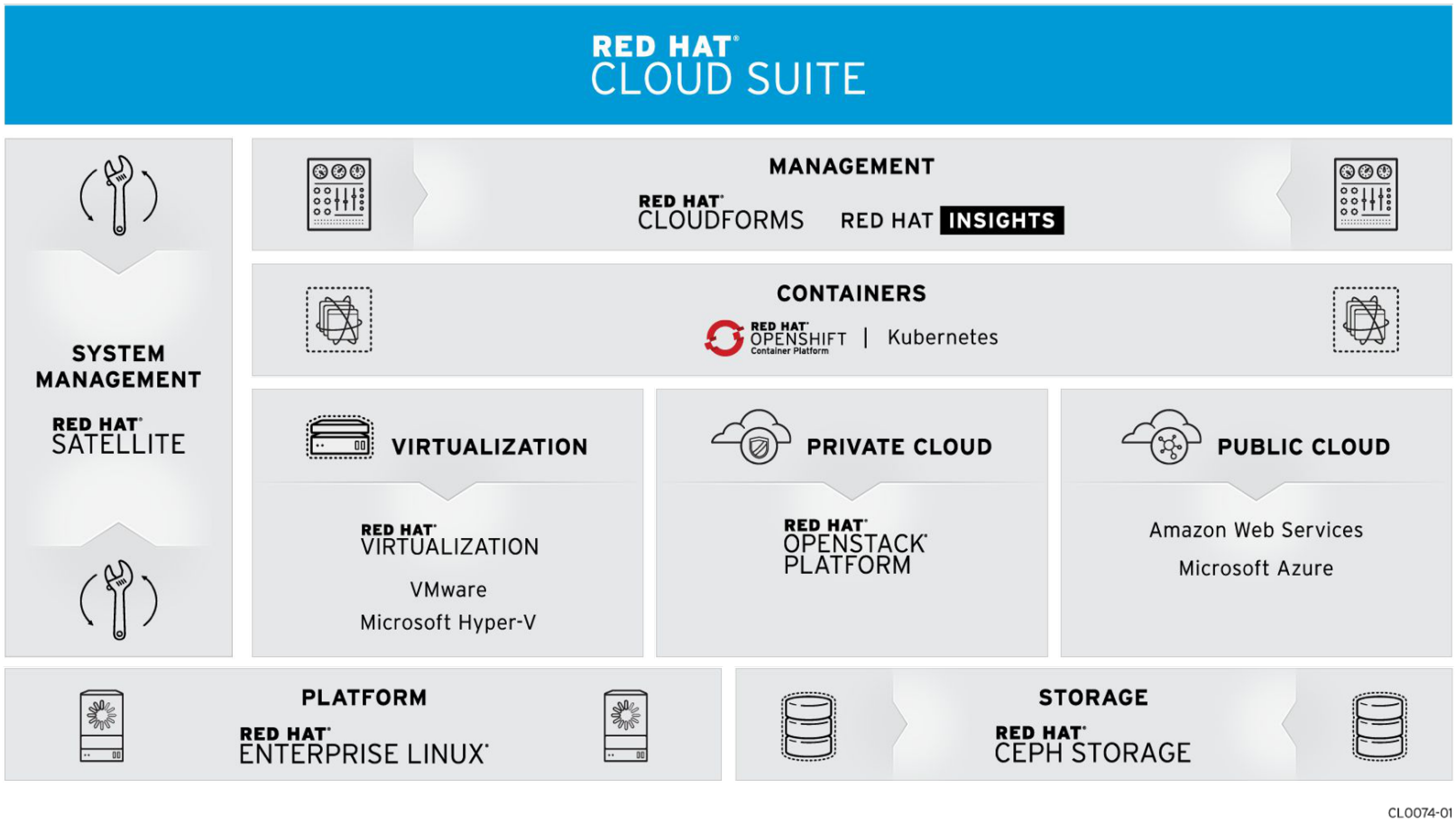
RED HAT® OPENSHIFT Container Platform

Public

SaaS Edition

IT Management

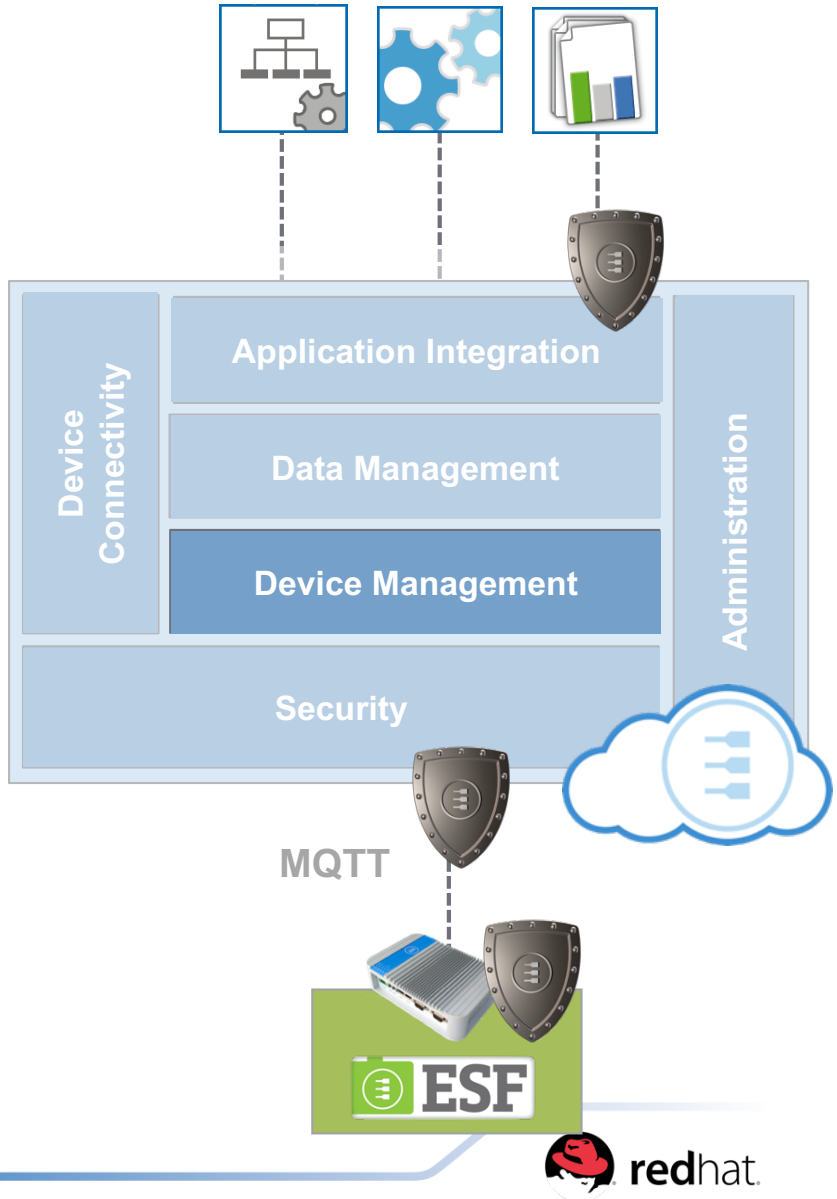
OpenShift as a platform for IoT microservices



