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Develop an IoT Cloud Service for Rental Car and Hotel Devices with Enterprise Use Cases

#CON5960

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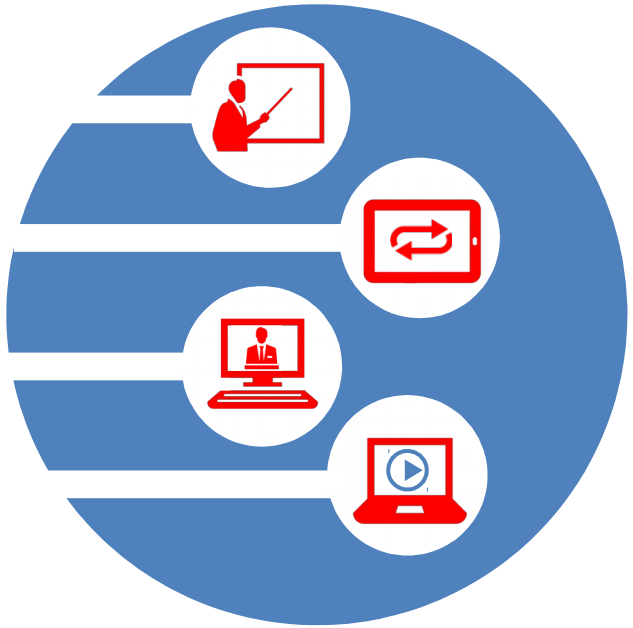

