Developing RESTful Services in Java

Course Summary

Description

This course shows experienced Java programmers how to build RESTful web services using the Java API for RESTful Web Services, or JAX-RS. We begin with an overview of web services development in the Java EE platform, including SOAP, WSDL, REST; JAX-WS, JAXB, and JAX-RS. Then students learn to work with JAXB to bind Java object models to XML Schema. The bulk of the course is devoted to study of JAX-RS: students work with the Jersey implementation of JAX-RS to create RESTful services from simple single-value interactions to more sophisticated services that manage CRUD (create/retrieve/update/delete) operations on more complex data types, using JAXB to marshal and unmarshal data over the wire.

Objectives

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

- Understand the advantages of the REST architecture for web services.
- Use JAX-RS to develop simple RESTful services.
- Control dispatching to service methods based on URL patterns and HTTP methods.
- Bind request values to method parameters when expressed as HTTP query parameters, form values, headers, cookies, and more.
- Manage XML content using XML Schema and JAXB.
- Incorporate XML entities into service input and output.
- Take advantage of lifecycle and context services available to JAX-RS services as Java EE components.

Topics

- Overview of Web Services
- Web Services for Java EE
- The Java API for XML Binding
- The Java API for RESTful Services
- Dispatching Requests to Methods
- Parameter and Return Types
- Entities and Complex Content
- Context and Lifecycle
- Course Tools and Utilities
- Handy Guide to Web-Services Acronyms

Prerequisites

- Strong Java programming skills are essential
- Students must be able to read XML documents and to write well-formed XML by hand
- Knowledge of XML Schema will be helpful, too, but is not a strict prerequisite
- Experience with other Java EE standards, especially servlets and JSP, will be very helpful in class, but is not strictly required.

Duration

Three days

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Course Outline

I. Overview of Web Services
- A. Why Web Services?
- B. Service-Oriented Architecture
- C. HTTP and XML
- D. SOAP
- E. WSDL
- F. The SOAP Vision
- G. The REST Vision
- H. UDDI
- I. The WS-I Basic Profile
- J. Security

II. Web Services for Java EE
- A. Hosting Web Services: Scenarios
- B. Web Services for Java EE
- C. JAX-WS and JAXB
- D. Web-Services Metadata
- E. WSDL-to-Java and Java-to-WSDL Paths
- F. Provider and Dispatch APIs
- G. SAAJ and JAXP
- H. JAX-RS for RESTful Services
- I. JAXR

III. The Java API for XML Binding
- A. The Need for Data Binding
- B. XML Schema
- C. Two Paths
- D. JAXB Compilation
- E. Mapping Schema Types to Java
- F. Java-to-XML Mapping Using Annotations
- G. Marshaling and Unmarshaling
- H. Working with JAXB Object Models

IV. The Java API for RESTful Services
- A. Applications
- B. Resources
- C. Sub-Resources
- D. Providers
- E. Scanning and @ApplicationPath

V. Dispatching Requests to Methods
- A. The Application Path
- B. The @Path Annotation
- C. The HTTP Method Annotations
- D. Sub-Resource Locators
- E. Annotation Inheritance and overriding

VI. Parameter and Return Types
- A. Simple Parameter Types
- B. @Consumes and @Produces Annotations
- C. @XXXParam Annotations
- D. The @DefaultValue Annotation
- E. Return Types
- F. Binary Content
- G. Delivering a File

VII. Entities and Complex Content
- A. Entity Providers
- B. Built-In Entity Providers
- C. Working with XML
- D. Driving XML Representations from Schema

VIII. Context and Lifecycle
- A. Reading Web Resources
- B. Finding Java EE Components
- C. Finding Databases
- D. Security Contexts

IX. Appendix A. Course Tools and Utilities

X. Appendix B. Handy Guide to Web-Services Acronyms

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