OT Management

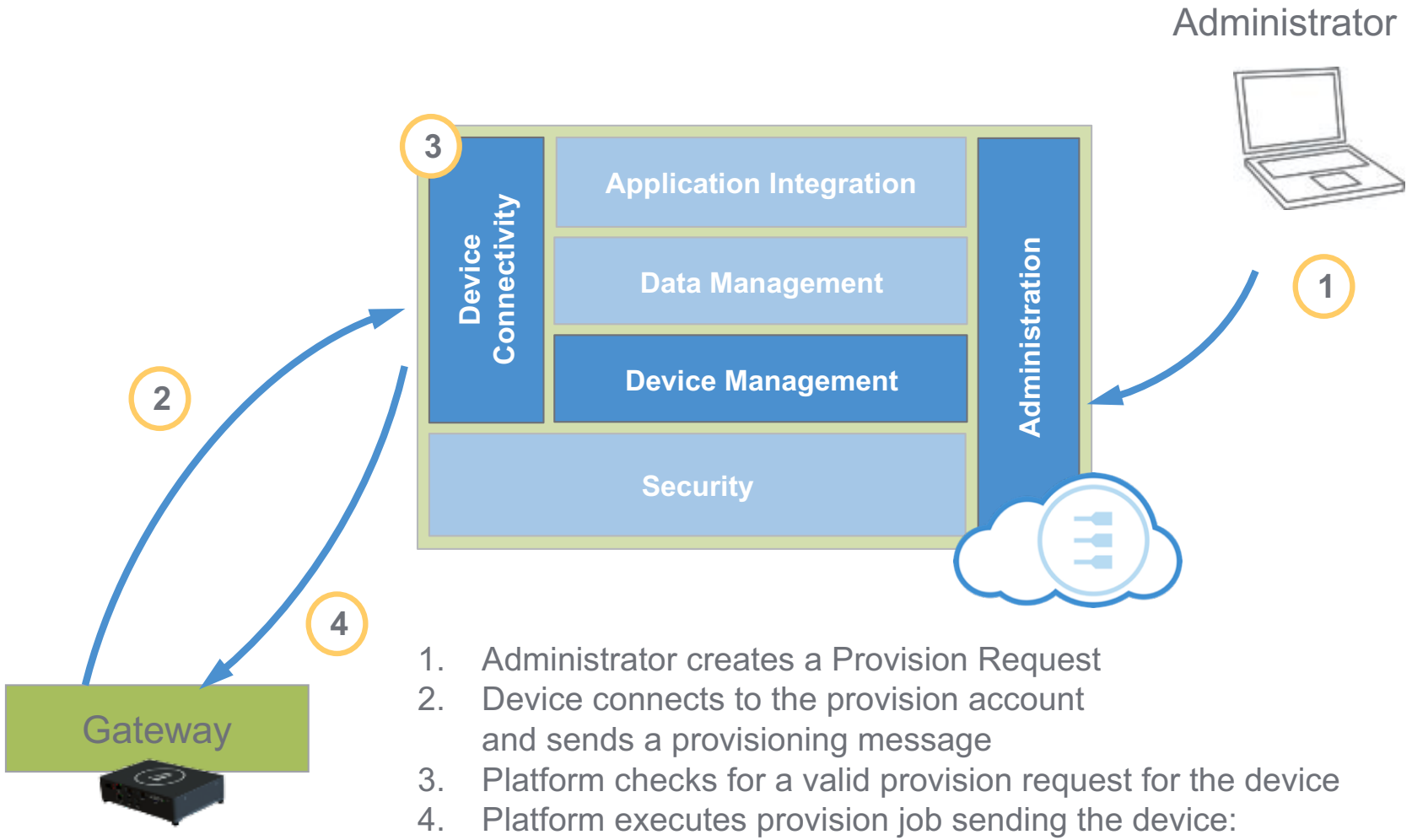
Device Management

- Device Provisioning
- Application Life-cycle Management
- Service Configuration Management
- Certificate Management
- Device Batch Operations
- Remote Access and Maintenance



