Tool Support for Developing Scalable J2EE Web Service Architectures

Guus Ramackers
Application Development Tools
Oracle Corporation

guus.ramackers@oracle.com
www.oracle.com
Using All This in Real Life …

- J2EE
- Web Services
- UML
- Architectures
- Legacy Systems
- Design Patterns
- Best Practices
- Frameworks
Confused?

*Compare with:*

*Elevator Sign in Hyatt Burlingame:*

In the event of a malfunction:
1. Do not become alarmed
2. Press the red button marked “alarm”
Why web services?

• Enabling Virtual Organizations
  – Eliminating the “stove pipe syndrome” within a company
    • E.g. telecoms company with .Net and J2EE focused divisions (based on pre-takeover culture)
  – Cross company collaborative business processes
    • E.g. doing what Dell does, without dictating implementation

• Ubiquitous Enterprise Application Integration
  – “Cheap and cheerful”, not heavyweight
  – Utilize the internet for inter-connection
  – No more “screen scraping”
Start from Scratch?

• Web Service development does *not* require
  – A “whole new way of developing”
  – A “whole new architectural paradigm”
  – A “whole new component model”

• Web Services are simply a different way of exposing an *interface* to existing architectures
  – “WSDL is the IDL for the internet”
  – As with IDL, care must be taken to design the right interfaces
  – A reusable architecture is a prerequisite
End-to-end J2EE Application Architecture

- **Component Standards**
  - Container provides standardized run-time, e.g. EJB, Servlets

- **Design Patterns**
  - Solve common design issues & provide common vocabulary
  - E.g. Session Façade, Value Object, Paged Lists

- **Development Frameworks**
  - Optimize interaction between multiple patterns
  - Focused on client, web, server, or database tier
  - E.g. Struts, Oracle BC4J

- **Application Architecture**
  - Combine frameworks to form end-to-end application architecture
  - Typically *Model-View-Controller* architecture in J2EE context
  - E.g. JSP + Struts + BC4J + JDBC
  - Reuse the Model (e.g. Mobile + WS + BC4J + JDBC)
Scalability of WS Interfaces

- Performance of the protocol
  - SOAP versus RMI
- Binding between systems
  - Enterprise systems can’t wait for each other
    - Asynchronous client
    - Asynchronous transport
    - Asynchronous server
- Granularity of requests
  - Batch up records
  - Batch up changes
Exposé Coarse Grain Services

- JSP
- Mobile
- Portal
- Java (3GL)
- Web Service
- WSDL
  - JMS Queue
  - EJB Session Facade
  - EJB
  - MDB
- PL/SQL
Contract Driven Development

- Define UML web service PIM (service and operations)
- Select implementation target and generate PSM and Artifacts
  - WSDL
  - Client stub
  - (Sample) Client skeleton
  - Server stub
  - Server implementation skeleton
- Add client and server method implementations in framework context
Implementation Driven Development

• Reverse Engineer UML web service PIM, by selecting methods to be exposed from existing (framework or legacy) implementation

• Tool generation of PSM and Artifacts
  • WSDL
  • Client stub
  • (Sample) Client skeleton
  • Server stub

• Refine client implementation
Launches the Web Service Publishing Wizard, which allows you to publish methods available in a Java class as web services.

To enable this option, you must select a project or a file within a project in the Navigator.
Standards are essential

- JAX-RPC, JSR-109
- Interoperability: WS-I
  - Profiles
  - Best practices
  - Monitoring, Logging, Analyzing tools
- Customer quote:
  “there are standards, and there are standards”
  - Royalty-free versus licensing required?
  - Centralized control versus community process?
  - Overlapping content versus complementary?
  - Historical competence versus competitive body?
Download Oracle 9i Application Server and JDeveloper for Free

http://otn.oracle.com/products/

- Full functionality software
- License fee payable on deployment of commercial application
- Many “How-To’s” and Examples available
Integration Gateway

Oracle E-Business Suite

Invocation Client API

Workflow Engine

Business Event System

XML Gateway

Web Services Runtime

Service Repository

Oracle9iAS Web Services

JAX-RPC Implementation

Standard Web Service Servlets

E-Business Suite XML Servlet

E-Business Suite Workflow Servlet
Oracle9i JDeveloper: Building Web services

- Built on standards
  - SOAP, WSDL, UDDI
  - Java XML Pack
  - Apache SOAP
- Complete lifecycle
  - Model, build, deploy, debug, profile
- Integrated
  - Publish J2EE components
  - Publish DB stored procedures
  - Consume external services
- UDDI lookup and discovery