DEVELOPING REAL TIME INTELLIGENT APPLICATIONS WITH IN-MEMORY DATA MANAGEMENT

Data → Insights → Actions

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AGENDA

- Demand for Data Driven Insights
- Emergence of Intelligent Applications
- Red Hat Solution for Intelligent Application Development
- Customer Case Studies
- Demo
SMART USE OF DATA EQUALS HIGHER REVENUE GROWTH

Organizations which use analytics get $10.66 for every $1 they spend on data management and analytics.

Source: MIT Sloan, Gartner, Nucleus Research

93% of executives believe their organization is losing revenue as a result of not being able to leverage fully the information available to them. On average they estimate this lost opportunity to equate to 14% of annual revenue.

*Figure based on private sector organizations only

Source: From Overload to Impact: An Industry Scorecard on Big Data Challenges

3X Growth in spending on real-time analytics vs. spending on non-real-time analytics.

Gartner: Move Analytics to Real Time Sept 2016 ID: G00249626
All data originate in real time!
But analytics to gain insights is usually done much later, often without any meaningful action.
INTELLIGENT APPLICATIONS
Infuse Analytics in Apps to Act in Real Time and Maximize Business Impact

Collect and Analyze Data
Integrated Analytics

Decide and Automate Process
Intelligent Automation

Data  Insights  Actions
ENTERPRISES MUST ACT ON A RANGE OF PERISHABLE INSIGHTS TO GET VALUE FROM DATA AND ANALYTICS

**Insights Types**

- **Interactive**
  - Insight: shopping for furniture
  - Action: recommend cleaning supplies
  - Useful Timespan and Optimal Time to React: Sub-second to seconds

- **Operational**
  - Insight: profit lower than goal
  - Action: optimize price
  - Useful Timespan and Optimal Time to React: Seconds to hours

- **Performance**
  - Insight: demand forecast strong
  - Action: increase inventory
  - Useful Timespan and Optimal Time to React: Hours to weeks

- **Strategic**
  - Insight: furniture demand high
  - Action: expand product line
  - Useful Timespan and Optimal Time to React: Weeks to years
EXAMPLE OF MODERN INTELLIGENT APPS

Engaging Experience
- Find
- Compare
- Ratings and Reviews
- Recommendations
- Cross-sell and Upsell
- Purchase
- Track
- Enjoy!
EXAMPLE OF MODERN INTELLIGENT APPS

Fast and Safe Experience
- Find
- Track
- Share
- Cashless
- Arrive
- Enjoy!
Planning, implementing, or expanding the use of in-memory data platform.

Source: Forrester Global Business Technographics Data And Analytics Online Survey, 2015
Base: 1,805 global data and analytics decision-makers
Modern app experiences require more and faster data access.

Scale and concurrency stress traditional architectural components to the breaking point.
WHAT IS IN-MEMORY COMPUTING?

In-memory computing (IMC) is an architecture-style where applications assume all the data required for processing are located in the main memory of their computing environment.
DATA ACCESS (READ & WRITE)

MEMORY vs. DISK

RAM

Hard Disk
1000x SLOWER

Solid State Disk
100x SLOWER
DATA SCALABILITY AND AVAILABILITY

SCALE UP vs. SCALE OUT
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Data → Insights → Actions
INTELLIGENT APPLICATIONS
Infuse Analytics in Apps to Act in Real Time and Work Smarter

Data stores

- In-Memory
- Scale out
- Compute, Analytics Grid
- NoSQL
- Security

- SQL and Odata Access
- Event Processing
- Stream Processing
- Hybrid Translytical

- Machine Learning
- Data Reasoning
- Decisions Management
- Tiered Data Storage

apps

devices & sensors

Data ➔ Insights ➔ Actions
INTELLIGENT APPLICATIONS
Infuse Analytics in Apps to Act in Real Time and Work Smarter

