IoT - Demo

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Agenda

- Demo Scenario Introduction
- IoT Enablers
- IoT is Business Driven
- IoT is Data Driven
- IoT in 3 Tiers
- Importance of Frameworks
- Open Source IoT
- Some News from Barcelona
- Fun Demo Stuff
Demo Scenario Introduction
IoT IN ACTION

The packages and the truck itself become “things” with addition of sensors; intelligent gateways relay data to the cloud for processing; business rules create alerts for driver, HQ staff, maintenance.

**Asset tracking**
- Security
- Temperature control
- Vibration control
- Humidity control
- Location monitoring

**Vehicle monitoring**
- Engine diagnostics
- Engine temperature
- Oil temperature
- Brake wear
- Tire pressure

**Transportation monitoring**
- Driver behavior
- Acceleration
- Excessive braking
- Location
- Travel time
- Route traveled

**Real-time alerts and business rules**
- Dispatch control
- Customer notification
- Rerouting
FLEET TELEMATICS/ASSET TRACKING RESULTS

BUSINESS OUTCOMES:

- Predictive maintenance capabilities reduces repair costs.
- Corrective action taken before damage to packages occurs reduces claims for damaged items.
- Insights from gathered data improves existing business processes and created new ones.
- Fleet monitoring improves operating performance, reducing driver error and increasing staff responsiveness.
- Reduction of damages, and visibility to shipment status improves customer and partner satisfaction.
- Personalized mobile app increases driver satisfaction.
Asset Tracking demo
Logistics made easy

Devices
(sensors & actuators)

Gateways

IoT Cloud Platform

Applications
The Technical Setup
Vehicles

<table>
<thead>
<tr>
<th>Vehicle ID</th>
<th>Route</th>
<th>ETA</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>truck-6</td>
<td>Snowdon, NV</td>
<td>Oct 7, 2017 5:51:03 AM</td>
<td>✔️</td>
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<tr>
<td></td>
<td>Lexington, KY</td>
<td></td>
<td></td>
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<tr>
<td>truck-1</td>
<td>Charleston, SC</td>
<td>Oct 6, 2017 8:34:32 PM</td>
<td>✔️</td>
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<td>Chattanooga, TN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>truck-4</td>
<td>Virginia Beach, VA</td>
<td>Oct 6, 2017 9:00:56 PM</td>
<td>✔️</td>
</tr>
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<td>Chattanooga, TN</td>
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<td></td>
</tr>
<tr>
<td>truck-5</td>
<td>Huntsville, AL</td>
<td>Oct 8, 2017 10:44:37 AM</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>Des Moines, IA</td>
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<td></td>
</tr>
<tr>
<td>truck-2</td>
<td>Raleigh, NC</td>
<td>Oct 8, 2017 11:17:17 AM</td>
<td>✔️</td>
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<tr>
<td></td>
<td>Des Moines, IA</td>
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<td></td>
</tr>
<tr>
<td>truck-3</td>
<td>Huntsville, AL</td>
<td>Oct 8, 2017 10:04:31 AM</td>
<td>✔️</td>
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<td>Lexington, KY</td>
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<td></td>
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</tbody>
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Client Shipments

<table>
<thead>
<tr>
<th>Client Package</th>
<th>Route</th>
<th>ETA</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geiko &amp; Co (Frozen Steaks)</td>
<td>New York, NY</td>
<td>Tomorrow at 8:45 PM</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>Chattanooga, TN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NY Enquirer (Fresh Fruit)</td>
<td>Knoxville, TN</td>
<td>Monday at 4:49 AM</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>Chicago, IL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bubba Gump Shrimp Co (Pecan Pecan)</td>
<td>New York, NY</td>
<td>Today at 5:04 AM</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>Chattanooga, TN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olivaundra's Hard Shop (Frozen Celis)</td>
<td>Charleston, SC</td>
<td>Monday at 7:10 AM</td>
<td>✔️</td>
</tr>
<tr>
<td></td>
<td>Lexington, KY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vehicle Tracking

