Innovating Healthcare with Red Hat Integration Technology

June 29 2016
View of Healthcare – Interoperability Prospective
Session Agenda

- Introductions of the speakers
- View of Healthcare – interoperability prospective
- Why does Healthcare need to innovate
- How is Fuse helping customers improve the speed of integration
- Sutter Health use case
- Panel Discussion / Q & A
Healthcare Trends Influencing IT

- Reduce Costs / Improve efficiency (ACA)
- Scale to Prosper (M&A and partnerships)
- Ensure security
- Government Compliance (HIPAA, ACA & MU)
- Data Explosion
  - Population Health Management (Big Data)
  - Transformation – Digital Innovation
    - Mobile, Wearable’s, Telemedicine
  - Value Based Care Models (ACO’s)
  - Interoperability Dependence (internal and external)

FUSE

BRMS, BPM
Meaningful Use Interoperability Stages – Penalty Phase Beginning

Stage 1
- Using Information to track key clinical conditions
- Communicating captured information for care coordination
- Reporting clinical quality measures
- Capturing Health information in a coded format

Stage 2
- Advanced clinical processes
- Disease management and clinical decision support
- Quality Measurements
- Support for patient access to their health information
- Bi-directional communication with health agencies

Stage 3
- Focused decision support for high priority conditions
- Achieving improvement in quality, safety and efficiency
- Access to comprehensive patient care
- Patient access to self management tools
<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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<tbody>
<tr>
<td>7</td>
<td>Knowledge driven engagement for a dynamic, multi-vendor, multi-organizational interconnected healthcare delivery model</td>
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<tr>
<td>6</td>
<td>Closed loop care coordination across care team members</td>
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<td>5</td>
<td>Community wide patient record using applied information with patient engagement focus</td>
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<tr>
<td>4</td>
<td>Care coordination based on actionable data using a semantic interoperable patient record</td>
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<tr>
<td>3</td>
<td>Normalized patient record using structural interoperability</td>
</tr>
<tr>
<td>2</td>
<td>Patient centered clinical data using basic system-to-system exchange</td>
</tr>
<tr>
<td>1</td>
<td>Basic peer-to-peer data exchange</td>
</tr>
<tr>
<td>0</td>
<td>Limited to no e-communication</td>
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# Value Based Care – Where is Integration Key

<table>
<thead>
<tr>
<th>Value Based Care Needs</th>
<th>Why do you need it?</th>
<th>RH Integration Technology</th>
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<tbody>
<tr>
<td>New Processes</td>
<td>New Integrated flows of data and process must be created</td>
<td>Yes</td>
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<tr>
<td>Interoperability everywhere</td>
<td>The data is critical to execute a VBC model</td>
<td>Yes</td>
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<tr>
<td>Mass aggregation of data</td>
<td>Understand the data to set and reimburse on care protocols</td>
<td>Yes</td>
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<td>Ability to build new apps. rapidly</td>
<td>Much of what is need does not exist</td>
<td>Yes</td>
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<tr>
<td>Cost effective IT to shift to new projects</td>
<td>ACA squeezing funds and new IT structures are must</td>
<td>Yes</td>
</tr>
<tr>
<td>Highly Secure Infrastructure</td>
<td>PHI protection is T.O.M concern</td>
<td>Yes</td>
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<tr>
<td>Open environment to ease in above</td>
<td>Everything must work together</td>
<td>Yes</td>
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Target percentage of payments in ‘FFS linked to quality’ and ‘alternative payment models’ by 2016 and 2018

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<thead>
<tr>
<th>Year</th>
<th>Historical Performance</th>
<th>Goals</th>
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<tr>
<td>2011</td>
<td>~70%</td>
<td>0%</td>
</tr>
<tr>
<td>2014</td>
<td>&gt;80%</td>
<td>~20%</td>
</tr>
<tr>
<td>2016</td>
<td>85%</td>
<td>30%</td>
</tr>
<tr>
<td>2018</td>
<td>90%</td>
<td>50%</td>
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Alternative payment models (Categories 3-4)
FFS linked to quality (Categories 2-4)
All Medicare FFS (Categories 1-4)
Extend this struggle to medical facilities, insurance providers, pharmacies, physicians, and patients across the country, and data integrity becomes a huge challenge.

This will only get worse with Patient Centered Care & IoT
How do these changes impact Healthcare IT

- Meet changes rapidly with improved development time to market
- Bring technology in at the lowest possible cost
- Position your IT infrastructure for agility and scalability
- Your products must be open to ease in integration and connectivity
- Flexibility so you do not lock yourself in
- Highly secure Enterprise class products
WHY CHANGE?

