CON7809 - Expert Insights for Accelerating Java CAPS Migrations to Oracle SOA Suite

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About the presenters

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Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle’s products remains at the sole discretion of Oracle.
Program Agenda

- Oracle SOA Suite 12c Overview
- Java CAPS to SOA Suite Migration Updates
- Customer Case Studies
  - Centerpoint Energy
  - Los Angeles Dept of Health Services
  - ITIJ, Portugal Ministry of Justice
- Summary
Oracle SOA Suite
Unified Integration Across Cloud, Mobile, and On-premise

• Simplifies development and management

• Standards-based, open infrastructure interoperates with your existing IT

• Consistent tooling - Single development, deployment and management platform
SOA Suite 12c: Drivers

- SOA is a critical requirement for mobile & cloud
- Shift from departmental solutions to shared services
- Constant increase in volumes
- SOA supporting increasingly critical business functions
- Customers looking for increased performance
- Expectations for greater development productivity and ease of use

**Steady increase in volume & criticality of workloads**

**Pole Emploi**
- Website to mainframe
- 100+ million msg/day

**Capital One**
- Shared services platform
- 150 million msg/day

**Dell**
- $50bn annual revenue
- Every single product order goes through Oracle SOA

**Schnieder**
- 5TB dehydration database
- 60 million BPEL inst/day
SOA Suite 12c

Key Features

- 30% memory footprint reduction
- Startup acceleration
- Pre-tuned database profiles
- One-click install
- Everything in JDeveloper
- Debugger & tester
- Templates
- First class support for mobile-friendly standards (REST, JSON, ...)
- Automated conversions REST/SOAP
- Cloud adapters to simplify on-prem to cloud integration
- Managed File Transfer (MFT) for file-based integration
- Certifications on Oracle Public Cloud
Java CAPS Migrations Updates

- Sun’s SOA active product lines will continue to be supported and maintained for extended time periods

- Oracle developed Migration Methodology and an Engagement Model
- Migration Tool in Controlled Availability through Oracle Support
- Interoperability certification for Java CAPS and SOA Suite
  - Web-services interoperability
  - JMS interoperability

<table>
<thead>
<tr>
<th>Release</th>
<th>Premier Support</th>
<th>Extended Support</th>
<th>Sustaining Support</th>
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<tbody>
<tr>
<td>Java CAPS Suite 6.3</td>
<td>Apr 2016</td>
<td>Apr 2017</td>
<td>Indefinite</td>
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<tr>
<td>Java CAPS Suite 6.2</td>
<td>Jan 2014</td>
<td>Jan 2017</td>
<td>Indefinite</td>
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<tr>
<td>Java CAPS 5.1.3</td>
<td>Jan 2014</td>
<td>Jan 2017</td>
<td>Indefinite</td>
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<td>GlassFish ESB 2.2</td>
<td>Jan 2014</td>
<td>Jan 2017</td>
<td>Indefinite</td>
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<tr>
<td>e*Gate 4.5.3</td>
<td>Jan 2014</td>
<td>Jan 2017</td>
<td>Indefinite</td>
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<tr>
<td>SRE 5.0.5</td>
<td>Jan 2014</td>
<td>Jan 2017</td>
<td>Indefinite</td>
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Java CAPS to SOA Suite Migration Aspects

- **License Migration**
  - Conversion of Java CAPS licenses to SOA Suite
  - Java CAPS Perpetual Licenses may be turned in for credit toward SOA Suite licenses. License migration will allow old and new licenses to run concurrently

- **Functional Migration**
  - Replacement of Java CAPS Infrastructure with Fusion Middleware
  - Java CAPS Functionality is **rewritten** in FMW using best practices or a **hybrid interoperability** solution is employed

- **Code Migration**
  - Java CAPS artifacts are migrate to run within the SOA Suite framework
  - Promises huge advantages include minimized implementation costs and risks

A successful migration solution resulting in a happy customer requires all three.
Migration Value Proposition

- Adoption of Oracle’s strategic middleware platform
  - Low Risk – Single point of contact, Single support platform and procedures
  - Low Cost -- License Credits, Single Support Contract
  - Leverage FMW Advance Features – Clustering, Coherence, Cloud, Mobile

- Preserve Existing Investment
  - Preserve business logic while moving to new strategic platform
  - Retain as much of the customer’s investment as possible: code, mappings, message flow and IP

- License migration program including ability to run both products concurrently
Houston’s Smart Grid: Transforming the Future of Electric Distribution & Energy Consumption
WHO IS CENTERPOINT ENERGY?