Red Hat Data Virtualization
SQL Data Access and Query

Spark
Data Processing

Red Hat BRMS
Data Analysis

Red Hat Data Grid
In-memory Data Store

Red Hat Intelligent Applications Dev Platform

Data → Insights → Actions
INTELLIGENT APPLICATIONS

Aggregate -> Analyze -> Act

Simplify Development of Intelligent Applications
• Aggregate data in real time
• Analyze data in-memory
• Act on perishable insights

Red Hat Data Virtualization
SQL Access and Query

Spark
Data Processing

Red Hat BRMS
Data Analysis

Red Hat Data Grid
In-memory Data Store

Red Hat Intelligent Applications Dev Platform
RED HAT JBOSS DATA GRID
In-Memory Data Management

Structured Data e.g. Oracle
Unstructured Data e.g. NoSQL, Log
Stream Data e.g. Kafka

Application Frameworks & APIs
Tiered Data Overflow Mgmt. to Persistent Store

Cassandra
Data Sources

Red Hat Data Grid
In-memory data platform

In-memory ETL /Materialization

Structured Data e.g. Oracle
Unstructured Data e.g. NoSQL, Log
Stream Data e.g. Kafka

BRMS JDV
Spark
Hadoop
EAP BPMS Fuse
Spring Boot etc.

RDD/DStream
Map-Reduce
Java Stream
IN-MEMORY DATA MANAGEMENT USE CASES

Red Hat JBoss Data Grid

Distributed Cache | NoSQL Database | Event Broker | Compute Grid

“Memory is the new Disk & Disk is the new Tape”
STRONG ANALYST RECOGNIZATION

In two (2) separate Forrester Waves for IMDG and IMDB

Forrester Wave™: In-Memory Data Grids, Q3 2015

Forrester Wave™: In-Memory Databases, Q1 2017
<table>
<thead>
<tr>
<th>Situation</th>
<th>Solution</th>
<th>Results</th>
</tr>
</thead>
</table>
| • Biggest online apparel store with  
  • Over 9 million users and  
  • Selling over 2 million products items  
  • With 18000 views/sec  
  • Needed digital marketing platform with real-time campaign needs | • eCommerce site clickstream and user activity logs stored in JDG, along with product catalogs, store info, purchase history, marketing history and offering info.  
  • Marketing used BRMS to setup rules for campaigns and offers.  
  • Data change events in JDG trigger rules executions to generate real-time offerings | • Increase sales conversion rates by over 40%. |
## REWE IMPLEMENTS
**PERISHABLE Products LOGISTICS SOLUTION**

<table>
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</table>
| • Largest food retailer in Germany with  
  • 119,000 employees  
  • 3400 stores  
  • €17.7 billion revenue  
  • Needed a real-time purchasing and logistics solution to ensure just the right amount of fresh goods are available at all times. | • Replaced legacy software by Red Hat JBoss Data Grid based automated fruit and vegetable purchase solution.  
• Enable employees to modify automatically-generated order proposals directly in the produce section with a mobile device.  
• Orders are immediately transferred back to headquarters for fulfillment. | • “We increase efficiency in the supply of goods and logistics while reducing operating costs. In a business-critical environment like ours, we have stringent requirements for speed and availability. JBoss Data Grid meets these requirements. JBoss Data Grid allows us to transfer centrally-generated order recommendations to a large number of supermarkets in less than a second.”  
Jens Siebenhaar Managing Director, Rewe Systems |
DATA AND ANALYTICS ENABLE EVERYTHING IN THE DIGITAL ECONOMY

✓ Guide every interaction
✓ Drive every process
✓ Inform every decision

CALL TO ACTION:

1. Walk through critical or challenging business processes
   ▪ At each step of the business process ask how in-memory could accelerate your data-to-insights-to-action processing and reduce latencies.

2. Walk through customer journey to improve digital experience design
   ▪ At each step of the customer journey, ask how in-memory could help capture interactive insights and create a dazzling, new customer experience.
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