

This is a 4-day course that covers the emerging Ajax technology, with a focus on developing Ajax applications using Java on the server side. The course starts with a fairly comprehensive coverage of basic JavaScript. The coverage includes some of the techniques for creating modules and doing Object-Oriented style programming in JavaScript, because Ajax uses JavaScript so heavily, and it's important that developers have some idea of how to write good JavaScript. This is not a thorough coverage of JavaScript - that is beyond the scope of the course. Students have enough so that they can write Ajax programs using JavaScript, and have some good foundations for doing it well. The course moves on to basic server side techniques for handling Ajax requests. Starting with a simple servlet, and then moving on to a Servlet/JSP combination. Then we go back to the client side to cover some of the major libraries that are in use today. Several libraries are represented, but your favorite may not be there due to time constraints. Detailed coverage of Dojo is not included because it's only just recently stabilized. The course then moves on to more advanced techniques using JSON, XML, Direct Web Remoting, and JSF to create Ajax based Web applications. This takes the student to the next level in writing Ajax applications. Finally some general design and security issues are covered.

Audience: Web developers using Ajax (about 2/3 of the course does not require Java knowledge) and Java developers who need to work with Ajax-based Web applications.

Prerequisites: Basic knowledge of HTML and JavaScript and practical Java and Servlet/JSP programming experience.

Number of Days: 4 days

- 1. Ajax Overview**
 - What are Rich Internet Applications?
 - RIA Technologies
 - Ajax Introduction
 - What is Ajax?
 - The Ajax Difference
 - Ajax, JavaScript, DHTML and More
 - XMLHttpRequest
 - What This Course Will Focus On
- 2. JavaScript Basics**
 - Java Script Introduction
 - What is JavaScript
 - Exploring JavaScript
 - JavaScript Variables
 - JavaScript – Writing to the Web Page
 - JavaScript PopUp Boxes
 - JavaScript Functions
 - External JavaScript Files
 - Functions as Data
 - Standard JavaScript Functions
- 3. XMLHttpRequest**
 - XMLHttpRequest Basics
 - More about XMLHttpRequest
 - Creating an XMLHttpRequest Object
 - Submitting a Request
 - XMLHttpRequest Properties
 - Asynchronous Requests
 - Handling an Asynchronous Response
 - The ReadyState Property
 - onreadystatechange Event Handler
 - XMLHttpRequest Methods
- 4. Servlets and JSP with Ajax**
 - Overview of Servlets
 - Java EE and Web Applications
 - Simple Web-centric Architecture

- Java EE Web Applications
- Web Application Structure
- Using Servlets
- A Simple HTTP Servlet
- How a Servlet Works
- The Web Archive (war) File
- Deploying Web Applications
- Servlets and Ajax
- Accessing the Servlet Using Ajax
- A Servlet Handling a Post Request
- Overview of JavaServer Pages (JSP)
- What is a JSP?
- A Very Simple JSP – simple.jsp
- JSPs Look like HTML
- JSP Expressions
- JSPs are Really Servlets
- Lifecycle of a JSP
- Object Buckets or Scopes
- Predefined JSP Variables – Implicit Objects
- Working with <jsp:useBean>
- More <jsp:useBean>
- How a Servlet Works With a JSP
- Issues with JSP
- Custom Tags
- Custom Tags and Tag Libraries
- The JSTL

- 5. More JavaScript and Ajax**
- Browser Events
- Event Based programming
- Event Handlers
- Defined Browser Events
- Defined Events
- Form Validation
- onload and onunload Events
- Using Ajax and Events
 - Ajax and Events
 - JavaScript Objects and Arrays
 - Creating JavaScript Objects
 - Working with Objects and Functions
 - Working with Object Properties
 - Arrays in JavaScript
 - Working with Arrays

- Array Methods
- Objects as Arrays
- Classes in JavaScript
- JavaScript Constructors
- The New Operator
- More on Constructors
- The Object Class
- The prototype Property
- Properties of the Prototype
- A More Complete Class
- Modules and Namespaces
- Utility Modules

- 6. Client Side Frameworks**
- Framework Overview
- No Need to Reinvent the Wheel
- Capabilities of Client Side JavaScript Libraries
 - General Library Capabilities
 - Some Client Side JavaScript Libraries
- Prototype Overview
- About Prototype
- Utility methods and DOM Extensions
- Utility methods of Element Class
- The \$() Utility Function
- Using \$ and the DOM Extensions
- Prototype Ajax Support
- Ajax.Request
- Ajax.Request – Additional Options
- Ajax.Updater
- Other Prototype Capabilities
- Much More Capability
- SCRIPT.ACULO.US Overview
- Using script.aculo.us
- The Scriptaculous Autocompleter
- Other Frameworks and Libraries
- Some Well Known Frameworks
- Dojo Functionality
- dojo.xhr* Functions
- Using dojo.xhrGet()
- Dojo.xhrGet Error Handling
- Some Issues with Dojo
- Yahoo User Interface Toolkit (YUI)
- The YUI Dom Class
- A Simple Application with YUI
- YUI and Ajax
- TabView and TreeView

