IoT and big data with Red Hat JBoss Middleware and SAP HANA

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THE INTERNET OF THINGS LANDSCAPE

Connectivity and “smarter” devices driving change

EXPLOSIVE GROWTH IN CONNECTED DEVICES

UBIQUITOUS INTERNET CONNECTIVITY

AFFORDABLE BANDWIDTH

COMMODITIZED STANDARDIZED HARDWARE

ADVANCES IN CLOUD COMPUTING

STANDARDS BASED AND OPEN SOURCE SOFTWARE

- Microcontrollers
- Electronic sensors

Decreased cost of storing and processing data
Global Data Growth Rising Fast = +50% CAGR since 2010...
Data Infrastructure Costs Falling Fast = -20% CAGR

Data in Digital Universe vs. Data Storage Costs, 2010 – 2015

Data in Digital Universe (Petabytes) vs. Storage Costs ($/GB)
Data Generators = Increasing Rapidly

Source: Apple, DJ, Wear, Tesla, Microsoft, Ring, Fitbit, B & H Foto & Electronics

#redhat #rhsummit
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
THE DATA-DRIVEN IoT

Devices are the eyes and ears of the intelligent system, not its brain.
Red Hat and IoT

Red Hat helps enterprises and partners collect, communicate, transform, store, and act upon critical data generated by the Internet of Things.

Our open-source solutions
• free you from proprietary lock-in and cost escalation
• capture community innovation
• provide the enterprise-level security, reliability, scalability and support required by the IoT
Unified enterprise IoT architecture

Real-time intelligence and business tools at the edge

Integration with enterprise applications and systems

Rapid application development and delivery across entire intelligent system
Common OSS infrastructure with enterprise-ready security, scale, and manageability
Intelligent gateway

Data acquisition, integration, and rules activation, providing dynamic intelligence at the edge

Bridge between IT and OT by streamlining the many data formats and velocities
• Process and act on data at scale
• Reduce latency and bandwidth
• Apply real-time decisions locally
• Transform IoT data and connect with enterprise systems
• Control and manage millions of IoT devices
Intelligent gateway Architecture
Transforming device data into actionable information
JBoss Data Virtualization
Data Control Challenges Getting Bigger with Big Data, Cloud, and Mobile

• Security capabilities are tightly coupled to data sources
• Extracting and moving data adds risk
• Every project solves data access and integration in a different way
• Inconsistent and decentralized control of data
DATA IS BURIED DEEP IN I.T. SYSTEMS

BIG DATA, CLOUD, MOBILE MAKING DATA PROBLEM BIGGER

1. Data silos that are difficult to access when needed
2. Point-to-point integration that simply does not scale
3. Data sprawl leading to security and compliance risks

Existing Data Integration approaches are not sufficient
• Extracting and moving data adds latency and cost
• Every project solves data access and integration in a different way
• Solutions are tightly coupled to data sources
• Poor flexibility and agility
HOW DOES JBOSS DATA VIRTUALIZATION WORKS RIGHT TIME INTEGRATION & DATA AS A SERVICE

- Contextual view of disparate source data
- Single point of access
- Standard based interfaces
- Shareable integration and transformation logic
- Reusable data services

But you cannot achieve this by writing more application code...

Diagram:

- BI Dashboard & Reports
  - SQL Request
- Analytical Applications
  - REST Request
- ESB/SOA Integration
- BPM Applications
- Mobile Applications

- JBoss Data Virtualization
  - SQL Result
  - JSON Result
  - REST Message
  - SQL Statement
  - SOAP Message

Logos:

- SAP HANA
- Hadoop
- NoSQL
- Cloud Apps
- Data Warehouse & Databases
- Mainframe
- XML, CSV & Excel Files
- Enterprise Apps
Turn Siloed Data into Actionable Information

Data Sources
- SAP HANA
- SQL
- SaaS
- Data Warehouse & Databases
- Mainframe
- XML, CSV & Excel Files
- Enterprise Apps
- Spark
- Analytics
- Hadoop
- NoSQL
- Cloud Apps

