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Best Practices for Developing & Deploying SaaS

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Agenda

- Introduction
- So What?
- Environment
- Industry Buzzwords
- SaaS Levels
- Design & Deployment Best Practices
- Q & A

About Me

- **Industries Experience**
 - Government (NLM)
 - Service/Consulting (IBM, MET, IIT Bombay)
 - Telecommunications (AOL, AT&T)
 - Transportation (Department of Post, India, UPS, BSES)
 - Entrepreneur (3 Years)
- **Education**
 - MS Technology Management, GMU, Fairfax, VA (Graduating 05/2009)
 - MS Mathematics (Operations Research & Statistics), IIT Bombay
 - BS Mathematics, Physics, and Statistics, University of Rajasthan, Jaipur
- **IT Roles & Responsibilities**
 - Web System Architect, Engineer, and Administrator @ AOL
 - Software, Systems Engineer @ AT&T, IBM, and NLM
 - CEO @ Baghel Corporation
 - CTO @ Suchna!
 - Project Leader, and Engineer @ IIT Bombay, MET

Introduction

- SaaS is a Networked Application
 - Anywhere, Anytime and All the Time
 - New name for ASP
- SaaS Business Models
 - B2B, B2C and B2G
 - Must have Competitive Advantage
 - Price Points
 - Product Differentiation

Introduction (contd.)

- Fundamental Benefits of IT
 - Enables Something
 - Multiplying Impact
- IT Types
 - Functional, Network and Enterprise
- General Managerial Tasks
 - IT Selection
 - IT Adoption
 - IT Exploitation

So What?

- Cost Benefits (Money & Time)
- Subject Matter Expertise
- Functional Standardization
- Collaboration
- Consolidation

Environment

- Multi Site for High Availability
- Open Source, COTS & Proprietary Technology
- Services consumed over WWW
- SLA for Performance & Availability
- Usage Reports & Metrics
- Secure and Scalable
- Monitored

Industry Buzzwords

- Service Oriented Architecture (SOA)
- Cloud/Utility Computing
- Open Source Tools & Technologies
- Virtualization
- Green IT

One could leverage all implementing SaaS

SaaS Levels

- Level 0 (Chaos):
 - Software Instances by a Customer
- Level 1 (Managed Chaos):
 - Single Software Version
 - Customizations are done via configuration
- Level 2 (Multi-Tenant, High-Rise):
 - Single Software Version
 - Single Instance for all customers
- Level 3 (Multi-Tenant, Build-Out):
 - Supports Scaling
- Level 4 (Utopia):
 - Supports Scaling
 - Efficiently running Multi Version & Multi Instances

Source: <http://www.infoq.com/news/2008/02/saas-architecture-maturity-model>

Design & Deployment Best Practices

- Optimize Software Framework & Tiers
- Forward vs. Backward Compatibility
- Stateful vs. Stateless
- Coupled vs. Decoupled Interfaces
- Synchronous vs. Asynchronous
- Security & Service Level Agreements
- Load Sharing and DNS TTL Settings
- Platform Monitoring

Optimize Software Framework & Tiers

- **Logical Tiers (LT) \geq Physical Tiers (PT)**
- **Operations Complexity Index**
 - For N Nodes in each Tier OCI is calculated as
 - $OCI = (LT-PT+1)*(N^{(PT-1)})$
 - For N=4; LT=PT
 - 3 Tier = 16, 4 Tier = 64, and 5 Tier = 256
 - For N=4, LT-PT=1
 - 3 Tier = 8, 4 Tier = 32, and 5 Tier = 128
- **Use only if you can't live without a Software Framework like Struts, EJB etc as each framework adds overhead**

Forward vs. Backward Compatibility

- Identify the business needs & make a choice
- Forward Compatibility is tough to sell but improves profitability
 - For example: Microsoft Operating Systems are forward compatible
- Backward Compatibility is easy to sell but lowers profitability
 - For example: Sun Microsystems Java Platform

Stateful vs. Stateless

- First choice: Implement Stateless
- Second choice: Implement Optional Stateful
- Third choice: Mandatory Stateful

Coupled vs. Decoupled Interfaces

- Make the design decision that supports the business model
- Coupled Interfaces promote profitability
- Decoupled Interfaces promote innovation

Synchronous vs. Asynchronous

- Synchronous
 - Only Real Time Activities
 - If needed, spin a new process to log events
- Asynchronous
 - Batch Jobs (If possible, create miniature)
 - Metrics Collection & Reports Activity

Security & Service Level Agreements

- Security
 - Network and Host based Firewalls
 - SSL Offload vs. SSL
 - Two way SSL
- Understand SLA
 - Availability
 - Total Load vs. Rate Limiting
 - Response Time
 - Service Level Expectations

Load Sharing & DNS TTL Settings

- DNS Rotor
- GSLB
 - It's a smart DNS Server
 - In-house vs. outsourced
- L4 VIP
 - Round Robin vs. Least Connection
- DNS TTL
 - 120 seconds max

Platform Monitoring

- Implement availability checks & reports
- Periodic logs review for dependency health
- Periodic logs rotate & purge
- End User Monitoring
- Open Source Monitoring Tools
 - Nagios <http://www.nagios.org>
 - Apache JMeter <http://jakarta.apache.org/jmeter/>

So What?

- Cost Benefits (Money & Time)
- Subject Matter Expertise
- Functional Standardization
- Collaboration
- Consolidation



Q & A

You can reach me
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