

JavaServer Pages (JSP) Introduction

Georgia Web Developers
Conference, July 25, 2001

Who I Am

- Hans Bergsten
 - hans@gefionsoftware.com
 - President of Gefion software
 - Member of the JSP working group (JCP)
 - Author of *JavaServer Pages* (O'Reilly)



Overview

- JSP Background
- Processing and Basic JSP 1.1 Elements
- Extension Framework/Custom Tags
- Flow Control and Scopes
- Java 2 Enterprise Edition (J2EE)
- Future Direction

Background

- Servlets part of JavaWebServer, 1997
- Formalized as Servlet 2.1, Nov. 1998

Code and HTML Mixed

```
public void doGet(...) {  
    ResultSet rs = getCustomers("VIP");  
    out.println("<ul>");  
    while (rs.next()) {  
        out.println("<li>" + rs.getString("Name"));  
    }  
}
```

Background

- Servlets part of JavaWebServer, 1997
- Formalized as Servlet 2.1, Nov. 1998
- JHTML, HTML with Java code snippets
- JSP 1.0, June 1999
- JSP 1.1, December 1999

Code and HTML Separated

```
<foo:getVIPCust id="vips" />
```

```
<ul>
```

```
<foo:loop name="vips" loopId="cust" >
```

```
  <li> <jsp:getProperty name="cust"  
      property="name" />
```

```
</foo:loop>
```

JSP Elements

- Directives: `<%@ dirname attr=value %>`
- Actions: `<pref.name attr=value ... />`
- Scripting:
 - Scriptlet: `<% scripting code %>`
 - Expression: `<%= expression %>`
 - Declaration: `<%! declaration %>`

JSP Page Example

```
<%@ page contentType="text/html" %>
```

```
<%@ include file="header.jsp" %>
```

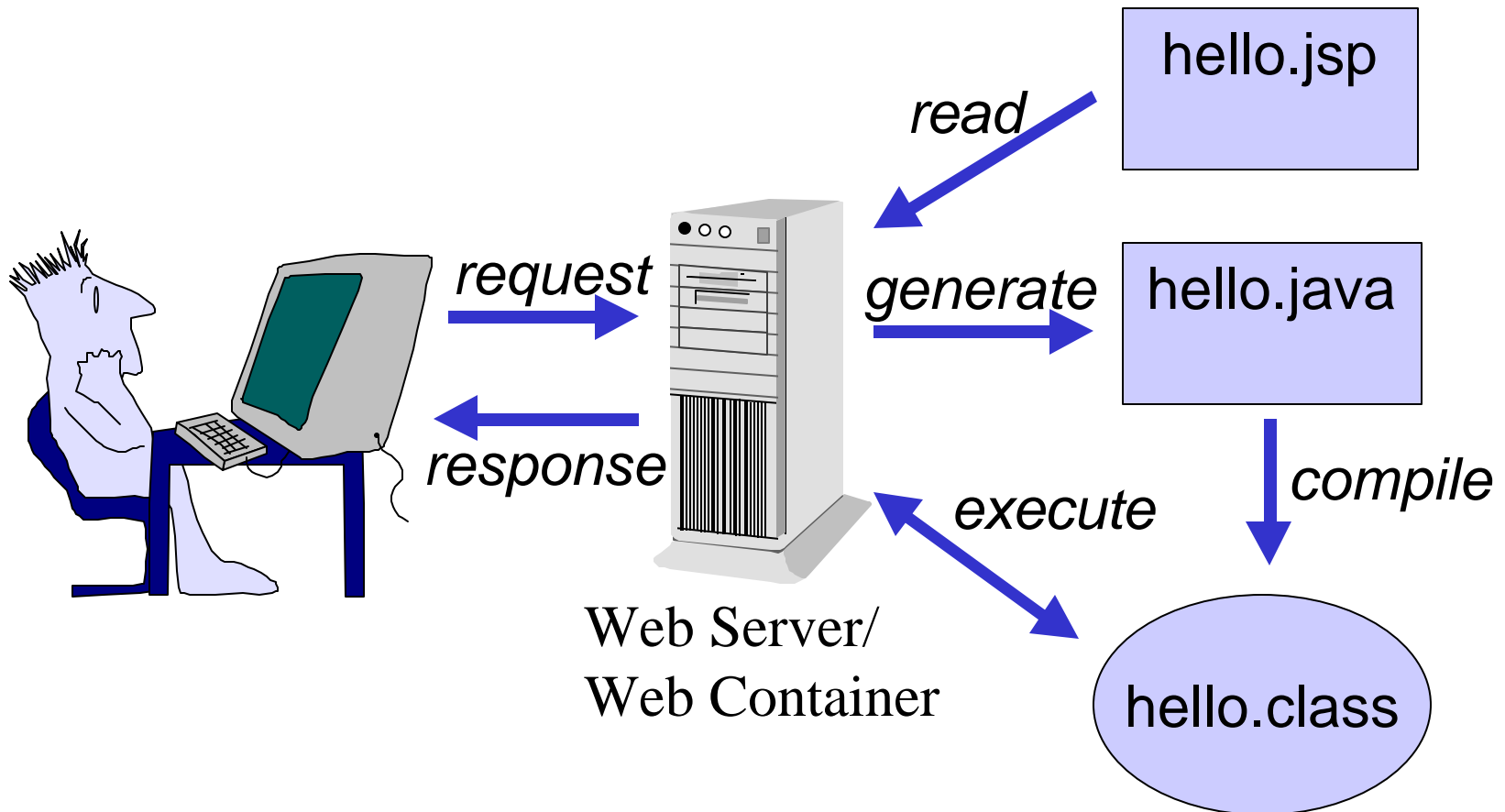
```
<h1>Hello World!</h1>
```

```
<jsp:useBean id="date"  
  class="java.util.Date" />
```