OT Management

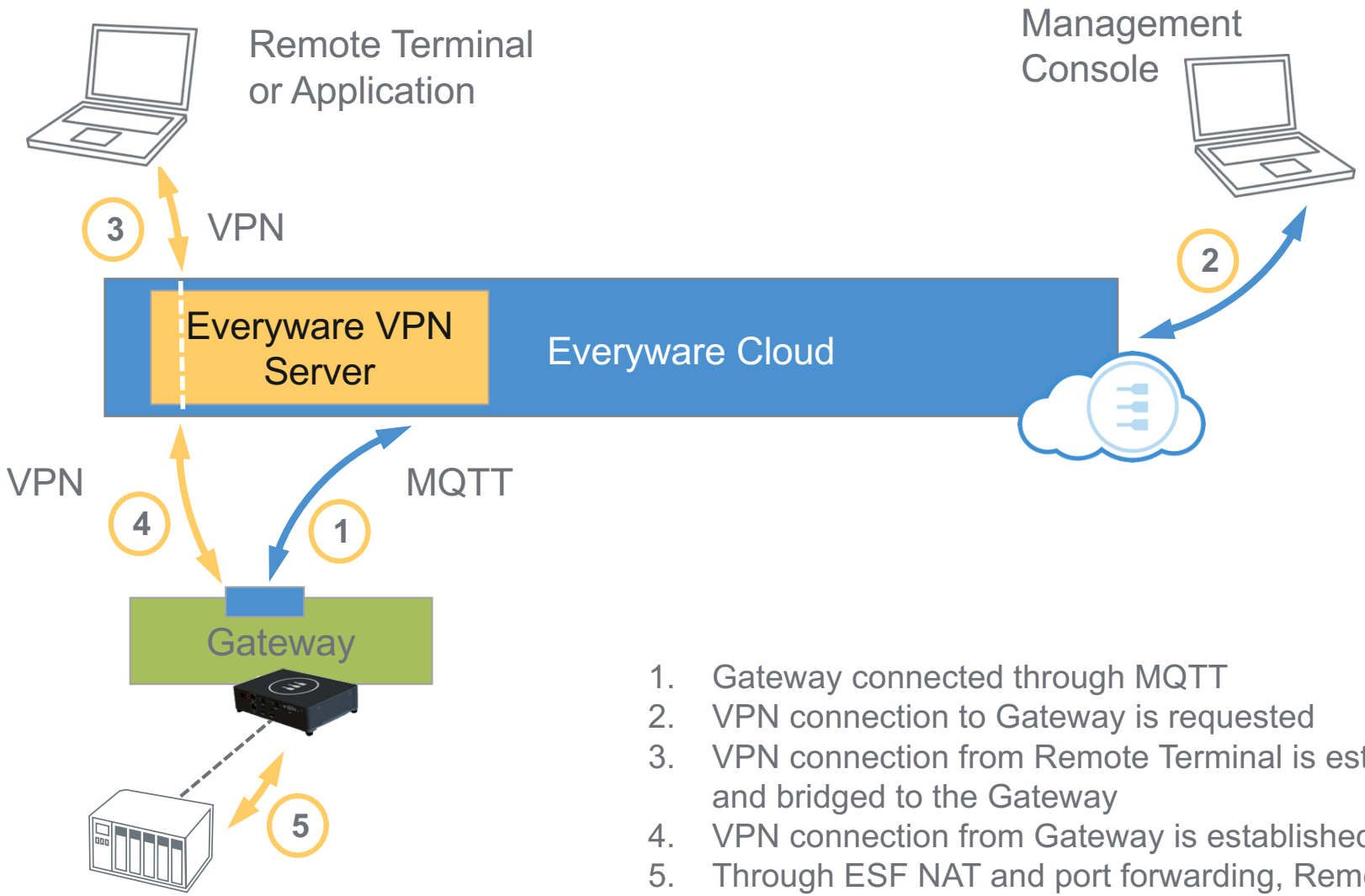
Device Provisioning



1. Administrator creates a Provision Request
2. Device connects to the provision account and sends a provisioning message
3. Platform checks for a valid provision request for the device
4. Platform executes provision job sending the device:
   a. Platform certificate for secure communication
   b. New device configuration
5. The device applies new configuration and connects under target account

OT Management

Remote Access



1. Gateway connected through MQTT
2. VPN connection to Gateway is requested
3. VPN connection from Remote Terminal is established and bridged to the Gateway
4. VPN connection from Gateway is established
5. Through ESF NAT and port forwarding, Remote Terminal can access devices connected to the Gateway subnet

IT-OT Security

Vulnerability Assessments
and Penetration Tests

Cloud-level Security

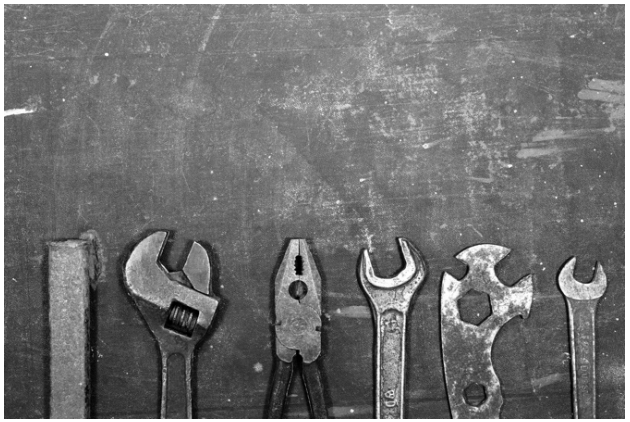
- ✓ Integrated Certificate Management
- ✓ Validated Server Identity
- ✓ Tenant Isolation
- ✓ Role-based Access Control
- ✓ 2-factor Authentication

Secure Communication

- ✓ SSL/TLS Encryption w/ Hostname Verification*
- ✓ Mutual Authentication
- ✓ Digitally Signed Messages

