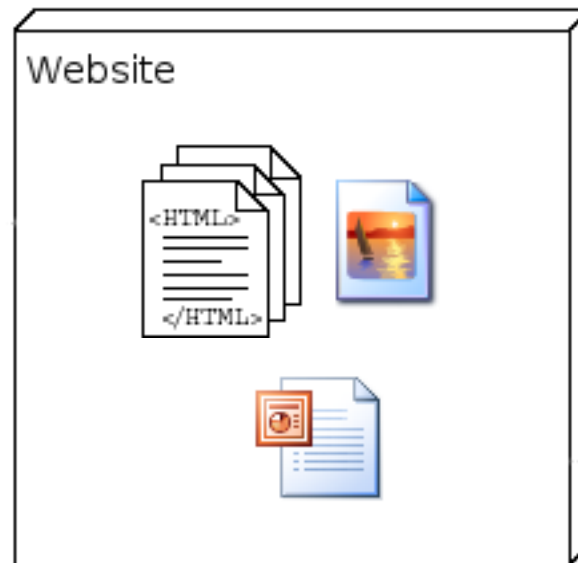




Web Component Development with Servlets & JSPs, Java EE 6

- ◆ In this session, you will learn to:
 - ◆ Describe website and Web application
 - ◆ Describe Hypertext Transfer Protocol (HTTP)
 - ◆ CGI
 - ◆ Java Servlet
 - ◆ Java server pages

- ◆ A website is a collection of files stored on a server.
- ◆ A website consists of:
 - ◆ HTML pages
 - ◆ Graphic files
 - ◆ Other static files



◆ A Web application:

- ◆ Is a program that executes on a server.
- ◆ Is accessed from a Web browser using various protocols, such as HTTP.

◆ To access a Web application:

- ◆ A client sends a request to the server.
- ◆ The server processes the request, generates the response, and sends the response to the client.

◆ Web server

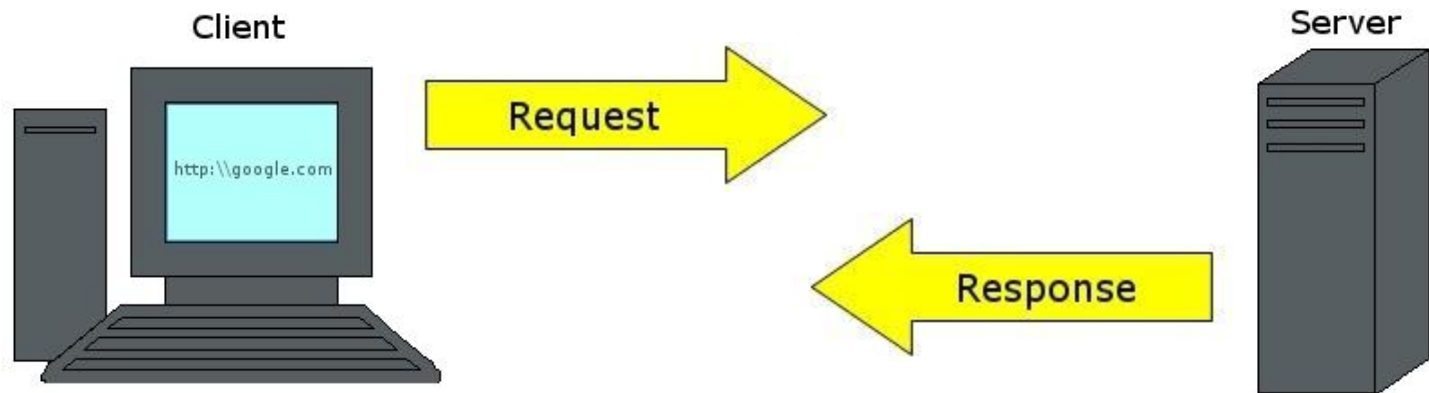
A Web server handles the HTTP protocol. When the Web server receives an HTTP request, it responds with an HTTP response. a Web server may respond with a static HTML page or image, send or redirect, or delegate the dynamic response generation to some other program such as CGI scripts, JSPs (Java Server Pages), Servlets, ASPs (Active Server Pages)

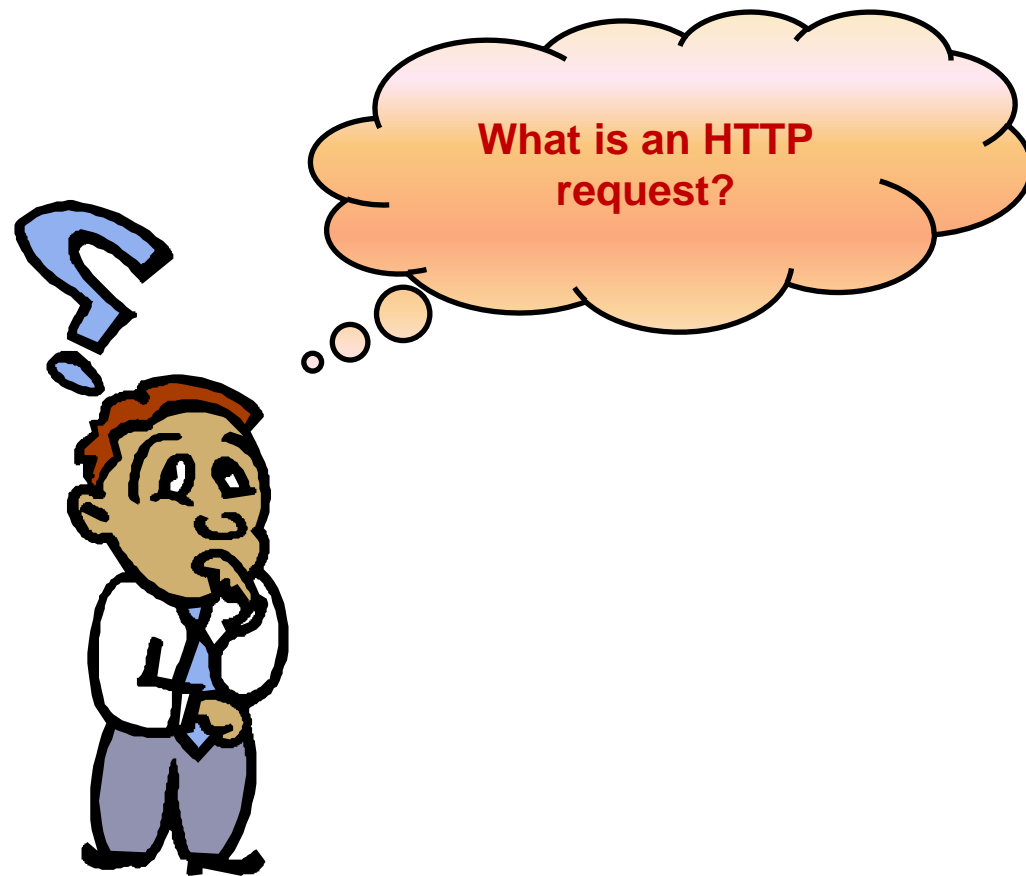
◆ Application Server :

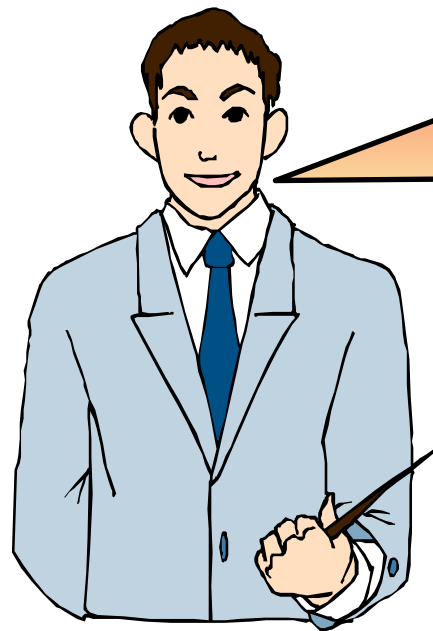
An application server exposes business logic to client applications through various protocols like HTTP, TCP-IP etc. An application server provides allows the client to access the business logic for use. The application server is used to run business logic or dynamically generating presentation code. An application server is more capable of dynamic behavior than web server.