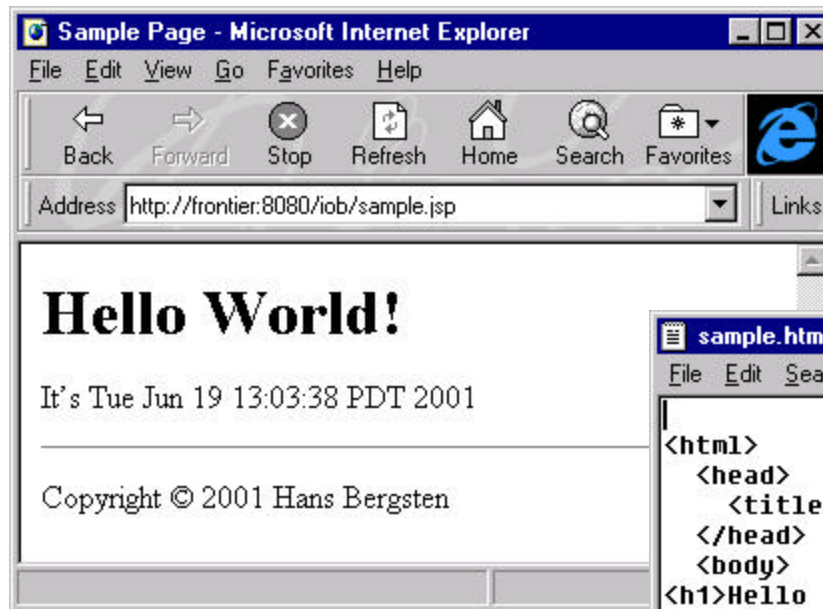
```
It's <%= date %>
```

```
<%@ include file="footer.jsp" %>
```

JSP Processing



JSP Elements Example



```
sample.htm - Notepad
File Edit Search Help
|
<html>
  <head>
    <title>Sample Page</title>
  </head>
  <body>
<h1>Hello World!</h1>

    It's Tue Jun 19 13:03:38 PDT 2001
    <hr>
    Copyright &copy; 2001 Hans Bergsten
  </body>
</html>
```

Directive Elements

- **page:** Page-dependent attributes
 - contentType, errorPage, buffer
- **include:** Include another source file
- **taglib:** Tag library declaration

Directives Example

```
<%@ page contentType="text/html" %>
```

```
<%@ include file="header.jsp" %>
```

```
<h1>Hello World!</h1>
```

```
<jsp:useBean id="date"  
  class="java.util.Date()" />
```

```
It's <%= date %>
```

```
<%@ include file="footer.jsp" %>
```

Action Elements

- useBean: Declare a bean
- getProperty: Add property value to page
- setProperty: Set property value
- include: Include response from page
- forward: Continue processing at page
- plugin: Add HTML for Java Plugin

JavaBeans Model

- A “thing” with public properties
- A JavaBeans component is a regular Java class
- Naming conventions for property access methods

JavaBeans Class Example

```
public class UserInfoBean {  
    private String firstName;  
    public void setFirstName(String fName) {  
        firstName = fName;    }  
    public String getFirstName() {  
        return firstName;    }  
}
```


useBean Example

```
<jsp:useBean id="user"  
  class="com.foo.UserInfoBean" />
```

setProperty Example

```
<jsp:setProperty name="user"  
  property="firstName" value="Hans" />
```

```
<jsp:setProperty name="user"  
  property="*" />
```

```
<jsp:setProperty name="user"  
  property="firstName" param="fName" />
```

getProperty Example

```
<jsp:getProperty name="user"  
property="firstName" />
```

Using Actions and a Bean for Input Validation

```
<jsp:useBean id="user"  
  class="com.foo.UserInfoBean" />  
<jsp:setProperty name="user"  
  property="*" />
```

Valid input?

```
<jsp:getProperty name="user"  
  property="valid" />
```

include Example

```
<jsp:include page="foo.jsp" flush="true">  
  <jsp:param name="user" value="Bob" />  
</jsp:include>
```

Reusing Page Fragments

My Yahoo! for hansbergsten - Microsoft Internet Explorer

File Edit View Go Favorites Help

Back Forward Stop Refresh Home Search Favorites Print Font Mail Edit

Address http://my.yahoo.com/p/d.html?v Links Best of the

Welcome, Hans! - [Yahoo!](#) - [Update](#) - [Account Info](#) - [Help](#) - [Sign Out](#) IBM WebSphere costs 7X Oracle9iAS. [Get the facts.](#)

[Gourmet foods delivered to your door!](#)

These jokers make serious cash, selling videos on Yahoo! [click here](#)
Todd and Sean--owners of sneetch.com **YAHOO!Store**
[Click Here for Yahoo Store!](#)

My Front Page [Add Page - Options](#)

[Shop Clinique](#)

Personalize **Content** **Layout** **My Front Page Headlines** Jun 19 1:24pm PT [Edit](#) [X](#)

Portfolios [Edit](#) [X](#)

Wireless Trading Mydiscountbroker.com

My First Portfolio

| | | |
|------------------------|----------|--------|
| DJIA | 10596.67 | -48.71 |
| NASDAQ | 1992.66 | +4.03 |
| ^SPC | 1212.58 | +4.15 |
| ^TYX | 56.84 | -0.09 |
| GE | 48.87 | -0.13 |

Top Stories from Reuters Jun 19 1:16pm PT

- [Ford Under Pressure at Congressional Tire Hearing](#)
- [U.S. to Assemble Settlement Team on Tobacco Case](#)
- [California May Avoid Blackouts As Heat Wave Hits](#)

World from Reuters Jun 19 1:09pm PT

Directive vs. Action

- Directive
 - In the translation phase
 - File merged into including page
- Action
 - In the request phase
 - Response added to including page's response

Using the Directive and the Action

```
<%@ include file="header.jsp" %>  
<jsp:useBean id="user" class="..." />  
<jsp:include page="portfolio.jsp"  
  flush="true">  
  <jsp:param name="user"  
    value="<%= user.getID() %>" />  
</jsp:include>
```


Scripting Elements

- Scriptlet: `<% scripting code %>`
- Expression: `<%= expression %>`
- Declaration: `<%! declaration %>`

Scriptlet Example

```
<% if (user.isValid()) { %>
```

```
    Do something
```

```
<% } else { %>
```

```
    Do something else
```

```
<% } %>
```

Expression Example

First Name: `<%= user.getFirstName() %>`

`1 + 1 = <%= 1 + 1 %>`

Declaration Example

```
<%! int pageCounter = 0; %>
```

```
<% int requestCounter = 0; %>
```

```
<h1>Counters</h1>
```

