Quality - The Key to Successful SOA

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WSO2

• Founded in 2005 by acknowledged leaders in XML, Web Services Technologies & Standards and Open Source

• Producing entire middleware platform 100% open source under Apache license

• Business model is to sell comprehensive support & maintenance for our products

• Venture funded by Intel Capital

• Global corporation with offices in USA, UK & Sri Lanka

• 100+ employees and growing
Agenda

• SOA - Introduction
• Traditional Software Testing
• SOA Testing
• Challenges in SOA Testing
• SOA Testing in Practice
• SOA Testing Tools
• SOA Testing Best Practices
Service Oriented Architecture - Introduction

• Definition
A service-oriented architecture (SOA) is the underlying structure supporting communication between services. SOA defines how two computing entities, such as programs, interact in such a way as to enable one entity to perform a unit of work on behalf of another entity. Service interactions are defined using a description language. Each interaction is self-contained and loosely coupled, so that each interaction is independent of any other interaction.
Service Oriented Architecture - Introduction

• Why SOA
  - To reduce the cost
  - To reduce the risk of difficulty of replacing legacy systems
  - To acquire new businesses

• SOA is about reuse

• Loose coupling
Service Oriented Architecture - Introduction

• SOA includes:
  - Transformations and mappings
  - Message routing
  - Security
  - Logging
  - Monitoring
  - Quality of Service aspects

• SOA provides these functions through SOA middleware components (Enterprise Service Bus (ESB), Identity management services, SOA registry, Business process engines etc..)
Traditional Software Testing

• Mostly Black-box

• Wait for an end-to-end working solution to test

• Higher UI interactions

• UI oriented automation

• Interact with application silo's – Less integration
SOA Testing

• Component based testing
• Bottom-up test execution
• Need fair knowledge in SOA concepts and technology
• Collaborative testing
• Test early – Test often
SOA Testing - What and How to Test

- Identify SOA components where things can go wrong
- Identify testing techniques
- Identify scope
- Set quality goals
- Focus on data
SOA Testing Challenges

• Complex standards and specifications
• Headless – non-UI based applications
• Message oriented tests
• Coding skills
• Complex test environments due to higher level of integrations
• Security
• Interoperability
Need Of Agility In SOA Testing

• Agile is all about faster feedback
• SOA demands quicker feedback mechanism
• Cost of rework is much higher
• Loosely coupled components
Agile Process for SOA Testing

• Light-weight documentation
• Developer involvement in test design and execution
• Risk based testing
• Component level testing
• Continuous integration
• Automated testing
SOA Testing in Practice
SOA Testing in Practice
Component Level Testing – Web Services

• Contract First Web Service Development

• Read and understand WSDL (contract), use WSDL validators

• Until service is implemented, use Mock Services and derive tests

• Service level performance testing
Web Services Testing with Quality Of Services (QOS)

- Service access is restricted using various policies (security, throttling)
- WS-Security
- WS-RM
- Service invocation with various transport protocols
Testing associated with ESB

- ESBs are configuration driven
- Test the configuration
- Test transformations, mediation and routing rules
Testing associated with Identity Management Servers

- User Management
- XACML (Extensible access control markup language)
- STS (Secure Token Service)
Testing associated with SOA governance registry

- Corporate governance policies
- Shared resources
- SOA metadata (wsdl, schemas etc..)
Business Process Testing

- Business process modeling - BPM
- BPEL (Business Process Execution Language) configuration testing
- Security with business processes
Business Activity Monitoring

• Service statistics
• Mediation statistics
• Service activity monitoring
• Service analytics
• Mediation analytics
• Reporting
End-to-End Testing

• To verify that the integrated components work correctly as part of the overall system

• Automated end-to-end testing
Open Source Tools for SOA Testing – SOAPUI

- Easy-to-use
- Can be used for both functional and performance testing
- WS-* Support
- Service mocking
Open Source Tools for SOA Testing – Jmeter

- SOAP/XML-RPC or WebService Samplers can be used
- Can be used for both functional and performance testing
- Data-driven testing
Open Source Tools – Java bench

• Java-clone of Apache-Bench, HTTP benchmarking tool

• Relatively easier configuration

• Simple utility for quicker benchmarking

• Ability to generate a much higher load from a single client machine

• No assertions

• Command-line interface

See java-bench simple and light-weight service load testing tool
Programmatic generation of messages

• Tools do not support all possible use cases

• Programmatic generation of SOAP messages is a solution

• Eg:- Axis2 ServiceClient API provides useful methods
  SendReceive(OMElement)
  SendRecieveNonBlocking(OMElement)
Jconsole – Monitoring tool for Java applications

• Includes in Sun JDK
• Very useful performance monitoring tool
SOA Tester's Work Bench

• Integrated Development Environment (IDE)

• Few tools to generate requests (SOAPUI, Jmeter, Java-Bench)

• Monitoring tool such as Jconsole
SOA Testing Best Practices

- Continuous testing
- Use of tools
- Test Automation
- Exploratory testing
- Interop testing
- Security testing
- Avoid scope creep – Test what you use
- SOA Testing is not only web services testing
- Risk based testing
Questions?
Engagement Model

• Quick Start
  - Combination of consulting, training and POC development in one week by WSO2 on-site team working hand-in-hand with customer team

• Development Support
  - On-going support for Customer's engineering teams

• Production Support
  - Full 24x7x365 enterprise support providing software maintenance and support
Selected Customers

- Deutsche Bank
- Alcatel-Lucent
- Prudential
- CA
- eBay
- Chapdelaine & Co.
- Trimble
- Lockheed Martin
- Software AG
- BBC
- Mercedes-Benz
- British Airways
- Kaiser Permanente
- Intermountain Healthcare
- EMC²
- HP
- 2° Technologies
- Concur Technologies
- WSO²