- ◆ Is a protocol that is used by a client and a server to communicate with each other.
- ◆ Supports only one request per connection.
- ◆ Can be used to transmit any file that follows the Multipurpose Internet Mail Extensions (MIME) specification.
- ◆ Uses the request and response process to transfer information from one computer to another

- ◆ The following figure shows the HTTP request and response process.

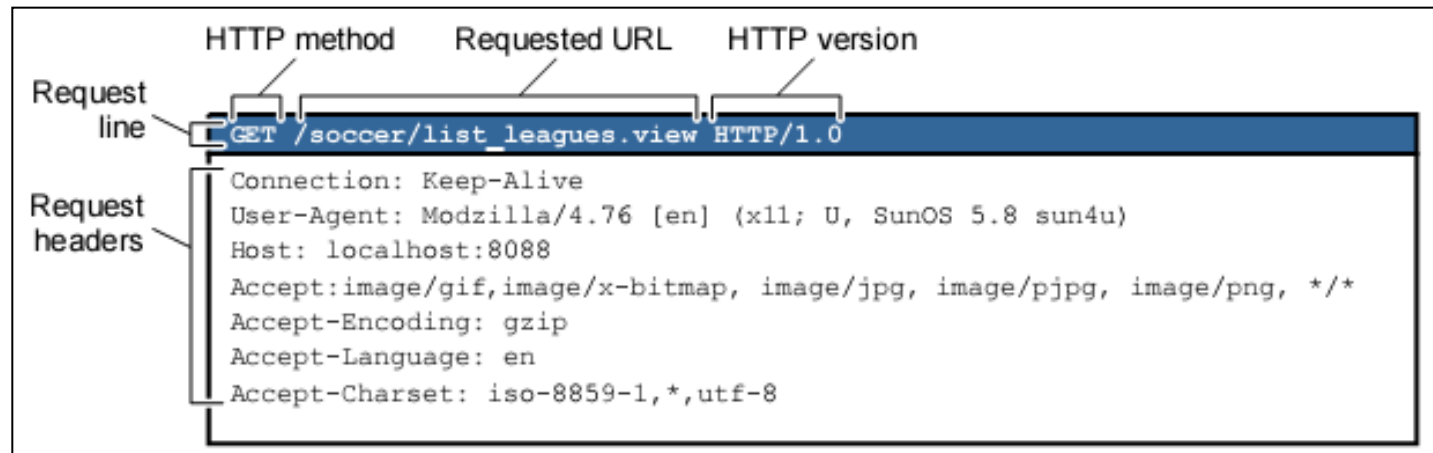






HTTP request is like an envelope, which contains the necessary information required by the Web server to process a client request.

- ◆ The following figure describes an HTTP request.



- ◆ An HTTP request consists of:
 - ◆ Request line
 - ◆ Request headers

- ◆ Request line includes:
 - ◆ HTTP method
 - ◆ Requested URL
 - ◆ HTTP protocol version number
- ◆ Request headers are used to determine the method that a Web server uses to process a request.
- ◆ The following table lists the request headers and their use.

<i>Header</i>	<i>Use</i>
<i>Accept</i>	<i>The MIME types the client can receive</i>
<i>Host</i>	<i>The internet host and port number of the resource being requested</i>
<i>Referer</i>	<i>The address from which the Request-Universal Resource Identifier (URI) was obtained</i>
<i>User-Agent</i>	<i>The information about the client originating the request</i>
<i>Connection</i>	<i>The connection options that are desired by the sender for that particular connection.</i>

◆ The various HTTP methods are:

◆ OPTIONS

Request for the communication options available on the request / response chain

◆ GET

Request to retrieve information identified by the request URI

◆ HEAD

Identical to the get Except that it doesn't return a message-body, only the headers

◆ POST

Request for the server to accept the entity enclosed in the body of the HTTP message

◆ PUT

Request for the server to Store the entity enclosed in the body of the HTTP message