Device-level Security

- ✓ Unique Device Identity and Credentials
- ✓ Signed ESF/Application Code
- ✓ Encrypted Configuration and Storage



Open Source
Open Standards
Open Hardware

Integration @ Edge
Integration @ Data Center
End-to-end IoT Solutions

IT Management
OT Management
IT-OT Security

Open. Integrated. Managed. IoT.

as simple as

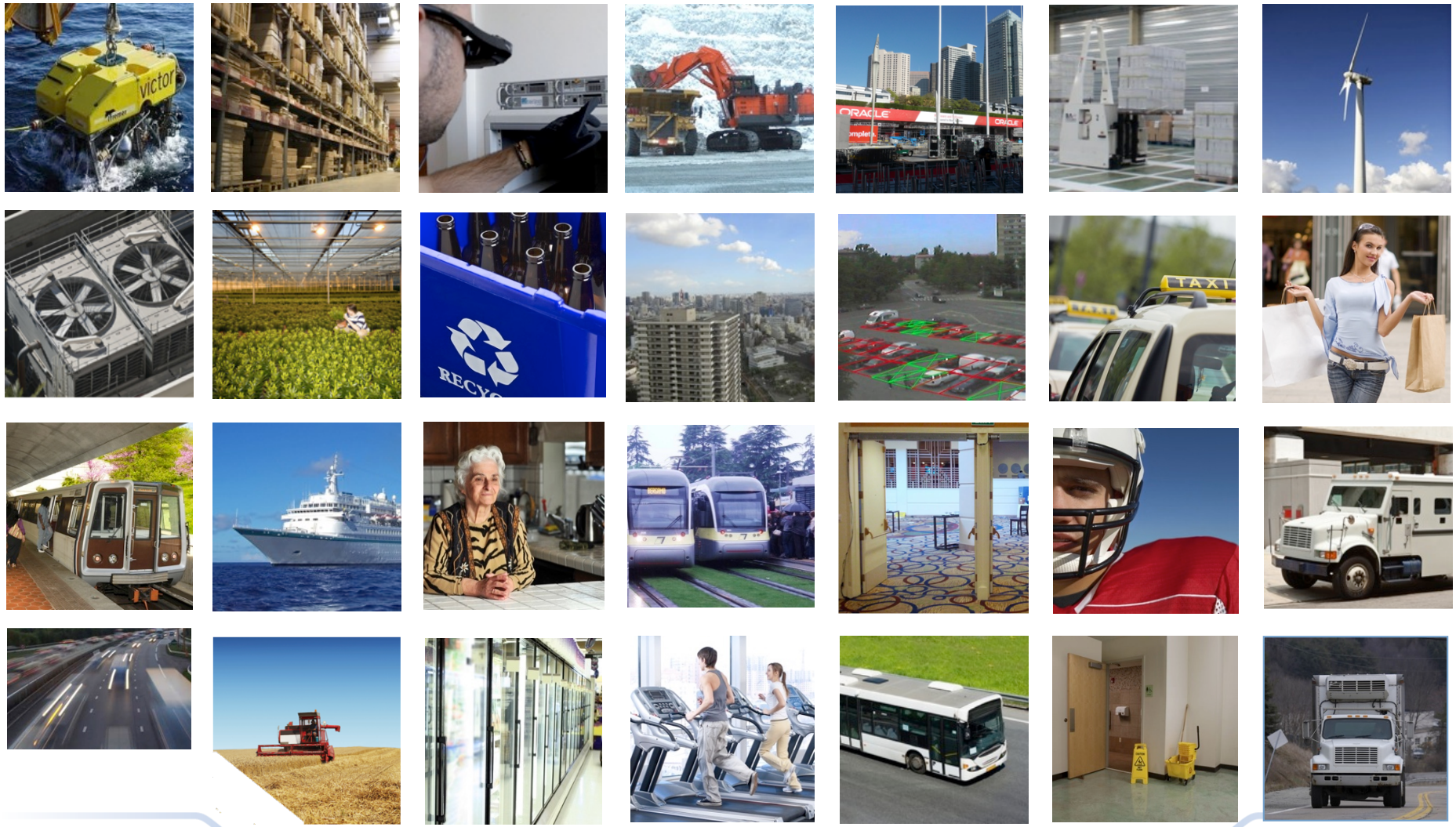
Everyware IoT™

EUROTECH

redhat.

