

15-415 Database Applications

Recitation 6

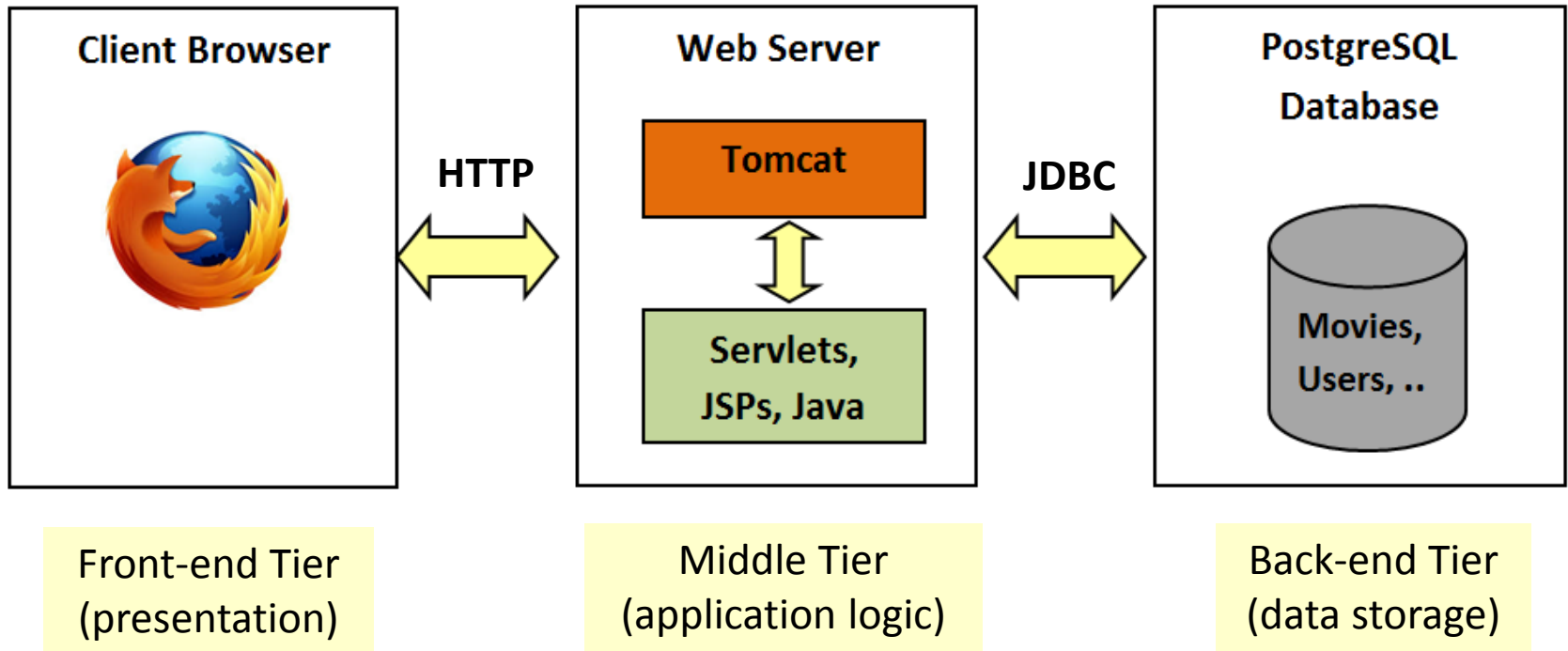
Project 3: ***CMUQFlix***

CMUQ's Movies Recommendation System

Project Objective

1. Set up a front-end website with PostgreSQL as the back-end
2. Allow users to login, “like” movies, and get personalized movies recommendations

Three-Tier Architecture of CMUQFlix



Front-End Tier:

HTML Forms & Javascript

HTML Forms

- HTML forms are a common way for
 - Getting user input at the front-end tier
 - Communicating the given input to the middle tier
- HTML forms are defined using the **FORM** tag
- FORM tag has three important attributes:
 - **NAME**: form name
 - **ACTION**: URI of the page to which the form is submitted
 - **METHOD**: method used to submit the form (Get*/Post**)

* A **Get** request *gets* (or retrieves) information (e.g. image, HTML page) from a server.