- Rich Text Editor and Calendar Control
- Other YUI Capabilities
- The Google Ajax Search API
- Google Search API Code
- Google Search Page Display
- Much More Capability
- Google Maps API
- Maps API Display
- Additional Google Maps API Capability
- 7. Cascading Style Sheets**
- Issues with Formatting in HTML
- Cascading Style Sheets (CSS)
- Declaring Style Information
- Style Sheets
- Using Style Sheets
- Resulting Display
- The Class Selector
- Descendant Selectors
- ID Selectors
- Display and Visibility Style Properties
- Other Style Properties
- Scripting Styles
- Scripting Classes
- The 'Cascading' in CSS
- 8. JSON (JavaScript Object Notation)**
- What is JSON
- Review of JavaScript Literals
- Arrays and More Complex Objects
- JSON Details
- Creating JSON Strings in JavaScript
- Parsing JSON Strings in JavaScript
- Parsing Strings with JSON.parse()
- JSON on the Server
- Creating JSON Text on the Server
- JSONObject and JSONArray
- Creating JSON Text from POJOs
- Creating JSON Text from Collections
- Dealing with Dates
- Custom Date Serialization
- JSONSerializer
- JSONStringer
- Other JSON-LIB Capabilities
- An Input Field Generating Ajax Requests
- Producing JSON in a Servlet
- JavaScript Code Constructing Suggestions
- Accessing the JSON Data We Want
- JavaScript Code Constructing the Suggestions
- Autocomplete at Work
- Other JSON Tools
- The JSON Universe
- 9. XML and AJAX**
- XML Overview
- What is XML?
- The Underlying Theme of XML
- JavaTunes Purchase order Document – Body
- The Document Body and Elements
- Attributes
- Working with XML
- Working with XML and Ajax
- Accessing XML with Ajax
- Working with XML Documents
- JavaTunes Purchase Order Document
- JavaTunes Order as a DOM Tree
- More about the W3C DOM
- Traversing a Document with JavaScript
- Getting Node Information
- Finding Nodes in a Document
- White Space Handling and Other Issues
- Creating XML Documents on the Server
- Producing XML with a Servlet and JSP
- The JSP Generating the XML
- An Input Field Generating Ajax Requests
- XML Document from Servlet/JSP
- JavaScript Code Constructing the Suggestions
- Accessing the XML Nodes We Want
- Using the Suggestions
- Autocomplete at Work
- XML Versus JSON
- XML and JSON for Data Interchange
- 10. DWR (Direct Web Remoting) and Other Technologies**
- What is DWR?
- How DWR Works
- Getting Started with DWR
- web.xml Configuration for DWR

dwr.xml Configuration File
Running the Test Pages - <webapp>/dwr
Working with DWR
Including the DWR JavaScript Code
Using the DWR Proxies
Functions with Java Object Arguments
DWR Options
Reverse AJAX
Other Technologies
JSON-RPC
Using JSON-RPC-Java
Google Web Toolkit (GWT)
GWT Architecture
Hello World with GWT
The Generated Application
More about GWT
Pros/Cons of GWT

11. AJAX and JSF
JSF Overview
JSF Purpose and Goals
JSF API
JSF as MVC
JSF Views – Facelets
Facelets Defined
JavaBean Defined
Managed Beans as JSF Model
JSF Controller Components
Managed Beans – Part of JSF Controller
faces-config.xml Details
FACES-CONFIG.XML Structure
Your First JSF Application
Configuring FacesServlet in web.xml
JSF Controller
JSF HelloWorld – Facelet
JSF HelloWorld –Viewing the Facelet
faces-config.xml
Review of Managed Beans
Managed Beans Lifecycle
Declaring a Managed Bean
Examining the Logon Form
Linking Input Fields to Bean Properties
Submitting the Form
Method Binding Expressions
Dynamic Navigation Rule
Creating / Deploying a JSF Application
AJAX and JSF

F:AJAX Details

12. Design and Best Practices
JavaScript Best Practices
JavaScript is a Key Ajax Technology
Object-Oriented Modular JavaScript
Dealing with Browsers
Separate Content, Behavior, &
Presentation
JavaScript Tips and Techniques
Don't Reinvent the Wheel
Ajax Design
Ajax is Still Evolving and Maturing
Basic Ajax Design Principles and
Patterns
Basic Ajax Design Patterns
Use Ajax Where Appropriate
Network Usage Considerations
Ajax and the Back Button – The
Problem
Ajax and the Back Button – Solutions
User Interface Design Considerations
Other Ajax Design Considerations
Ajax Security Ideas
General Security Issues for Ajax
Basic Security Guidelines
Scripting Vulnerabilities – Malicious
Code
The Dangers of Code Injection
XSS – Same Origin Policy
Same Origin Policy – The Good and the
Bad
Preventing Malicious Content
JSON Issues
Security Summary
Resources