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Web Services Development Using RAD v7.0

Course Summary

Description

This course teaches students how to develop, deploy and secure Web services using Rational Application Developer. The RAD features that streamline Web services development and deployment are covered in depth. The concepts taught in this course are reinforced by hands-on lab exercises.

Objectives

At the end of this course, students will be able to:

- Develop, secure, deploy, publish and consume simple and advanced Web services.
- Publish and retrieving Web service definitions from a UDDI registry.
- Exploit the rapid application development tools provided by RAD which automate Web service development.

Topics

- RAD Overview
- Web Services Basics
- RAD: Web Service Development
- SOAP
- RAD: TCP/IP Monitor
- WSDL
- UDDI
- RAD: Web Services Explorer
- JAX-RPC
- RAD: Web Services Client Development
- Axis
- Web Services for J2EE
- Application Assembly and Packaging
- Web Services Security Concepts
- Defining Web Services Security
- Deploying Web services in WebSphere Application Server
- JMS Application Development
- SOAP Over JMS
- SOAP Messages with Attachments
- Appendix: XML Basics
- Appendix: Namespaces
- Appendix: Validating XML With XML Schemas

Prerequisites

Students should have J2EE programming experience and familiarity with XML

Duration

Five days

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Course Outline

I. RAD Overview
- A. RAD Development Tools
- B. Perspectives and Editors
- C. Server Configurations
- D. Debugging Tools
- E. Project Properties

II. Web Services Basics
- A. Service-Oriented Architecture (SOA)
- B. What are Web Services?
- C. Web Services Advantages
- D. Interactions and Components
- E. Web Services Standards: XML, SOAP, WSDL and UDDI
- F. Web Services Interoperability (WS-I)
- G. Java Web Services Developer Pack (Java WSDP)

III. RAD: Web Service Development
- A. What's New
- B. Development Approaches
- C. Runtime Environments: Apache Axis and IBM WebSphere
- D. WS-I Compliance
- E. Creating a Bottom-Up and Top-Down Web Services
- F. Creating an Axis Web Service
- G. Testing the Web Service
- H. Specifying Deployment and Editing WSDL
- I. Using the TCP/IP Monitor and the Web Services Explorer
- J. Generated Files

IV. SOAP
- A. SOAP Processing Model
- B. SOAP Messages
- C. SOAP Message Elements (Envelope, Header, Body and Fault)
- D. Communication Styles (Document Style & RPC Style)
- E. Encoding
- F. Java/SOAP Mappings
- G. SOAP Bindings
- H. Error Handling
- I. SOAP Implementations

V. RAD: TCP/IP Monitor
- A. TCP/IP Monitor Configuration
- B. Controlling the Monitor
- C. Using the TCP/IP Monitor View
- D. Examining Requests and Responses
- E. Examining SOAP Messages

VI. WSDL
- A. What is WSDL?
- B. Java/WSDL Mapping
- C. Abstract vs. Concrete Descriptions
- D. WSDL Document Structure
- E. WSDL Elements (Types, Ports, Services, Messages, Operations and Port Types)
- F. Bindings and Extensibility Elements
- G. WSDL Style/Use
- H. Service and Port Definitions
- I. Binding to a Service (Early vs. Late Binding)

VII. UDDI
- A. UDDI Overview
- B. Registries
- C. UDDI Interactions
- D. UDDI Data Model
- E. Data Types: businessEntity, businessService, bindingTemplate and tModel
- F. UDDI4J
- G. UDDI Clients

VIII. RAD: Web Services Explorer
- A. Overview of the Publishing Process
- B. Web Services Explorer Functions
- C. Launching the Web Services Explorer
- D. Accessing a UDDI Registry
- E. Publishing a Business Entity, Business Service and Service Interface
- F. Locating Web Services

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Course Outline (cont'd)

IX. JAX-RPC
- A. JAX-RPC Overview (JSR 101)
- B. Why Use JAX-RPC?
- C. JAX-RPC Model
- D. Service Endpoint Definition
- E. Development Steps
- F. The ServiceLifeCycle Interface
- G. Service Deployment
- H. Java/XML and XML/Java Mappings
- I. Web Service Clients (Static Stub, Dynamic Proxy and Dynamic Invocation Interface)
- J. The javax.xml.rpc.Service Interface
- K. Handlers
- L. Data Type Mapping
- M. JAX-RPC Implementations