Cloud

Technology

Applications

Industries

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Program Agenda

1. Internet of Things (IoT)
2. Java for IoT
3. Cloud Computing
4. IoT and Cloud Demo System
5. Summary

The Internet Of Things

The 3rd IT Revolution

Proprietary Hardware & Software

x86 Architecture/ Windows OS

Standards Based Hardware & Software

Host Era

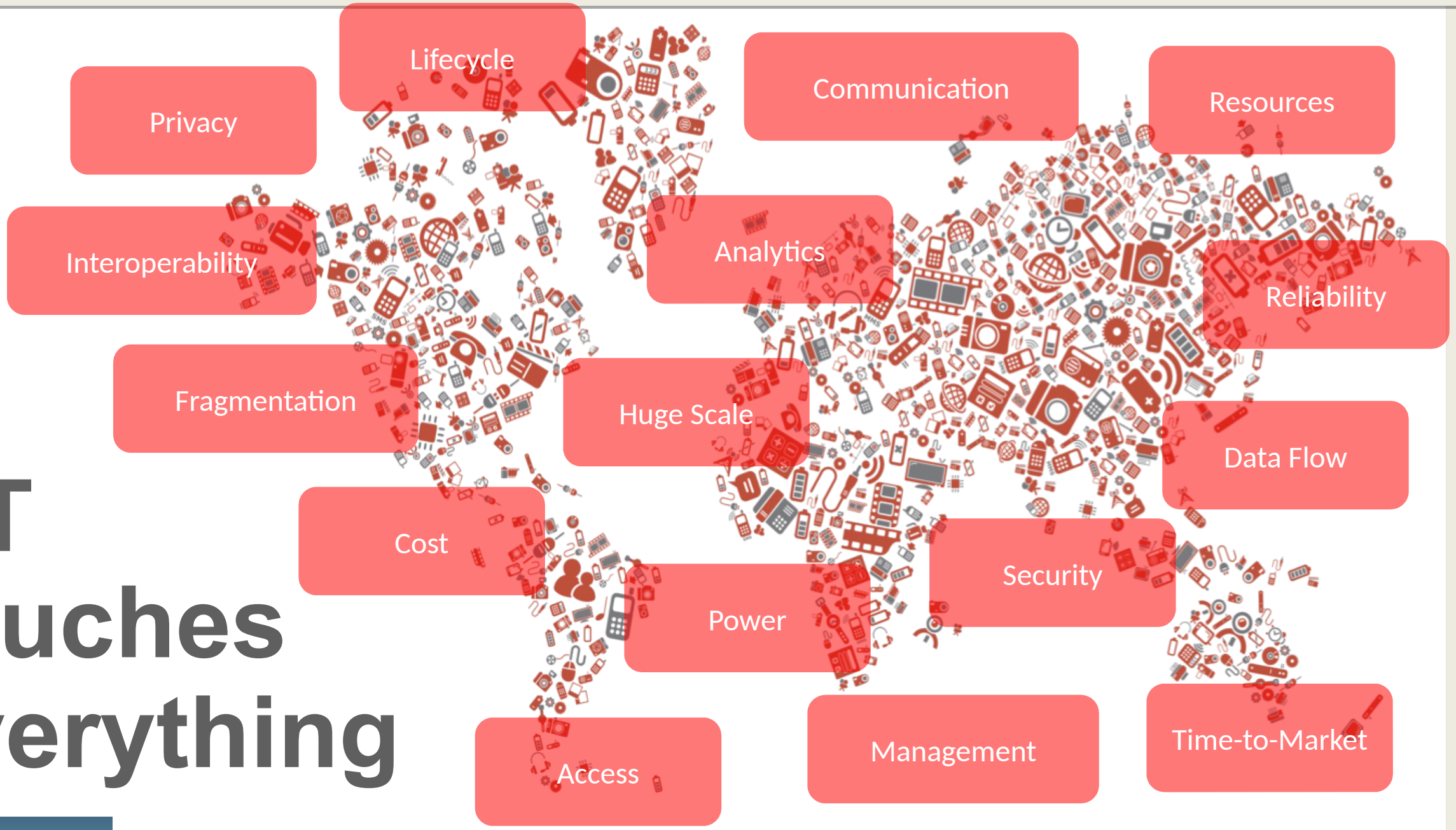
PC Era

Internet of Things

1960 - 1985

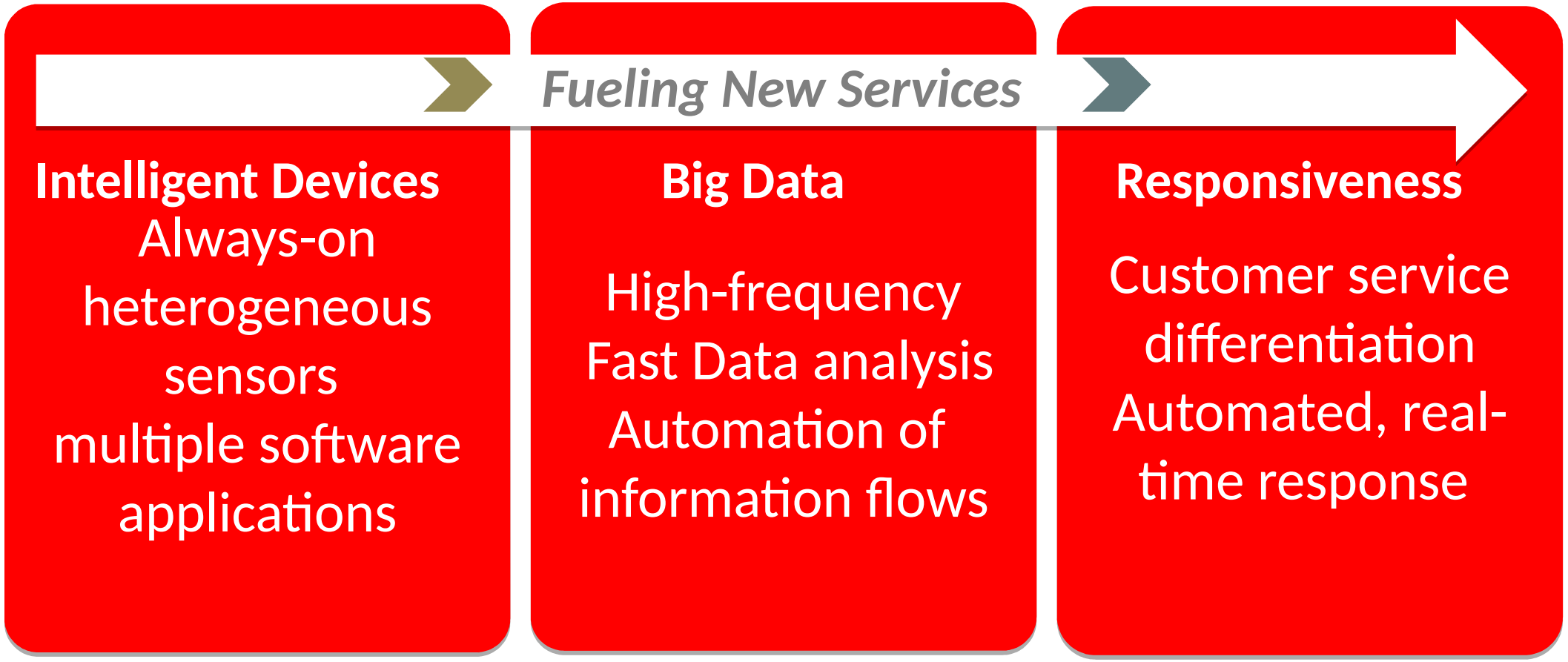
1985-2006

2006 - 2025



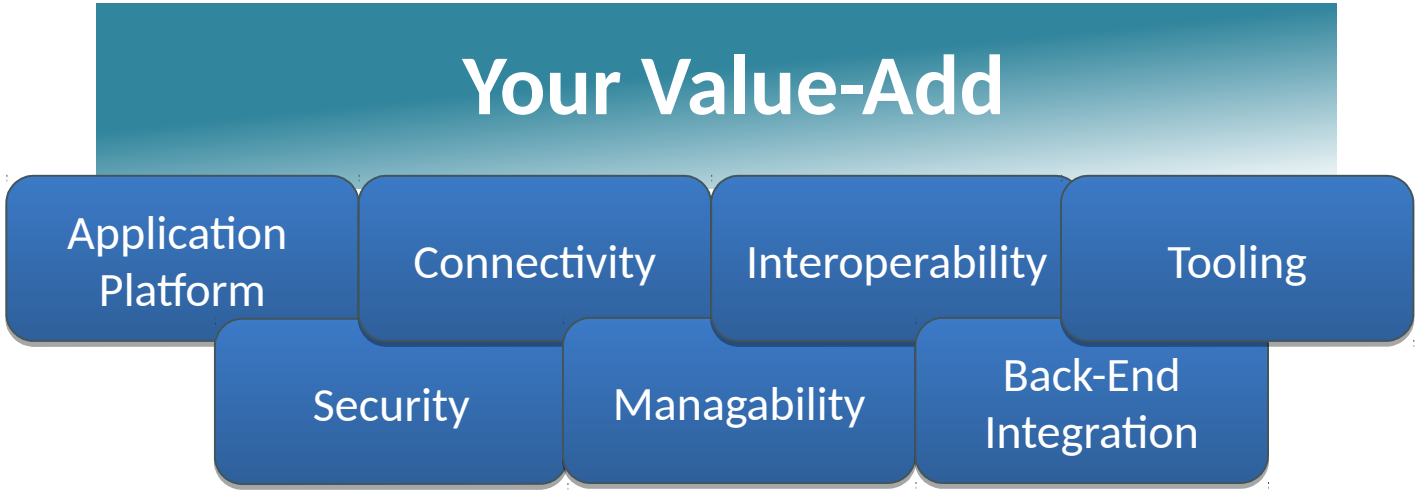
IoT Touches Everything

Challenges in the IoT Era



Need for a Horizontal Services Platform

Stop reinventing the plumbing!



Shift from

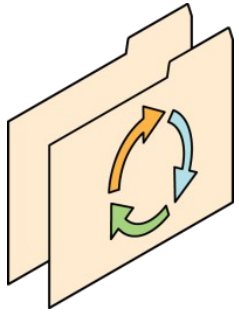
proprietary point solutions

to

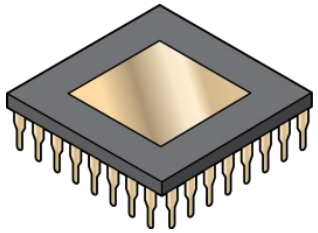
horizontal platforms and infrastructure

The Embedded Ecosystem Today

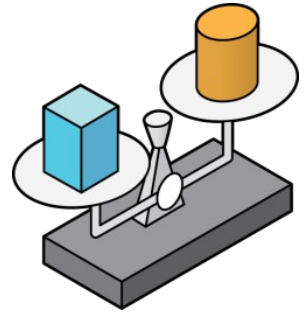
Diversity of hardware, need for ubiquitous software



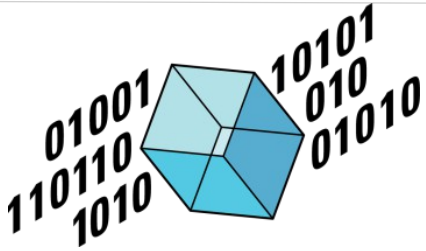
Highly diverse and rapidly changing use cases & technologies



Hardware capabilities & connectivity evolving rapidly

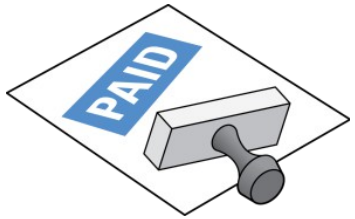


Value is in software, but embedded software development is difficult



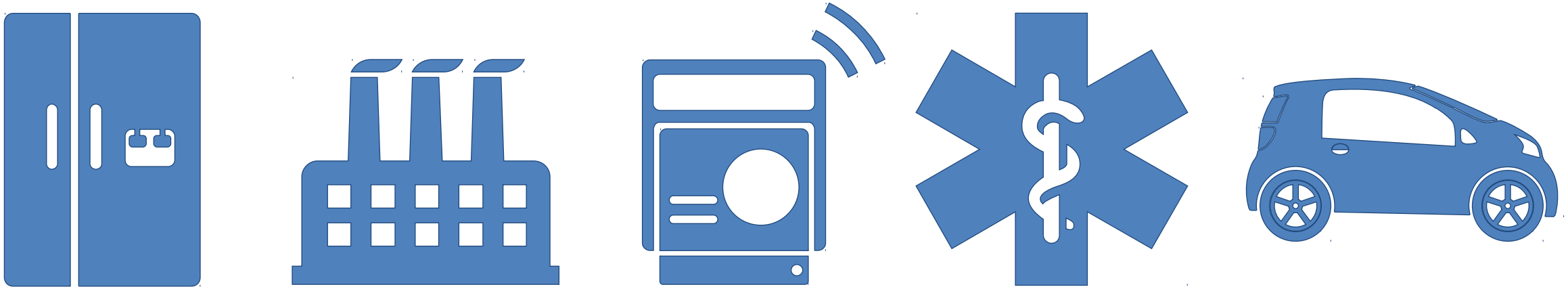
Expensive to reinvent and reintegrate must-have features (management, security, etc.)