Data Virtualization
- Basis
- Virtualize
- Transform
- Federate
- Easy, Real-time Information Access

Data Consumers
- BI Reports & Analytics
- Mobile Applications
- ESB, ETL
- SOA Applications & Portals

Connect
- Native Data Connectivity

Compose
- Unified Virtual Database / Common Data Model
- Data Transformations

Consume
- Standard based Data Provisioning
  - JDBC, ODBC, SOAP, REST, OData

Design Tools
- Dashboard
- Optimization
- Caching
- Security
- Metadata

Siloed & Complex

Unified Virtual Database / Common Data Model

Analytics
JBoss Data Virtualization

Key Business Values

Increase ROA
- Improved utilization of data assets
- Derive more value from existing investments
- Complements existing systems

Boost Agility
- Faster, less costly than batch data movement
- Data virtualization provides loose coupling

Improve Productivity
- Better/faster than hand coding
- Right data at the right time to the right people
- Decision support, BI with a complete view of information

Better Information Control
- Powerful security, Auditing, Data Firewall
- Avoid data silo proliferation
- Central data access and policy, Compliance
## JBoss Data Virtualization: Supported Data Sources

### Enterprise RDBMS:
- Oracle
- IBM DB2
- Microsoft SQL Server
- Sybase ASE
- MySQL
- PostgreSQL
- Ingres

### Enterprise EDW:
- Teradata
- Netezza
- Greenplum

### Office Productivity:
- Microsoft Excel
- Microsoft Access
- Google Spreadsheets

### Big Data:
- Apache
- HortonWorks
- Cloudera
- Apache Spark
- More coming...

### In-Memory:
- JBoss Data Grid
- SAP HANA
- HP Vertica

### Specialty Data Sources:
- ModeShape Repository
- Mondrian
- MetaMatrix
- LDAP

### NoSQL:
- JBoss Data Grid
- MongoDB
- Cassandra
- More coming...

### Enterprise & Cloud:
- Salesforce.com
- SAP
- Amazon RedShift

### Technology Connectors:
- Flat Files, XML Files, XML over HTTP
- SOAP Web Services
- REST Web Services
- OData Services
SAP HANA and SAP SDA
SAP HANA – Overview and Introduction to Smart Data Access

Aleksandra Aleksic
SAP HANA Product Management

June 2016
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SAP HANA – Introduction
The issue: Data and system interconnectivity becomes the bottleneck
Point optimizations is no longer enough for modern application development and deployment

**IMPACT ON BUSINESS**

<table>
<thead>
<tr>
<th>Real-time Business Requirements</th>
<th>Sales</th>
<th>Customer Service</th>
<th>Finance and Operations</th>
<th>Manufacturing</th>
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</thead>
<tbody>
<tr>
<td>Real-time bonus calculations for consumers</td>
<td>Customer churn, micro targeting, real-time interactions</td>
<td>Iterative period end closing with new posting into accounts constantly</td>
<td>New ATP strategies; MRP run for individual ATP check/instant re-planning</td>
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</tbody>
</table>

**IMPACT ON IT**

<table>
<thead>
<tr>
<th>Planning</th>
<th>Predict</th>
<th>Monitor</th>
<th>Communicate</th>
<th>Analyze</th>
<th>Summarize</th>
<th>Aggregate</th>
<th>ETL</th>
<th>Staging</th>
<th>Clean-Data Quality</th>
<th>Collect</th>
<th>Transact</th>
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<tr>
<th>Transactional Data store</th>
<th>Data marts and Warehouse</th>
<th>IoT and Sensors Data</th>
<th>Mobile and remote Data</th>
<th>Data Archives</th>
<th>Social &amp; Text</th>
<th>Geo-Spatial</th>
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<tbody>
<tr>
<td>Order Processing</td>
<td>Operational Reporting</td>
<td>RT Risk &amp; Fraud</td>
<td>Trend Analysis</td>
<td>Sentiment Analytics</td>
<td>Predictive Analytics</td>
<td>ML and Pattern Recognition</td>
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<td>Locate Intelligence</td>
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**IMPACT ON BUSINESS**