◆ DELETE

Request for the server to delete the resource identified by request -URI

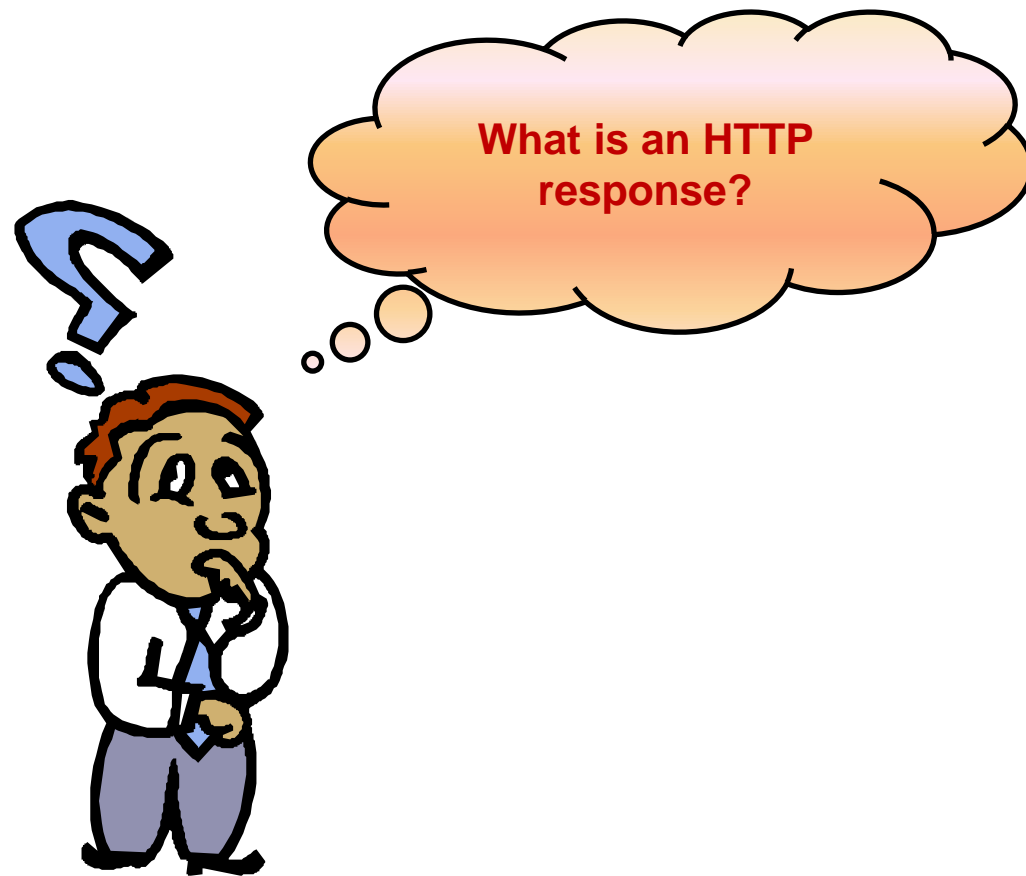
◆ TRACE

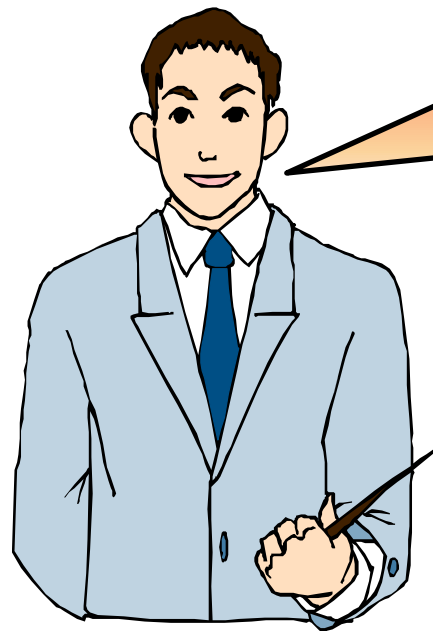
Request for the server to invoke an application -layer loop-back of the request message

◆ CONNECT

Reserve for use with a proxy that can switch to being a tunnel

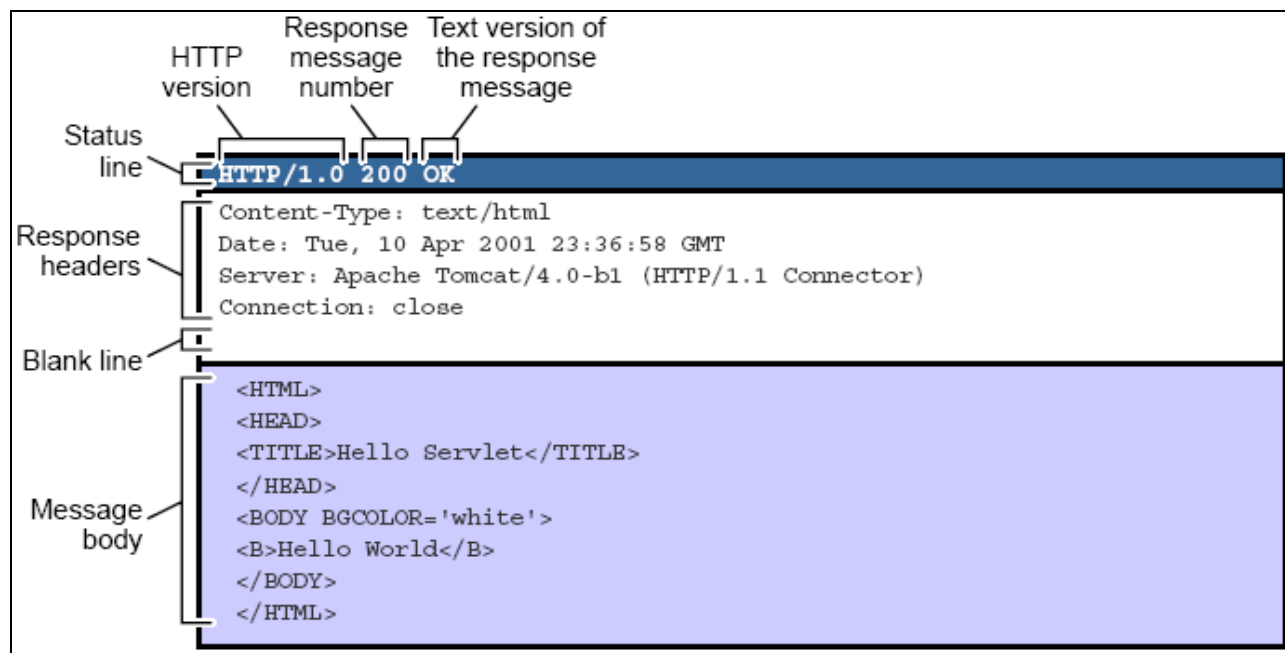
- ◆ The two most common HTTP methods are:
 - ◆ GET
 - ◆ POST
- ◆ GET method is used when a user:
 - ◆ Clicks a hyperlink.
 - ◆ Enters a Universal Resource Locator (URL) in the browser's address bar.
- ◆ POST method is used when:
 - ◆ Amount of form data is large.
 - ◆ Content of the request should not be visible in the URL.





HTTP response is like an envelope that contains the response generated by a server that would be displayed by a Web browser.

◆ The following figure describes an HTTP response.



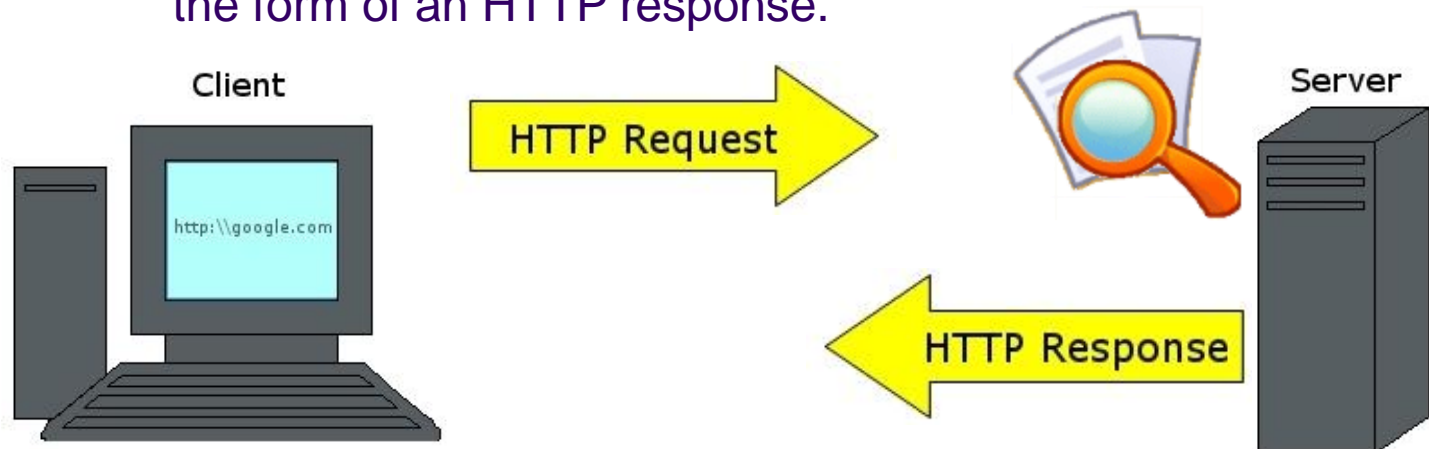
- ◆ The HTTP response consists of:
 - ◆ Status line
 - ◆ Response headers
 - ◆ Blank line
 - ◆ Message body

