INTRODUCTION TO WEB SERVERS AND SERVER PRODUCTS

For Class- B.Pharmacy 2nd Semester

Subject- COMPUTER APPLICATIONS IN PHARMACY (BP205T)

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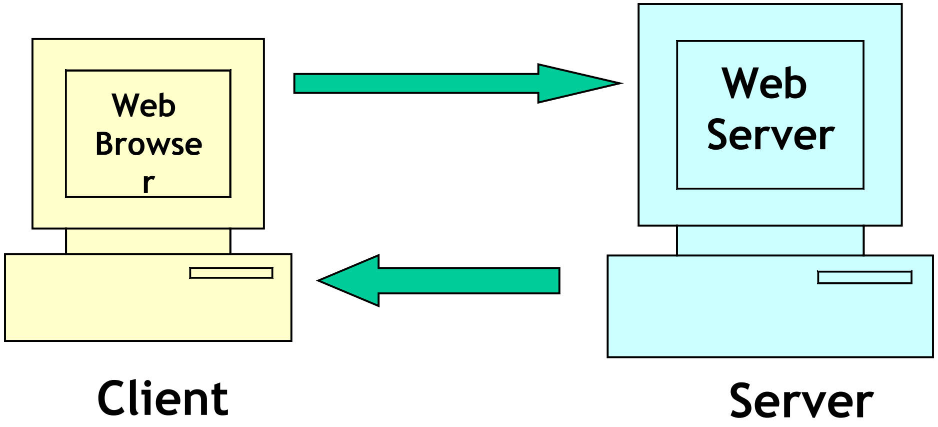
Introduction



A web server is specialised software that responds to client (I.e. web browser) requests

Every web site requires a web server to process client requests and 'serve up' the pages

Web servers used to service Internet, intranets and extranets

Note that web server in this context is software. Server machine is also referred to as the web server.

System architecture

A web server is part of a multi-tier application (also called n-tier application

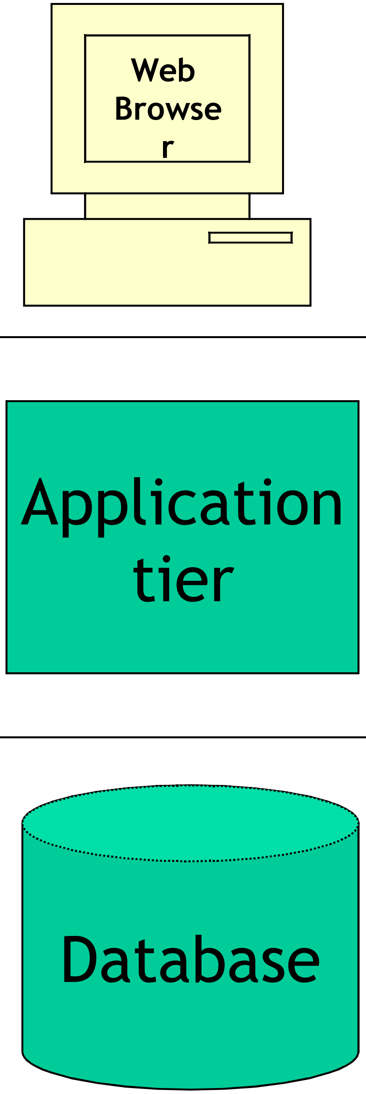
Functionality is divided into separate tiers or groupings

Tiers can be on same computer or on separate computers

Web applications are often three tiered:

- Information tier (also called data tier)
- Middle tier
- Client tier (user interface tier)

Common web system architecture



Client tier

Application User interface. The client interacts with the middle tier to make requests and to retrieve data from the information tier

Middle tier

Controls the interactions between the application clients and application data. Enforces business rules. implements presentation logic. **Web server** typically supports this tier.