- **Slow Response Times**
- **Usability Challenges**
- **Lack Of Adaptability**

- **High Latency**
- **Complexity**
- **High Cost of Solutions**
The solution: Make all data readily available to all applications
Reduce data movement and data latency – improve business agility & innovation

Unified application workloads
Unified data – single copy
Real-time processes

Complete business view
Ability to react in real-time
Ability to innovate
The solution is only possible with in-memory data management
Only data in-memory enables all applications to become real-time

Data

- Manufacturing App
- Finance App
- Sales App
- Analytics App
- Service App
- Spatial App
- Streaming App
- Predictive App

ONE Platform for ALL applications

- Logic
- Logic
- Logic
- Logic
- Logic
- Logic
- Logic
- Logic

No waiting for data access and processing
All application logic (OLTP & OLAP) processed in one system
All data types processed in one system

Speed
Simplicity
Innovation
SAP HANA Platform – foundation for Modern Applications

SAP HANA PLATFORM
ON-PREMISE | CLOUD | HYBRID

Application Services
- Web Server
- JavaScript
- Fiori UX
- Graphic Modeler
- Application Lifecycle Management

Processing Services
- Spatial
- Graph
- Predictive
- Search
- Text Analytics
- Streaming Analytics
- Series Data
- Business Functions

Integration & Quality Services
- Data Virtualization
- ELT & Replication
- Data Quality
- Hadoop & Spark Integration
- Remote Data Sync

Database Services
- Columnar OLTP+OLAP
- Multi-Core & Parallelization
- Advanced Compression
- Multi-tenancy
- Multi-Tier Storage
- Data Modeling
- Openness
- Admin & Security
- High Availability & Disaster Recovery
Platform for Startups & ISVs
A single platform powering next generation of applications

DRIVING ADOPTION
• Platform to imagine new generation of applications
• Simple consumption model – lowering barriers to entry
• Rapid commercialization of innovation

RECENT PROJECTS
• Industry solutions - Healthcare, Capital Markets
• Consumer and enterprise applications
• startups.sap.com (3000+ Startups & ISVs)
SAP HANA Platform – Integration Services

Data from any source for a complete view of the business

- Access information stored in data silos while keeping the data in place
- Replicate and move any type of data in real-time to the cloud and on-premise
- Capture and analysis live data streams and route to appropriate storage or dashboard
- Synchronize data between HANA and thousands of remote databases (SQL Anywhere, UltraLite)
- Multiple access points from HANA to Hadoop data: thru Spark, Hive, HDFS & Map Reduce
SAP HANA – Smart Data Access
Motivation

**Issue**

Customers are facing a heterogeneous system landscape across different locations, storing huge amount of data in different formats

**Requirement**

Customers require a cost-efficient, easy-to-deploy solution to get real-time data visibility across their fragmented data sources, e.g. for operational reporting, monitoring, predictive analysis, search

**Virtualized Access**

Diagram showing data sources such as Enterprise databases, Warehouse databases, Master data database, HDFS cluster, and a report.
SAP HANA Smart Data Access: Overview

Key value proposition:

- Enables access to remote data just like “local” table
- Smart federated query processing
- Supports data location agnostic development
- No special syntax to access heterogeneous data sources
- Cost savings
- Benefit from HANA functionality without moving all data to HANA
- Rapid deployment of high-performance, data intensive transactional and analytical applications
Key Concept: Virtual tables

SAP HANA smart data access is based on local virtual tables that map to an existing object at the remote data source site.
### Additional Information Sources

#### SAP Public Web

- **hana.sap.com**: SAP HANA Product home page
- **http://scn.sap.com/community/hana-in-memory**: SAP HANA SCN community page

#### SAP Education and Certification Opportunities

- **SAP HANA openSAP courses (free!)**: [http://open.sap.com/courses](http://open.sap.com/courses)
- **SAP HANA Education and Certifications**: [www.sap.com/education](http://www.sap.com/education)
Demo – Retail Beacon
SAP HANA CLOUD PLATFORM