- ◆ **The HTTP response consists of:**
 - ◆ Status line
 - ◆ Response headers
 - ◆ Blank line
 - ◆ Message body
- ◆ Response headers are used to determine the method that a Web browser uses to process the response and display it to a user.
- ◆ **The following table lists the response headers and their use.**

<i>Header</i>	<i>Use</i>
<i>Content-Type</i>	<i>A MIME type (such as text/html) which classifies the type of data in the response</i>
<i>Content-Length</i>	<i>The length (in bytes) of the payload of the response</i>
<i>Server</i>	<i>An informational string about the server that responded to this HTTP request</i>
<i>Cache-Control</i>	<i>The information about the client originating the request</i>

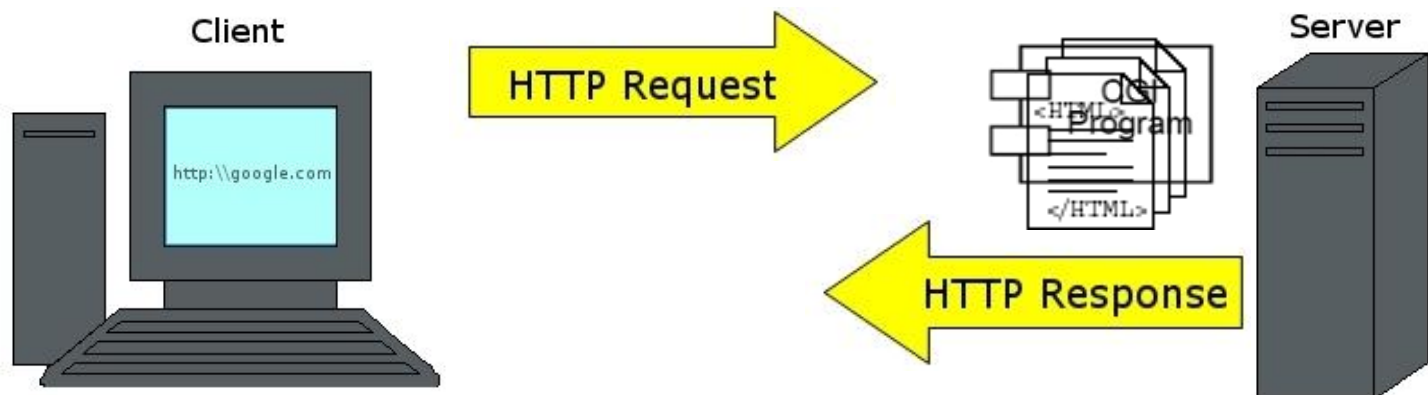
◆ **In the HTTP client-server architecture:**

1. The client sends an HTTP request for a resource to a Web server.
2. The Web server searches for the requested resource.
3. The Web server sends the requested resource to the client in the form of an HTTP response.



- ◆ Some of the commonly used Web application technologies are:
 - Common Gateway Interface (CGI)
 - Java Servlets
 - Java Server Pages (JSP)
 - Java Server Faces(JSF)

- ◆ CGI is a technology used to build Web applications.
- ◆ CGI programs are executed in the following way:
 1. The client sends a request to the server.
 2. The server launches the CGI program in a separate Operating System (OS) shell.
 3. The CGI program processes the data and sends the response to the client as HTML.



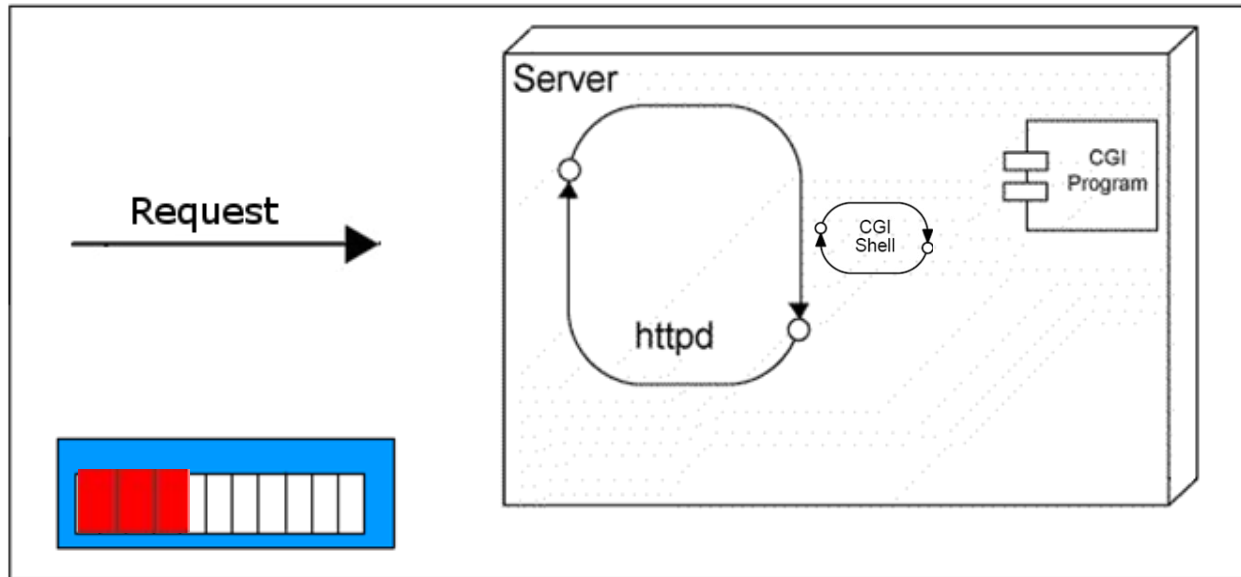
➤ Advantages of CGI programs are:

- They can be written in various languages, such as Perl.
- They do not crash a server if there are bugs in the program.
- They do not cause concurrency conflicts.

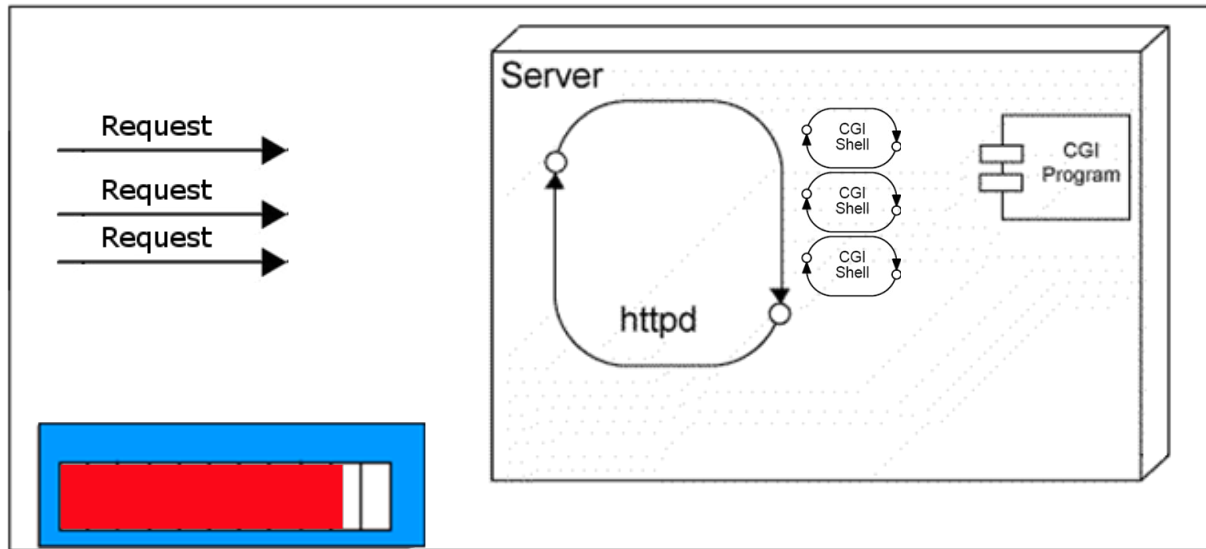
➤ Disadvantages of CGI programs are:

