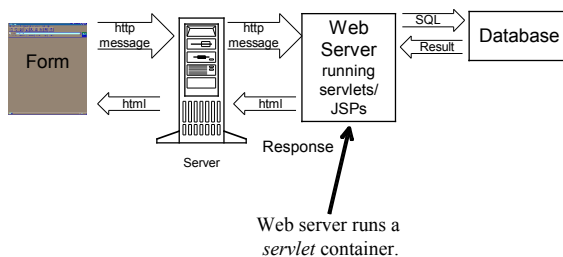# COMP2009
Software Engineering

What is a Web Application?
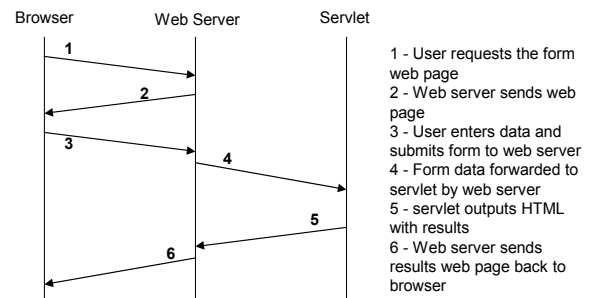

Web Applications

- Now very familiar — many examples.
- Built on top of web infrastructure and HTTP protocol.
- Effectively client/server based.
- Accessed via a web browser with HTML-based GUI.
- Make use of *forms* on web pages to allow user input.
- Javascript allows code to embedded directly in web pages to make them more interactive.
  - AJAX (Asynchronous JAvascript + Xml) allows a web page to interact with server without reloading the complete page.

2

Three-Tier Architecture

On the Java Platform a servlet is an object (instance of a class) that handles http requests forwarded from the web server container. A JSP is compiled to a servlet class. It is all object-oriented.
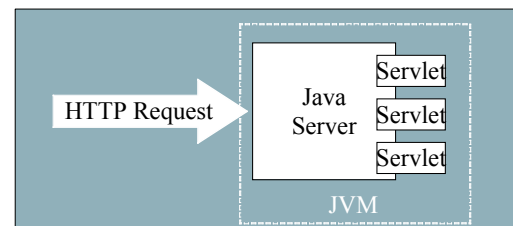
3

Request Handling

1 - User requests the form web page
2 - Web server sends web page
3 - User enters data and submits form to web server
4 - Form data forwarded to servlet by web server
5 - servlet outputs HTML with results
6 - Web server sends results web page back to browser

4

Servlets

- A servlet is a Java object called by a Java web server when requested by a client via a URL.
- A servlet is an instance of a servlet class.
- Servlets are not complete programs but are classes dynamically loaded as needed.
- A request is handled by:
  - Examining the request message to determine what service is being requested.
  - Extracting parameter data (input from web form).
  - Processing request (invoke business logic classes).
  - Formatting result as HTML and returning a web page.

5

Servlets(2)

- Servlets are run by threads within the server JVM.
- In fact, the entire server can be a Java application.

6

Application Classes

- Servlets make use of Application or Business Logic classes.
- These implement the "business logic".
  - i.e., process the input data and generate the result data.
- Ordinary Java classes.

Data Layer

- Data is stored in a SQL database.
- Data Layer classes map between objects and SQL queries/updates.
  - Often called DAOs, Data Access Objects.
- The database will consists of one or more tables.
- For example, a Person object:
  - is an instance of class Person.
  - holds information about a specific person in memory while the application is running.
  - persists (stores) the information in a row in a database table.

User Interface Layer

- HTML web pages.
  - Generated by servlets JSPs, or view classes.
  - Rendered by a browser.
- HTML forms allow user input to be entered and sent as request data to the server.
- Web 2.0 supports more dynamic interactions.
  - Implemented by JavaScript within web pages and AJAX.

JSP - Java Server Pages

- Alternative to directly using servlets.
- Makes managing HTML output much easier.
- A JSP can effectively embed Java code in an HTML web page.
- The Java code is executed by the server when the web page is requested.
  - Application classes still used.
- Actually, the JSP is converted to a servlet behind the scenes, so everything is really done by servlets.

Servers

- Tomcat
  - Official reference implementation
- Glassfish
  - Commercial quality, high performance implementation
- Both open source and freely available
- Both are easy to install and manage via a web-based interface.

Development Tools

- IDEs
  - Eclipse
    - eclipse.org
    - wide range of plugins for web development
  - NetBeans
    - netbeans.org
    - also has good plugins
  - Both are open source
- Dreamweaver, photoshop
  - Available on IS clusters

Database

- MySQL
  - mysql.com
  - widely used open source SQL database
- Postgres
  - postgresql.org

Alternatives to Java

- Many tools and frameworks available including:
  - Grails
  - Ruby on Rails
  - Google GWT
  - PHP
  - etc.

SE and Web Applications

- Requirements and use cases are fully applicable for use with web applications.
- All components and entities (servlets, web pages, etc.) can be modelled in OO terms.
- And using UML.