Everyware IoT Use Cases

Many Customers & Applications



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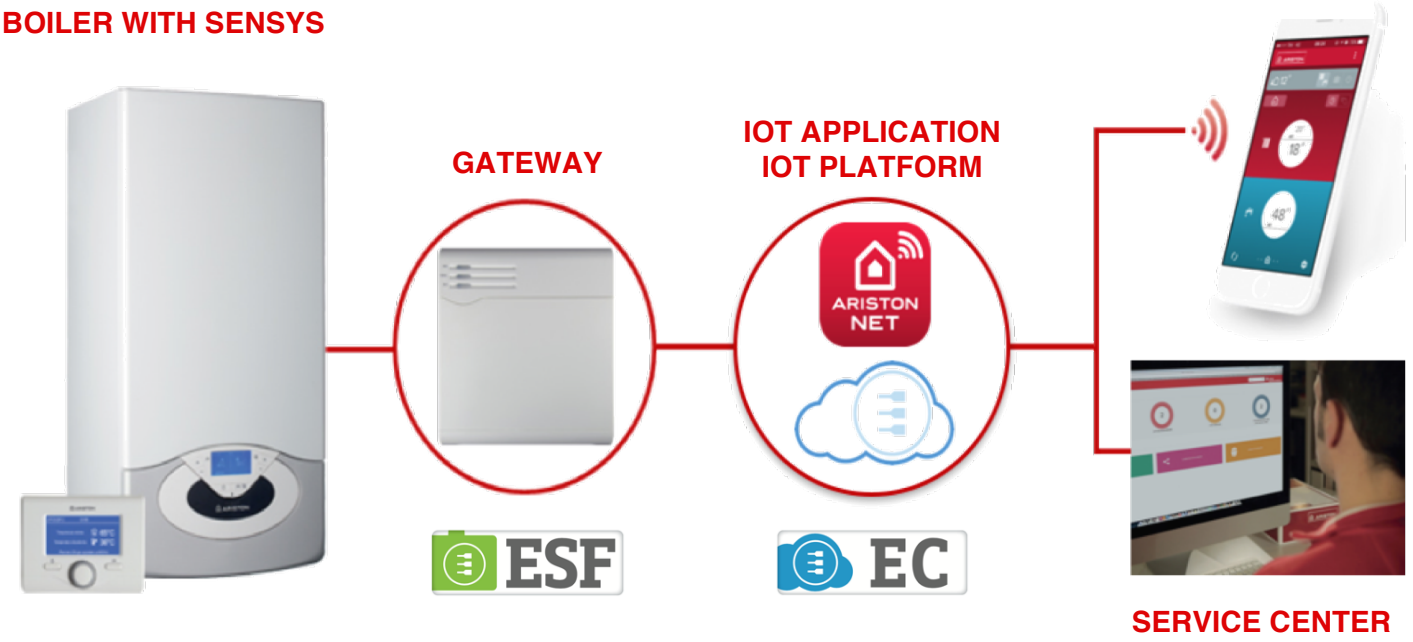
Connected Product

ARISTON THERMO GROUP

elco heating solutions



Application:

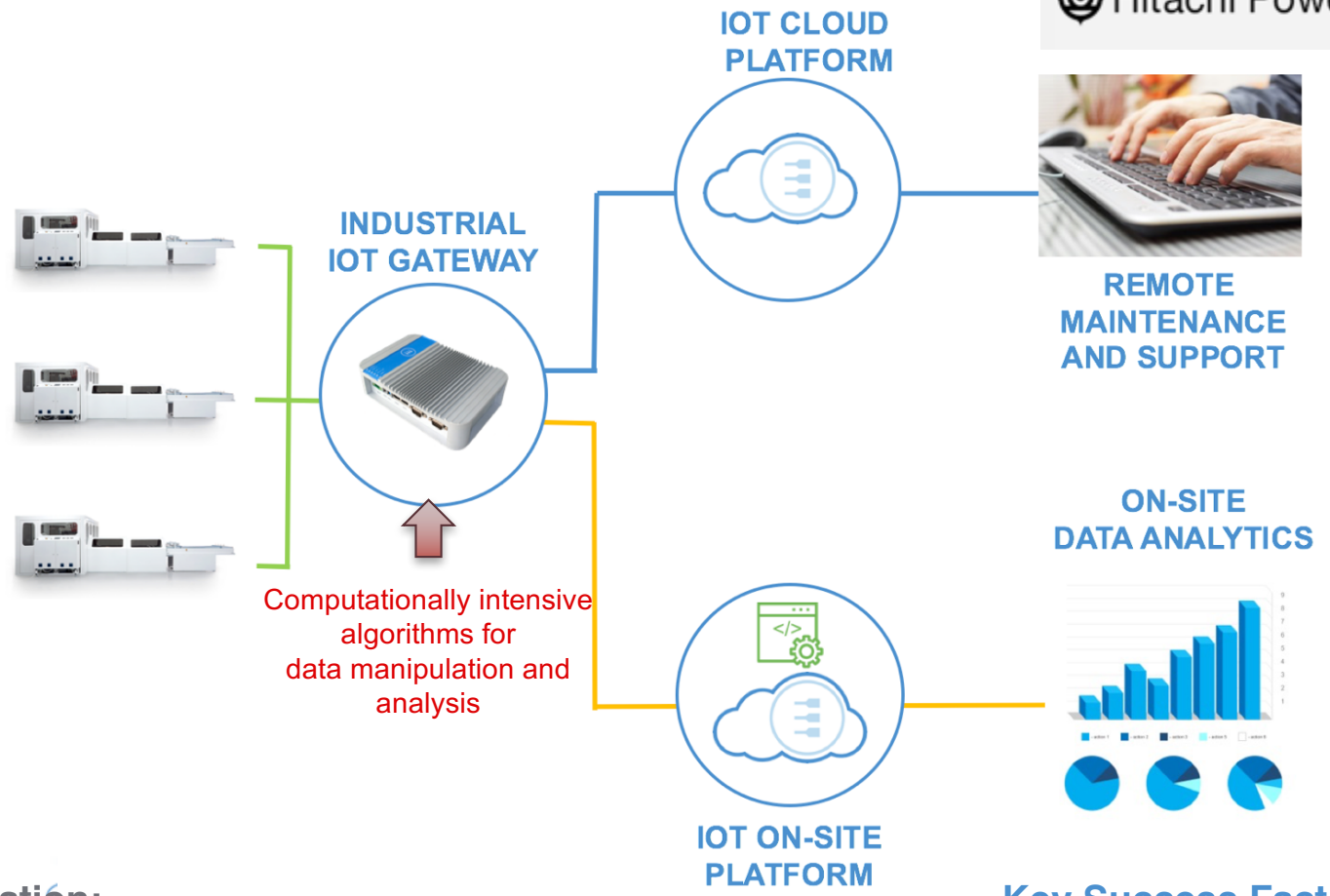
- end users to remote control their own thermo-devices
- for technical assistance operators to perform remote diagnostics
- valuable data for R&D, Service, Marketing departments to develop & sell new products and services

Key Success Factors:

- Service-oriented business model
- Open and industry standards based
- ESF hardware abstraction, Java/OSGi
- Remote device & embedded app. mgmt.
- Real time data
- M2M / IoT know how in Eurotech
- Eurotech worldwide footprint

Predictive Maintenance

Hitachi Power Solutions Co.,Ltd.



