

JBoss innovation AWARD WINNER 2006

JBoss World 2006 LAS VEGAS

ORBITZ and JBoss AS

Making Travel Commerce Fast & Easy

chuck clark
Director of Platform Technology

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Who Am I?

- chuck clark
- Director of Platform Technology for Travelport (formerly Cendant TDS)
- 10 years of software engineering experience
- Developed trading applications, .com, wireless applications and major travel websites
- Wide breadth of knowledge including Linux and Java with a focus on distributed systems
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Agenda

- Orbitz Overview and Background
- The Pre-JBoss Architecture
- Context and Drivers to Innovate with JBoss AS
- The Post-JBoss Architecture
- Reflecting Back and Looking Forward with JBoss AS
- Questions & Answers

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Orbitz Overview

- Founded in 2000 by the world's leading airlines
- Public site launched in 2001 – Celebrating our 5th Anniversary since launch in June 2006!
- Top three travel site in just over two years
- Award winning air, car, and hotel products
- Public Offering on December 17th, 2003
- Acquired by Cendant TDS in November 2004
- Cendant TDS renamed Travelport in 2006




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Business Context

- Orbitz launched 3 to 5 years after major competitors
- Air carriers saw trends driving distribution costs higher
- A notoriously competitive market with thin margins
- Customer focused
 - ✓ Broad selection of lowest priced products
 - ✓ Features and functions that are relevant and easy to use
 - ✓ Fast feature delivery
 - ✓ Highly responsive and highly available web site
 - ✓ Customer care and service a key component
- Supplier friendly
 - ✓ Partnering with carriers
 - ✓ Reducing distribution costs
 - ✓ Long range commitments

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Platform Priorities

- Speed to market
- Flexibility (both development and execution)
- Scalability
- Developer effectiveness
- Low cost (all else being equal)

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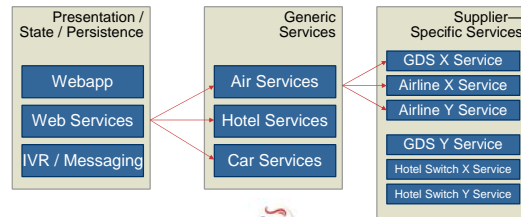
The Development Landscape at Travelport

- More than 200 developers worldwide
 - ✓ Majority of development occurs in Chicago
 - ✓ Remote development sites in Denver, Israel and Bangalore
- Developers have state of the art Linux workstations
- Systems primarily written in Java
- Major releases of the site occur every two weeks
- Millions of lines of code across hundreds of code depots
- Code written in development and progresses through multiple environments until it reaches production with massive scale

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High-Level Architecture



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Background On Jini



- Not only for devices
- Standards based and built on standard JDK technologies like RMI
- A true service oriented architecture
- Enables construction of robust distributed systems
- Travelport infrastructure relies on Jini to seamlessly add capacity and provide fault tolerance
- Currently Jini is under review to become an Apache project

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Technology Stack Pre-JBoss AS

- All Jini services run in a homegrown container
 - ✓ Embedded in each service
 - ✓ Not JMX enabled
 - ✓ Drove us to build our own monitoring
- Many commodity components written and maintained by Travelport
 - ✓ Custom logging
 - ✓ DB connection pooling
 - ✓ Host connection pooling

Oracle Shipping and Booking Services			
Sun JMX	Sun JDBC Oracle DB Oracle Pooling	Oracle Remots Logger	Apache Tomcat
Oracle ServiceLoader Container			
Sun JDK 1.4			
Red Hat Enterprise Linux 3.1			
Rackable 64-Bit Dual CPU Server			

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Current Projects Renewed Our Focus

- Integration of major travel websites after Cendant TDS (now Travelport) acquisition
- Building a unified global travel commerce platform to enable international expansion and pursuit of new business models
- Forced us to re-evaluate our priorities and focus on:
 - ✓ developing features and functionality related to selling travel
 - ✓ developing tools to give our business users more insight into how the site is performing
 - ✓ minimal site downtime
 - ✓ leveraging public implementations of commodity components
 - ✓ avoiding monolithic deployments
 - ✓ simplifying dependency management
 - ✓ applying the 80:20 rule

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Why JBoss AS?

- Full JMX Support
- Leverage the AOP framework
- Tomcat already in use for all internal applications
- SAR concept ideal for a SOA
- Open Source
- JSP 2.0
- JDK 1.5 compatibility
- Opportunity to replace custom code with commodity code
- JBoss ON

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What does it mean to be innovative?

As defined by Webster:

innovative

adjective
 • (of a product, idea, etc.)
 featuring new methods;
 advanced and original :
 innovative designs

adjective
 • (of a person) introducing new
 ideas; original and creative in
 thinking : an innovative thinker

According to BusinessWeek:

"Innovation is becoming ever
 more broadly defined."

- Product innovation
- Business model innovation
- Process innovation

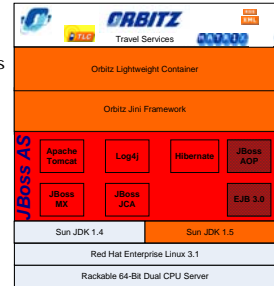
["The World's Most Innovative
 Companies," BusinessWeek 24 April
 2006](#)

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Technology Stack Post-JBoss AS

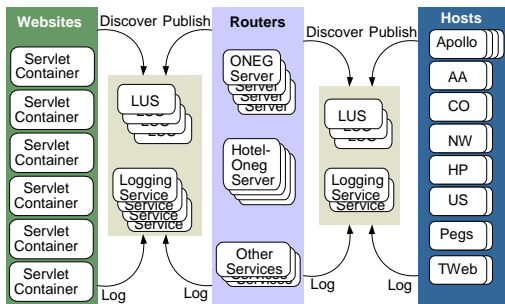
- JBoss AS and the JDK now included in standard server image
- Standardize library versions
- Operational efficiency improves due to common monitoring and management interface
- Leverage commodity functionality built and maintained by JBoss and the OSS community
- Introduce a more distinct layering to the architecture
- **Focus on delivering business value**



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High Level Deployment Overview



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Implementation Details

- Identify components to target for initial migration
 - ✓ Small and well-contained
 - ✓ Not critical to site
 - ✓ High-load is preferable
- Extracted components now deployed on an as needed basis
- Unifying scripts for monitoring and management is an ongoing effort
- Rollout still in progress but the benefits are already visible

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Lessons Learned

- Configuration
 - ✓ Default install is the only option
 - ✓ Port conflicts complicate deployment
- Classloader issues
 - ✓ Running multiple SARs in one JBoss AS instance
 - ✓ Conflicts between jars used by JBoss AS and in-house applications
- Versioning
 - ✓ Incredibly difficult problem to solve using Java
 - ✓ Forces meticulous management of dependencies
 - ✓ Forces development of a rarely changing wire representation

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Looking Toward The Future

- Incorporating EJB 3.0 in a common Data Access Service
- Seamless integration with advance monitoring and complex event processing tools
- Standardize on Tomcat throughout the system
- Use JBoss AOP to deploy common functionality in a unified manner
- Move away from compensating transactions and use JBossJTA where possible

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Why Was Our JBoss Deployment Successful?

- Industry Defining and Leading Technology
- Cultural fit
 - ✓ Open Source is used in every environment and every layer of the stack
 - ✓ Naturally inquisitive developers
 - ✓ Value architectures capable of masking complexity and planning for change
- Support model fits our needs
 - ✓ Google and source code availability is empowering
 - ✓ Subscription support as needed

"The [team] who doesn't read [the source]...has no significant advantage over the [team] who can't."

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Q&A

Questions?

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