Information tier

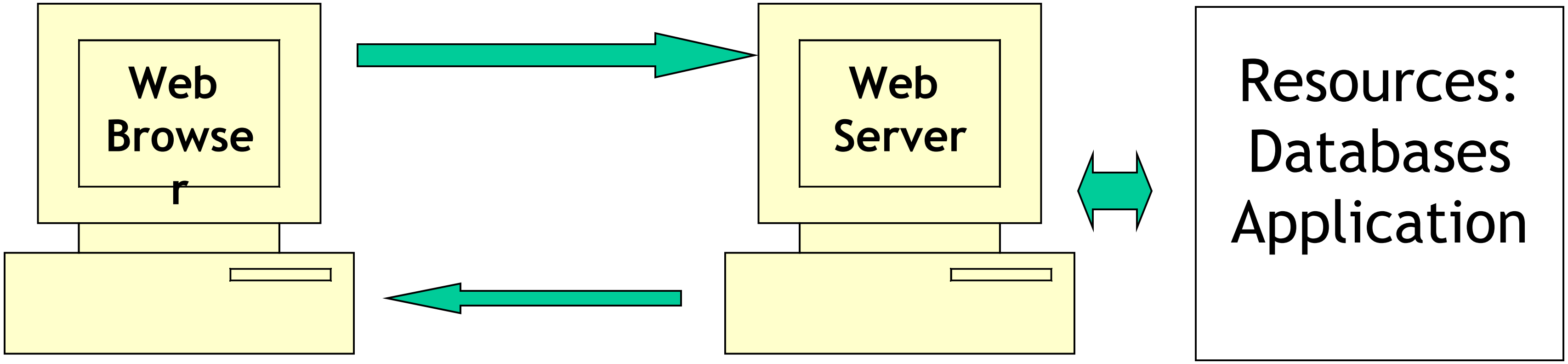
Maintains data for the application. Data typically stores in a relational database management system (RDBMS)

Hyper Text Transfer Protocol

Request

e.g. “*Get* me a webpage”

“*Post* this data to the server”



Web Browse r

Web Server

Resources: Databases Application

Client

Response

Server

e.g. “here’s the web page”

Basic function of web server is to act as **HTTP server**

Web servers communicate with clients using a Response-Request protocol: HTTP

Client-Server model and HTTP

- A request is generated by a client (by browser software)
  - Most common requests are “Get” and “Post”
- Request reaches the appropriate web-server
- Request is processed by the web-server
- A response is formulated by the web server and sent back to the client (e.g. web page contents)

Client-Server model and HTTP

- HTTP is the de facto standard for transferring World Wide Web documents

- Usually to port 80

- HTTP messages (requests and responses) between client and server are human readable

Http: Requests from client

- Request
  - Get resource
  - Type of browser
  - Name of host
  - etc
- First line is request-line. Contains the nature of the Request   e.g.
  - GET: Get a file from the server
  - POST: Post data to the server
  - PUT: Store some resource

Http: Requests from client: HTML Examples

```
<body>

  <form method= “post” action =“process.jsp”>

     Word to look up: <Input type = text Name =
   “word”>

   <input types = “submit”>

  </form>

</body>
```

HTML code
for a form

Indicates a **post** request
Data in form is posted to the server

Http: Requests from client: HTML Examples

```
<body>

  <form method= “get” action =“process.jsp”>

     Word to look up: <Input type = text Name =
   “word”>

   <input types = “submit”>

  </form>

</body>
```

HTML code for a form

Indicates a **get** request
Not usually used for forms
Sends any parameters in the query string as www.hostname?name=word& etc

Http: Response from web server

- Response
  - 200 = Status code
    - All’s well
  - Type of server
  - Other contents etc

```
HTTP/1.1 200 OK
Date: Thu, 22 July 1998 18:40:55 GMT
Server: Apache 1.3.5 (Unix) PHP/3.0.6
Last-Modified: Mon, 19 July 1997 16:03:22 GMT
Content-Type: text/html
Content-Length: 12987
...
```