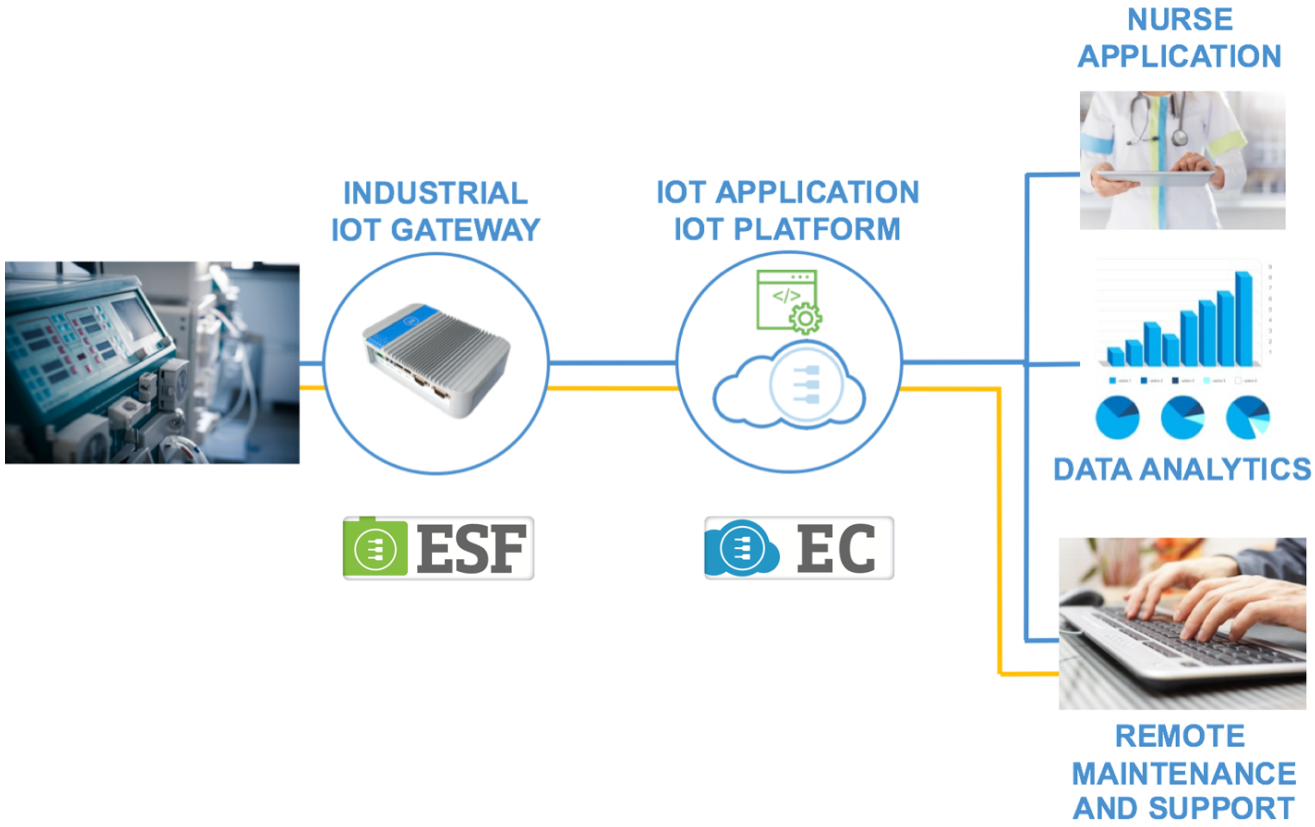
Application:

- Failure Monitoring and Predictive Maintenance
- Smart sensor and analytics capabilities at the edge
- Powerful analytics and visualization solutions at the enterprise IT level

Key Success Factors:

- Flexibility of the platform
- Advanced Analytics and Pattern Matching at the gateway (Fog/Edge Computing)
- Multiple Cloud connections