Instance variable counter:

```
<%= pageCounter++ %>
```

Local variable counter:

```
<%= requestCounter++ %>
```

Implicit Scripting Variables

- request
- response
- session
- application
- pageContext
- and more

Accessing Request Data

Method: `<%= request.getMethod() %>`

URI: `<%= request.getRequestURI() %>`

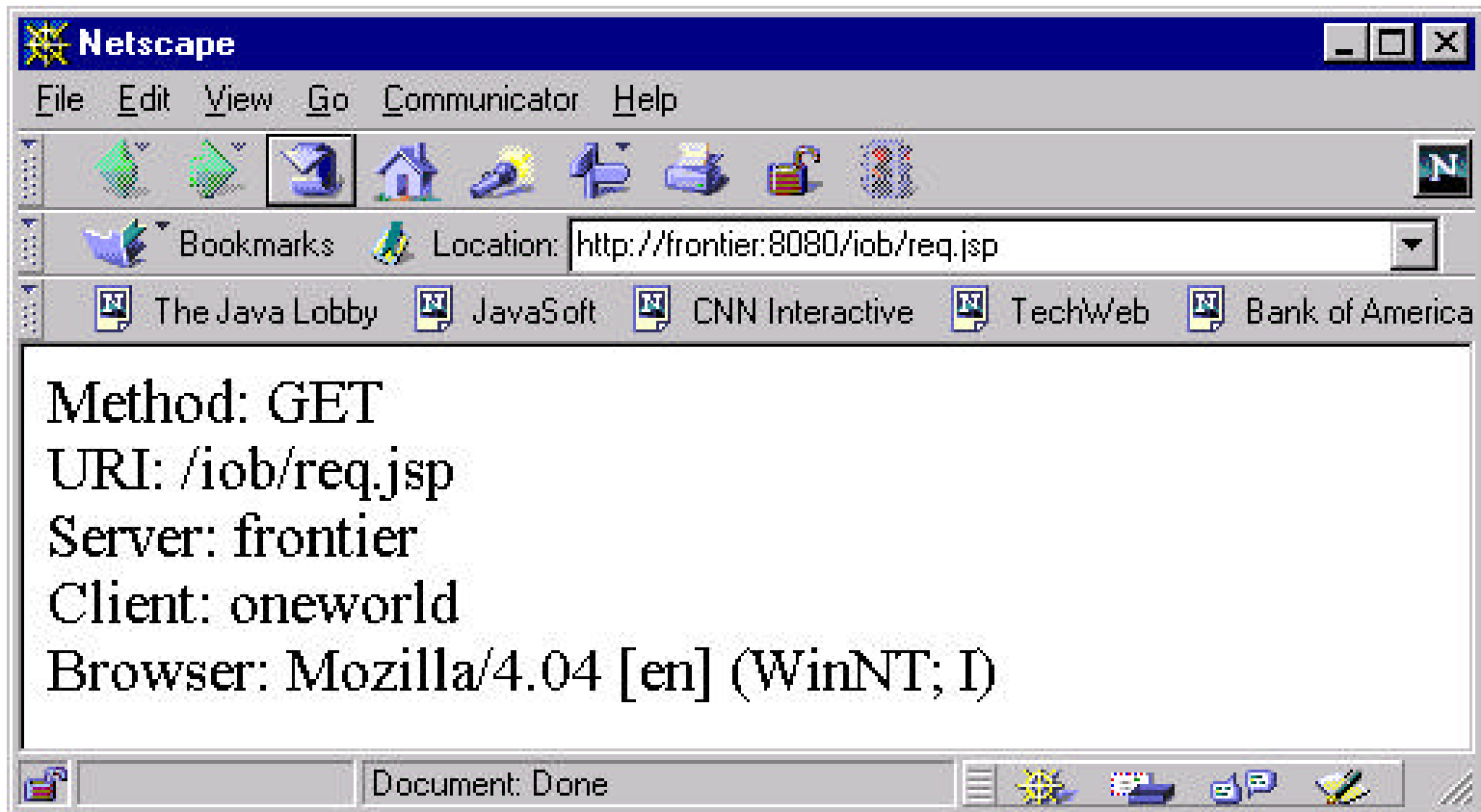
Server: `<%= request.getServerName() %>`

Client: `<%= request.getRemoteHost() %>`

Browser:

`<%=request.getHeader("User-Agent")%>`

Accessing Request Data



Setting Response Data

<%

```
Cookie c = new Cookie("foo", "bar");  
c.setMaxAge(2592000); // Seconds  
response.addCookie(c);
```

%>

Custom Actions

- Used the same as standard actions
- Regular Java classes; JavaBeans with a few extra methods
- Invoked automatically by the container
- Access to request and application data
- Reduces the need for scripting code!

Custom Actions Example

```
<%@ taglib uri="/foolib" prefix="foo" %>
```

```
<foo:ifEq name="user" property="valid"  
value="true">
```

```
<foo:save name="user" />
```

```
</foo:ifEq>
```

Custom Action Example

```
<%@ taglib uri="/foolib" prefix="foo" %>
```

```
<foo:setCookie name="foo" value="bar"  
    maxAge="2592000" />
```