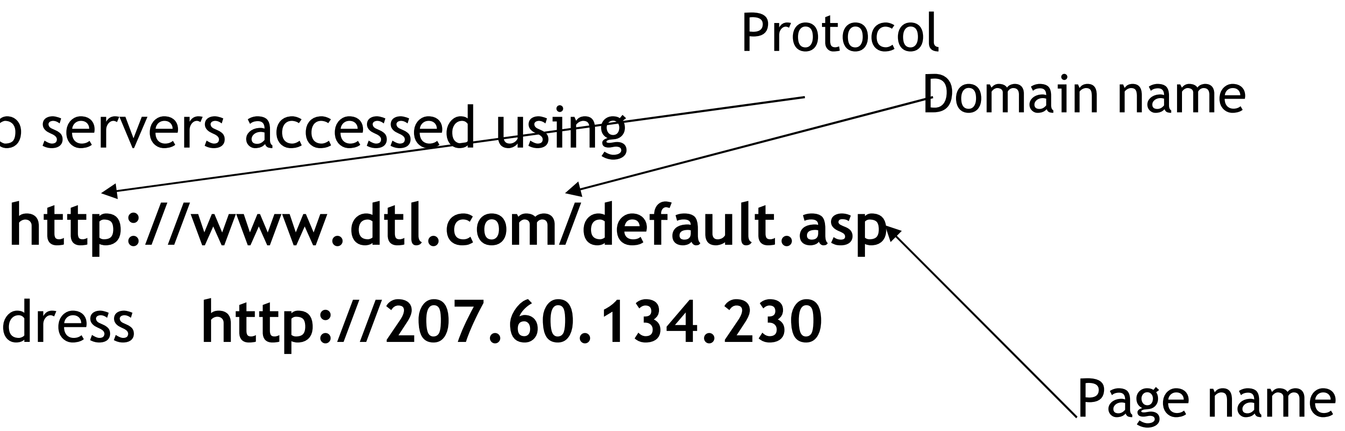
HTTP Response Status Codes

- 1XX: Provide information to the client
- 2XX: Correct response has occurred.
- 3XX: Browser must carry out some further action in order for the request to be successful. For example, the code 301 indicates that the resource that was requested has been permanently moved to another location.
- 4XX: Something has gone wrong; for example, the most frequent status code that is returned is 404 which indicates that the resource that has been requested cannot be found.
- 5XX: Server has experienced a problem. For example, the status code 503 indicates that the service requested has not been able to be carried out.

Accessing web servers

- Must know host name on which web server resides

- Remote web servers accessed using
  - URL: **http://www.dtl.com/default.asp**
  - OR IP address **http://207.60.134.230**



- Local web servers (on same machine) accessed using machine name or *localhost*

web server functionality

- HTTP Server (at a minimum)

But usually includes many other functions such as:

- File Transfer Protocol (FTP) server
- Simple Mail Transfer Protocol (SMTP) server (for Email)
- Web development and publishing functionality
- Support for specific server side technologies e.g. JSP, SSIs
- Security features
- And more

Leading web servers

Server	*Vendor*	*Comment*
IIS (Internet Information Server)	Microsoft	Bundled with Windows operating system. Supports Active Server Pages
Apache	Freeware	Free. Most used web server.
Netscape	Netscape	Free. High performance. Compatible with Unix or Windows OSs

Leading web servers

Server	*Vendor*	*Comment*
Domino	IBM	Supports multiple operating systems. About $500
ONE webserver	SUN	Cost about $1500. Supports multiple operating systems.
Sambar	Freeware	Free
Zeus	Zeus	About $1,500

Plus hundreds more…. E.g. Blazix

See
ttp://www.macronimous.com/resources/web_servers_demystifyed.asp
http://www.serverwatch.com/tutorials/article.php/1363221

Market Share for Web Servers

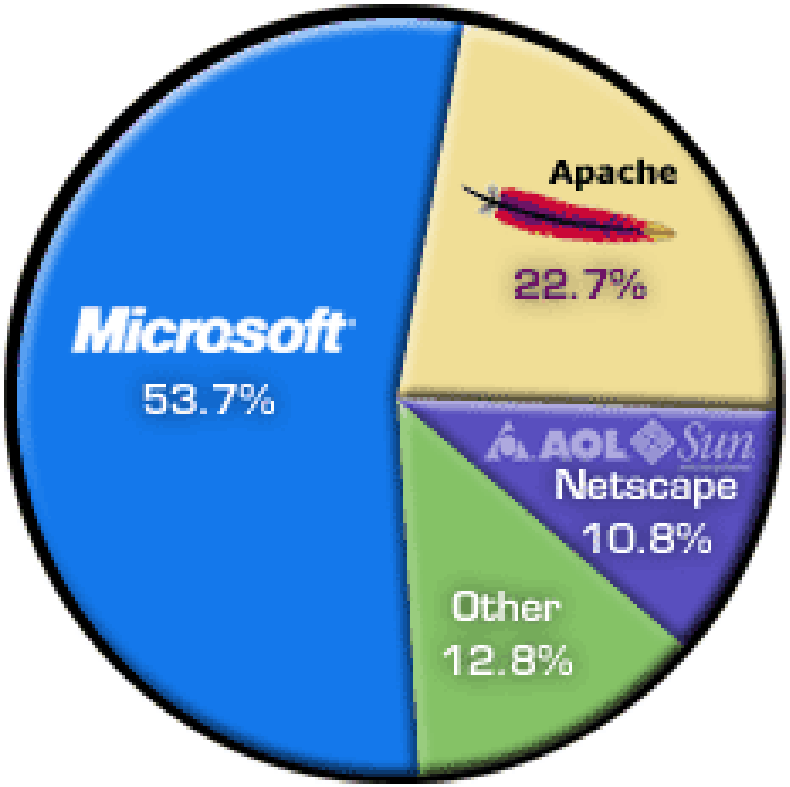
Developer	July 2005	Percent	August 2005	Percent	Change
Apache	47030635	69.60	48895205	69.46	-0.14
Microsoft	13871645	20.53	14384006	20.43	-0.10
Sun	1842812	2.73	1864788	2.65	-0.08
Zeus	608121	0.90	580675	0.82	-0.08