- Response time is high due to the creation of new OS shell for each request.
- They are not scalable due to the limited number of OS shells that can be created on a server.
- Languages used for CGI programs are often platform dependent.
- Most of the programming languages used for CGI are not object oriented.
- There is no separation of business logic and presentation logic.

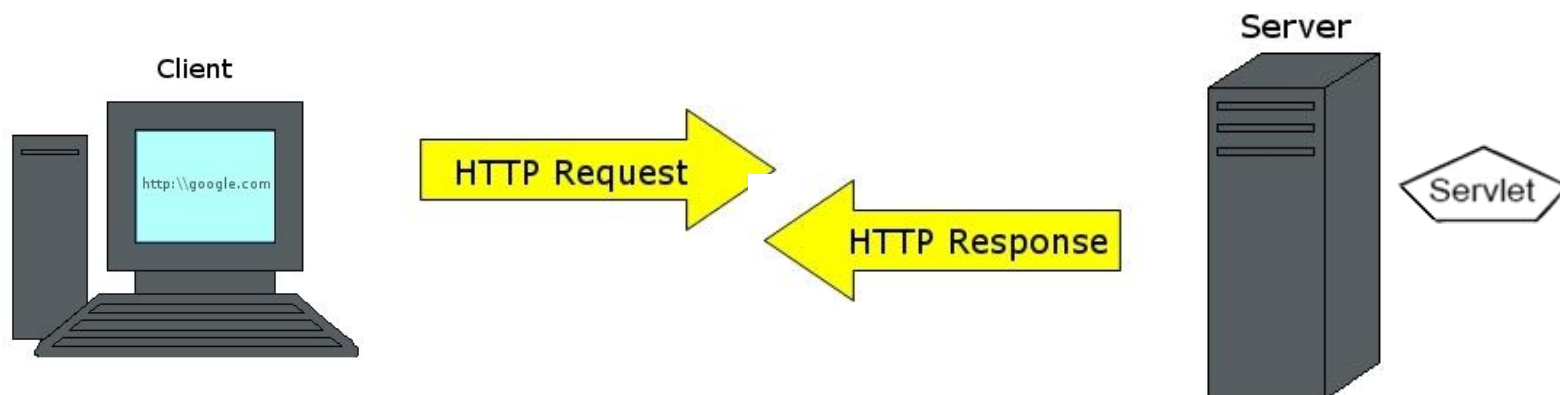
- ◆ The following figure shows the server load while executing a CGI program for a single request.



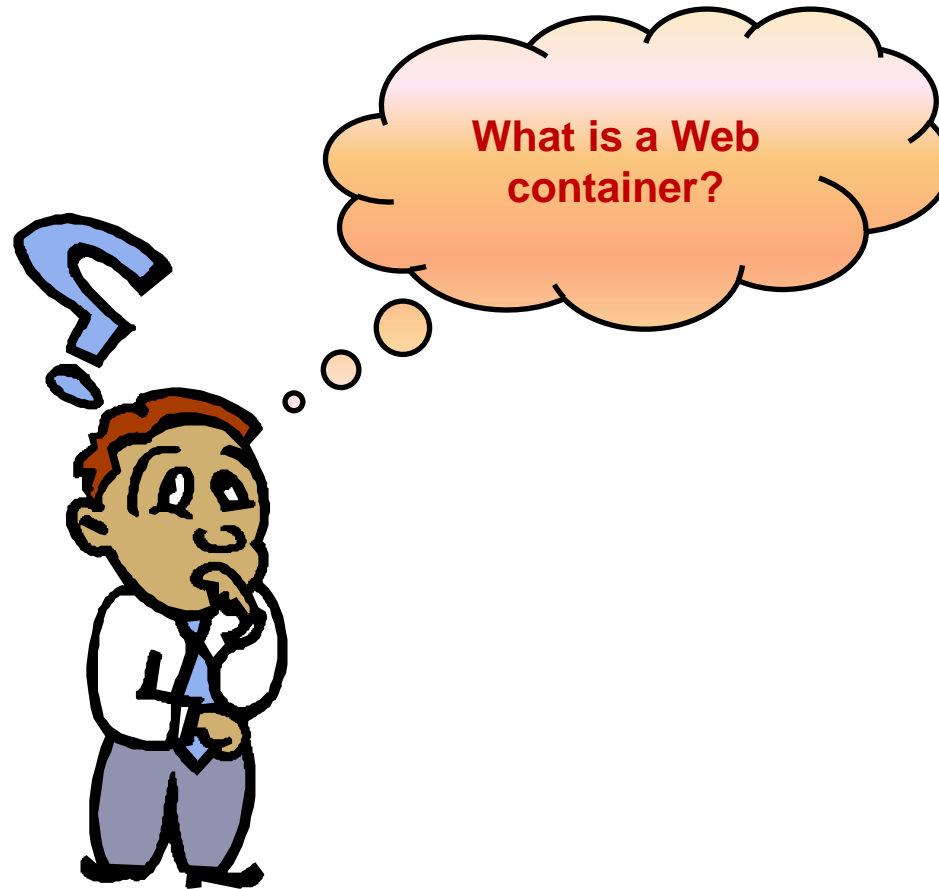
- ◆ The following figure shows the server load while executing a CGI program for multiple requests.



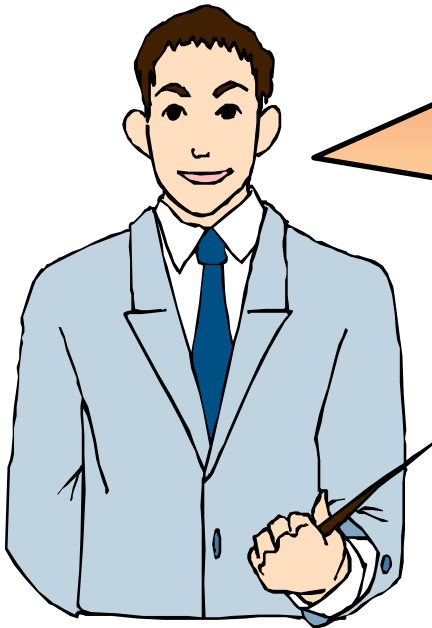
- A Servlet is a Java program that runs on a server.
- A Servlet performs the following tasks:
 - Processes HTTP requests
 - Generates dynamic HTTP responses
- A servlet is similar to a CGI program, but executes inside a Web container as a thread.