The value of data gaining importance as a business driver



Time-to-market and flexibility are key to success

Java Embedded Enables New IoT Services



Home Automation

Industrial Automation

Smart Utilities

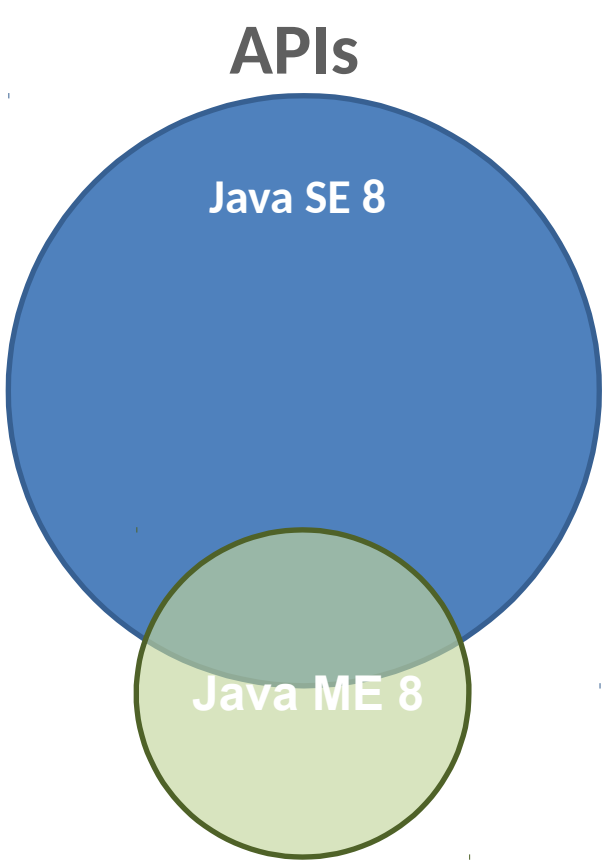
Healthcare

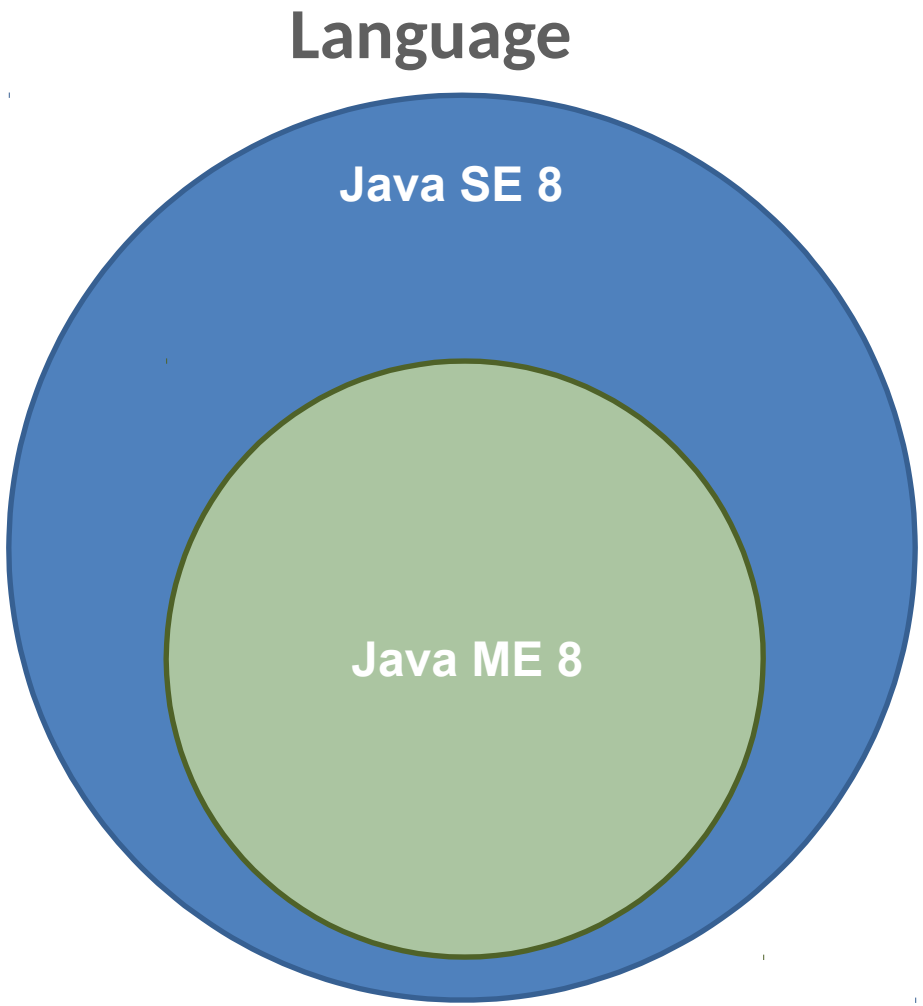
Automotive Telematics

Why Java For IoT?

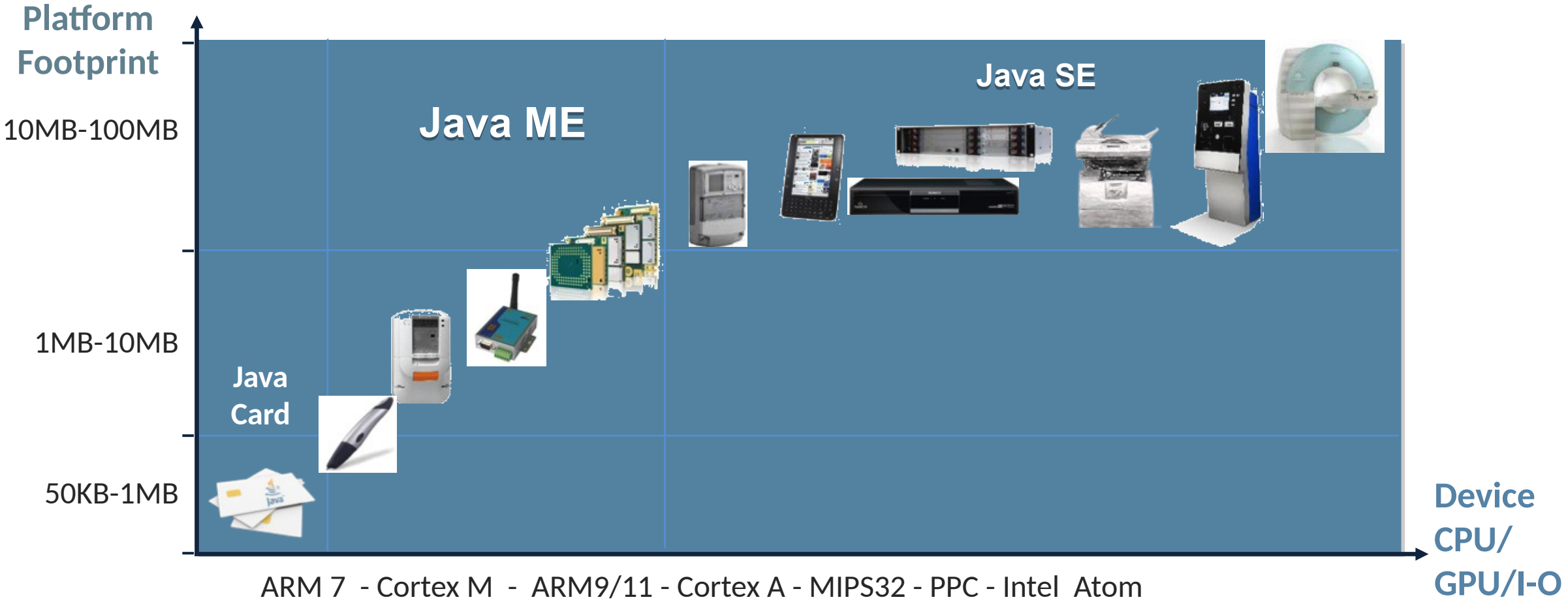
Software Portability & Increased Reach	Large Ecosystem & Pool of Resources	End-to-end Development Platform
Software Updatability & Extended Lifecycle	Robust & Proven Technology	Standards-based, Trusted Vendor
Faster Innovation & Competitive Advantage	Reduced Time-to-Market, Reduced Risk	Ease of Reuse and Back-End Integration