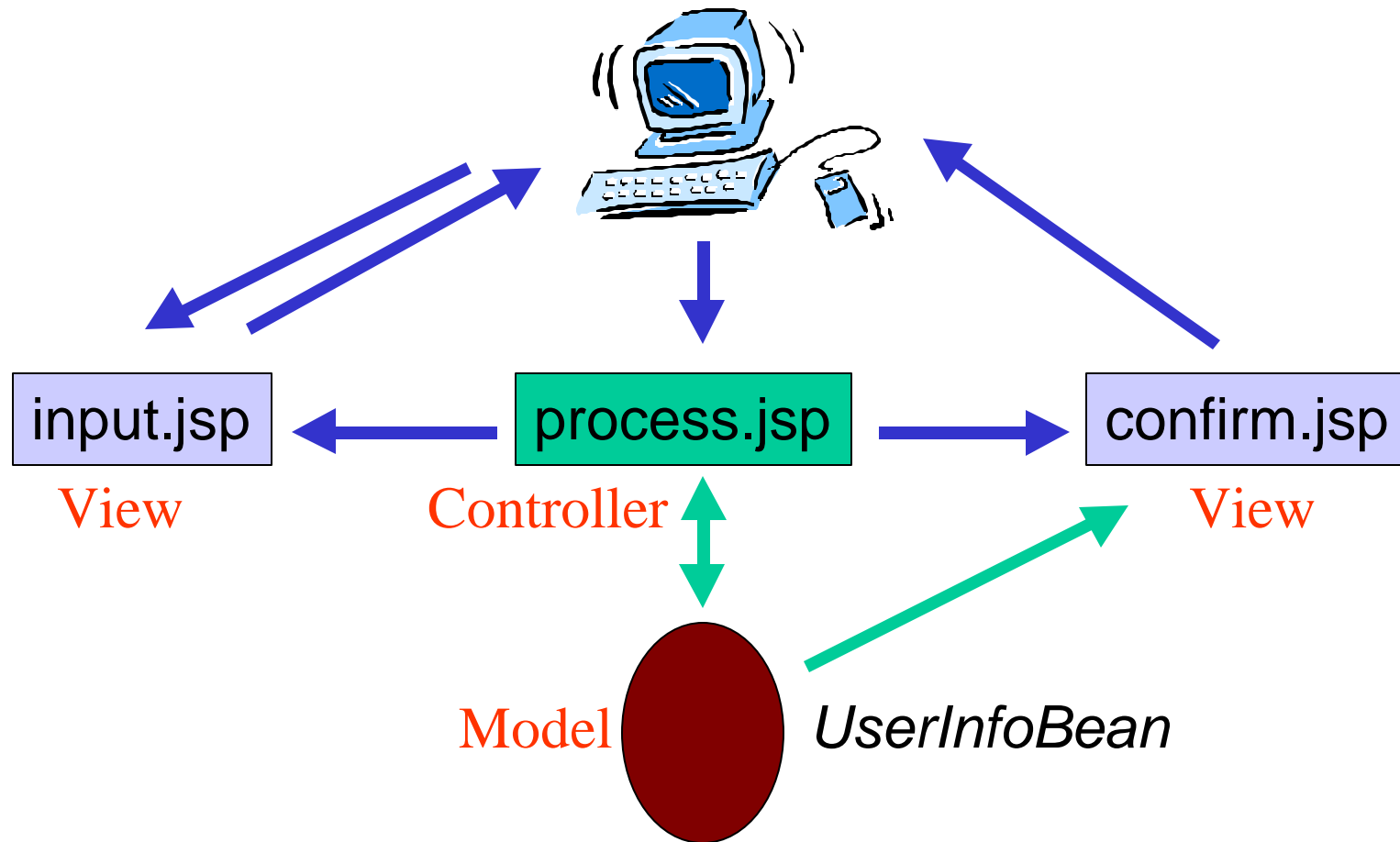
MVC Pattern

- Model: business data and logic
- View: user's view of business data
- Controller: user interaction