X. RAD: Web Services Client Development
- A. Web Service Client Wizard
- B. Generating a Proxy and Sample Application
- C. Generated Files
- D. Testing the Client
- E. Using the Generated Proxy
- F. Service References

XI. Axis
- A. History of Axis
- B. Axis Engine
- C. Axis Framework
- D. Handler Chains
- E. Axis Services
- F. Deployment Options (JWS and WSDD)
- G. Mapping Tools (Java2WSDL and WSDL2Java)
- H. Generated Files
- I. Axis Development Process
- J. Handlers
- K. Axis Clients
- L. Custom Type Mapping
- M. TCP Monitor Tool (tcpmon)

XII. Web Services for J2EE
- A. Web Services for J2EE Architecture (JSR 192)
- B. Port Definition
- C. Managing Ports
- D. Requirements for Exposing Session Beans and Java Classes
- E. Service Implementation Bean Lifecycle
- F. Container Responsibilities
- G. Web Services Deployment Descriptor (webservices.xml)
- H. JAX-RPC Mapping
- I. Client Development
- J. Service References
- K. Security
- L. WebSphere Support

XIII. Application Assembly and Packaging
- A. J2EE Deployable Units
- B. Assembly Process
- C. Packaging Checklist
- D. Creating Enterprise Application Projects
- E. Importing Resources
- F. Adding J2EE Modules and Utility JARs
- G. JAR Dependency Editor
- H. Using the Application Editor
- I. Deployment Descriptor Elements (EJB, Web, Connector, Client and Application)
- J. IBM Extensions and Bindings
- K. Exporting Resources

XIV. Web Services Security Concepts
- A. Web Service Security Risks
- B. Encryption and Decryption
- C. Cryptography
- D. Certificates
- E. Digital Signatures
- F. Security: Message Level vs. Transport Level
- G. SSL/TLS
- H. WS-Security

XV. Defining Web Services Security
- A. WebSphere Security Model for Web Services
- B. WS-Security Authentication
- C. Enabling Authentication
- D. Message Integrity Using XML Signatures
- E. Configuring Integrity
- F. WS-Security Confidentiality
- G. Configuring Confidentiality

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Course Outline (cont'd)

XVI. Deploying Web services in WebSphere Application Server
- A. WebSphere Architecture
- B. WebSphere Administrative Console
- C. Web Services Support in WebSphere
- D. Creating Required Resources
- E. Deploying a Web Service to WebSphere Application Server
- F. Managing Deployed Applications

XVII. JMS Application Development
- A. JMS Capabilities and Messaging Styles
- B. JMS Interactions and Participants
- C. JMS Runtime Environment
- D. JMS Application Steps
- E. Message-Driven Beans
- F. RAD JMS Support
- G. Configuring JMS Resources
- H. JMS Deployment
- I. JMS and Transactions

XVII. SOAP Over JMS
- A. Why Use SOAP Over JMS?
- B. Communication Styles
- C. Using Queues and Topics
- D. Web Service Development Process
- E. Web Services Wizard
- F. Generated Resources
- G. Generated WSDL
- H. Using the Endpoint Enabler to Enable SOAP/JMS

XVII. SOAP Messages with Attachments
- A. The Need for SOAP Attachments
- B. Attachments vs. Encoding
- C. What is MIME?
- D. MIME Header Fields
- E. Multipart/Related Content Type
- F. SOAP Message Package
- G. Referencing Attachments
- H. Related Java APIs
- I. JAX-RPC Mappings: MIME to Java
- J. javax.activation.DataHandler
- K. WSDL MIME Binding
- L. WebSphere Support

XVII. Appendix: XML Basics
- A. The History of XML
- B. XML Documents: Markup and Data
- C. XML Document Components and Structure
- D. XML Tags
- E. Well-Formed XML
- F. Elements and Attributes
- G. Names and Name Tokens
- H. Namespaces
- I. Entities and Escape Sequences
- J. CDATA Sections and Comments

XVIII. Appendix: Namespaces
- A. The Need for Namespaces
- B. Declaring Namespaces
- C. Qualified Names
- D. Namespace Scoping
- E. Default Namespaces

XIX. Appendix: Validating XML With XML Schemas
- A. XML Schema Structure
- B. Element Declarations
- C. Built-in Data Types
- D. Creating and Extending Types
- E. Defining Restrictions
- F. List Types and Union Types
- G. Anonymous Types
- H. Complex Types
- I. Occurrence Constraints
- J. Defining Attributes and Attribute Groups
- K. Global Elements & Attributes
- L. Declaring Mixed Content