- Public company traded on the New York Stock Exchange (CNP)
- Headquartered in Houston, TX
- Operating 6 business segments in six states
  - Electric transmission and distribution
  - Natural gas distribution
  - Interstate pipelines and natural gas gathering
- Serving 5.4 million electric & gas customers
- $22 billion in assets
- $8.5 billion in revenue
- 8,827 employees
- Over 130 years of service to our communities

Vision
“To be recognized as America’s Leading Energy Delivery Company... and more”
Who is CenterPoint Energy – Electric?

Houston Electric Division (CEHE)
Houston (4th largest city in the US)
Houston Metro Area (6th largest in US)

- 5,000 square mile service area
- Approximately 2.5 million electric meters
- Houston Electric
  - Delivers 77 Gigawatt hours yearly for about 300 certified Retail Electric Providers

Transmission and Distribution System
- 3,742 miles of transmission lines
- 48,733 miles of distribution lines
- 232 substations

Electric Challenge:
Effectively monitor and control millions of meters, line devices and miles of delivery wire which, if laid end to end, almost circle the earth twice around the equator.
Products Used

- SOA Suites
- Spring Bean
- BPEL solutions
- Mediator
- Extensive Usage of SAP Adapters
- HA File Adapter implementation
- OSB
- Coherence
- B2B
- Business Rules Engine
- ADF Framework
- Worklist applications
## Technology Stack

<table>
<thead>
<tr>
<th>User Interaction</th>
<th>Sharepoint</th>
<th>ADF</th>
<th>SAP UI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trading Partner Integration</td>
<td>B2B/EDI</td>
<td></td>
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<tr>
<td>Fault Investigation and Correction</td>
<td>Human Workflow</td>
<td>Database Queries</td>
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<tr>
<td>Logic</td>
<td>Rules Engine</td>
<td>Spring Beans</td>
<td>Stored Procedures</td>
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<tr>
<td>Integration Patterns</td>
<td>Synchronous</td>
<td>One-Way</td>
<td>Aggregation</td>
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<tr>
<td>Process Orchestration</td>
<td>Stateless BPEL</td>
<td>Mediator</td>
<td>OSB Proxy</td>
</tr>
<tr>
<td>Integration Technology</td>
<td>File Adapters</td>
<td>Database Adapter</td>
<td>Oracle AQ Adapter</td>
</tr>
</tbody>
</table>
Migration Strategy - JCAPS to FMW

- **Proof Of Concept**
  - Jumpstart Approach
  - Technical Evaluation for the JCAPS objects to FMW Spring Beans

- **Consulting**
  - Engaged Oracle Consulting Services
  - Oracle Assessments
  - Leverage Oracle Customer Product Management Advisory Board

- **Conversion**
  - Utilized the migration tool
  - Preserved Business Logic

- **Implementation**
  - No Big Bank approach
  - Multiple GO Lives to eliminate the risks
  - Dynamic Configuration Implementation to switch the process to run on JCAPS Middleware or Fusion Middleware in the case of back out
Performance and Benefits

- Billing and Invoice Transactions Performance
Technical Challenges and Solution

- Spring Bean Implementation
  - Changed spring bean scope configuration (singleton to prototype)
  - Redesigned LSE application to use Spring Bean with Java EE message-driven beans and HA File Adapter implementation
- JMS
  - Switched from foreign server to Store and Forward (SAF) message delivery due to circular dependency
  - Changed Java Message Server (JMS) Adapter configurations to eliminate high CPU utilization
- B2B
  - EDI Batching with the combinations of Number of transactions + Time + Size
  - Not able to use the Out of Box outputs due to the canonical XML translation. Implemented B2B Utility Java API for EDIF ECS to EDI.
- File Adapter
  - Switched from non-HA to HA adapters due to clustering and the file rotations
Best Practices and Lessons Learned

- **SOA Suites**
  - Built-in Audit is helpful during development, as non-technical users can see payload and debug issues.
  - Set CompositeName as the Transaction Id, to link custom auditing with built-in auditing
  - Turning off instance logging produces a big gain in performance for batch oriented and compute intensive processes

- **OSB**
  - Best solution if the need is only Transformation and Routing
  - Built in throttling helps when integrating with slower systems

- **Coherence**
  - Payloads are kept in Coherence layer for better performance and eliminating the load on the JMS hops

- **JMS Store**
  - File Based JMS store with local storage

- **SAP Adapter**
  - Database based configuration for clustering environment
Expert Insights for Accelerating Java CAPS Migrations to Oracle SOA Suite

October 2, 2014

Shant Gharibi
Information Technology Specialist
Los Angeles County Department of Health Services
Los Angeles County Department of Health Services (LA DHS)

- 2nd largest public health care system in the United States
- Provides care to more than 10 million residents through 6 primary hospital-based facilities and several offsite clinics
- Annual budget of $3.5 billion
- Workforce of 22,000 people
LA DHS Challenges

- Implementing new EHR across all county hospitals with Cerner Millennium
- Implementing new data warehouse with Oracle Healthcare Data Warehouse Foundation (HDWF)
- Implementing new MDM solution with IBM InfoSphere MDM
- Implementing new middleware platform integrating above solutions with Oracle Fusion Middleware and Oracle SOA Suite for Healthcare, including migration of existing middleware projects (focus of this presentation)
Los Angeles County Department of Health Services (DHS) is in process of replacing its mature production solution for hospital systems integration, Sun/SeeBeyond e*Gate 4.5.3 product suite, to Oracle Fusion Middleware.

