

Introducing JavaServer Pages Lecture 7

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Agenda

- What is JSP
- Why we need JSP
- How JSP works
- Benefits of JSP
- Setting up your environment for JSP
- A simple example

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What is JSP

- **Java Server Pages**
 - An answer to Microsoft's Active Server Pages (ASP)
 - Allows Java code to be invoked from HTML pages
 - Thus providing *dynamic* web page content
- **JSPs are compiled to become servlets**
 - A page compiler is run on the `.jsp` file contents
 - The generated servlet source code is at:
 - Tomcat 4.x: in the `work` subdirectory
- **JSPs are not a replacement for servlets**
 - Too much logic in a JSP is a bad practice
 - Becomes a maintenance headache
 - Defeats the simplicity that JSPs were meant to bring

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The Need for JSP

- **With servlets, it is easy to**
 - Read form data
 - Read HTTP request headers
 - Set HTTP status codes and response headers
 - Use cookies and session tracking
 - Share data among servlets
 - Remember data between requests
 - Get fun, high-paying jobs (1990's)
- **But, it sure is a pain to**
 - Use those `println` statements to generate HTML
 - Maintain that HTML

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The JSP Framework

- **Idea:**
 - Use regular HTML for most of page
 - Mark servlet code with special tags
 - Entire JSP page gets translated into a servlet (once), and servlet is what actually gets invoked (for each request)
- **Example:**
 - JSP
 - Thanks for ordering
 - `<I><%= request.getParameter("title") %></I>`
 - URL
 - `http://host/OrderConfirmation.jsp?title=Core+Web+Programming`
 - Result
 - Thanks for ordering *Core Web Programming*

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Benefits of JSP

- **Although JSP technically can't do anything servlets can't do, JSP makes it easier to:**
 - Write HTML
 - Read and maintain the HTML
- **JSP makes it possible to:**
 - Use standard HTML tools such as HomeSite or DreamWeaver
 - Have different members of your team do the HTML layout than do the Java programming
- **JSP encourages you to**
 - Separate the (Java) code that creates the content from the (HTML) code that presents it

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Advantages of JSP Over Competing Technologies

- **Versus ASP or ColdFusion**
 - Better language for dynamic part
 - Portable to multiple servers and operating systems
- **Versus PHP**
 - Better language for dynamic part
 - Better tool support
- **Versus pure servlets**
 - More convenient to create HTML
 - Can use standard tools (e.g., HomeSite)
 - Divide and conquer
 - JSP programmers still need to know servlet programming

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Advantages of JSP (Continued)

- **Versus Velocity or WebMacro**
 - Standard
- **Versus client-side JavaScript (in browser)**
 - Capabilities mostly do not overlap with JSP, but
 - You control server, not client
 - Richer language
- **Versus server-side JavaScript (eg, LiveWire, BroadVision, JRun)**
 - Richer language
- **Versus static HTML**
 - Dynamic features
 - Adding dynamic features no longer "all or nothing" decision

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Setting Up Your Environment

- **Set your CLASSPATH. Not.**
- **Compile your code. Not.**
- **Use packages to avoid name conflicts. Not.**
- **Put JSP page in special directory. Not.**
 - *install_dir*\webapps\ROOT\ (HTML and JSP -- Tomcat)
 - *install_dir*\servers\default\default-app (JRun)
 - Some servers reserve certain parts of Web hierarchy for JSP pages. Tomcat 3 and JRun (standalone) don't.
- **Use special URL to invoke JSP page. Not.**
- **Caveats**
 - Previous rules about CLASSPATH, install dirs, etc., still apply to regular Java classes used by a JSP page

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Example

```
<!DOCTYPE HTML PUBLIC
    "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML>
<HEAD>
<TITLE>JSP Expressions</TITLE>
<META NAME="author" CONTENT="Marty Hall">
<META NAME="keywords"
    CONTENT="JSP, expressions, JavaServer, Pages, servlets">
<META NAME="description"
    CONTENT="A quick example of JSP expressions.">
<LINK REL=STYLESHEET
    HREF="JSP-Styles.css"
    TYPE="text/css">
</HEAD>
```

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Example (Continued)

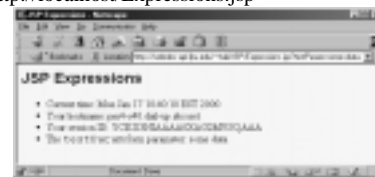
```
<BODY>
<H2>JSP Expressions</H2>
<UL>
<LI>Current time: <%= new java.util.Date() %>
<LI>Your hostname: <%= request.getRemoteHost() %>
<LI>Your session ID: <%= session.getId() %>
<LI>The <CODE>testParam</CODE> form parameter:
    <%= request.getParameter("testParam") %>
</UL>
</BODY>
</HTML>
```

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Example Result

- **If location was**
 - C:\jakarta-tomcat-4.0\webapps\ROOT\Expressions.jsp or
 - C:\Program Files\Allaire\JRun\servers\default\default-app\Expressions.jsp
- **URL would be**
 - http://localhost/Expressions.jsp



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Most Common Misunderstanding Forgetting JSP is Server-Side Technology

- **Very common question**
 - I can't do such and such with HTML.
Will JSP let me do it?
- **Why don't this question make sense?**
 - JSP runs entirely on server
 - It doesn't change content the client (browser) can handle
- **Similar questions**
 - How do I put a normal applet in a JSP page?
Answer: send an <APPLET...> tag to the client
 - How do I put an image in a JSP page?
Answer: send an tag to the client
 - How do I use JavaScript/Acrobat/Shockwave/Etc?
Answer: send the appropriate HTML tags

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2nd Most Common Misunderstanding Translation/Request Time Confusion

- **What happens at page translation time?**
 - JSP constructs get translated into servlet code.
- **What happens at request time?**
 - Servlet code gets executed. *No* interpretation of JSP occurs at request time. The original JSP page is totally ignored at request time; only the servlet that resulted from it is used.
- **When does page translation occur?**
 - Typically, the first time JSP page is accessed after it is modified. This should never happen to real user (developers should test all JSP pages they install).
 - Page translation does *not* occur for each request.

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JSP/Servlets in the Real World

- **ofoto.com: print and manage digital and conventional photos.**



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JSP/Servlets in the Real World

- **First USA Bank: largest credit card issuer in the world; most on-line banking customers**



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- **Delta Airlines: entire Web site, including real-time schedule info**



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- **wine.com: the Internet's leading wine retailer**



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- **American Century Investments:** more than 70 mutual funds, \$90 billion under management, two million investors



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- **Excite:** one of the top five Internet portals; one of the ten busiest sites on the Web



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Summary

- **JSP makes it easier to create and maintain HTML, while still providing full access to servlet code**
- **JSP pages get translated into servlets**
 - It is the servlets that run at request time
 - Client does not see anything JSP-related
- **You still need to understand servlets**
 - Understanding how JSP really works
 - Servlet code called from JSP
 - Knowing when servlets are better than JSP
 - Mixing servlets and JSP
- **Other technologies use similar approach, but aren't as portable and don't let you use Java for the "real code"**

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