What is a Web Container?

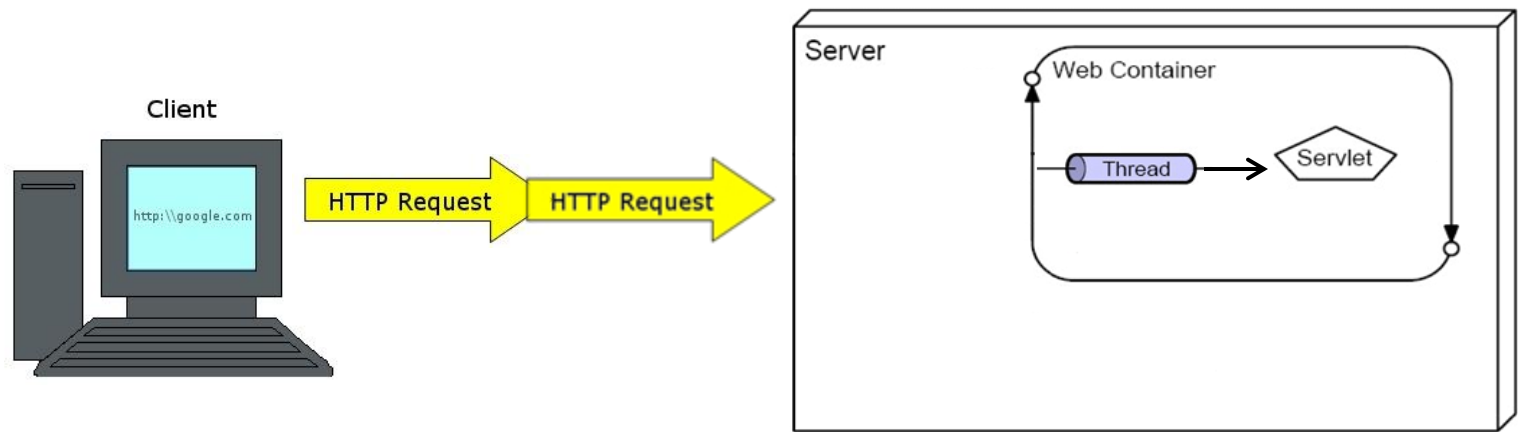


What is a Web Container ?

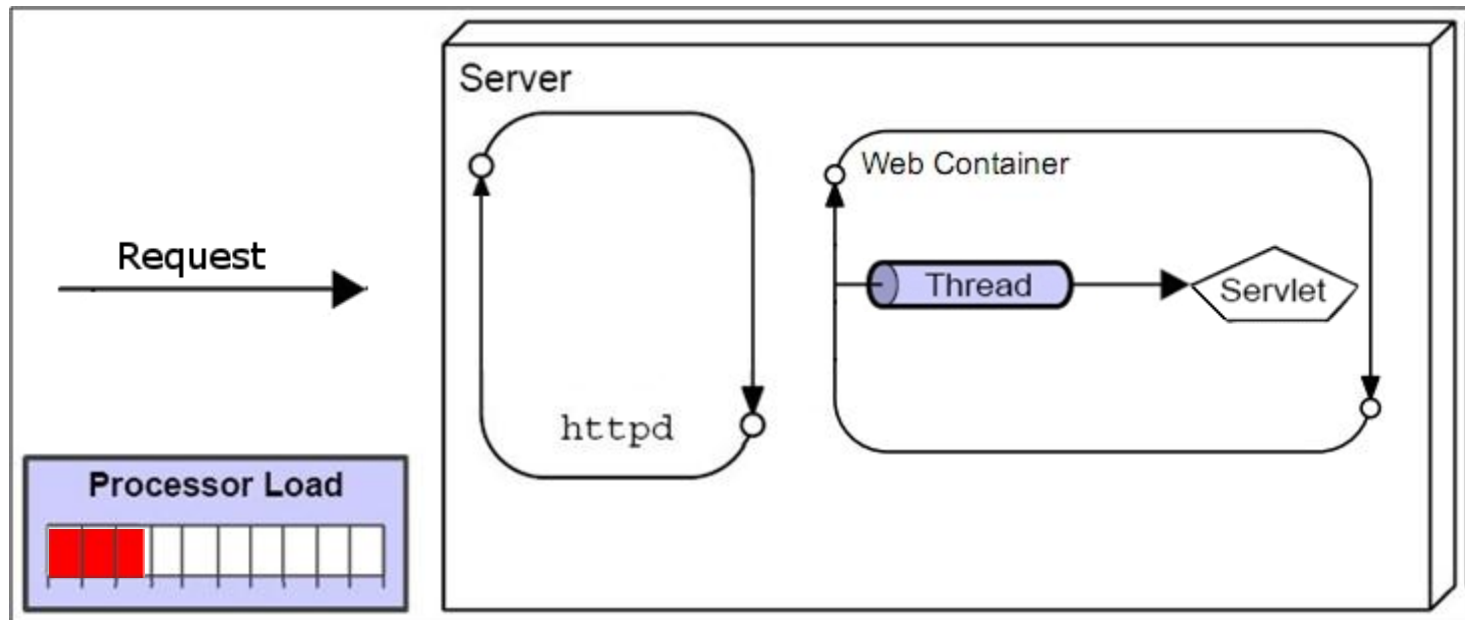


- The web container is a java virtual machine that supplies an implementation of the java Servlet API.
- All java Servlets must Exist in Web container.
- Web Container activate the Servlet that match to request.

