Java EE, Part 7 of 8: JAX-WS Web Services

Meet the expert: Ali Hamad has a Bachelor and Masters degree in Computer Science and has been training many aspects of Java for over 14 years, covering Introduction through JDBC, JBoss and beyond. His training and consulting background also covers C, C , Object Oriented Analysis and Design (OOAD), and Unix/Linux. Ali has worked for or been a consultant and trainer for many companies including Dell, Texas Instruments, State of New Hampshire, Web Age Solutions, and many more. He is the author of training material for several programming topics such as Java, Struts, C , Unix and J2EE applications.

Prerequisites: This course is intended for Java programmers with beginner level knowledge of Java EE and XML.

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Course description: Java is a very important part of Internet usage or services, thus being able to deal with web services in Java is also very important. This course will cover many of the necessary aspects of dealing with the Java API for XML (JAX) Web Services. The course will start with basic introductions to the Eclipse programming platform and Web Services and then move on to Basic XML Schemas and Schema Content Management. From there, Java API for XML Binding (JAXB) will be covered and JAX-WS will be introduced. Once the basic foundation is covered the course moves into the start of web services with Declarative Service Configuration, Web Service Description Language (WSDL) and Configuration Management, as well as introducing JAX-WS 2.0.

Course outline:

Using Eclipse Part 1
- Introduction
- The Eclipse Platform
- Demo: Installing JDK
- Demo: Environment Variables
- Demo: Testing
- Summary

Using Eclipse Part 2
- Introduction
- Views, Perspective and Editor Areas
- Basic Operations With Views
- The Java Perspective
- The Debug Perspective
- WTP
- Tomcat Servlet & JSP Web Container
- The JBoss Application Server
- Demo: Setting Up Environment
- Summary

Intro To Web Services
- Introduction
- A Conceptual Look at Services
- Defining Services
- Server Communication Analogy
- Three Key Service Questions
- Connecting The Dots
- SOA: Runtime Implementation
- What is a Web Service?
- Enterprise Assets as Services
- Typical Development Workflow
- Advantages of Web Services
- Web Service Business Models
- Example: Internal System Integration
- Example: Business Process Externalization
- Demo: Web Service
- Summary

Web Service Standards
- Introduction
- Binding via SOAP
- SOAP in Protocol Stack
- SOAP Structure
- SOAP Message Architecture
- Applying SOAP
- Interface with WSDL
- WSDL Structure
- Applying WSDL
- Locating a Service
- UDDI Overview
- Applying UDDI
- WS-I Overview
- WS-I Deliverables
- Demo: More Web Service
- Summary

Basic XML Schemas
- Introduction
- What is XML Schema?
- Goals of Schema
- Converting DTDs to Schema
- Recall: Namespaces
- The equivalent schema
- Sample instance document
- Documents Needed
- XML Schema Namespaces
- Link Documents to Schemas
- Inline element declarations
- XSchema Data Types
- XSchema Type Defintions
- XSchema Simple Data Types
- Primitive Data Types
- Simple Types
- Demo: XML Schema File
- Summary

Common Facets
- Introduction
- Element Content Restrictions
- Using the Facet
- More Samples
- Define Simple Element Type
- Element Declaration
- Element Occurrence Indicators
- Complex Type
- Attribute Declarations
- Occurrence of Attributes
- Attribute Value Constraints
- Sequence Element
- Element Choices
- Express any Order
- Annotations
- Demo: Common Facets
- Summary

Schema Config Management
- Introduction
- Evolving Schema
- Managing XML Schema
- Management Techniques
- Internal Techniques
- Schema Attribute Version
- Adding an Attribute
- Namespace Change
- File-Based Mechanisms
- External
- Which To Use?
- Summary

JAXBOverview
- Introduction
- Overview of JAXB
- Advantages of JAXB
- XML Parsing APIs
- Validation using Schemas
- Java Binding
- Using JAXB
- Binding XML To a Schema
- Binding Compiler
- Interfaces and Classes
- Implementing Classes
- Compiling the files

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Java EE, Part 7 of 8: JAX-WS Web Services

- Use the generated files
- Unmarshal
- To Unmarshal
- Retrieving data
- Validation
- Demo: JAXB APIs
- Summary

XML and JAXB
- Introduction
- ObjectFactory
- Generating XML from JAXB
- Step 1: Binding the schema
- Step 2: Create the content tree
- Step 3: Marshall the content tree
- Marshall the content tree
- Validation
- Customizing your application
- Advantages
- Demo: Bind to read XML
- Summary

Introduction to JAX-WS
- Introduction
- JAX Attack
- JAX-WS Origins
- JAX-WS Architecture and Tools
- Providing a Service
- Service Source (Option 1)
- Service-enabling Java
- Service Source (Option 2)
- Calling a Service
- Client Source (Option 1)
- Client Source (Option 2)
- Advanced Features
- Demo: JAX-WS
- Summary

Declarative Service Config
- Introduction
- Configure Eclipse: Annotations
- Start-from-Java
- JSR-181 Annotations
- Core Annotations
- Hello World Example
- WebService Annotation Params
- @OneWay Annotation
- WebParam Annotation Params
- WebResult Annotation Params
- More Annotations
- HandlerChain Annotation Params
- SoapBinding Annotation Params
- Advanced Hello World Example
- WSDL Generated
- Demo: Declarative Service Conf
- Summary

WSDL Overview
- Introduction
- WSDL Overview
- WSDL Document Tags
- WSDL Namespaces
- <definitions>
- <import>
- <types>
- <message>
- <portType>
- <operation>
- One-way <operation>
- Request-Response <operation>
- Solicit-Response <operation>
- Notification <operation>
- Modeling Simple Operation
- Demo: WSDL
- Summary

Modeling Operations
- Introduction
- Modeling Complex Operations
- <binding>
- More on <binding>
- <binding> Syntax
- <service> and <port>
- More on <port>
- WSDL SOAP Binding Extensions
- soap:binding
- soap:operation
- RPC or Document Style
- WSDL API for Java
- Demo: WSDL
- Summary

Maybe Its Modeling Operations
- Introduction
- Demo: WSDL continued
- Demo: Schema Editor
- Demo: Editing Types
- Demo: Relating Elements & Type
- Summary

Configuration Management
- Introduction
- SOA Configuration Challenges
- Service Versioning
- XML Schema Versioning
- XML Schema Versioning Guidlines
- WSDL Versioning
- Standards Work
- Vendor Support
- Configuration Management Tips
- Configuration Managment Gotchas
- Summary

Details
- Introduction
- JAX-WS
- JAX-WS Scope
- JAX-WS and JAXB
- JAX-WS Implementors
- WSDL-to-Java Mapping
- WSDL Files
- <defintions>
- <portType>
- <types>
- <operation>
- <operation> parameters
- <fault>
- Customization Binding
- JAVA-to-WSDL Mapping
- The Implementation Class
- Package Name
- Class Name
- Methods and Types
- JAXB Usage
- Exceptions
- Demo: Top-Down Web Service
- Summary

Available JAX APIs
- Introduction
- Available API
- Client API - Service
- Service
- Using Service
- Dispatch
- Provider
- WebServiceContext
- Exception Classes
- WebServiceFeature
- Annotation Support
- JAX-WS Annotations
- The Handler Framework
- Handler Invocation
- Handler Types
- Using Handlers
- Demo: Available JAX APIs
- Summary