

Developing Web Services with JBuilder (5 Days)

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Developing Web Services with JBuilder (CTI 188)

Students will learn how to develop Web Services with JBuilder and use standards such as SOAP, WSDL and JAX-RPC. This course covers the basics of XML and includes all the features and techniques needed to program Web Services.

Prerequisites: Familiarity with the Java language, JavaBeans, and web application architecture and concepts. Experience with JBuilder helpful. Successful completion of course CTI 173, "Enterprise Java Programming Using JBuilder," satisfies these requirements.

Minimum software requirements: Microsoft Windows NT 4.0 or Windows 2000 or later. JBuilder. Java-compatible browser. J2SE 1.4.1 SDK and J2EE 1.4 SDK.

Minimum hardware requirements: Pentium at 500 mHz; minimum of 256 Mb RAM; 500 Mb free disk space; Internet connection.

Microsoft PowerPoint on instructor's workstation for presentation purposes.

Module 1: The Web Services Architecture

- Evolution of Web Services
- Motivation for Web Services
- HTTP and XML
- Interoperability Stacks
- The Wire Stack
- Simple Object Access Protocol (SOAP)
- The Description Stack
- Web Service Description Language (WSDL)
- The Discovery Stack
- Universal Description, Discovery and Integration (UDDI)
- Hosting Web Services: Scenarios
- Observing SOAP Traffic

Module 2: JBuilder and Web Services

- The JBuilder Platform
- Web Services Features and Support
- JBuilder -Speak for Web Services
- The JBuilder IDE
- Limitations of JBuilder
- The JBuilder Server
- Creating a Domain
- Ant Tasks for Web Services
- Development Process

Module 3: Java and Web Services

- Java and Web Services
- Web Services and the J2EE
- JBuilder Support for Standard APIs
- The Java API for XML Processing (JAXP)
- The Java API for XML Binding (JAXB)
- The SOAP with Attachments API for Java (SAAJ)
- The Java API for XML Messaging (JAXM)
- Low-Level Web Services in WebLogic (SAAJ)
- The Java API for XML-Based RPC (JAX-RPC)
- High-Level Web Services in WebLogic (JAX-RPC)
- WSDL-to-Java vs. Java-to-WSDL
- The Java API for XML Registries (JAXR)
- JBuilder UDDI

Module 4: The Simple Object Access Protocol (SOAP)

- SOAP Messaging Model
- SOAP Namespaces
- SOAP over HTTP
- The SOAP Envelope
- The Message Header
- The Message Body
- SOAP Faults
- Attachments
- XML Schema
- Validating Message Content
- The SOAP "Section 5" Encoding Arrays
- Avoiding Redundant Serialization

Module 5: The Java APIs for SOAP Messaging (SAAJ)

- The SAAJ Object Model
- Parsing a SOAP Message
- Reading Message Content
- Bridges to JAXP
- Working with Namespaces
- Creating a Message
- Setting Message Content
- JBuilder SAAJ: Bugs and Limitations

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Module 6: SAAJ Web Services

- JAXM vs. JBuilder JMS
- Messaging Scenarios
- Point-to-Point Messaging
- SAAJ Services Using JAX-RPC
- Creating a JAXM Connection
- Sending a Message

Module 7: Web Services Description Language (WSDL)

- Web Services as Component-Based Software
- The Need for an IDL
- Web Services Description Language
- WSDL Description Model
- The Abstract Model – Service Semantics
- Message Description
- Messaging Styles
- The Concrete Model – Ports, Services, Locations
- Extending WSDL – Bindings
- SOAP Style and Use Attributes
- Service Description

Module 8: The Java API for XML-Based RPC (JAX-RPC)

- The Java Web Services Architecture
- Two Paths
- How It Works - Build Time and Runtime
- Mapping Between WSDL/XML and Java
- Generating from WSDL
- What Gets Generated
- What the Application Sees
- Generating from Java
- Which Way to Go?
- Passing Objects
- Another CORBA?

Module 9: Generating Web Services from Java Code

- The Java-to-XML Mapping
- Primitive Types and Standard Classes
- Value Types and JavaBeans
- The Java-to-WSDL Mapping
- Service Endpoint Interface
- Scope of Code Generation
- Inheritance Support
- JBuilder JAX-RPC: Bugs and Limitations
- Multi-Tier Application Design
- Analyzing the Domain
- High-Level Ant Tasks
- web-services.xml
- When Things Don't Fit
- Polymorphism
- Extensible Type Mapping

Module 10: Generating Java Web Services from WSDL

- The XML-to-Java Mapping
- Simple and Complex Types
- Enumerations
- Arrays
- JBuilder Extended Mappings
- The WSDL-to-Java Mapping
- Mapping Operation Inputs and Outputs
- Building a Service Client
- Locating a Service
- Client-Side Validation
- Interoperability Under Java-to-WSDL
- Creating a Web Service
- Mid-Level Ant Tasks
- XML and WSDL Design Guidelines
- Deploying the Service
- Interoperability Under WSDL-to-Java
- Controlling Names and URIs

Module 11: Web Services and EJB

- Enterprise JavaBeans
- Three Tiers for J2EE
- EJB 2.1 and JAX-RPC
- Session Beans as Web Service Endpoints
- How It Works – Build Time and Runtime
- The Bean's Service Endpoint Interface
- SOAP as an RMI Transport
- Adding a SOAP Interface to a Session Bean
- Generating From WSDL
- "Gotchas"

Module 12: Message Context and Message Handlers

- Handling SOAP Headers
- Servlet Endpoint Context
- EJB Endpoint Context
- Using SAAJ
- JAX-RPC Message Handlers
- Handler Chains
- Processing Model and Patterns
- The <handlerChain> Ant Task

Module 13: SOAP Attachments

- JBuilder Support for Attachments
- SAAJ Object Model, Revisited
- The SOAPMessage Class
- MIME
- The Java Activation Framework
- The MimeHeaders Class
- The AttachmentPart Class
- Adding SOAP Attachments
- Identifying Attachments
- Reading Attachments

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Module 14: Web Services and JMS

- Asynchronous Messaging
- The Java Message Service
- Queues and Topics
- Message Types
- Message-Driven Beans
- Asynchronous Web Services
- Message Queues as Web Services
- Ant Tasks and JMS Services

Module 15: Security

- Web Services and Security
- Threats
- Technology and Techniques
- Public Key Encryption
- Digital Signature
- J2EE Techniques
- Securing Web-Service URIs
- HTTPS
- XML and SOAP Solutions
- XML Encryption and Signature
- WS-Security
- SAML
- XACML
- JBuilder Support for WS-Security
- Securing a Service's Messages
- Key Pairs and Keystores
- Enhancing the Client