Java 8 Embedded





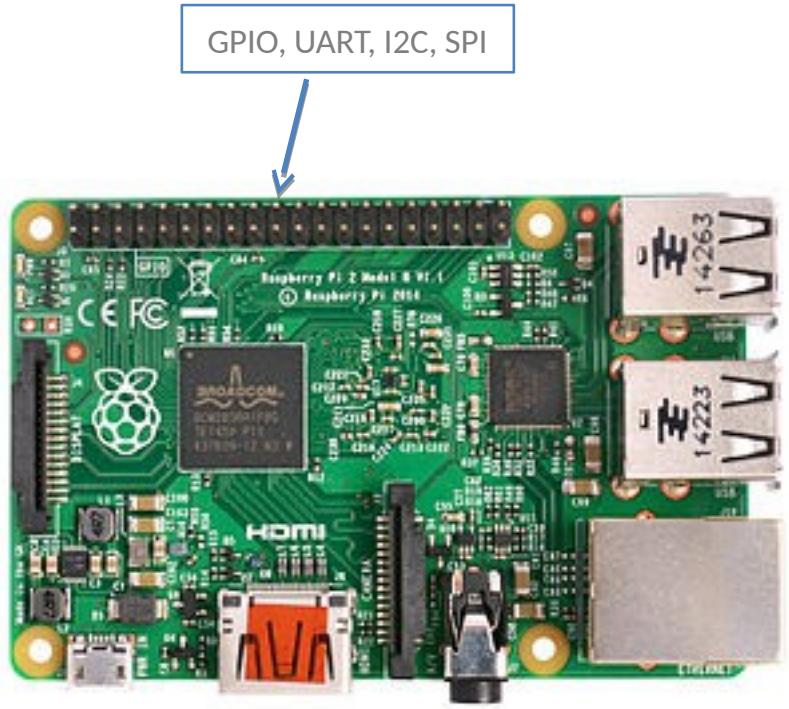
Highly Portable and Scalable



Raspberry Pi

Popular low-cost board for development and educational use

- Raspberry Pi 2
  - 900 MHz quad-core ARM Cortex-A7
  - 1Gb RAM, 4.0W power consumption
  - Debian Linux
- Peripherals: UART, GPIO, SPI, I2C
- Java ME 8 Embedded
  - Device I/O API
- Java SE 8 Embedded
  - Pi4J



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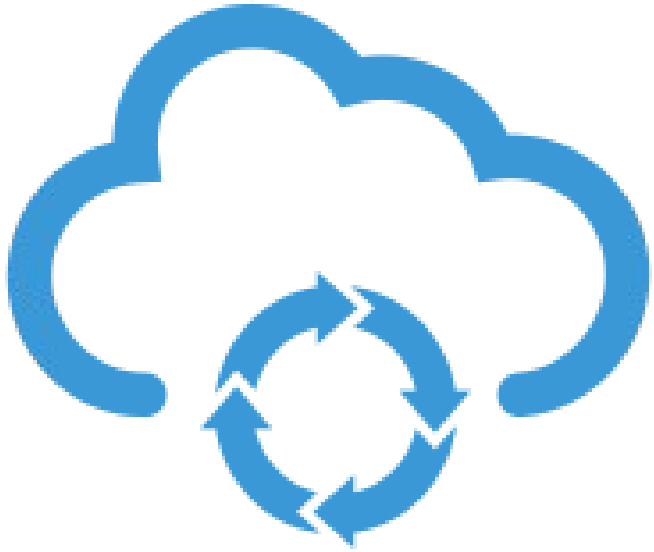


Cloud Computing

Cloud Computing: Fundamental Principles

Where it is doesn't matter

On premises or public cloud

Elastic resource provisioning

Only use the resources you need to get the job done

Pay for what you use

The classic utility model

Cloud Computing vs. Data Center Terminology

- Premise (noun, singular)
  - A previous statement or proposition from which another is inferred or follows as a conclusion
- Premises (noun, plural)
  - A house or building with its grounds, etc.

Cloud Computing: Service Models

- Software-as-a-Service (SaaS)
  - Provider's applications running on a cloud infrastructure
- Platform-as-a-Service (PaaS)
  - The capability to deploy applications onto the cloud
- Infrastructure-as-a-Service (IaaS)
  - Provision processing, storage, networking and other fundamental computing resources

Oracle Cloud: Platform-as-a-Service

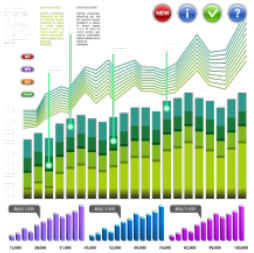
Database

Java

Developer

Mobile

Documents



Business Intelligence

Cloud Marketplace

Common Infrastructure & Lifecycle Services

Platform-as-a-Service

Java-as-a-Service

- Full-Featured App Server – WebLogic 12c or 11g
- Elastic Load Balancing: Scale up as required
- Oracle Backs Up, Patches, Manages App Server
- Full WLS-T, JMX, HTTP, RMI, Root Access, Enterprise Manager, All Java Tools
- Full Portability - On-Premises & Cloud

PaaS and Java EE

Java EE design principles and capabilities

- Common programming model for enterprise developers
- Runtime handles application's infrastructure concerns
- Declarative resource references
- Scalable component models
- The way Java EE has always been designed

PaaS and Java EE

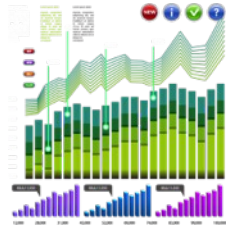
Java EE 7: Making Java EE Ready For The Cloud

- Enhancements
  - New Roles for PaaS
  - Services as first class citizens
  - Multi-tenancy
- Evolution, not a revolution!

