Customizing a Packaged Application for a J2EE Environment: A Case Study

Leslie Tierstein
TopTier Consulting, Inc.
Overview (1)

- Learning experiences in a J2EE Environment
  - The environment
  - Deployment of a database-independent application
  - Identity management
  - Interfaces to external systems
    - Transport protocols
    - Message formatting
Overview (2)

- Learning experiences in a J2EE Environment
  - Customizing the user interface
    - Cascading Style Sheets
    - Internationalizing/nationalizing text strings
    - Web programming (HTML, JavaScript, JavaServer Pages)
  - Java and Javascript programming
Deployment Environment

● Four logical tiers:
  – Database server (SQLServer, Oracle, UDB/DB2)
  – Application server (WebLogic, WebSphere, JBoss)
  – Web server (Apache, IHS, IIS)
  – Browser (IE, Firefox)

● How many physical tiers?

● How many different combinations of hardware and software?
Deployment Options (1)

- Web server – software and hardware (OS)
  - IHS = IBM HTTP Server
  - Number of deployments as of June 2006

<table>
<thead>
<tr>
<th>Web Server</th>
<th>OS</th>
<th>Deployments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apache</td>
<td>Linux</td>
<td>1</td>
</tr>
<tr>
<td>Apache</td>
<td>Solaris</td>
<td>2</td>
</tr>
<tr>
<td>IHS</td>
<td>AIX</td>
<td>6</td>
</tr>
<tr>
<td>IHS</td>
<td>Solaris</td>
<td>2</td>
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<tr>
<td>IHS</td>
<td>Windows</td>
<td>3</td>
</tr>
<tr>
<td>IIS</td>
<td>Windows</td>
<td>10</td>
</tr>
</tbody>
</table>

The open source solution

The IBM solution

The Windows solution
## Deployment Options (2)

- Application server – software and hardware

<table>
<thead>
<tr>
<th>Application Server</th>
<th>Operating System</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WebLogic</td>
<td>Linux</td>
<td>1</td>
<td>Which is “open source”?</td>
</tr>
<tr>
<td>WebLogic</td>
<td>Solaris</td>
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<td></td>
</tr>
<tr>
<td>WebSphere</td>
<td>Solaris</td>
<td>3</td>
<td></td>
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<tr>
<td>WebSphere</td>
<td>AIX</td>
<td>6</td>
<td>IBM solution</td>
</tr>
<tr>
<td>WebSphere</td>
<td>Windows</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>JBoss</td>
<td>Windows</td>
<td>7</td>
<td>Windows/J2EE solution</td>
</tr>
<tr>
<td>WebLogic</td>
<td>Windows</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Deployment Options (3)

- Database server – software and hardware (OS)

<table>
<thead>
<tr>
<th>Database</th>
<th>OS</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle</td>
<td>Linux</td>
<td>1</td>
</tr>
<tr>
<td>Oracle</td>
<td>Solaris</td>
<td>6</td>
</tr>
<tr>
<td>Oracle</td>
<td>AIX</td>
<td>4</td>
</tr>
<tr>
<td>Oracle</td>
<td>HP-UX</td>
<td>1</td>
</tr>
<tr>
<td>SQLServer</td>
<td>Windows</td>
<td>11</td>
</tr>
<tr>
<td>Oracle</td>
<td>Windows</td>
<td>1</td>
</tr>
</tbody>
</table>
Database Deployment (1)

- Connection to the database is via JDBC
- The J2EE application server requires definition of data sources
  - Other applications (Cold Fusion) require (redundant) definition of the same data sources
Database Deployment (2)

- Database-Independence?
  - Really multiple versions of DDL
  - Need a tool that generates database-specific code from database-agnostic metadata
  - Compromises
    - Maintainability
    - Performance
Application Server Deployment

- **WebSphere vs WebLogic vs Jboss**
  - WebSphere and WebLogic are enterprise solutions
  - JBoss is a application solution
- **Configuration issues**
  - Adjustment of out-of-the-box parameters
- **Deployment complexity**
Identity Management

- Fat-Client Oracle-Based Identity Management
  - Each user assigned a database login
  - Authentication handled by the database
  - Authorization handled by a combination of database roles, application-specific user tables, and application code
  - Persistent sessions allow use of package variables
Identity Management

- Thin-Client Web-Based Identity Management
  - All users connect to the application’s database via the same database login
  - Application-specific database tables store additional information for authenticating the user and authorizing access to various parts of the
  - Web session variables, cookies, or other mechanisms track the user through non-persistent sessions
Identity Management

- LDAP-Based Identity Management
    - MS Active Directory, Oblix (acquired by Oracle)
    - OpenLDAP, IBM Tivoli Access Manager (TAM)
    - Others
  - One integration point is Single Signon (SSO)
  - Other integration points may provide user lookup/selection and authorization
  - May be used in conjunction with application-specific authorization tables
External Interfaces

- Transport protocols
  - File: via polling
  - Database: JDBC compliant
  - Java Message Services (JMS)
  - IBM MQ Series queues
  - HTTP -- Web services via SOAP
    - Still more talked about than practical

- Proprietary interfaces
  - HP OpenView API
  - Sockets
Web Services

- Security issues need to be addressed
  - Service-specific certificates
- Interface to other customizable packages
  - BMC Remedy Help Desk
  - Published WSDL
External Interfaces