BUSINESS EXPECTATIONS BECOME IT CHALLENGES

100% of IT resources 70% to maintain current infrastructure 30% to invest in innovation and differentiation
WHAT ARE THE MOST IMPORTANT ASSETS?
YOU ALREADY HAVE IN YOUR DATACENTER

DATA
Locked into Legacy datastores.
Key to new offerings and business models

FUNCTIONALITY
Locked into Legacy systems.
Not available for integration with partners and new channels
HOW TO MODERNIZE?
BEFORE GETTING DISRUPTED

• Unlock your Data and Functionality

• Get ready for massive Integrations

• Offer value-added option
  • Enable new business models
  • Accelerate and enrich existing ones
ENABLING TECHNOLOGIES

- Integration choices → APIs enabled with JBoss Fuse
- Microservices → Containers at scale with OpenShift
- Mobile Channels → Custom and Public Apps
- Cloud Platforms → Salesforce, Partner platforms
Integration Platform

- CRM applications
- Web applications
- Enterprise applications
- SOA applications
- Mobile applications

- ERP applications
- Remote branch/Kiosk applications
- SaaS applications
- Data sources
- Files XML/CSV
JBoss Fuse Integration Platform

MODULAR
Supports multiple use cases, adaptable architecture

LIGHTWEIGHT
Flexible footprint, use only what is required

CONNECTIVITY
Connect traditional information sources, SaaS/PaaS, mobile, IoT

CLOUD BASED
Based on foundation of agility, flexibility, deployment choice
Messaging Platform
(Multi-protocol, Multi-platform)

JBoss A-MQ

Integration Platform
(Mediate, Route, Transform)

JBoss Fuse

Analyze in Realtime

Decision Management System
(Business Rules & Processes)

JBoss BRMS/BPMS

IoT Data
Migration Statistics

- 250+ applications integrated
- 1200+ MLLP connections
- 2000+ routes
Why we selected Red Hat Fuse

• Fuse is based on open source technologies
• High Availability/Failover is near instant
• Ability to incorporate DevOps best practices
• Near copy/paste of our JCAPS code
Timeline

- **Jan/14**: Review of Fuse started
- **Oct/14**: POC Build
- **Dec/14**: POC completed
- **Mar/15**: Migration starts
- **May/15**: POC approved
- **Jun/28**: First go live
- **Dec/15**: 1200 routes migrated

#redhat #rhsummit
Migration Challenges

• ActiveMQ performance when moving from POC to Production hardware
  • Resolution: Red Hat was able to make a series of performance improvements

• Fabric performance as we scaled out
  • Resolution: Pending testing of the latest 6.2.1 R2 patch

• Timeline to complete the migration by March 2017
  • Resolution: Reuse of the JCAPS OTDs has kept the development effort minimal

• Monitoring of the Fuse product
  • Resolution: Using Splunk to scrape logs and ActiveMQ Advisory messages to monitor brokers.
Future Plans

• Short term objectives
  • Updating projects to allow for multiple versions of the same bundle to run in a single container
  • Upgrading to Fuse 6.2.1
  • Build our service catalog to align with ITIL

• Long term objectives
  • Improve our Continues Deployment processes
  • API deployment
  • Improve process for patching Fuse
CMS has adopted a framework that categorizes payments to providers

<table>
<thead>
<tr>
<th>Category 1: Fee for Service – No Link to Value</th>
<th>Category 2: Fee for Service – Link to Quality</th>
<th>Category 3: Alternative Payment Models Built on Fee-for-Service Architecture</th>
<th>Category 4: Population-Based Payment</th>
</tr>
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<tbody>
<tr>
<td>Payments are based on volume of services and not linked to quality or efficiency</td>
<td>At least a portion of payments vary based on the quality or efficiency of health care delivery</td>
<td>Some payment is linked to the effective management of a population or an episode of care</td>
<td>Payment is not directly triggered by service delivery so volume is not linked to payment</td>
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<tr>
<td>Medicare Fee-for-Service examples</td>
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<td>Limited in Medicare fee-for-service</td>
<td>Hospital value-based purchasing</td>
<td>Accountable Care Organizations</td>
<td>Eligible Pioneer Accountable Care Organizations in years 3-5</td>
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<td>Majority of Medicare payments now are linked to quality</td>
<td>Physician Value Modifier</td>
<td>Medical homes</td>
<td>Maryland hospitals</td>
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<td>Readmissions / Hospital Acquired Condition Reduction Program</td>
<td>Bundled payments</td>
<td>Comprehensive ESRD</td>
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<td>Comprehensive Primary Care initiative</td>
<td>Medicare-Medicaid Financial Alignment Initiative Fee-For-Service Model</td>
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