Oracle Cloud: Common Infrastructure and Lifecycle Services

Diagnostics
Logging and Notification

Deployment
Install, Upgrade, Patch



Monitoring
Managing Service Levels

Provisioning
Configure, Integrate & Customize

Migration
Transport Apps & Services

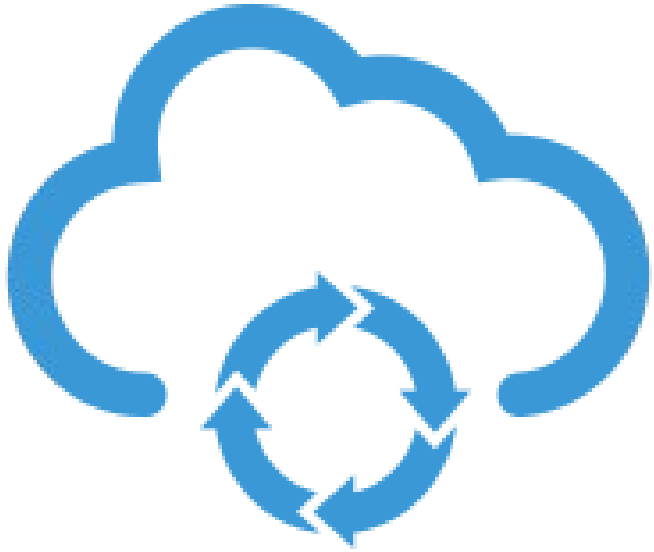
Continuous Integration & Delivery
Develop, Test, Deploy, Test

Oracle Cloud: Scale

30,000+ Devices
400 PB+ Storage

19 Tier 4
Data Centers

62 Million+ Users/Day
23 Billion+ Transactions/Day

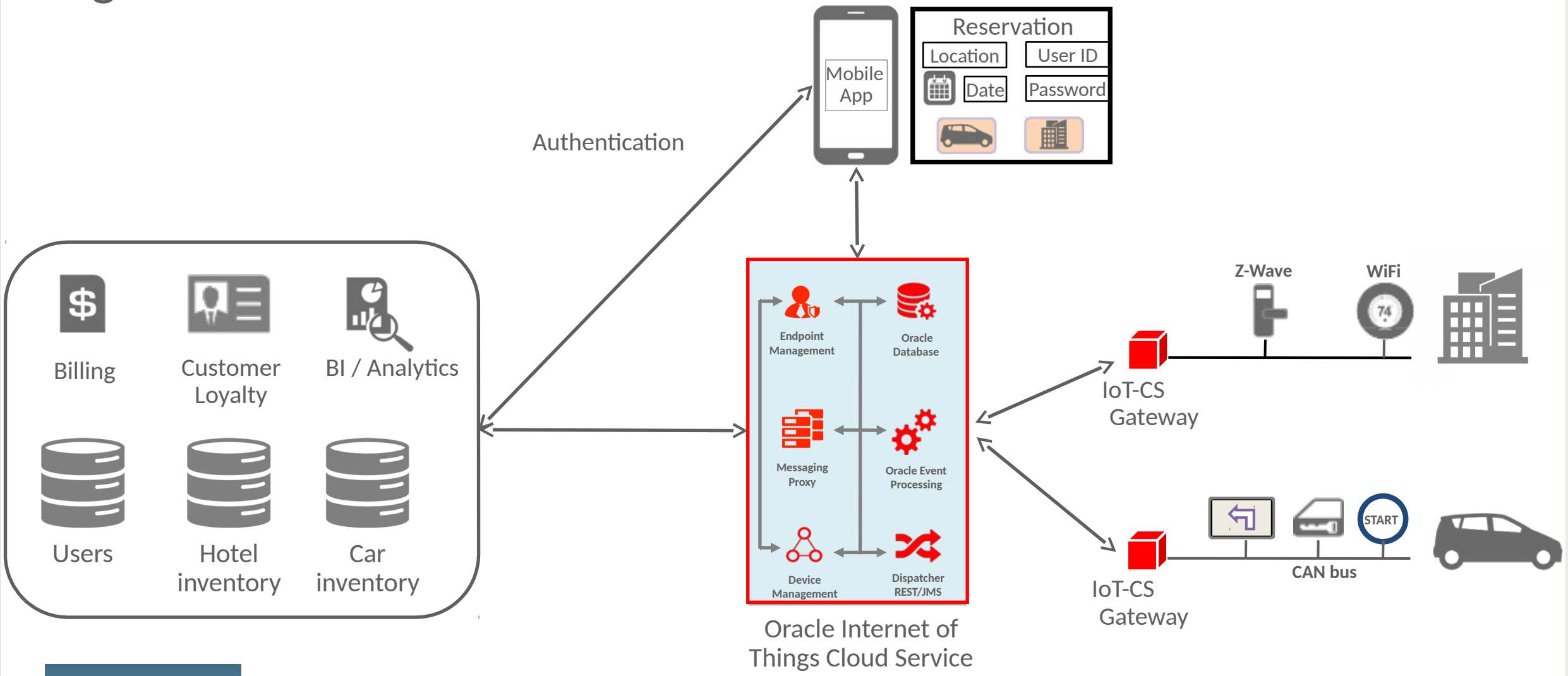


IoT And Cloud Demo System

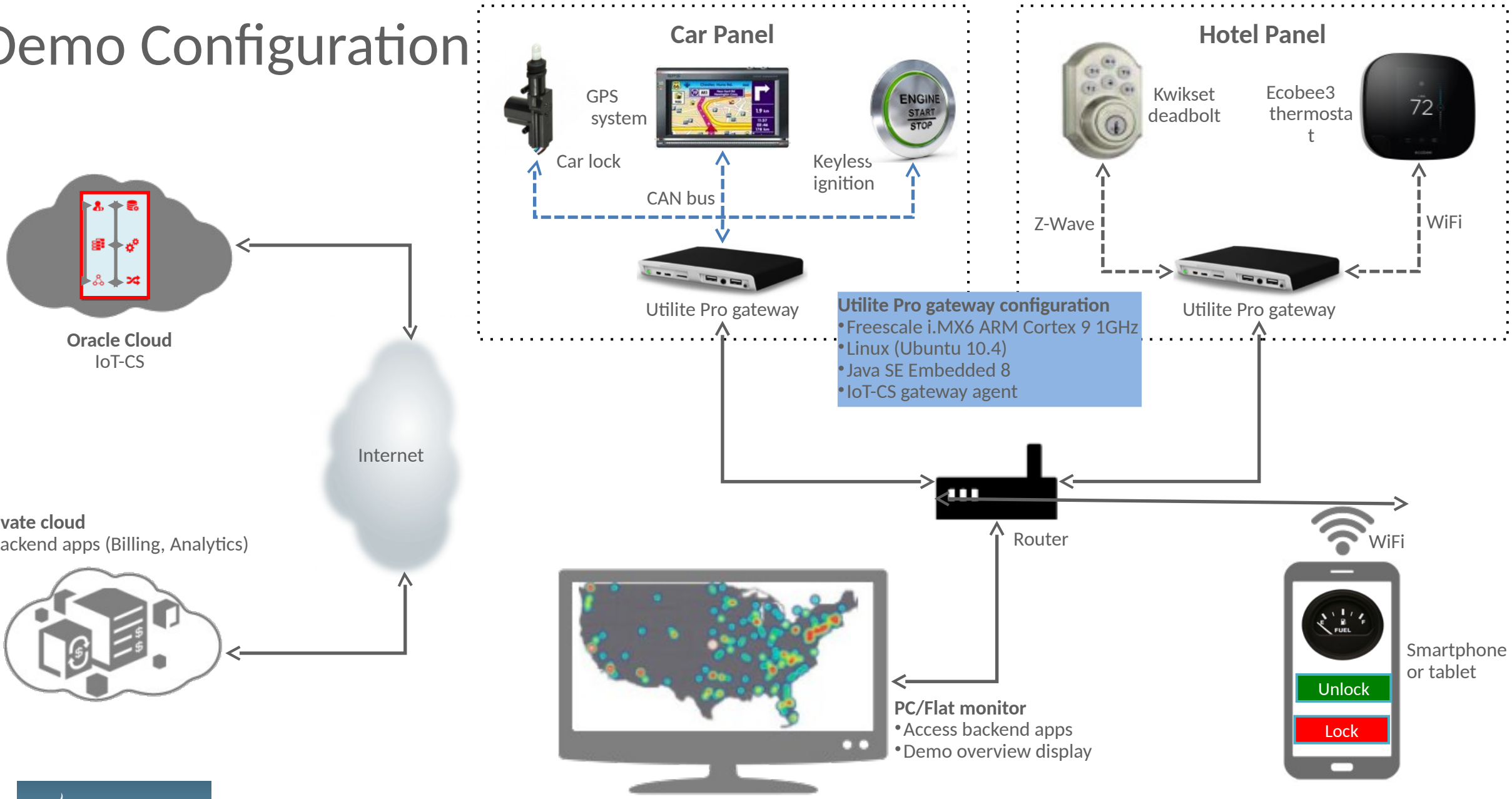
Demo Scenario

- Travel company and car-hire company partner
  - Provide seamless travel experience
- Demo uses Oracle IoT-CS (Cloud Service)
  - Foundation for end-to-end architecture
  - Business intelligence, Event processing, Identity management, Billing
- Key architectural points
  - Open architecture
  - Device data can flow in both directions
  - Security built-in