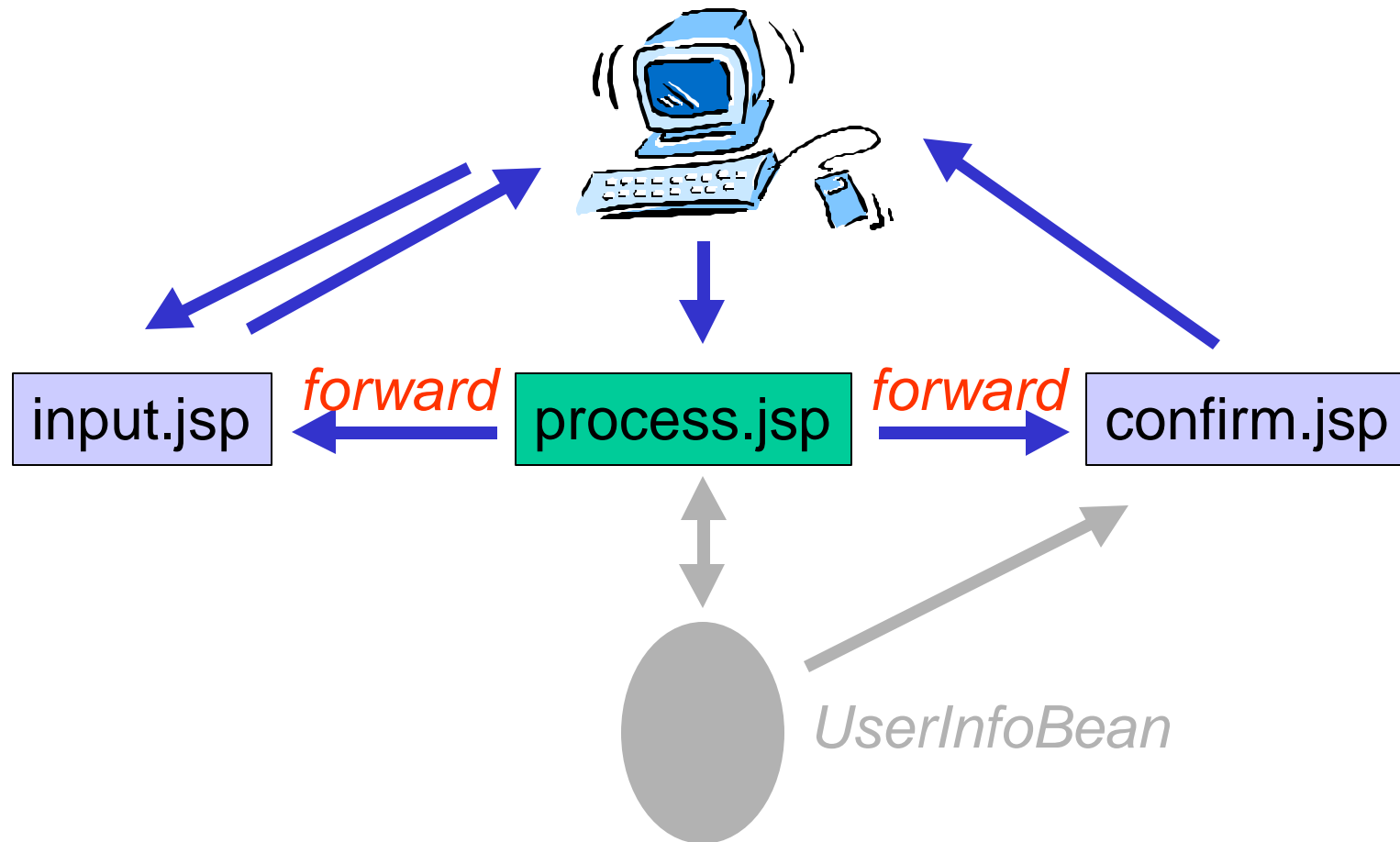
MVC Pattern for Web Apps

- Model: JavaBeans
- View: JSP page
- Controller: JSP page or servlet

MVC for Web Apps



Page Flow Control



forward Example

```
<%@ taglib uri="/foolib" prefix="foo" %>
```

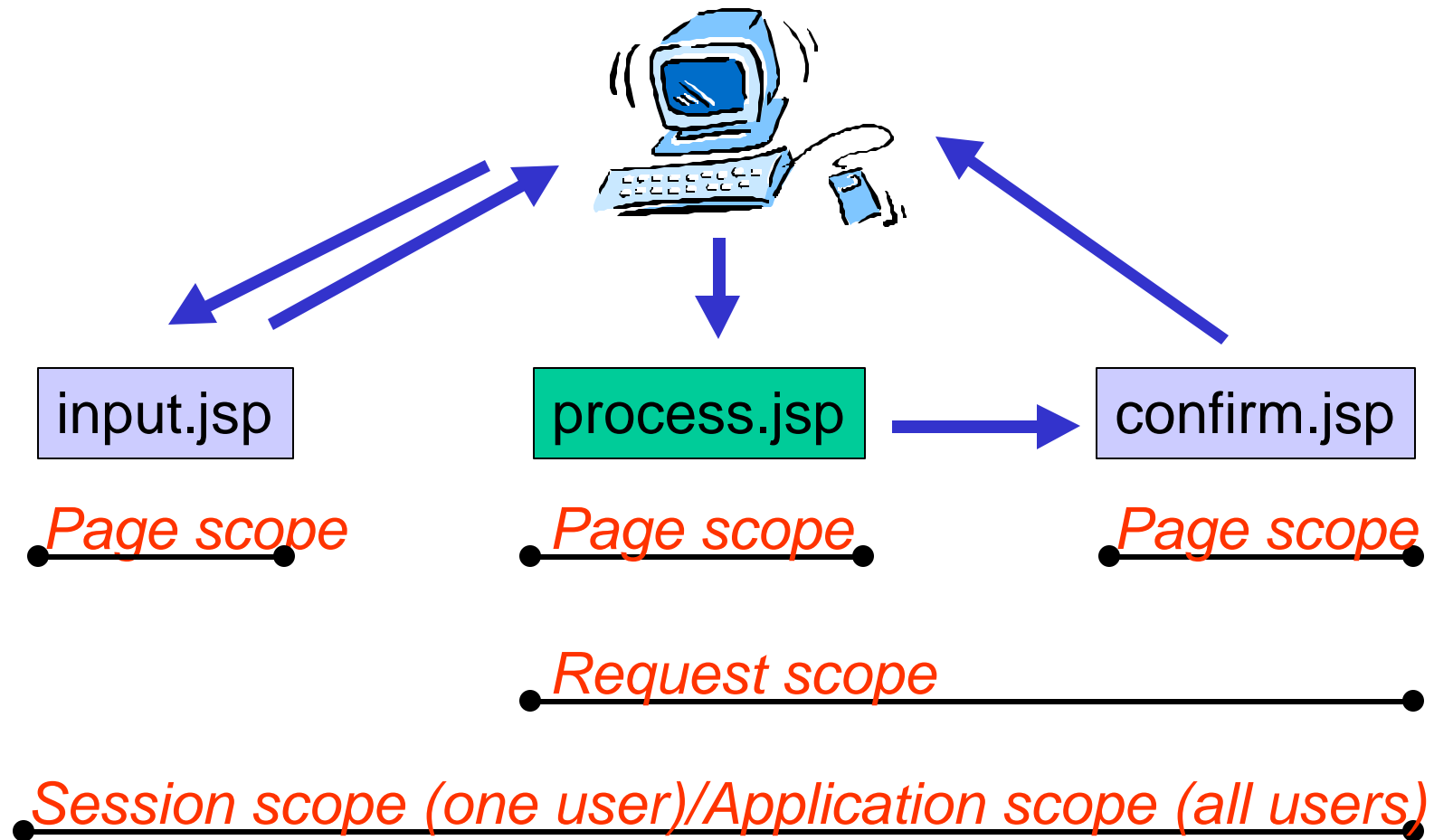
```
<foo:ifEq name="user" property="valid"  
value="true">
```

```
<foo:save name="user" />
```

```
<jsp:forward page="confirm.jsp" />
```

```
</foo:ifEq>
```


