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## JSP Intro and Overview

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JSP and Servlet Books from Sun Press: <http://www.coreservlets.com>

## Agenda

- Understanding the need for JSP
- Evaluating the benefits of JSP
- Comparing JSP to other technologies
- Avoiding JSP misconceptions
- Understanding the JSP lifecycle
- Installing JSP pages
- Looking at JSP in the real world

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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
- **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:**

```
<!DOCTYPE ...>
<HTML>
<HEAD>
<TITLE>Order Confirmation</TITLE>
<LINK REL=STYLESHEET
      HREF="JSP-Styles.css"
      TYPE="text/css">
</HEAD>
<BODY>
<H2>Order Confirmation</H2>
Thanks for ordering
<I><%= request.getParameter("title") %></I>
</BODY></HTML>
```

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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 Macromedia DreamWeaver or Adobe GoLive.
  - 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., DreamWeaver)
  - 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 (e.g., LiveWire, BroadVision)**
  - 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)
- **Use special URLs to invoke JSP page. Not.**
  - Use same URLs as for HTML pages (except for file extensions)
- **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="keywords"
CONTENT="JSP,expressions,JavaServer Pages">
<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)

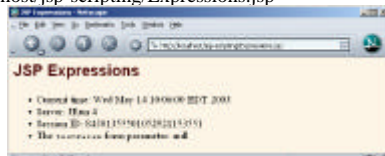
```
<BODY>
<H2>JSP Expressions</H2>
<UL>
<LI>Current time: <%= new java.util.Date() %>
<LI>Server: <%= application.getServerInfo() %>
<LI>Session ID: <%= session.getId() %>
<LI>The <CODE>testParam</CODE> form parameter:
<%= request.getParameter("testParam") %>
</UL>
</BODY></HTML>
```

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## Example: Result

- **If location was**
  - C:\jakarta-tomcat-xx\webapps\ROOT\jsp-scripting\Expressions.jsp or
  - C:\JRun4\servers\default\default-ear\default-war\jsp-scripting\Expressions.jsp
- **URL would be**
  - <http://localhost/jsp-scripting/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 doesn'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 <IMG...> 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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## The JSP Lifecycle

	Request #1	Request #2	Request #3	Request #4	Request #5	Request #6
JSP page translated into servlet	Yes	No	No	No	Yes	No
Servlet compiled	Yes	No	No	No	Yes	No
Servlet instantiated and loaded into server's memory	Yes	No	Yes	No	Yes	No
init (or equivalent) called	Yes	No	Yes	No	Yes	No
doGet (or equivalent) called	Yes	Yes	Yes	Yes	Yes	Yes

Vertical labels: Page first written (Requests 1-2), Server restarted (Requests 3-4), Page modified (Requests 5-6)

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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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## JSP/Servlets in the Real World

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



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## JSP/Servlets in the Real World

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



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## JSP/Servlets in the Real World

- **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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## Questions?

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