High-Level IoT/Cloud Demo Architecture

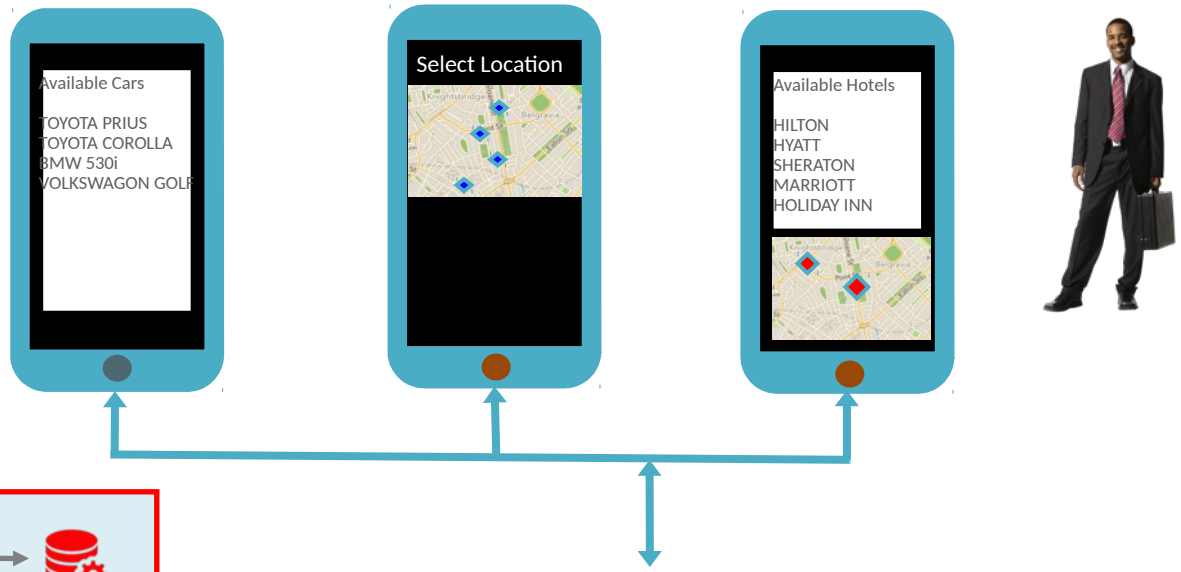


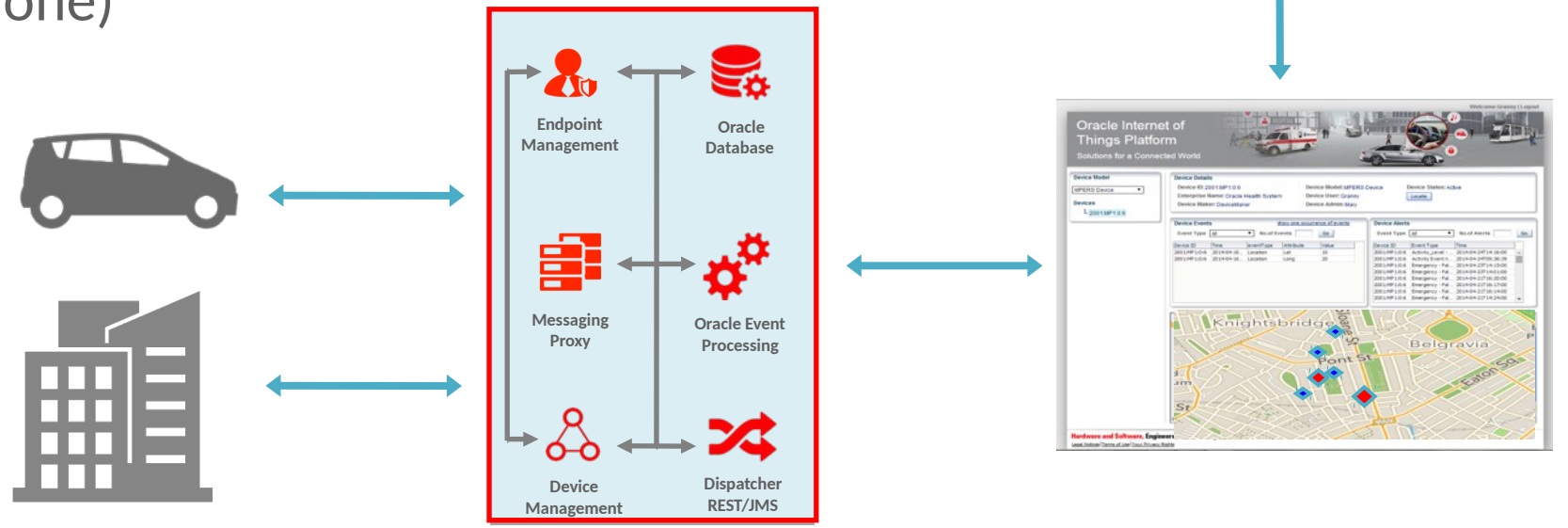
Demo Configuration



Step 1. User Searches for and Checks Vehicle Location & Room Availability

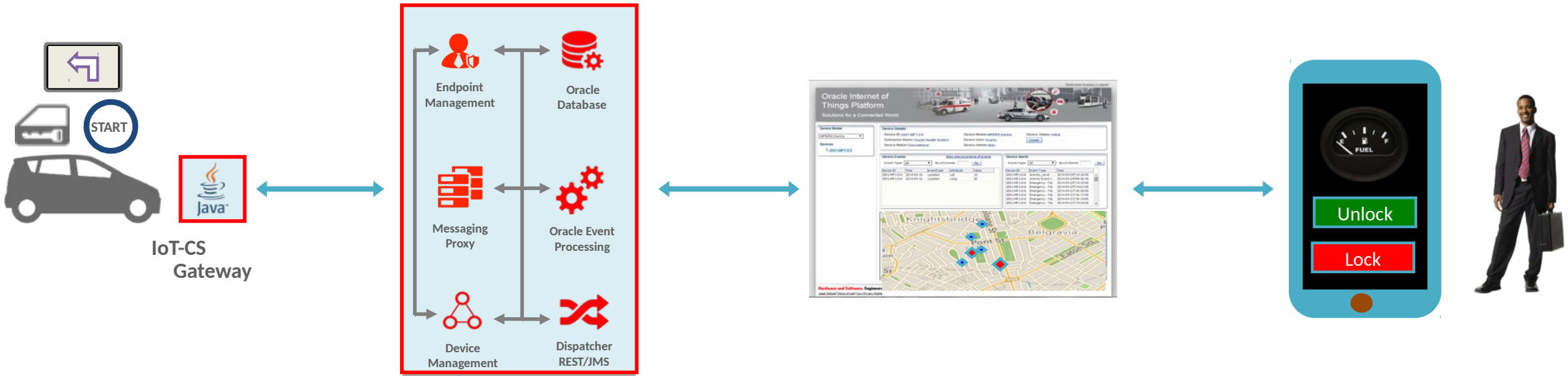
1. User Rents Vehicle & Accommodation
2. Simulated Map Viewer
   GUI / Mobile App
3. List of car locations and types
   (User selects one)
4. List of hotel locations
   (User selects one)