JSP Data Scopes



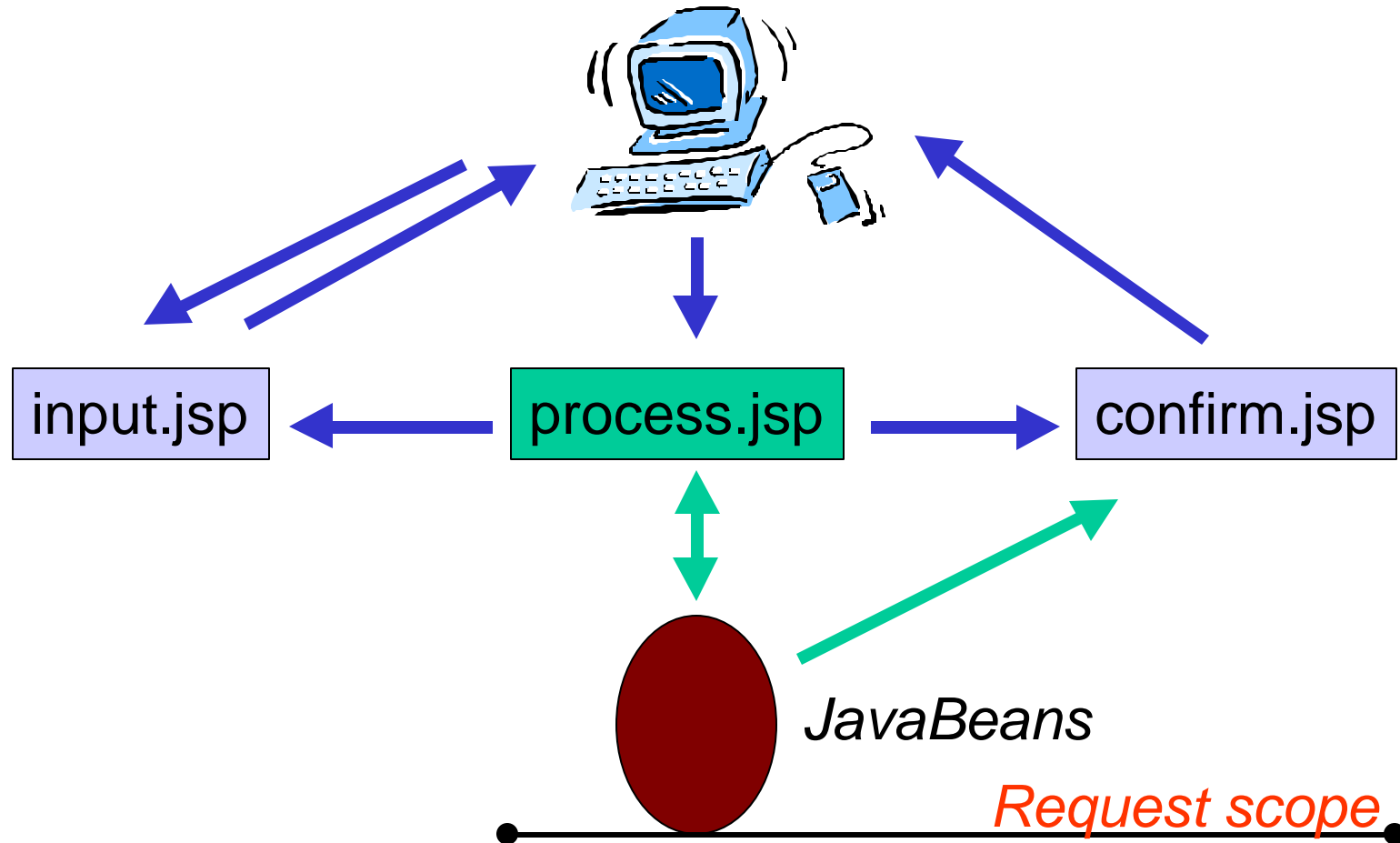
Saving Data in a Scope

```
<useBean id="user" class="..."  
  scope="request" />
```

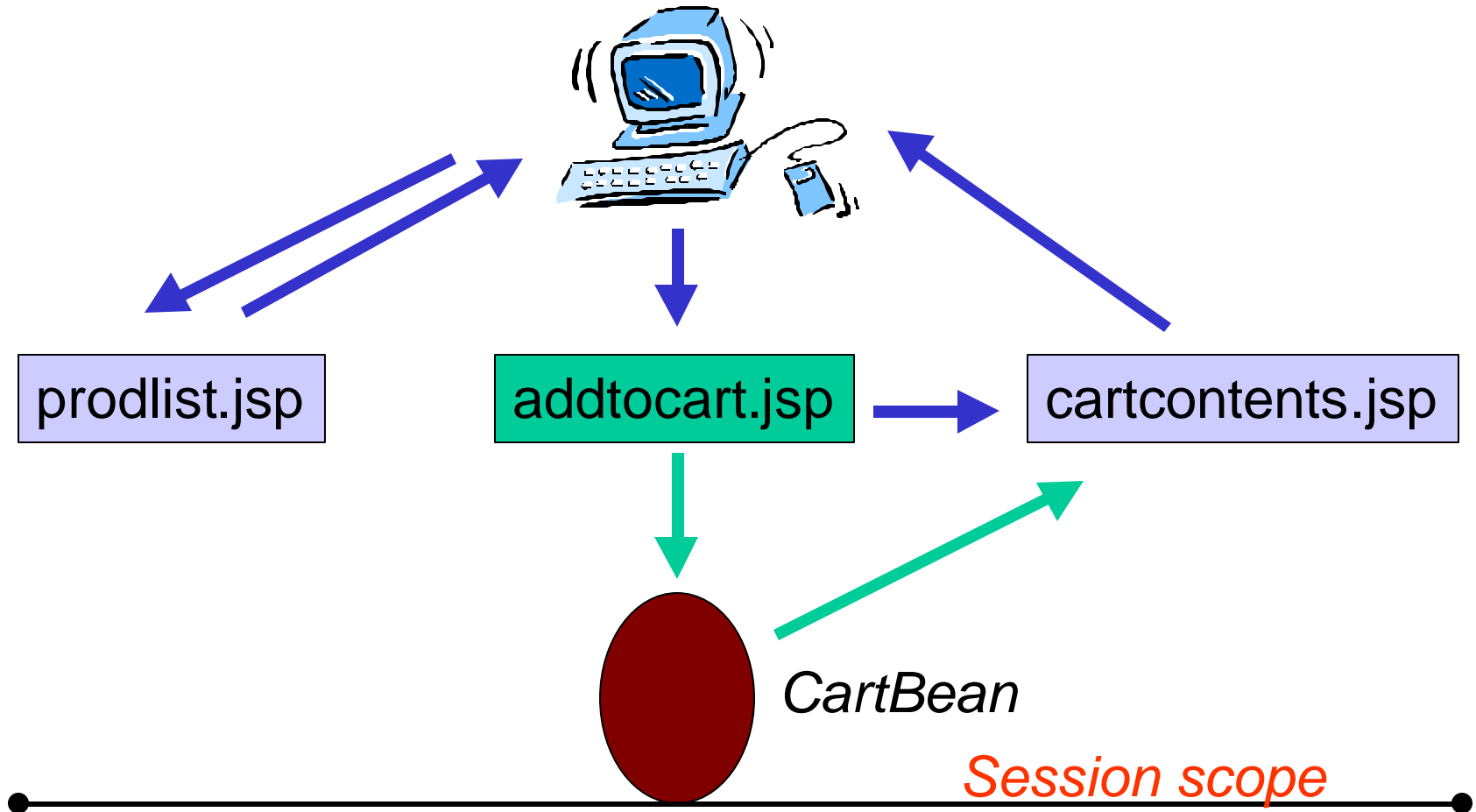
Or with a scriptlet:

```
<%  
  UserInfoBean u = new UserInfoBean();  
  request.setAttribute("user", u);  
%>
```