Source: http://news.netcraft.com/archives/2005/08/01/web_server_survey_turns_10_finds_70_million_sites.html

70 million domains surveyed

Web server market share top 1000 companies

Source: http://www.port80software.com/surveys/top1000webservers/ May 2005



Microsoft IIS	53.7%
IIS 5.0	38.5%
IIS 6.0	12.8%
IIS 4.0	2.4%

Netscape	10.8%
Enterprise 6.0	5.5%
Enterprise 4.1	3.9%
Enterprise 3.6	0.9%
Enterprise 4.0	0.3%
Other	0.2%

Other Servers	12.8%
Sun One	2.6%
Lotus Domino	1.5%
IBM	0.9%
WebLogic	0.7%
WebSphere	0.6%
Zeus	0.1%
Other	2.9%
Unknown	3.5%

Apache	22.7%
Apache 1.3.27	3.3%
Apache 2.0.46	1.2%
Apache 2.0.50	1.3%
Apache 1.3.26	1.0%
Apache 1.3.29	1.0%
Apache 1.3.31	1.0%
Apache 1.3.33	1.0%
Apache 1.3.28	0.7%
Apache 1.3.20	0.5%
Apache 1.3.12	0.4%
Apache 1.3.19	0.4%
Apache 2.0.40	0.4%
Apache 2.0.52	0.4%
Apache 1.3.9	0.3%
Apache 2.0.49	0.3%
Apache 2.0.44	0.2%
Apache 2.0.48	0.2%
Apache Coyote	0.4%
Apache Tomcat	0.2%
Apache Other	4.7%
Apache Variants	3.8%

Survey of top 1000 companies
Conclusions?

Comparisons

Server	*Performance*	*Reliability*	*Ease of Use*	*Support*
IIS	9	9	8	8
Apache	10	10	6	9
Netscape	9	10	8	8
Sambar (features)	8	10	10	2

Source: serverwatch.com

Selecting a web server

Various criteria

Performance

e.g. how many client requests per second can be processed? Load balancing?

Reliability

How robust is the web server? How liable to crash? How easily recovered?

Ease of Use

How easy to set up , administer, learn?

Support

What support is provided by the

vendor?

Selecting a web server (cont.)

Price

How must does it cost to

buy and maintain?

Security

What security functionality

is offered? e.g. SSL?

Functionality

- **server side techologies supported?**

(as add-ons? - e.g. TomCat for Apache)

e.g. ASP? JSP? CGI? etc

- **Logging**
- **Proxy server**

Operating system

What operating system(s) does the web server support?

See http://www.serverwatch.com/tutorials/article.php/1363221 for examples of assessments

Proxy servers

Proxy server: specific purpose web server:

In an enterprise that uses the Internet, the **proxy server** is like a “buffer” between user computers’ and the Internet.

The proxy server sits between the users’ workstations and the Internet so that the enterprise can ensure security and improved
performance. It intercepts all requests to the real server to see if it can fulfill the requests itself. If not, it forwards the request to the real server.

Proxy Servers

- **Improved performance** -→ caching reduces external requests (View/Refresh forces external request)

- **Security** → filters requests/ firewall

Web servers

- More details on examples of web servers
- IIS
- Apache
- Blazix

Internet Information Server

- IIS – supplied by Microsoft

- Enterprise level web server

- Popular with large corporations

- Must run on Windows operating system

- Usually associated with web applications built using Active Server Pages

- Also supports CGI and Server side includes

- Scaled down version of IIS is called Personal Web Server (PWS) – good for small businesses, individuals

Apache web server

Most popular web server (almost 70% of all web sites use it – Apache.org July 2005)

Freeware.