Step 2 - User Enters and Starts Car

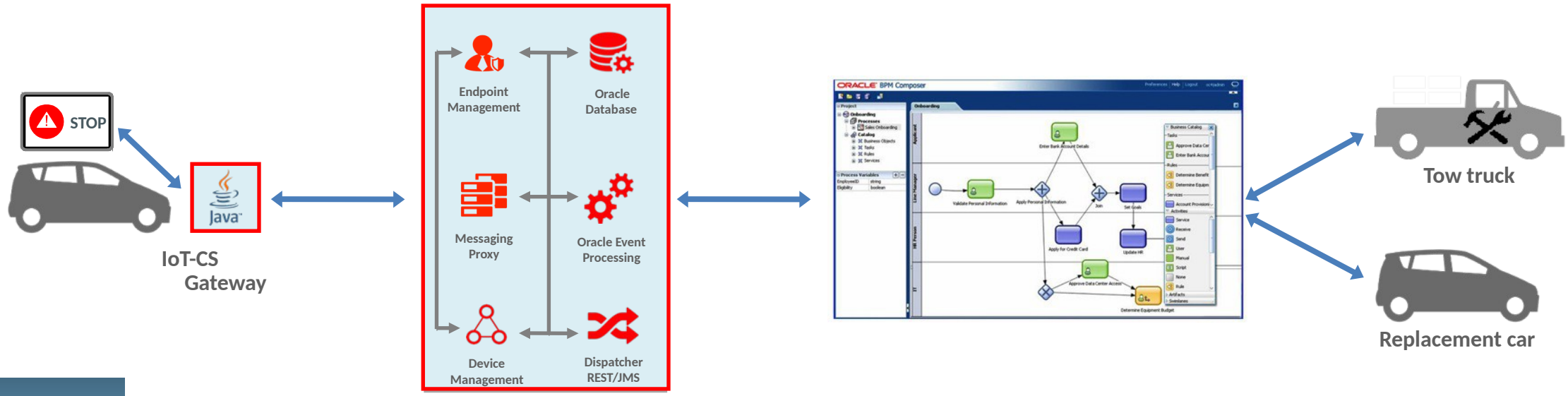
1. User arrives at destination, and locates rented car through mobile app
2. Vehicle door is unlocked
3. Ignition system is turned on



Step 3 – Predictive Maintenance

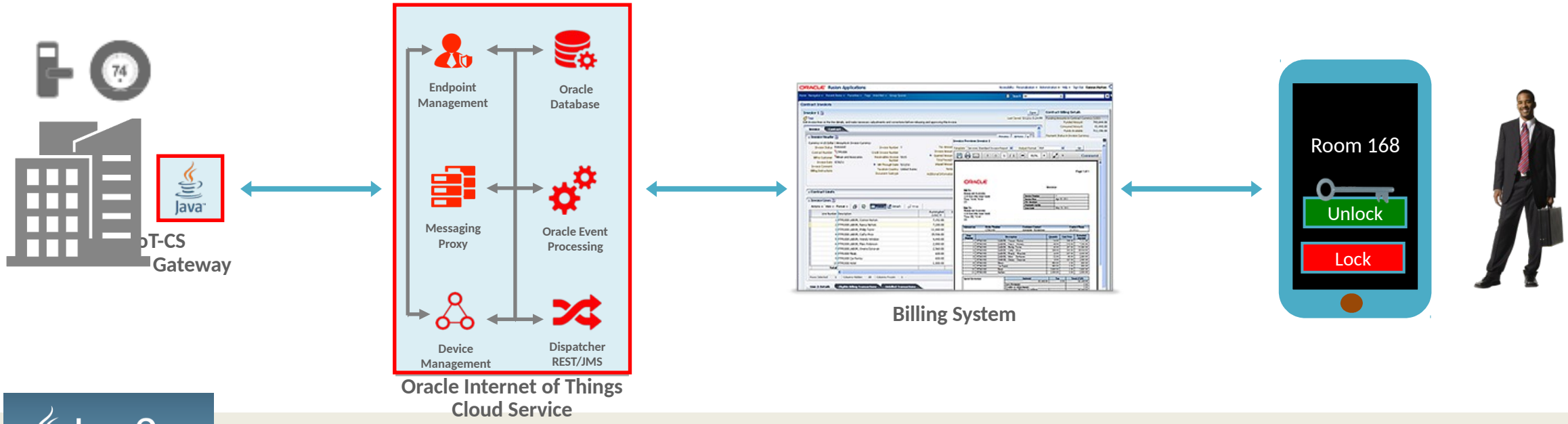
Based on analysis of telematics data, rental company is alerted that the car

1. transmission is about to fail
2. An alert is displayed on navigation system informing driver to stop
3. A replacement car (and a service truck) are dispatched
4. User resumes trip to the hotel in replacement car



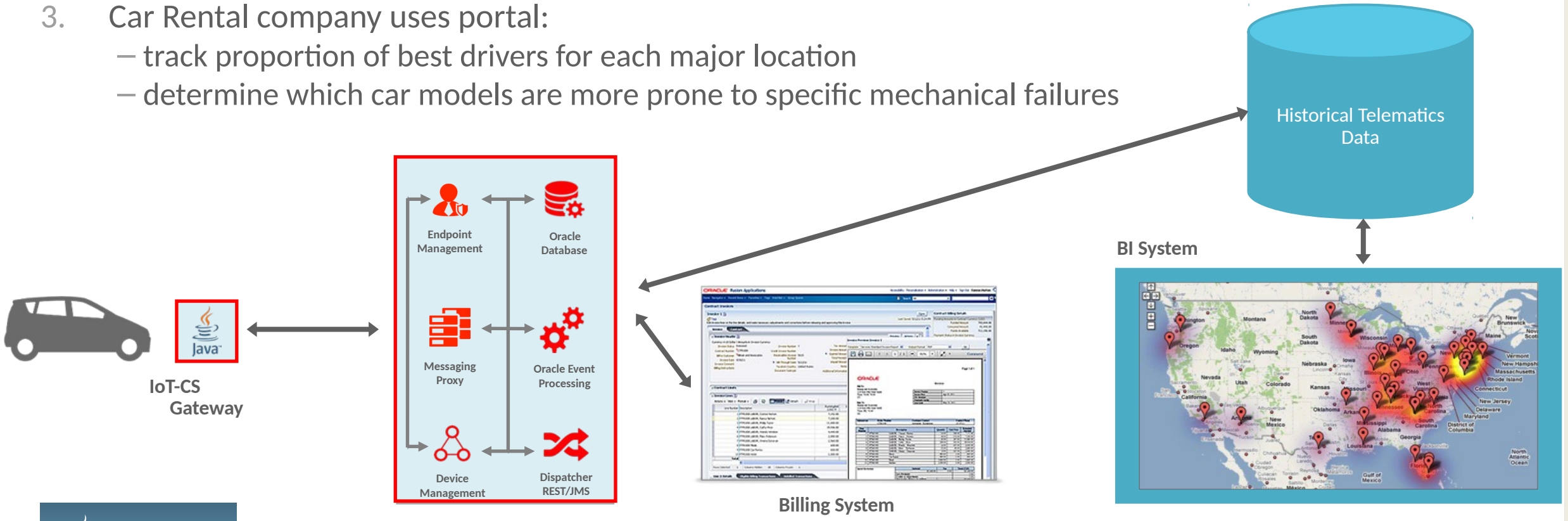
Step 4 – User Enters Hotel Room, Adjusts Temperature