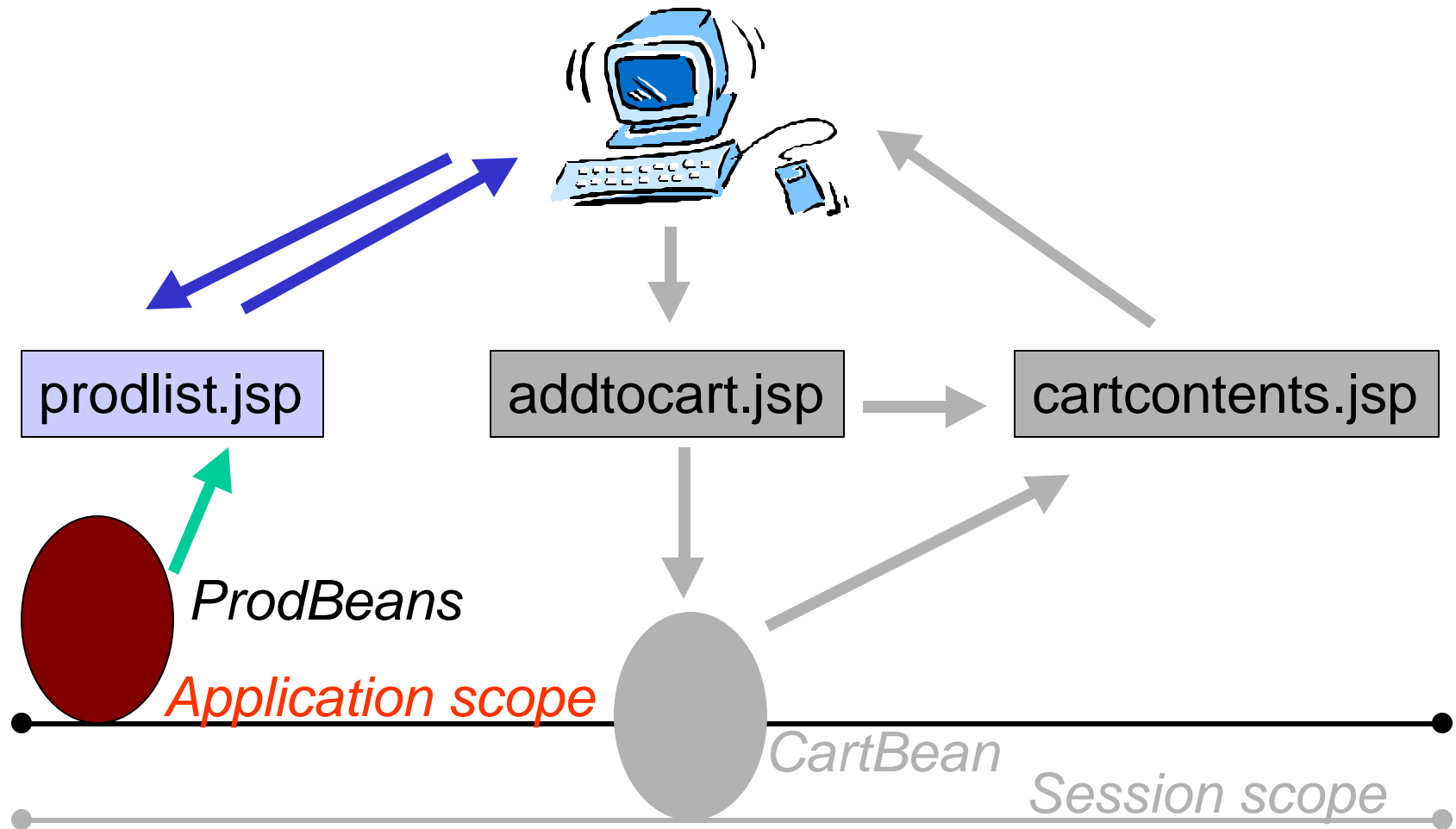
Request Scope



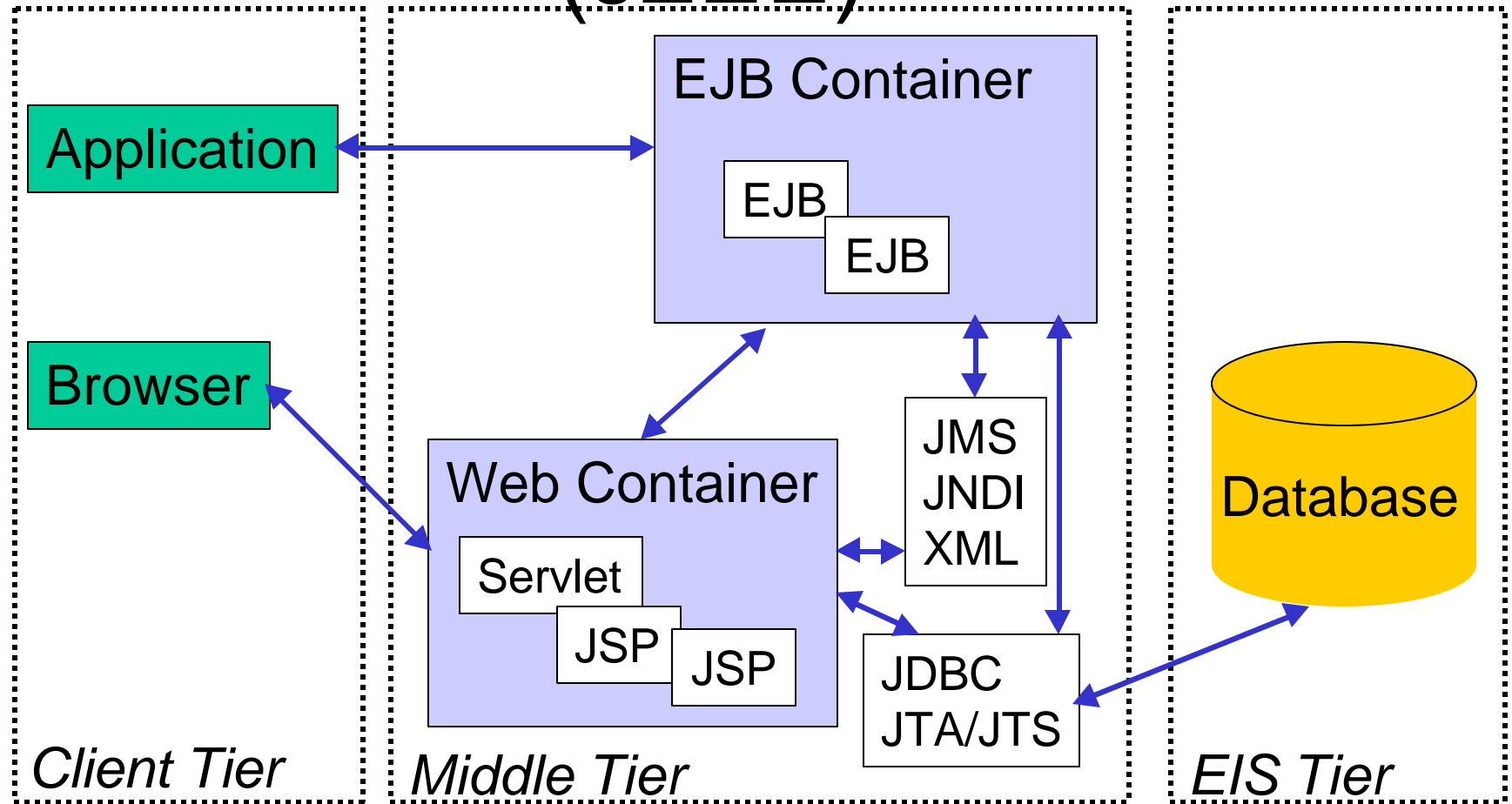
Session scope



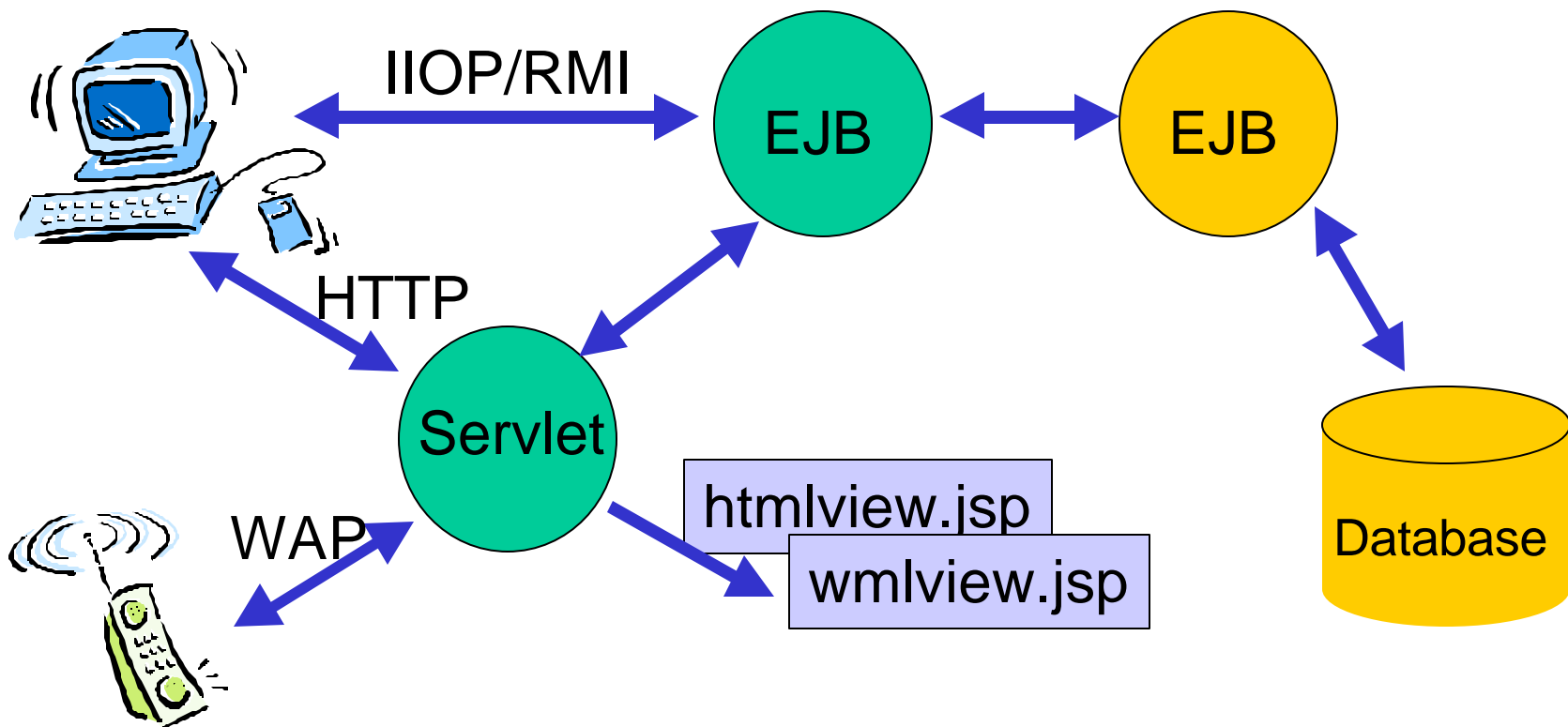
Application scope



Java 2 Enterprise Edition (J2EE)



J2EE Application Example



Future Direction

- JSP 1.2/Servlet 2.3
 - include without flush
 - Listeners
 - Filters
 - Custom tag development enhancements
- JSP Standard Tag Library (JSPTL)
 - Conditionals, Iterators, XML/XSLT, Database access, etc.

More Info

- **JSP Specification**
<http://java.sun.com/products/jsp/>
- **JavaServer Pages book**
<http://TheJSPBook.com/>
- **Jakarta Tomcat, Taglibs & Struts**
<http://jakarta.apache.org/>
- **InstantOnline Basic**
<http://www.gefionsoftware.com/InstantOnline/>