**IOT SENSOR INPUTS**
- Beacons
- Video heat mapping
- Location tracking

**RED HAT® JBOSS®**
- FUSE
- Web UI/node.js
- A-MQ

**RED HAT® JBOSS®**
- BRMS
- SQL Anywhere

**RED HAT® JBOSS® DATA VIRTUALIZATION**
- Postgres sales data
- Salesforce customer data
- Redshift promo data

**SAP HANA CLOUD PLATFORM**
- RDSync
- HANA
Customer information and alerts based on all data

SAP HANA 1
AWS - SDA

SAP HANA 2
All store inventory

SAP RDSync

SAP SQL Anywhere
Tables: customer, department, inventory

RED HAT® JBOSS®
BRMS

RED HAT® JBOSS®
A-MQ

IoT beacon

Web UI
Customer movements

IoT Gateway

Postgres
Sales data

Salesforce
Customer data

Redshift
Promo data

RED HAT® JBOSS®
DATA VIRTUALIZATION
Benefits Red Hat and SAP

Open architectures where customers can combine complementary technologies and use their product of choice

**SAP HANA and SDA with JBoss Data Virtualization**

In an IOT architecture, HANA can act as the performance booster and a data virtualization server can provide the required agility. In other words, deploying both technologies complement each other to produce a highly performant and agile architecture for IOT and Big Data.

**RDSync**

Acynchronous communication between the gateway and data center

**SQL Anywhere**

Very lightweight, feature rich, flexible data source

**A-MQ**

Asyncronous, scalable, transport for IOT data on the edge with MQTT and AMQP protocols

**BRMS**

Filter Data at the gateway and take quick action where necessary
<table>
<thead>
<tr>
<th>Session Title</th>
<th>Date and Time</th>
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<tbody>
<tr>
<td>Integration Roadmap: iPaaS, API Management, Red Hat JBoss Fuse, Data Virtualization, and more</td>
<td>Tuesday, Jun 28 10:15 am - 11:15 am</td>
</tr>
<tr>
<td>Data-driven decision-making: How Red Hat uses data to improve its products and customer experiences</td>
<td>Tuesday, Jun 28 10:15 am - 11:15 am</td>
</tr>
<tr>
<td>Anatomy of a big data application in containers</td>
<td>Tuesday, Jun 28 11:30 am - 12:30 pm</td>
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<tr>
<td>Think differently with real-time data</td>
<td>Tuesday, Jun 28 3:30 pm - 4:30 pm</td>
</tr>
<tr>
<td>Big data DevOps: Apache Spark streaming on OpenShift Enterprise by Red Hat</td>
<td>Tuesday, Jun 28 4:45 pm - 5:45 pm</td>
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<tr>
<td>Using predictive analytics to manage infrastructure risk</td>
<td>Wednesday, Jun 29 4:45 pm - 5:45 pm</td>
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<tr>
<td>Unifying analytics across data sources with Red Hat JBoss Data Virtualization</td>
<td>Wednesday, Jun 29 4:45 pm - 5:45 pm</td>
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<tr>
<td>IoT and big data with Red Hat JBoss Middleware and SAP HANA</td>
<td>Wednesday, Jun 29 4:45 pm - 5:45 pm</td>
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<tr>
<td>Real-time data services with Red Hat JBoss Data Virtualization and Red Hat JBoss Data Grid</td>
<td>Thursday, Jun 30 11:30am – 12:30pm</td>
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<tr>
<td>The intersection of business rules management and big data</td>
<td>Thursday, Jun 30 3:30 pm - 4:30 pm</td>
</tr>
<tr>
<td>Big data processing and analytics in Red Hat JBoss Data Grid 7</td>
<td>Thursday, Jun 30 4:45 pm - 5:45 pm</td>
</tr>
</tbody>
</table>
POWER UP and PARTY DOWN with Red Hat Mobile, Middleware and OpenShift.

Wednesday evening 9PM - 12AM

Pick up your invitation for the party that beats all parties at: Mobile, Middleware or OpenShift demo pods in the Red Hat Booth, Partner Pavilion