Due to the various projects DHS has to implement, Oracle e*Gate to SOA Suite Migration tooling looked highly beneficial to retain decades old IP while moving to SOA Suite for Healthcare in a timely fashion.
Business Drivers

- Cost reductions via migration from older, unsupported hardware/software due to requirements from e*Gate 4.5.3
- Move to service oriented infrastructure and methodologies, reducing overall software development costs, and becoming more agile to quickly respond to new business requirements
- Move to a more scalable and reliable platform, allowing the ability to more easily scale operations to meet different business needs
- Reduced support for eGate
Products Used In Migration

- Oracle Fusion Middleware 11.1.1.7 PS6
  - SOA Bundle Patch 4, 11.1.1.7.4
  - Spring, JMS, DB, File/FTP, Mediator, BPEL

- Oracle SOA Suite for Healthcare

- Oracle e*Gate to SOA Suite Migration Tools

- Oracle 11g R2 RAC database
LA County DHS’s e*Gate projects implement MLLP interfaces via the HL7 e*Way and all business logic is implemented in the integration layer.

Components:
- HL7 e*Way – for connecting to end systems via MLLP
- JMS – used in the integration layer to decouple components
- Java Collaboration Definitions (JCDs) - for validation, mapping and routing
- Event Type Definitions (ETDs) - for managing data objects (such as HL7 messages) at runtime
**Project Details**

- **Typical e*Gate 4.5.3 design**

The diagram illustrates the typical design of e*Gate 4.5.3, connecting various components such as HL7/MLLP, JCD, JMS, DB, and other systems through directed pathways, indicating the flow and interaction between them.
LA DHS SOA Middleware Production v10

Primary Data Center F5 (PROD)

Load Balancer Rules:
1. HTTP Traffic – load balanced, direct traffic to remaining node if one node is lost.
2. TCP Traffic – direct to each managed server round robin (only the active server will pick up the message)

PORT 8001 – balance load

PROD VM Server

VM Server Physical Node A

Virtual Machine SOAHOST1

WebLogic Server

Managed Server

PROD_SOA_ORCHID1

SOA

HealthCare (Active)

UMS

VIP1

Admin Console Access

Port 7001 SOAHOST1

VIP2

CPU: 16 vCores
Memory: 64GB VRAM
Disk: 25GB (Local)

PROD SAN

PROD RAC DB Storage

DB Disk: 1.5TB Usable High Speed LADHS Standard RAID Configuration

PROD Shared Disk and File Storage

Shared Disk: 200GB Usable High Speed File Disk: 200GB Usable High Capacity LADHS Standard RAID Configuration
Migration Strategies

- Oracle supports 3 options:
  - Functional migration to Oracle SOA Suite (rewrite)
  - Code migration to Oracle SOA Suite
  - Combined approach of functional and code migration

- DHS chose combined approach, combining best of both worlds
Technical Challenges and Solutions

- e*Gate multiple outbound JMS adapters per pathway
Technical Challenges and Solutions

■ SOA Suite flow
e*Gate multiple inbound/outbound JMS adapters per pathway
Technical Challenges and Solutions

- Migrated SOA Suite project
Technical Challenges and Solutions

- Migration to SOA Suite for Healthcare using the SOA Suite flow
Best Practices and Lessons Learned

- Test data object ETD’s/OTD’s extensively
- JMS based projects are perfect candidates for migration, others are still good candidates
- Raise SR’s as quickly as possible and follow through
- Test error handling as different products behave differently than SOA Suite
- Transition from previous generation product methodology “mindset” to SOA mindset
- Direct contact with Oracle engineering team streamlined and was critical to migration effort under the engagement model
IGFEJ
Portugal Justice Department

JAVA CAPS Migration
Oracle Open World 2014
Agenda

• Company Summary
• Business Requirements and Challenges
• Product Selection, effort and estimation
• Target architecture & infrastructure
• Migration benefits
• Technical challenges
• Conclusions, tips & lessons learned
Company Summary

IGFEJ is responsible for the management of the financial resources of the Portuguese Ministry of Justice

