Tool Support for Developing Scalable J2EE Web Service Architectures

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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
Expose Coarse Grain Services

WSDL

JMS Queue

MDB

EJB Session Facade

EJB

PL/SQL

JSP

Mobile

Portal

Java (3GL)

Web Service
Tool Support for J2EE WS

WSDL

Generate

UDDI Registry

JSP, Servlet, Java, Web Service Clients

SOAP Stub

Client

HTTP

SOAP

Java, EJB, JMS, PL/SQL

Application Server

Generate

Java SOAP Servlet

EJB SOAP Servlet

JMS SOAP Servlet

PL/SQL SOAP Servlet

JDBC

Database
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?
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- Full functionality software
- License fee payable on deployment of commercial application
- Many “How-To’s” and Examples available
Oracle9iAS: Application Server

Web Services Description Language

SOAP Translator

J2EE Components

JDBC SOAP JCA JMS

Trading Partners

Customers

Exchanges

Service Providers

Packaged Applications

Custom Applications

Legacy Systems

Heterogeneous Data Sources

Oracle9iAS Application Server
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