

22.03.05

Building and configuring Web 2.0 applications using JSP and Ajax Using Tomcat 6

Duration: 3 days

Building Web 2.0 Applications using Java Servlets, JSP and Ajax provides all the information required to build state-of-the-art Web 2.0 applications using Java EE technologies such as Servlets and JSP. Java Servlets allow flexible handling of user requests without the limitations of CGI-based applications or those created in a web server-specific manner. The JavaServer Pages technology allows one to create sophisticated dynamic web content while harnessing the power of Java and Java Servlets. Ajax will allow your web sites to be even more dynamic and responsive to user request.

Who can benefit?

Designed for developers who wish to create state-of-the-art Web 2.0 applications using Java EE technologies.

Attending students should be able to use the syntax of the Java language without difficulty. Familiarity with the behavior of accessing web content from the perspective of the end user is also helpful.

Detailed description

Java Servlets and JavaServer Pages are essential server-side Java technologies for building web applications. Servlets are programs that run on a web server; they can respond to client requests. JavaServer Pages are useful for dividing work between Java developers and HTML designers. Ajax allows a web page to be very dynamic and responsive to the user's actions. This course is a comprehensive tutorial in the design and programming of servlets and JSPs. Students will learn about:

- Building scalable web applications
- Servlets and JSP technologies
- Custom tag development
- Web application design and architecture (using Model 2)
- Various Web Application techniques
- Web Security
- Ajax (from scratch)
- Introduction to Ajax toolkits and frameworks (e.g, Dojo)
- Explore DWR

A correct architecture and design is paramount. That's why we explain all technologies within the Model 2 architecture (de de-facto standard, which is also followed by frameworks like Struts, JSF and Spring MVC). So we will not explain Servlets and JSP as a list of technologies as they were specified chronically, but always within its architectural context. You will learn all technologies.

Workshop overview

This is an overview of the course. For a detailed description with objectives per topic, we refer to the detailed workshop overview, listed further below in this document.

Introduction to Java EE Web applications

Introduction
Introduction to Servlets and JSP

Java EE Web Applications

Configuration (Databases, EJB and configuration data)
Session Management
Security
Programming Java EE Filters
Introduction to Custom Tags

Introduction to AJAX

Introduction to Ajax
Using XML (Ajax) and JSON (Ajaj)
Ajax Technologies and Frameworks

Detailed overview

Introduction to Java EE Web applications_(rev:2524)

Introduction

- Understand the concept of dynamic web applications
- List the Web technologies in Java EE 5
- Understand for each their purpose and architectural position
- Get an overview of the deployable unit of a web application
- Explain the principles of Servlet and JSP
- Introduce JSF

Introduction to Servlets and JSP

- Introduce the Model 2 architecture (MVC for the web)
- Understand the architectural relation between Servlets and JSP
- Understand the responsibilities and typical implementation technology of each element in the Model 2 architecture
- Understand how to write a Servlet to process a form
- Understand how to configure a Servlet in the *web.xml* deployment descriptor
- Understand the basic Servlet API
- Understand how to write a JSP
- Understand the different techniques available in JSP
- Introduce attributes, their scope and their role in the Model 2 architecture
- Introduce the use and syntax of Unified Expression Language
- Introduce JSP standard actions
- Introduce JSTL
- Mention and discuss language based scripting



Java EE Web Applications_(rev:2524)

Configuration (Databases, EJB and configuration data)

- Adding `ServletContext` parameters
- Data access in Web Applications
- Accessing resources (e.g., `Datasources`) using Dependency injection (DI)
- Discuss shortcomings of DI
- Explain the process of a JNDI lookup
- Use the DAO (Data Access Object) pattern
- How to locate EJB.

Session Management

- Client side session management using cookies
- Understand HTTP cookies
- Understand under which criteria cookies are accepted
- Server side session management using `HttpSession` object
- Understand the architectural impact when using server side state management (fail-over, server affinity, session replication etc)
- Understand the two web-application life-cycle listeners
- Understand the three session life-cycle listeners
- Understand when to use an `HttpSessionBindingListener`

Security

- Understand the security tasks and how they are addressed in Java EE
- Understand how to establish proof of identity in web applications
- Understand how to restrict access to parts of the web application
- Understand how to establish data integrity and privacy
- Explain the configuration of security and the power of indirection
- Understand Users, Groups & Roles
- Understand role based security
- Understand principal mapping strategies

Programming Java EE Filters

- Understand the concept of filtering and chaining of filters.
- List the three methods of the `javax.servlet.Filter` Interface and explain their purpose
- Configuring a Filter in the deployment descriptor
- Understand the rationale behind the *interceptor pattern*
- Understand the use of the *Wrapper* pattern in Filters
- Understand how to use the `HttpServletRequestWrapper` and the `HttpServletResponseWrapper`

Introduction to Custom Tags

- Understand the proposed architectural role of Custom Tags
- List the components that make up a Custom Tag
- Understand the rationale behind the `<file>TLD</file>` file
- Understand how to make a deployable unit of your Tag Library
- Understand how to deploy a Tag Library in your web applications
- Understand the possible need for further validation of tag usage using *TEI* and *Validators*
- How to declare and enable attributes to your tag
- How to declare *scripting variables*

Introduction to AJAX_(rev:)

Introduction to Ajax

- Introduce Ajax and its principles
- Understand the technologies involved
- Understand the architecture of Ajax
- Make a first Ajax enabled web page
- Introduce the W3C XMLHttpRequest (XHR)
- Understand the XHR API and lifecycle
- Discuss security restrictions on Ajax

Using XML (Ajax) and JSON (Ajaj)

- Use XML requests and response
- Introduce W3C DOM
- Understand the DOM Levels and browser support
- Use DOM to create and parse XML documents
- Understand and address browser differences in using DOM
- Understand how to use Web Services and REST in conjunction with Ajax
- Introduce JSON
- Ajaj: Receive and use JSON

Ajax Technologies and Frameworks

- Ajax Toolkits (Dojo)
- Direct Web Remoting (DWR)
- Understand the DWR architecture
- Understand the workings of DWR
- Configure a Web Application and DWR
- Understand how to use DWR
- Use Java objects as argument and return types
- Advanced DWR configuration

Hands-on lab exercises

Exercise 1 - Writing a Servlet and a JSP applying Model2

The objective of this exercise is to develop JSP and Servlet using the Model2 architecture, EL and JSTL.

Exercise 2 - Database access

Configure the server (connection pool) and obtain a database connection in a Java EE environment using Dependency injection for the `DataSource`

Exercise 3 - Build a stateful online shop

Understand how to use HTTP Sessions and Web Application events.

Exercise 4 - Build a secure web application

Understand how to secure a web application for different roles and understand how user administration might be implemented

Exercise 5 - Add SSL to the Web Application (optional)

Understand how to enable data integrity, privacy and proof of server identity

Exercise 6 - Track visitor behavior using Filters

Understand how to program and use Java EE Filters



Exercise 7 - Creating a custom tag

Familiarize yourself with writing TLD files and using the `SimpleTagSupport` class

Exercise 8 - Creating Custom tags and tag files

Understand how to implement tag handlers in Java and JSP tag files

Exercise 9 - Create AJAX Suggestion box

Understand how to build a AJAX solution from scratch

Exercise 10 - Use DWR

Explore DWR