Remote Maintenance and Services



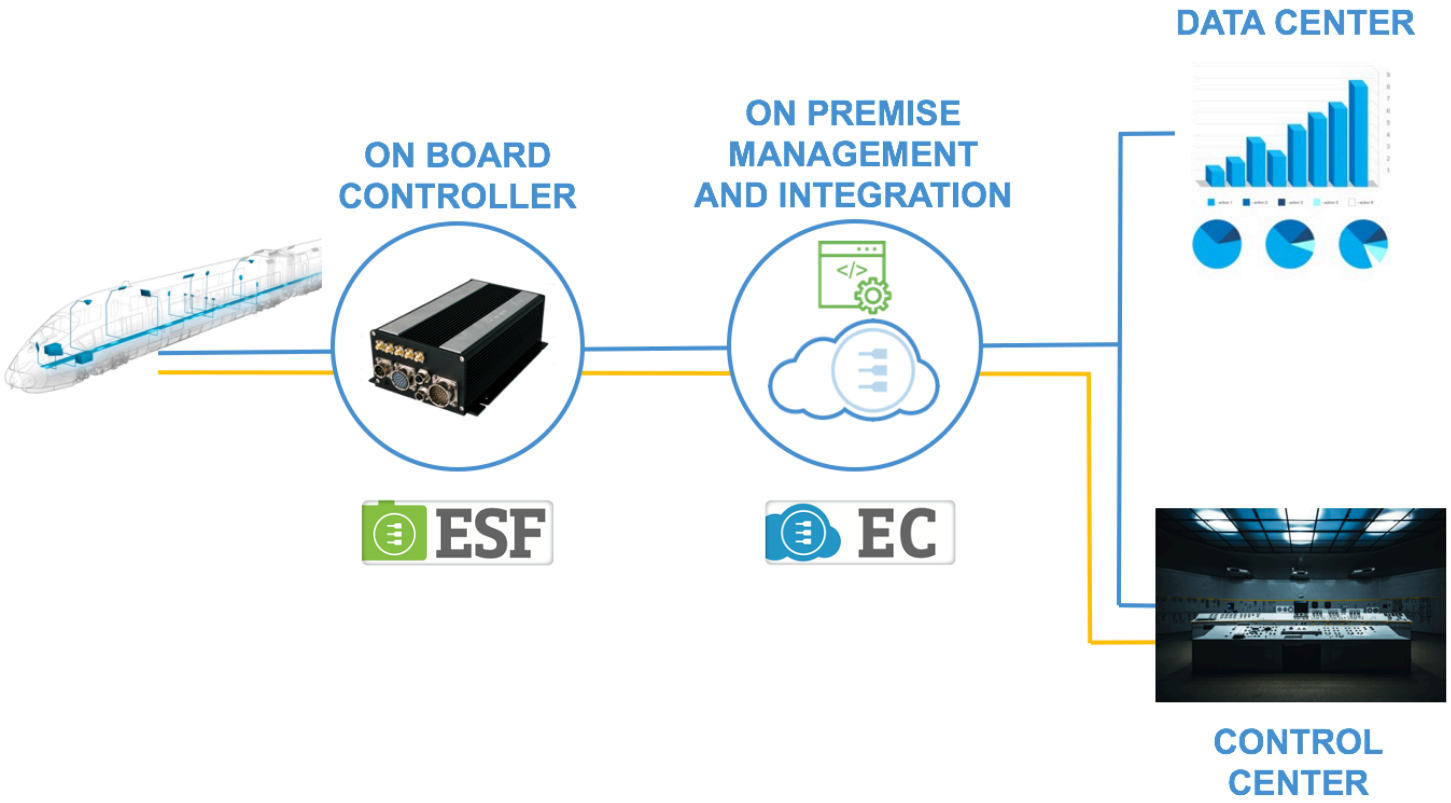
Application:

- Connect machines to the internet in a nonintrusive way
- Provide nurses with access to machine status
- Provide manufacturers access to machine logs
- Enable remote maintenance with less field visits

Key Success Factors:

- Open Standard Connectivity
- Device Provisioning
- Remote Access VPN
- Onboarding and Data Acquisition App
- Port/IP Forwarding
- Cellular Connectivity

Intelligent Data Logger



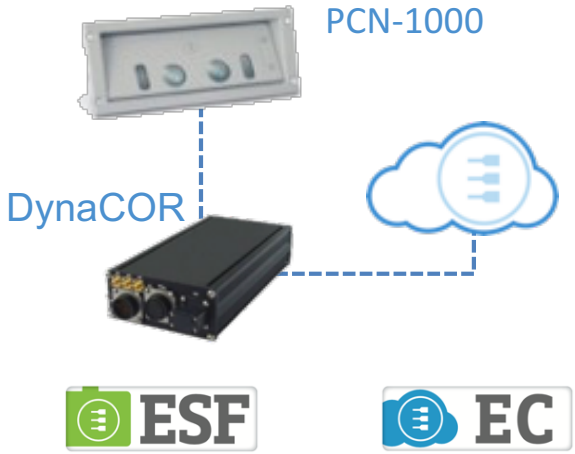
Application:

- On board diagnostics
- Data collection for optimization and predictive maintenance
- Remote access and maintenance
- Railway certified hardware with MVB interface
- On premise device management and data integration

Key Success Factors:

- Open Standard Connectivity
- Modular Field Access Drivers
- Data Flow Programming
- Portable IoT Edge Middleware
- On-premise IoT Cloud Platform

