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

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
- Contact: cclark@orbitz.com

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

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

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

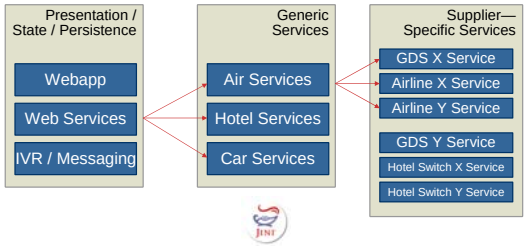
Platform Priorities

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

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

High-Level Architecture

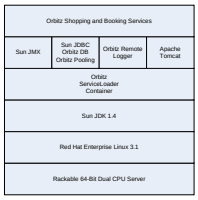


Background On Jini

- 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 and Apache project

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



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

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

What does it mean to be innovative?

As defined by Webster:

in•no•va•tive
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*

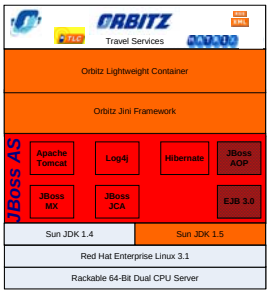
According to BusinessWeek:

"Innovation is becoming ever more broadly defined."
- Product innovation
- Business model innovation
- Process innovation

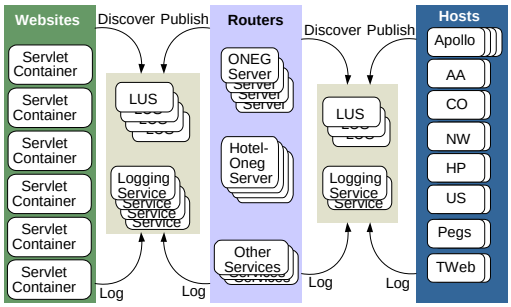
"The World's Most Innovative Companies," BusinessWeek 24 April 2006

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***



High Level Deployment Overview



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

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

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

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."

Q&A

Questions?