Package Telemetry

- Frozen Steaks (Client: Geiko & Co)
  - Temperature: 23.7°C
  - History
  - Humidity: 71.9%
  - History
  - Light: 258.6lm
  - History
  - Pressure: 30.0 inHg
  - History

Vehicle Telemetry

- Engine Temp: 26.9°C
- RPM: 654.7 rpm
- Oil Pressure: 41.4 psi
IoT Enablers
THE INTERNET OF THINGS LANDSCAPE
Connectivity and “smarter” devices driving change

EXPLOSIVE GROWTH IN CONNECTED DEVICES

UBIQUITOUS INTERNET CONNECTIVITY

AFFORDABLE BANDWIDTH

COMMODITIZED STANDARDIZED HARDWARE
- Microcontrollers
- Electronic sensors

ADVANCES IN CLOUD COMPUTING
- Decreased cost of storing and processing data

STANDARDS BASED AND OPEN SOURCE SOFTWARE
The Internet of Things

Putting things in perspective

Customer Relationship Management (CRM)

Warehouse Management System (WMS)

Enterprise Resource Planning (ERP)

Manufacturing Execution System (MES)

Application Integration

Process Handling

Data Management

Core IT Infrastructure

Other Applications

IT Infrastructure Management & Services

Data Warehousing / Big Data

IoT Integration Platform

IIoT

Device HW
IoT is Business Driven
BUSINESS DRIVERS

Business drivers behind enterprise IoT investment

- Economic gains
- New revenue streams
- Regulatory compliance

- Efficiencies and productivity
- Ecological impact
- Customer satisfaction, ease of use
Red Hat + Eurotech IoT Fleet Telematics Demo

Business Trends
Fuel Efficiency
Value Under Transport
On-Time Performance
Customer Satisfaction

Facility Utilization
8070 Available of 9668 sq. ft.
1598 sq. ft. Used

Fleet Maintenance Events
4 Events
This Period
View All Events

State of the Business
Retention 96 of 100
Margin 92 of 100
Facilities 81 of 100
P/E Ratio 93 of 100
Closed 98 of 100
IoT is Data Driven
THE DATA-DRIVEN IoT

Devices are the eyes and ears of the intelligent system, not its brain.
INTERNET OF THINGS INFORMATION LIFECYCLE

DATA
Data emitted from sensors, control panels, actuators, human interfaces, etc.

INFORMATION
Data analyzed to drive tactical action

INTELLIGENCE
Actions driven from information

KNOWLEDGE
Information stored in DB and analyzed, yielding optimized tactical tools.

Field level data analysis
Information triggers pre-defined business rules
Summarized information sent to back office for deep analysis
New rules created and pushed to business rules engine

Controlled and augmented by domain experts

New data analysis optimizations
IoT in 3 Tiers
Industrial IoT
ENTERPRISE IoT ARCHITECTURE
Driving datacenter function to the edge
ENTERPRISE IoT ARCHITECTURE
Driving datacenter function to the edge

DATACENTER
- Business processing
- Reporting
- Long-term data analytics
- Data infrastructure
- Enterprise integration
- Software-defined storage

GATEWAYS
- Communications/messaging
- Data pre-processing
- Real-time data analytics
- Real-time actions/rules
- Software-defined storage
- Security

DEVICES
- Communications/messaging
- Data acquisition
Importance Of Frameworks
Framework View

IOT Gateway

OT Middleware
MGMT / SEC / HW ABST / CONN

Business logic
Smart routing & integration
Operating system

Device Connectivity
Message Routing

App. Integration / IoT Services
Mobile platform

Security
Device Management
Device Registry
Data Management
Real-Time CEP

Foundation / PaaS

IOT Integration Hub

IoT Applications
Real-time dashboards

Connected “Things”

redhat
Open Source IoT
Upstream Framework

Connected “Things”