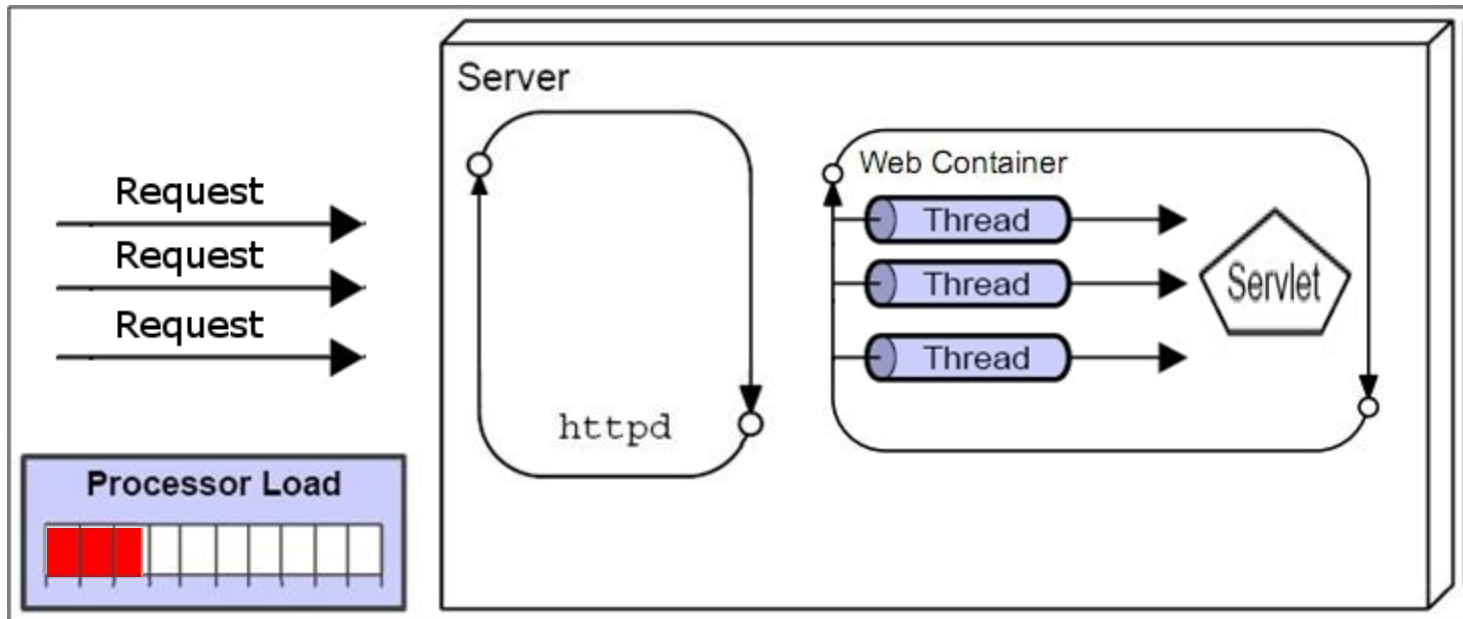
- ◆ A servlet executes in the following way:
 1. The client sends request to the server.
 2. The Web container, running inside the server, receives the request.
 3. The Web container creates a new thread to process the request.
 4. The Web container forwards the request to the servlet.
 5. The Web container executes the servlet.



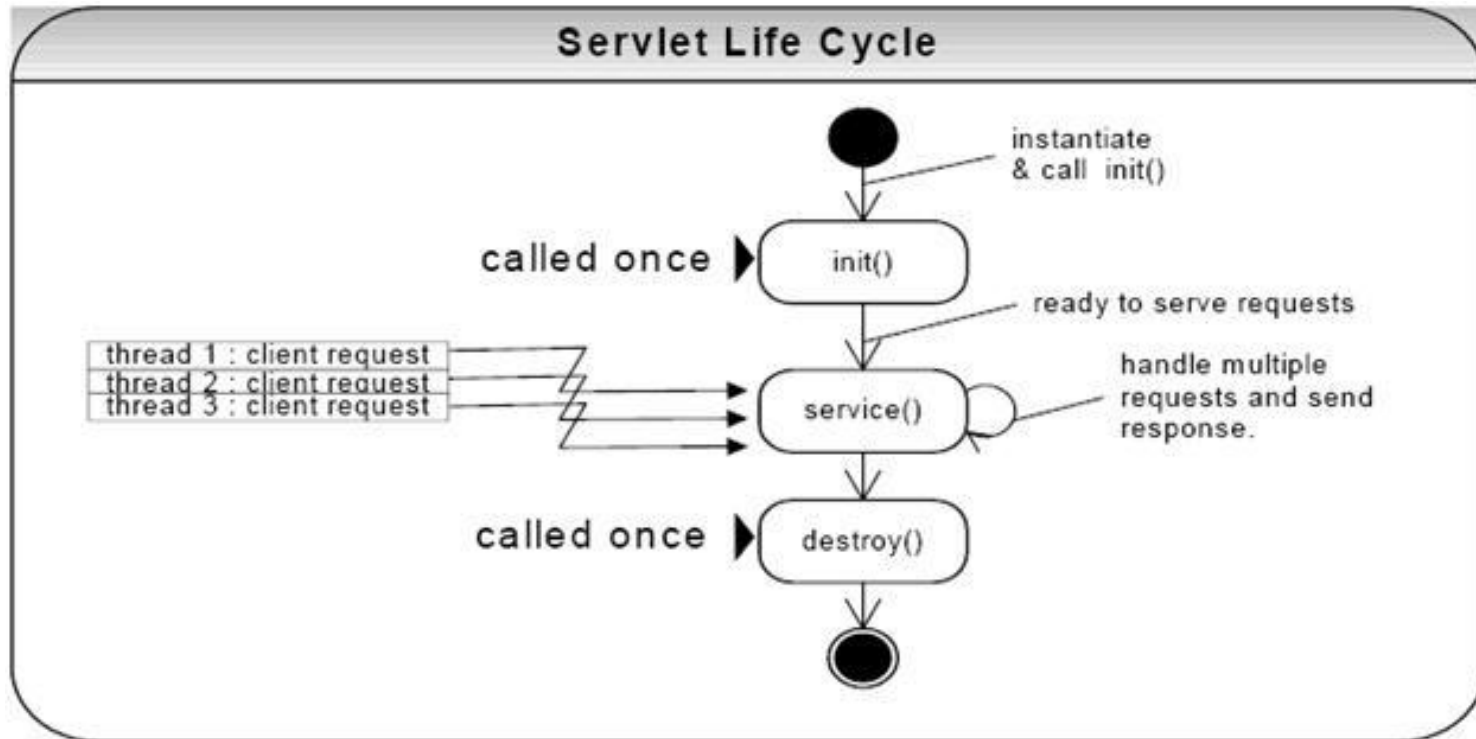
- The following figure shows the execution process of a Servlet with a single request.

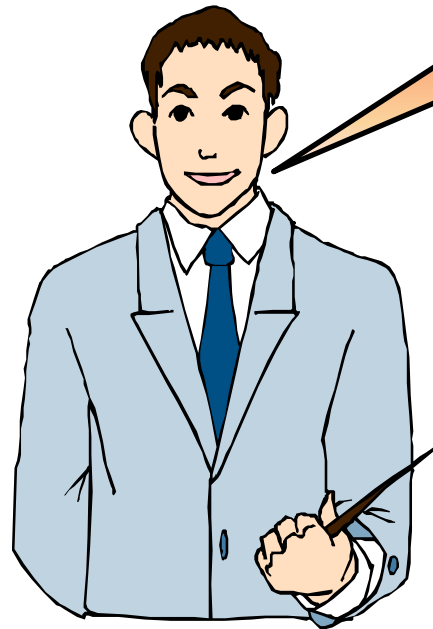


- The following figure shows the execution process of a servlet with multiple requests.