Tram Fleet Management Optimization



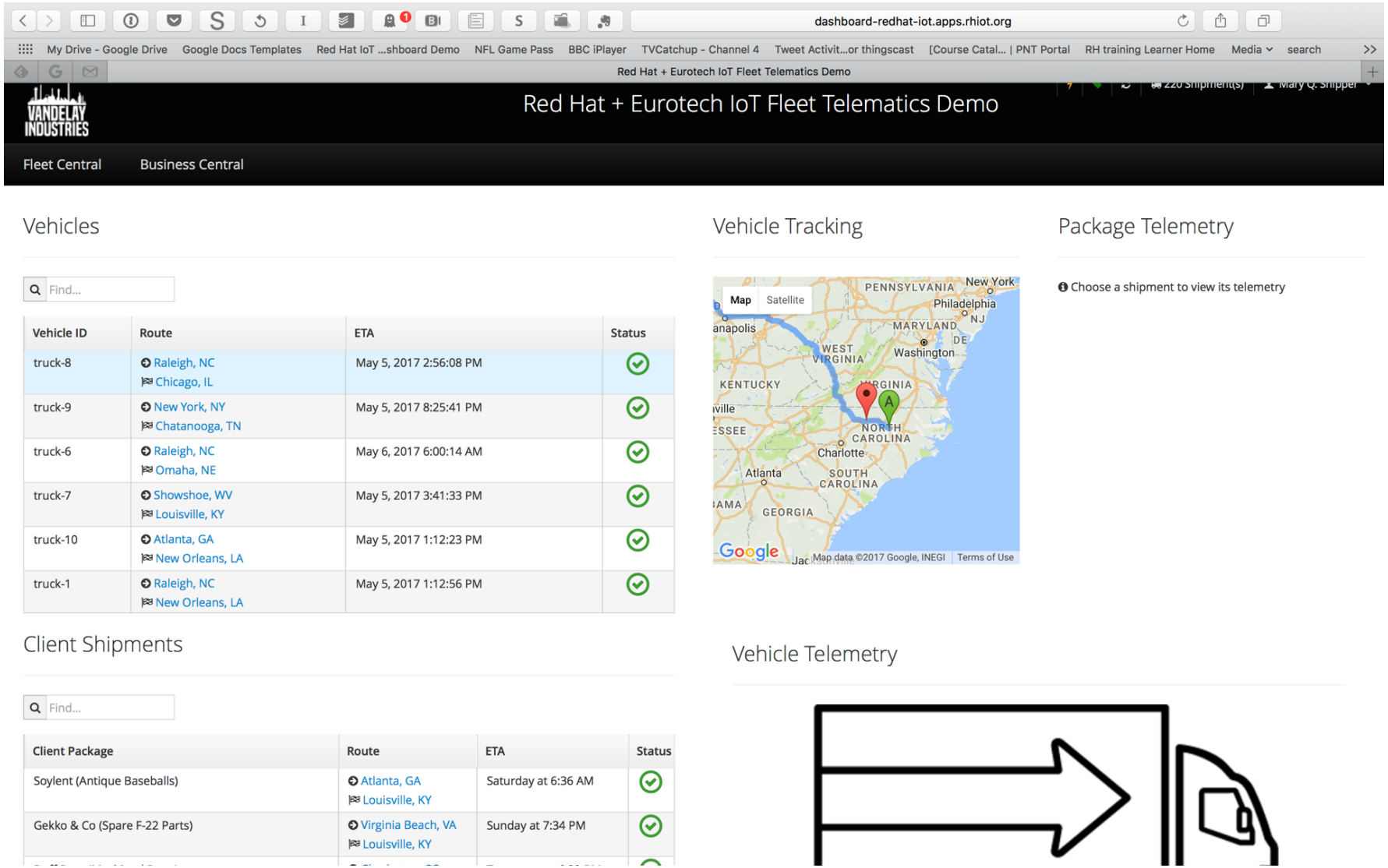
Application:

- Cloud based automatic passenger counting (APC) system
- Equip trams with Eurotech's passenger counters and a gateway
- Real time planning of route, optimizing use of the fleet
- Application for Data Statistics, combining passenger counts, GPS positioning, door open/close events and other route information

Key Success Factors:

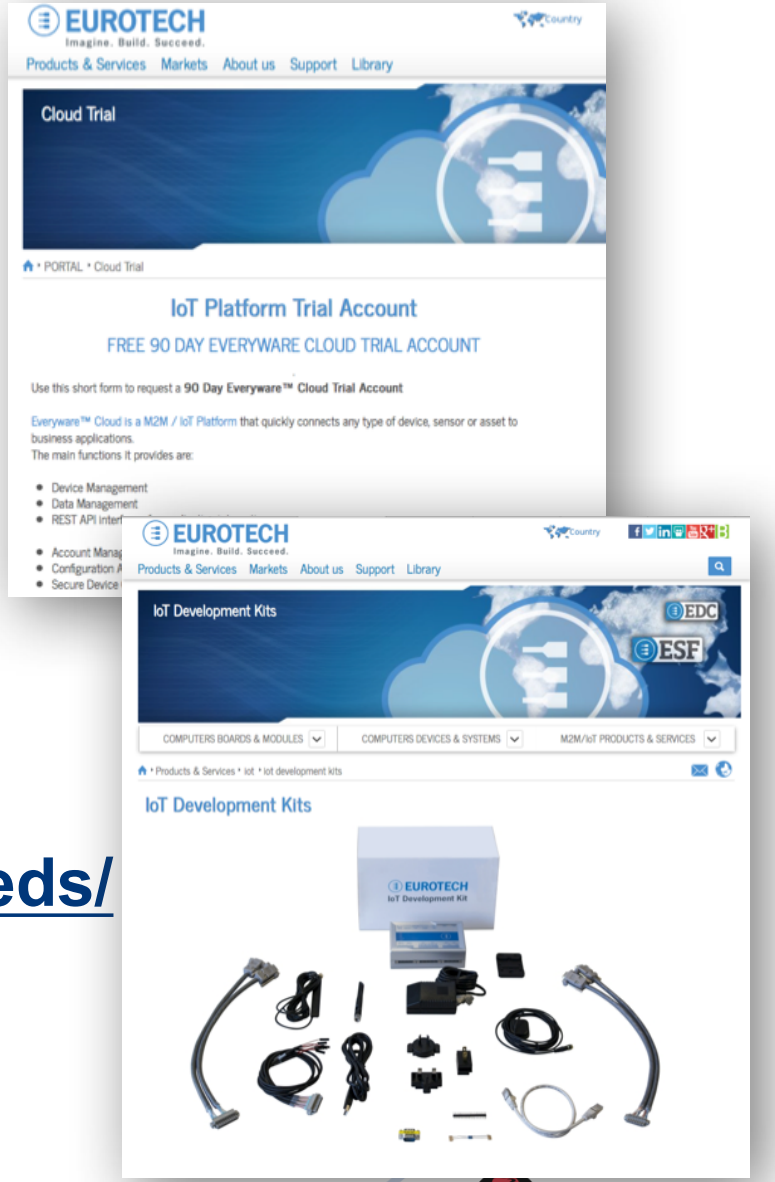
- Complete end-to-end solution
- Advanced PCN technology
- High accuracy
- Short development time
- Easily integration with web app
- Cost effective
- Scalable for future requirements

Eclipse IoT Testbed



For more information

- Go to http://redhat.com/iot or http://developers.redhat.com/iot
- Go to http://eurotech.com or http://esf.eurotech.com
- Go to http://eclipse.org/kura
- Go to http://eclipse.org/kapua
- Go to https://iot.eclipse.org/testbeds/
- Come by IoT Pavillion



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