** A **Post** request posts (or sends) data from the client (e.g. usernames, passwords) to a server.

HTML Forms (contd.)

- Three important tags used to get user input:
INPUT, *SELECT*, and *TEXTAREA*
- *INPUT* is used to render text fields and buttons:

```
<INPUT TYPE="text" NAME="username" VALUE="Joe Bloggs">
```

```
<INPUT TYPE="password" NAME="password" VALUE="123456">
```



```
<INPUT TYPE="reset" VALUE="Reset Fields">
```

```
<INPUT TYPE="submit" VALUE="Submit Form">
```

Apache Tomcat

Apache Tomcat

- Apache Tomcat is an ***open-source web server*** developed by the Apache Software Foundation (ASF)
- Apache Tomcat is a servlet container i.e. it can invoke and execute servlets and JSPs
- Unlike web-servers that run on a TCP port number 80, Tomcat runs on port number 8080

Installing Tomcat

- Login to your VM (`<andrew_id>@<andrew_id>-db.qatar.cmu.local`)
- Install JDK 7 (`apt-get install openjdk-7-jdk`)
- Install Tomcat 7 (`apt-get install tomcat7 tomcat7-admin`)
- Check that Tomcat is running
 - Type `service tomcat7 status`, or
 - Browse to `<andrew_id>-db.qatar.cmu.local:8080`
- Manually start/stop/restart Tomcat
(`service tomcat7 start/stop/restart`)
- Deploy your application “cmuqflix” in Tomcat’s webapp
(`cp cmuqflix /var/lib/tomcat7/webapps`)
- View Tomcat’s log files (for debug info.)
(`cd /var/log/tomcat7; cat *;`)

Java Servlets

What are Servlets?

- A servlet is primarily Java code that executes some application logic and produces HTML output
- A servlet can:
 - Interact with databases (using JDBC)
 - Generate custom HTML pages (as output)
 - Maintain session information for each client

Creating a Servlet

- A web-based servlet must:
 - Extend the ***HTTPServlet*** abstract class
 - Override the ***doGet*** and/or ***doPost*** functions
(to respond to get and post HTTP requests)
- The web-server (i.e. Tomcat) transparently invokes ***Service*** to determine the type of HTTP request made

Methods defined in the HttpServlet Abstract Class*

```
void doGet ( HttpServletRequest request, HttpServletResponse response )
```

```
void doPost ( HttpServletRequest request, HttpServletResponse response )
```

```
void Service( HttpServletRequest request, HttpServletResponse response )
```

* Note that all the above functions can throw *ServletException* and *IOException*

Request and Response Classes

- Class **HttpServletRequest** provides methods :
 - getParameter, getParameterNames, getParameterValues, getCookies, getSession
- Class **HttpServletResponse** provides methods:
 - addCookie, getOutputStream, getWriter, setContentType

Integrating a Servlet with Tomcat

- Define the new servlet (e.g., *newservlet.java*) under `cmuqflix/WEB-INF/src`
- Compile *newservlet.java*
`javac -cp /usr/share/tomcat7/lib/servlet-api.jar newservlet.java`
- Copy `newservlet.class` to `cmuqflix/WEB-INF/classes`
- Define the new servlet in `cmuqflix/WEB-INF/web.xml`

JavaServer Pages (JSPs)

What are JSPs?

- A JavaServer Page (JSP) is primarily HTML that embeds java code to perform some application logic
- JSPs serve the same purposes as servlets

Servlets vs. JSPs

- Use servlets for:
 - Simple HTML
 - Complex application logic
- Use JSPs for:
 - Complex HTML
 - Simple application logic