IOT Gateway

IOT Integration Hub

IoT Applications
Real-time dashboards

Apache Camel
Kapua
Fedora
Drools
ActiveMQ

redhat
Production Framework

Connected “Things”

IOT Gateway

IOT Integration Hub

IoT Applications
Real-time dashboards

RED HAT JBOSS® FUSE
RED HAT JBOSS® AMQ
RED HAT JBOSS® BRMS

RED HAT® MOBILE APPLICATION PLATFORM

EUROTECH
Everyware Cloud™

redhat®
Open End-to-End IoT Architecture: Functional
Integrating IOT Operating Technology, Data Management, Analytics, and Applications
Open End-to-End IoT Architecture: Functional
Integrating IOT Operating Technology, Data Management, Analytics, and Applications

Connected “Things”

IOT Gateways

OT Middleware
Smart Services
Machine Learning
Business Rules
Operating system
Open End-to-End IoT Architecture: Functional
Integrating IOT Operating Technology, Data Management, Analytics, and Applications
Open End-to-End IoT Architecture: Functional

Integrating IOT Operating Technology, Data Management, Analytics, and Applications

**Connected “Things”**

**IOT Gateways**

- OT Middleware
- Smart Services
- Machine Learning
- Business Rules
- Operating system

**IOT Integration Hub**

- Device connectivity
- Device Management
- Security
- Data Management
- Administration

**Middleboxes**

- Containers
- Orchestration
- Developer Services

**Telemetry Data**

**Centralized Data Mgmt. and Analytics Platform**

- Data Ingest
- Real-Time Processing
- Data Storage
- Machine Learning
- Real-Time Analytics
- Data Security

**Machine Learning Model**
Open End-to-End IoT Architecture: Functional

Integrating IOT Operating Technology, Data Management, Analytics, and Applications

Connected “Things”

IOT Gateways

- OT Middleware
- Smart Services
- Machine Learning
- Business Rules
- Operating system

IOT Integration Hub

- Device connectivity
- Device Management
- Security
- Data Management
- Administration

Containers
Orchestration
Developer Services

Applications

- App Data
- Telemetry Data

Centralized Data Mgt. and Analytics

Platform
Some news from Barcelona
• Standards/Solution Overload
• Everybody talks about the Edge
  ○ 3 Tier IoT
  ○ Machine Learning
  ○ Security
• Top 2 Questions @ Booth
  ○ What is Red Hat
  ○ What is Open Source
• Pre-Emptive Maintenance was the main topic.
Fun Demo Stuff
DEMO ARCHITECTURE

Kura Simulator

Kapua

Dashboard Proxy

elasticsearch

OpenShift

TELEMETRY

TELEMETRY / HISTORY / CONTROL

TELEMETRY

TELEMETRY STORE / SEARCH

BUSINESS STORE

RED HAT JBOSS DATA GRID
Demo
Things to take away
Getting into the game

- Business/Data Driven
- Frameworks do Heavy Lifting
  - Start OSS
    - Kura - Kapua - OpenShift Origin
  - Get Enterprise Support
    - ESF - Everywhere Cloud - OpenShift - JBoss MW
- Back-End Heavy
  - Cloud/Scalable Back-End: OpenShift
Eclipse Open IoT Testbeds

» Asset Tracking

The Asset Tracking Management testbed demonstrates how assets with various sensors can be tracked in real-time in order to minimize the cost of lost or damaged parcels.

Many high-value assets move through airports, railways, and via trucks. These assets need to be monitored in real-time for location and environmental conditions.

Check out how the Eclipse IoT Open Testbed for Asset Tracking is solving this problem.

The Challenge

The overall cost of mishandled bags to the air transport industry was US$2.6 billion in 2016.[1][7] A key concern for shipping companies is to be able to know when and where damage is taking place so that they can, overtime, learn from this data and minimize the number of damaged parcels.
THANK YOU

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youtube.com/user/RedHatVideos
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twitter.com/RedHatNews