- Message content - custom XML dialect
- Message transformation - XSL

<table>
<thead>
<tr>
<th>General Properties</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Name</td>
<td>Survey Outbound Transform</td>
</tr>
<tr>
<td>Direction</td>
<td>Outbound (used in one agent)</td>
</tr>
<tr>
<td>Created On</td>
<td>03/02/2006</td>
</tr>
<tr>
<td>Created By</td>
<td></td>
</tr>
<tr>
<td>Last Updated On</td>
<td>03/02/2006</td>
</tr>
<tr>
<td>Last Updated By</td>
<td></td>
</tr>
</tbody>
</table>

```
<xsl:stylesheet version="1.0"
    xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
    xmlns="http://www.w3.org/TR/xhtml11/strict">
<xsl:template match="/">
<ClosingTicketDetailsDS>
<ClosingTicketDetailsTable>
  <RCTaskID><xsl:value-of select="/message/task-started/task/task-id"/></RCTaskID>
  <RCRequisitionID><xsl:value-of select="/message/task-started/requisition/requisition-id"/></RCRequisitionID>
  <RCRequisitionEntryID><xsl:value-of select="/message/task-started/requisition/requisition-entry-id"/></RCRequisitionEntryID>
</ClosingTicketDetailsTable>
</ClosingTicketDetailsDS>
</xsl:template>
```

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Out-of-the-Box User Interface

- Logo and branding (top-right and bottom-left)
- (Lack of) color scheme
Customized User Interface

- Logo and branding (top-right and bottom-left)
- Color scheme
- Text strings
Customized User Interface

- Cascading Style Sheets
  - Allow appearance of the web pages to be changed without having access to source code
  - Requires knowledge of CSS syntax and capabilities
  - Requires knowledge of HTML: classes, id’s, elements and their attributes
  - Requires knowledge of the HTML used in the application
Customized User Interface

- Cascading Style Sheets
  - Style Sheet

```css
/** Header class provides the branding logo at top-right of the page. */

#header
{
  background: #ffffff url(/TopTier/images/mylogo.jpg)
  ...;
}
```
Customized User Interface

- Cascading Style Sheets
  - Application Page HTML

```html
<div id="header">
  <div id="nav">
    <span class="scmenu" onclick="processmenu(event);">
      TopTier Services Module
    </span>
  </div>
</div>
```
Customized User Interface

- Customizing text of strings
  - No strings hard-coded in the application
  - All text strings stored in locale-dependent resource bundles (using the Java Resource Bundle coding guidelines)
  - Also need the ability to edit particular strings to user requirements
Customized User Interface

- Sometimes, users just wanted a change that couldn’t be accommodated via customization tools
- Changes to source were required
  - JavaServer Pages
  - Cold Fusion! (being phased out)
- Use of the product’s customization framework
  - JavaScript for Interactive Service Forms (ISF)
Working with JSPs

- The page as displayed by the application
Working with JSPs

- The JSP source code
  - Use of JSTL and custom tags

```<table class="formTable" width="100%" cellpadding="0" cellspacing="0">
<tr>
<td class="formReq"></td>
<td class="formLabel">
  <label for="formItem1"><ns:DisplayString key="common.person.loginname"/>
</td>
<td class="formElement">
  <c:out value="${personprofileform.loginName}"/>
  <input type="hidden" name="loginName" value="${personprofileform.loginName}"/>
</td>
</tr>
</table>"/>
Working with JSPs

- The generated HTML

```xml
<table class="formTable" width="100%"
cellpadding="0" cellspacing="0">
  <tr>
    <td class="form Req"></td>
    <td class="form Label">
      <label for="formItem1">Login Name</label>
    </td>
    . . .
  </tr>
</table>
```
Working with JSPs

- JDeveloper’s Design View
  - JSP Tags are displayed
Java 101

- Textbooks, including books on Java Certification, includes lots that’s not relevant and are missing lots that is relevant

- Missing, easy-to-acquire knowledge
  - Thinking in Java, object-orientation (it’s in PL/SQL now, too)

- Missing, harder-to-acquire knowledge
  - Java methods and objects
  - Java terminology and mindset
    - Design patterns
JavaScript 101

- The technology that “can’t get no respect”
  - Perhaps AJAX will help to change this
- Debugging can be difficult
- Browser wars still alive and well
- Document Object Model (DOM) is critical for advanced functionality
Conclusion

- Have you been counting the technologies/skills?

<table>
<thead>
<tr>
<th>Java</th>
<th>XML</th>
<th>HTML</th>
</tr>
</thead>
<tbody>
<tr>
<td>JavaScript</td>
<td>XSLT</td>
<td>JSTL</td>
</tr>
<tr>
<td>JavaServer Pages</td>
<td>SQL</td>
<td>LDAP</td>
</tr>
<tr>
<td>Cold Fusion</td>
<td>CSS</td>
<td>SSO</td>
</tr>
<tr>
<td>JDBC</td>
<td>SOA</td>
<td>WSDL</td>
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</tbody>
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About the Author

- Leslie Tierstein is a Principal Technical Architect at a Silicon Valley company which produces a software package for Service Catalog Management.
- She has delivered presentations many Oracle user groups and has been the technical editor for several books published by Oracle Press.
- She can be reached at ltierstein@earthlink.net.
- Her website is http://home.earthlink.net/~ltierstein.