- Management of its technological infrastructures
- Responsible for proposing new technology
- Executing IT projects

All this is accomplished interacting with several internal and external entities to the Ministry of Justice.
<table>
<thead>
<tr>
<th>The Challenge</th>
<th>The Solution</th>
<th>The Future</th>
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<tbody>
<tr>
<td>• Migrating JCAPS</td>
<td>• SOA = BPEL + Java</td>
<td>• Use BAM, to build real-time dashboards in order to monitor relevant information in real time.</td>
</tr>
<tr>
<td>• Project budgets</td>
<td>• OSB</td>
<td>• By using an established security standards (WSS), weblogic is able to connect to several security providers. When the time comes, seamlessly switch to the Ministry of Justice unified system without any impact to our clients.</td>
</tr>
<tr>
<td>• Incorporating new features whenever possible</td>
<td>• Weblogic (for HA)</td>
<td></td>
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<td></td>
<td>• Oracle Databases</td>
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Business Requirements and Challenges

• Due to EOL of JCAPS – required to move to another platform
• Maintain 100% functional compatibility
• Retain as much intellectual property where possible
  – Design patterns (as well as code)
  – Common services (reuse of components)
• Technical requirements:
  – Consolidate integration endpoints (service virtualization)
  – Support new WS-* standard features not supported by JCAPS
  – Introduce HA
  – Employ new SOA products & features where it makes sense
• Timeline: Migration of core processes by end of 2014
Product Selection Criteria

- Technology Viability and Clear Evolution Roadmap (with Best In Class Technology)
- Migration Tool that automate most of the effort
- Clear Assessment on the Effort Involved
- Migration Strategy Proved and Documented
## Effort and Estimation

<table>
<thead>
<tr>
<th>Project Area</th>
<th>Complexity</th>
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<tbody>
<tr>
<td>CC</td>
<td>Complex</td>
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<tr>
<td>IC Ws</td>
<td>Medium</td>
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<tr>
<td>IC (Async)</td>
<td>Medium</td>
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<tr>
<td>IES</td>
<td>Complex</td>
</tr>
<tr>
<td>STS WS</td>
<td>Simple</td>
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<tr>
<td>Ent Externas WS</td>
<td>Medium</td>
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<td>Gest Doc WS</td>
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<td>Reclusos WS</td>
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<tr>
<td>SICRIM WS</td>
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<td>SIRMCOM WS</td>
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<td>Automovel WS</td>
<td>Medium</td>
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<tr>
<td>DUA</td>
<td>Medium</td>
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### Factors for Complexity:

- eWay Use
- Business functionality
- Pattern suitability
Effort and Estimation

- Evaluation phase: **two and half months in duration** (includes risk mitigation) with most of team assigned full time

- Migrated projects for each complexity level/pattern

- Measures (eg: project with **medium** complexity)
  - ~ 8 man hours for install/configure environment
  - ~ 4 man hours to migrate the project (using the tool)
  - ~ 4 man hours to do end-to-end testing (quality assurance)
  - = 16 man hours in total

- Estimation then scaled for 100 projects
Target Infrastructure

4 x Sun Fire X4170 M2
Or reuse existing hardware

- Sun Fire X4170 M2
  Intel Xeon X5670 2.93GHz
  2CPU x 6Cores, 2.93GHz

Database Systems
Web Services
JMS, FTP, etc.
Migration Benefits

- Fastest time-to-value
  - High Code Reuse
  - Best Practices, Methodology and Assistance
  - Tooling Support
- Lower TCO
  - License migration program
  - Lower overall project cost
- Control Risk
  - Single point of Support (Oracle)
- Target OSB/SOA Platform
  - Up-to-date Standards
  - Monitoring
  - Development Environment
Technical Challenges

- BPEL migration
  - Dealt with sequence nodes vs choice nodes
  - Handle BPEL 1.1 -> 2.0 mapping of empty nodes
- Migration tool – initially using the first “beta” versions
- Handling of JMS – not so natural in SOA Suite
Conclusions, Tips & Lessons Learned

- Teams must be trained in SOA Suite
- **Java and BPEL skills** still relevant in Oracle
- Do not underestimate the architecture and design phase! Investment in **evaluation period** very important. Try different things!
- Do not change the project team after the PoC and before starting the migration!
- Choose a **first migration scenario** for hands-on training
- Introduce the **optimizations** related with capabilities that exist in SOA Suite and that had been coded in JCAPS
Summary

- Oracle has proven Migration Methodology to help migrate Java CAPS artifacts to FMW (SOA Suite)

- Reach out to your Oracle account team to discuss if you qualify for a free assessment workshop

- Send email to SoaMigrationExperts_us@oracle.com for your migration queries