1. User arrives at the hotel and walks to his hotel room
2. As he opens the mobile app, the reservation system recognizes the user's ID and configures the door lock and thermostat to only respond to the user's mobile app
3. User unlocks the door, the reservation system triggers the billing system
4. User adjusts the thermostat through its mobile app



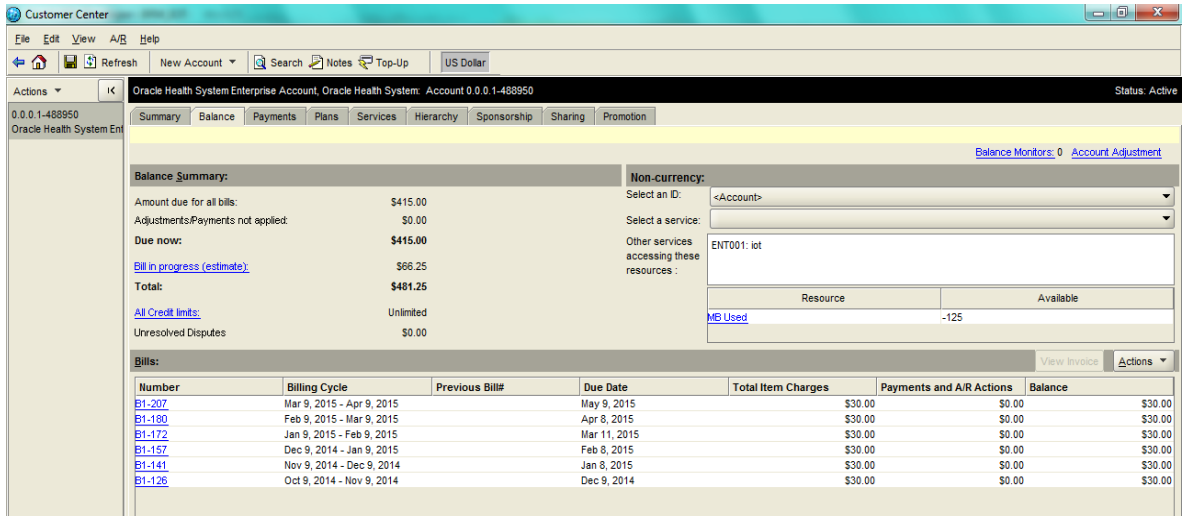
Step 5: Analytics Based on Rental Car Telematics data

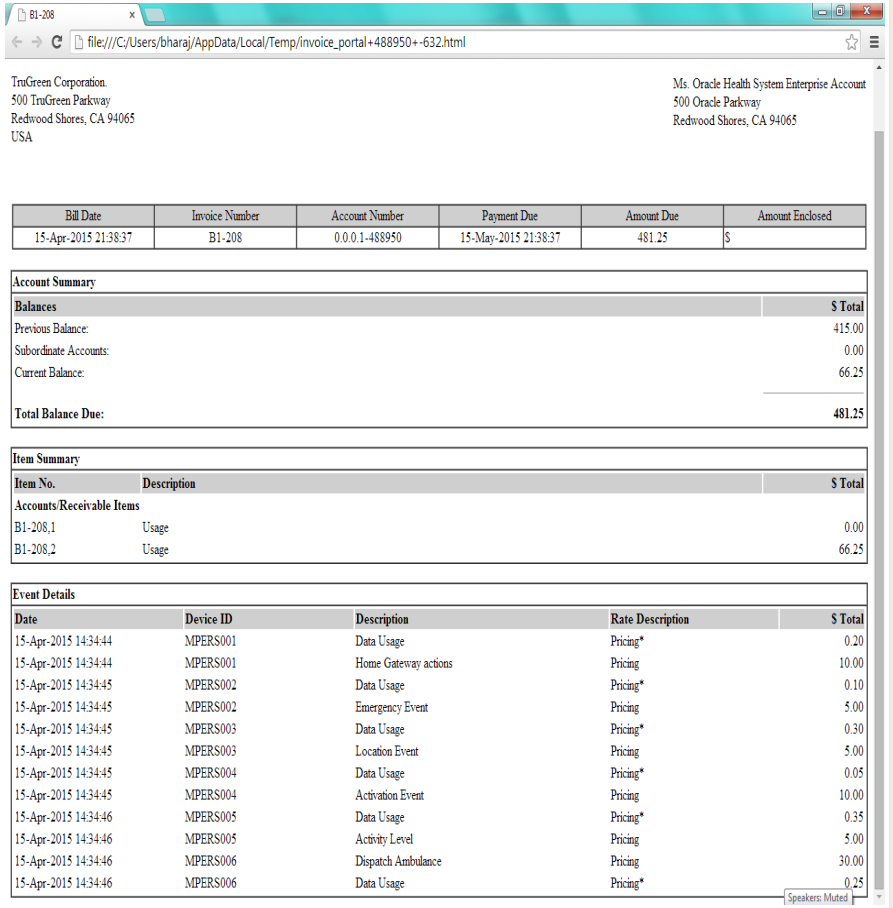
1. IoT-CS Gateway located in the car: real time analysis of driver's driving patterns information is sent to a loyalty system and billing system
2. A bonus is assigned to user for good driving or if user's car has experienced mechanical failure
3. Car Rental company uses portal:
   - track proportion of best drivers for each major location
   - determine which car models are more prone to specific mechanical failures

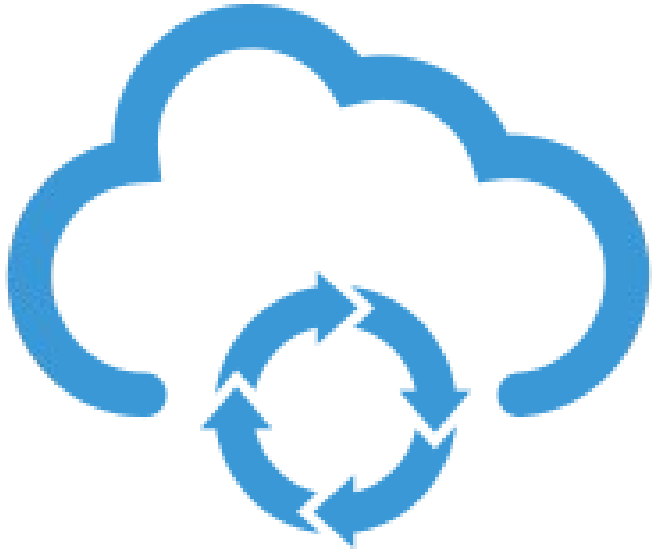


Step 6: Hotel and Rental Company are Billed for Service

1. Billing based on number of car rentals, locks/unlocks
2. Billing based on number of hotel rooms booked,
3. door locks/unlocks
4. Billing based on number of API data streams accessed for rental
5. location information
6. Rebate based on driving habits and car maintenance incidents







Summary

Demo

Q&A

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Integrated Cloud

Applications & Platform Services


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