Frequent updates. Maintained by the Apache Software Foundation - Website www.apache.org Welcome! - The Apache Software Foundation.htm

Runs on Unix, Linux and Windows operating systems

Supports a range of server-side technologies, but can require additional software installation

To support Java server pages, need **Tomcat** with Apache

Blazix web server

- Lightweight web server (about 1.5M)
- Supports java technologies (JSP, servlets etc
- Similar to Tomcat in configuration and interface see directories..
- Freeware
- Limited support
- Available at www.blazix.com

Apache web server: Tomcat

To support java server pages, require additional software:
Tomcat

Tomcat is a free open source implementation of java server pages and java servlets, developed as part of the Jakarta project under the Apache Software Foundation

Tomcat can be used with Apache web server, or in standalone mode

(It can also be installed to work with IIS or Netscape..)

More info at:
http://www.ccl.net/cca/software/UNIX/apache/tomcatfaq.shtml

Tomcat Operation

- To use Tomcat web server working need to know about:
- Environment variables
- How to start and stop the server
- How to configure Tomcat to pick up web files from your directory

Tomcat Installation

Should be installed on lab machine but may want to install to zip drive

Extract source zip file into a directory on hard disk. Default directory is jakarta-tomcat-*version#*.

A set of subdirectories are automatically created (bin, conf, doc etc)

Tomcat uses two environment variables:

environment variables   JAVA_HOME and CATALINA_HOME

point to directory containing
JDK I.e. c:\jdk.1….

point to directory containing

Tomcat

c:\jakarta…etc

Access through MS-DOS
Or control panel

Tomcat environment variables

- *Java_home* points to directory in which jdk is held
- *Catalina_home* points to tomcat directory
  (e.g. c:\apache\tomcat 5.0) - in Tomcat version 5, it should be automatically created.
- Both can be set through DOS
  e.g. `set Java_Home=C:\jdk1.4…..`
- Will need to do this if either is incorrect on your machine OR if you're installing Tomcat to a ZIP or USBkey drive.
- If installing to ZIP or USB key drive, could edit the startup.bat command so that it always sets the environment variables correctly (by adding the two SET commands)

Tomcat - Starting up

From DOS prompt, go to directly where TomCat is installed e.g. `C:\jakarta-tomcat-….`

Go to the subdirectory `\bin`

To START: Type: `startup` into the DOS prompt

This will start up Tomcat in another DOS window.

Tomcat server executes on TCP port 8080 (in case another server is using the default port 80)

Tomcat - Test/Stop

To TEST: To test Tomcat, in browser type URL:

http://localhost:8080/

(or http://127.0.0.1:8080/)

This will access the Tomcat documentation welcome page if server working properly

To STOP Tomcat when it is running : type `shutdown`

at DOS prompt

To configure Tomcat to find web files from your directory(e.g. U:\ drive)

- By default, Tomcat looks in its own WEBAPPS directory for web application files (e.g. jsps, html etc)

- To hold application files elsewhere, need to edit the *server.xml* configuration file (in the \conf directory) to look in alternate location. Both <host> and <context> element need to be changed -

- Always make a backup of server.xml before changing!

To point Tomcat to directories other than default (e.g. u:\ drive)

(1) In server.xml:

- … change Host name parameter appbase from ‘webapps’ to the preferred directory you want (e.g. U:/webapps)

-
  ```
  <Host name="localhost" debug="0"
  appBase=“u:\webapps" reloadable =
  "true"
  ```

To point Tomcat to directories other than default (e.g. u:\ drive)

(2) In server.xml:
Add a <context> element just under the <host element…

(A context represents a web application).. If you set up 20 web applications, might need 20 different context elements within Tomcat.

```
<Context docBase=“U:/webapps" path="">
</Context>
```

Tomcat - to set up an application directory

To create a new web application (e.g. survey) in your web application directory Tomcat directory :

1. create a subdirectory of your WEBAPPs directory in which to hold the web application files. e.g.

```
> u:\webapps\survey
```

This directory is now the top level directory for the web application SURVEY, accessed as

```
  http://www.somedomainname/survey/
```

Tomcat - setting up an application directory

1. Create a special subdirectory of your web application directory called WEB-INF. Special configuration files (e.g. Web.xml) are stored in this. Don't need the files now – but DO need the directory.

```
> f:\webapps\survey\WEB-INF
```

3. Test server by putting a html file into the main application directory (e.g. survey) and call it from browser

```
http://locahost:8080/survey/htmlfilename..
```

Typical Tomcat installation problems

- Environment variable java_home incorrect
- Not putting 8080 in URL (http://localhost:8080)
- Not configuring server.xml to look at correct location of your web files
- Not starting the server…
- Not re-starting the server when you've added/ changed your files
- Not re-setting the environment variables when DOS session re-started