JSP
Intro and Overview

Originals of Slides and Source Code for Examples:
http://courses.coreservlets.com/Course-Materials/csajsp2.html

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Taught by the author of Core Servlets and JSP, More Servlets and JSP, and this tutorial. Available at public venues, or customized versions can be held on-site at your organization. Contact hall@coreservlets.com for details.
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

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
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:
  ```html
  <!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>
  ```

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 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
Higher-Level Alternative: JSF 2

• Servlets and JSP
  – Well-established standard
  – Used by google.com, ebay.com, walmart.com, and thousands of other popular sites
  – Relatively low level by today’s standards
  – Covered in this tutorial

• JSF (JavaServer Faces) Version 2
  – Now an official part of Java EE 6
    • But runs in any recent Java-enabled server, including Tomcat 6+
  – Higher-level features: integrated Ajax support, field validation, page templating, rich third-party component libraries, etc. Designed around the MVC approach.
  – Not yet as widely used, but recommended for many or most new projects
  – Covered at http://www.coreservlets.com/JSF-Tutorial/jsf2/

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
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

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.
  – Use the WebContent folder in Eclipse
    • Same as for HTML, GIF, JPEG, CSS, etc.
• 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
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>
<body>
<h2>JSP Expressions</h2>
<ul>
<li>Current time: <%= new java.util.Date() %></li>
<li>Server: <%= application.getServerInfo() %></li>
<li>Session ID: <%= session.getId() %></li>
<li>The <code>testParam</code> form parameter: <%= request.getParameter("testParam") %></li>
</ul>
</body></html>
Example: Result

- If Eclipse project was
  - jsp-scripting
- And folder was
  - WebContent
- And file was
  - Expressions.jsp
- URL would be
  - http://hostname/jsp-scripting/Expressions.jsp

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
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

<table>
<thead>
<tr>
<th>JSP page translated into servlet</th>
<th>Request #1</th>
<th>Request #2</th>
<th>Request #3</th>
<th>Request #4</th>
<th>Request #5</th>
<th>Request #6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Servlet compiled</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Server restarted</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>init (or equivalent) called</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>doGet (or equivalent) called</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Ten Most Popular Web Sites (Alexa.com, 2010)

1. Google
   - Java (Web), C++ (indexing)
2. Facebook
   - PHP
3. YouTube
   - Flash, Python, Java
4. Yahoo
   - PHP and Java
5. Microsoft Live.com
   - .NET
6. Baidu
   - Unknown
   - PHP
8. Blogger
   - Java
9. MSN
   - .NET
10. Twitter
    - Ruby on Rails, Scala, Java

Fall 2010: Google reports over two billion Web pages that use JSP (inurl:jsp).

Keywords in Job Postings

Job Trends from Indeed.com

Percentage of Matching Job Postings

- java
- c#
- php
- ruby

Indeed™
One search. All jobs.
JSP/Servlets in the Real World: Airlines

- Delta Airlines
- United Airlines
- AirTran
- American Airlines
- British Airways
- KLM
- Air China
- Saudi Arabian Airlines
- Iceland Air

JSP/Servlets in the Real World: Travel Sites

- Travelocity.com
- Orbitz.com
- HotWire.com
- Hotels.com
- CheapTickets.com
- National Car Rental
- Avis Car Rental
- Enterprise Car Rental
- Hertz Car Rental
JSP/Servlets in the Real World: Financial Services

- American Century
- Vanguard
- Fidelity
- NY Stock Exchange
- First USA Bank
- Royal Bank of Scotland
- Banco Popular de Puerto Rico
- Bank of America
- China Construction Bank

JSP/Servlets in the Real World: Retail

- Sears.com
- Walmart.com
- HomeDepot.com
- SamsClub.com
- Macys.com
- llbean.com
- Kohls.com
- Ikea.com
- Target.com
- Longaberger.com
- Nike.com
- CircuitCity.com
JSP/Servlets in the Real World: Entertainment

- WarnerBrothers.com
- Billboard.com
- E! (eonline.com)
- PBS.org
- Comcast
- games.atari.com

JSP/Servlets in the Real World: Military and Federal Government

- DHS
- TSA
- FAA
- CIA
- NSA
- GSA
- IRS
- Army
- Navy
- USPS
Science and Research

- NSF
- UN Oceans
- diabetes.org
- fas.org
- dlse.org
- science.edu.sg
- gbif.net
- collegeboard.com

JSP/Servlets in the Real World: State, Local, International
JSP/Servlets in the Real World: Sports

- Baltimore Orioles
- Washington Redskins
- Washington Nationals
- Major League Baseball
- NHL.com
- NASCAR.com

JSP/Servlets in the Real World: Search/Portals

- Most of Google
- All of Ebay
- netscape.com
- excite.com
- dice.com
- hi5
- Paypal
JSP/Servlets in the Real World: Random Amusing

Summary

- JSP is more convenient, not more powerful
  - 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”
Questions?

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