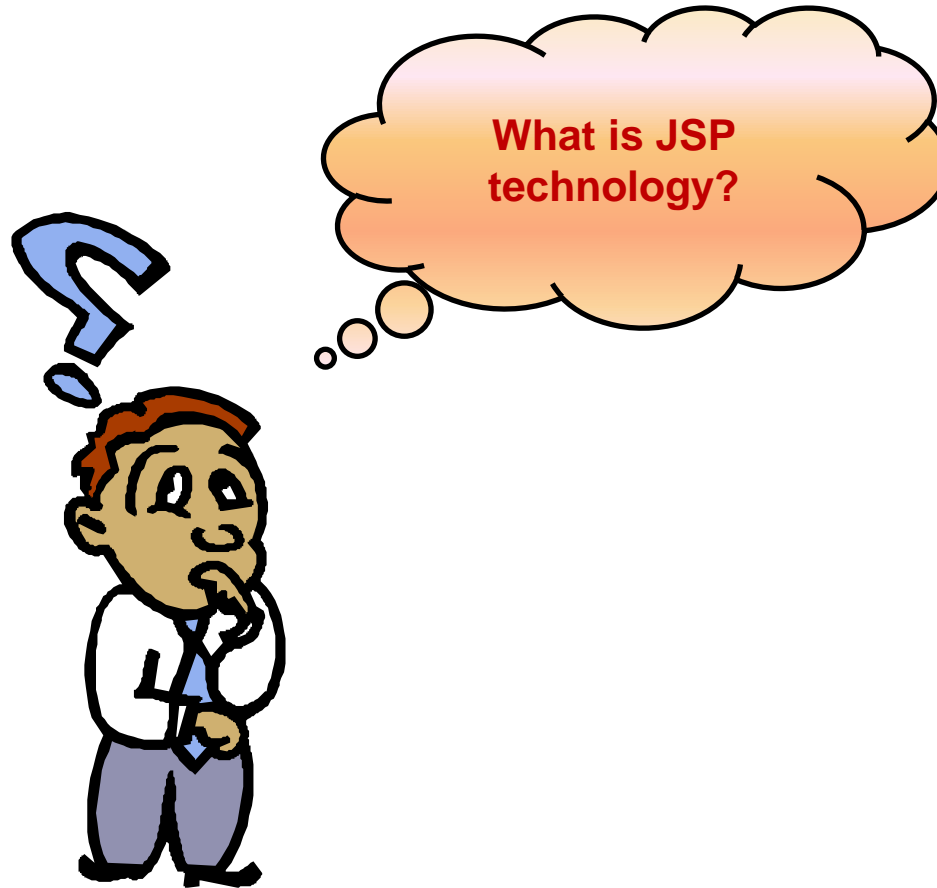


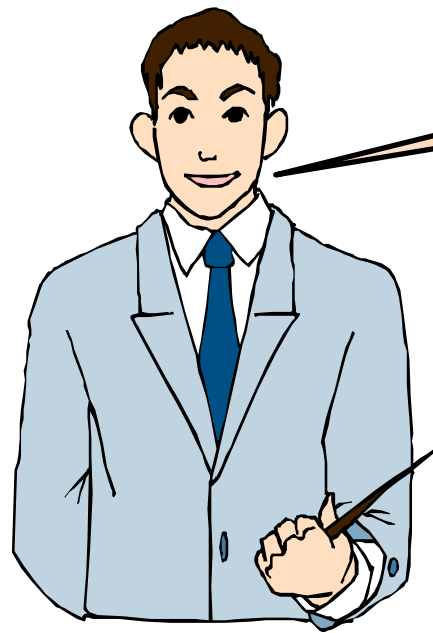
- **The advantages of Servlets are:**
 - They are efficient.
 - They are secure and scalable.
 - They are platform independent.
- **The disadvantages of Servlets are:**
 - They do not separate presentation and business logic.
 - They need to handle concurrency conflicts.





Let us see how to develop a Servlet.



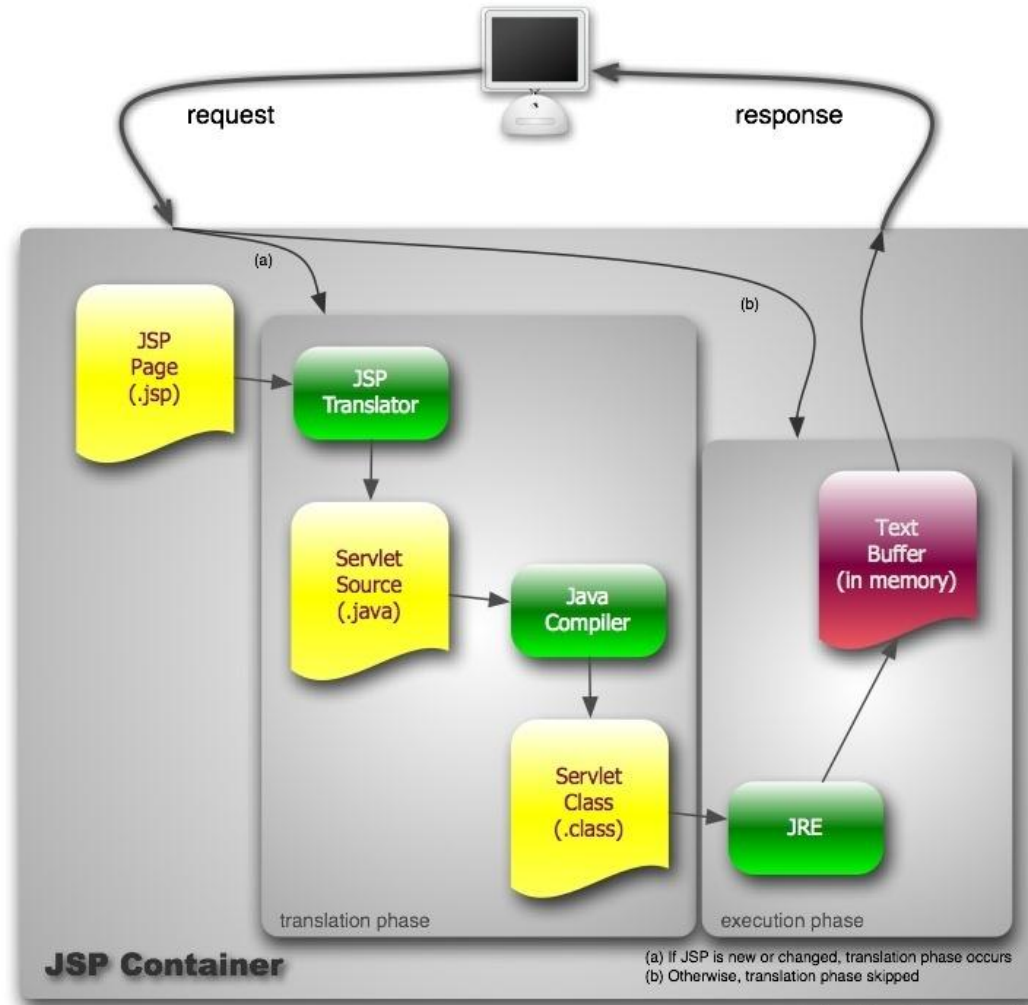


JSP is a server-side programming technology that is used to generate dynamic Web pages.

- JSP technology facilitates the segregation of the work profiles of a Web designer and a Web developer.
- A Web designer can design and formulate the layout for a Web page by using HTML.
- A Web developer, working independently, can use Java code and other JSP specific tags to code the business logic

- **Advantages of JSP technology:**
 - It provides high performance and scalability.
 - It is built on Java technology, and is therefore, platform independent.
 - It takes advantage of Java and its Application Programming Interfaces (APIs).

- **Disadvantages of JSP technology:**
 - It is difficult to debug.
 - It needs to handle the concurrency issues.



by Bear Bibeault, September 2005

Difference between Servlet and JSP

Servlet	JSP
Handle Dynamic data	
Handle Business Logic	Handle Presentation Logic
Html with in java	Java with in html
Created and maintained by Java programmers	Created and maintained by Web designers.

