Web Component Development Using Servlet & JSP Technologies (EE6)

Module -1: Introduction to Java Servlet

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ORACLE
Certified Expert
Java EE 6 Web
Component Developer

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HISTORY™

Objectives

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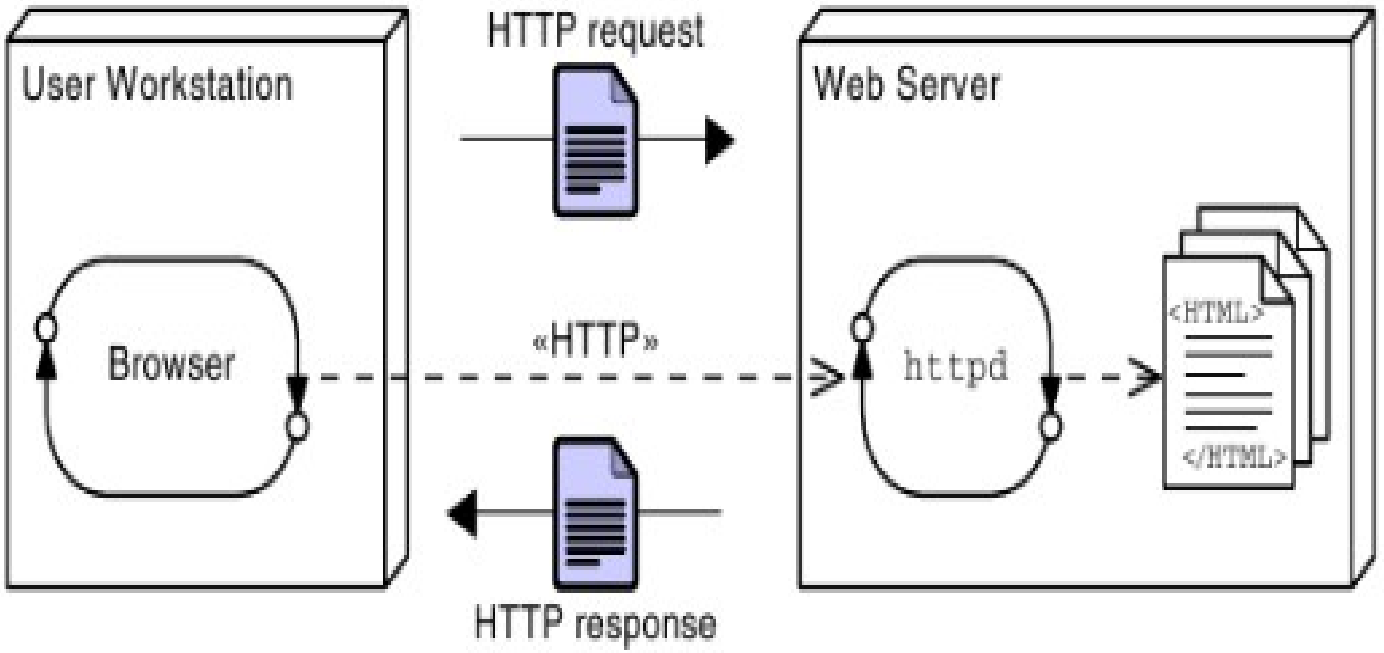
Upon completion of this module, you should be able to:

- Outline Java Servlet technology

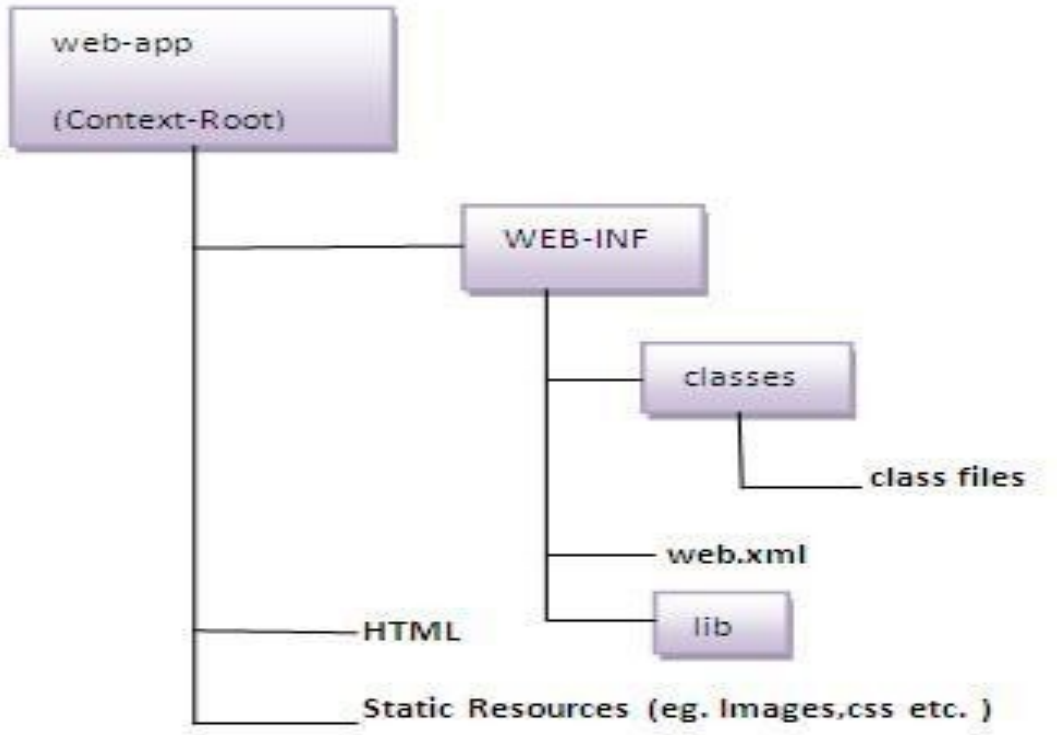
Relevance

- Discussion – The following questions are relevant to understanding what technologies are available for developing web applications and the limitations of those technologies:
  - What web applications have you developed?
  - Did your web technology allow you to achieve your goals?

HTTP Client-Server Architecture



Web Application Directory Structure



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Uniform Resource Locator (URL)

protocol://host:port/path/file

http://www.soccer.org:80/league/Spring2001.html

- A URL locates a specific resource on the Internet.
- The path element includes the complete directory structure path to find the file.
- The port number is used to identify the port that is used by the protocol on the server.
- If the port number is the standard port for the given protocol, then that number can be ignored in the URL

Web Sites and Web Applications

- A web site is a collection of static files, HTML pages, graphics, and various other files.
- A web application is an element of a web site that provides dynamic functionality on the server.
- A web application runs a program or programs on the server.

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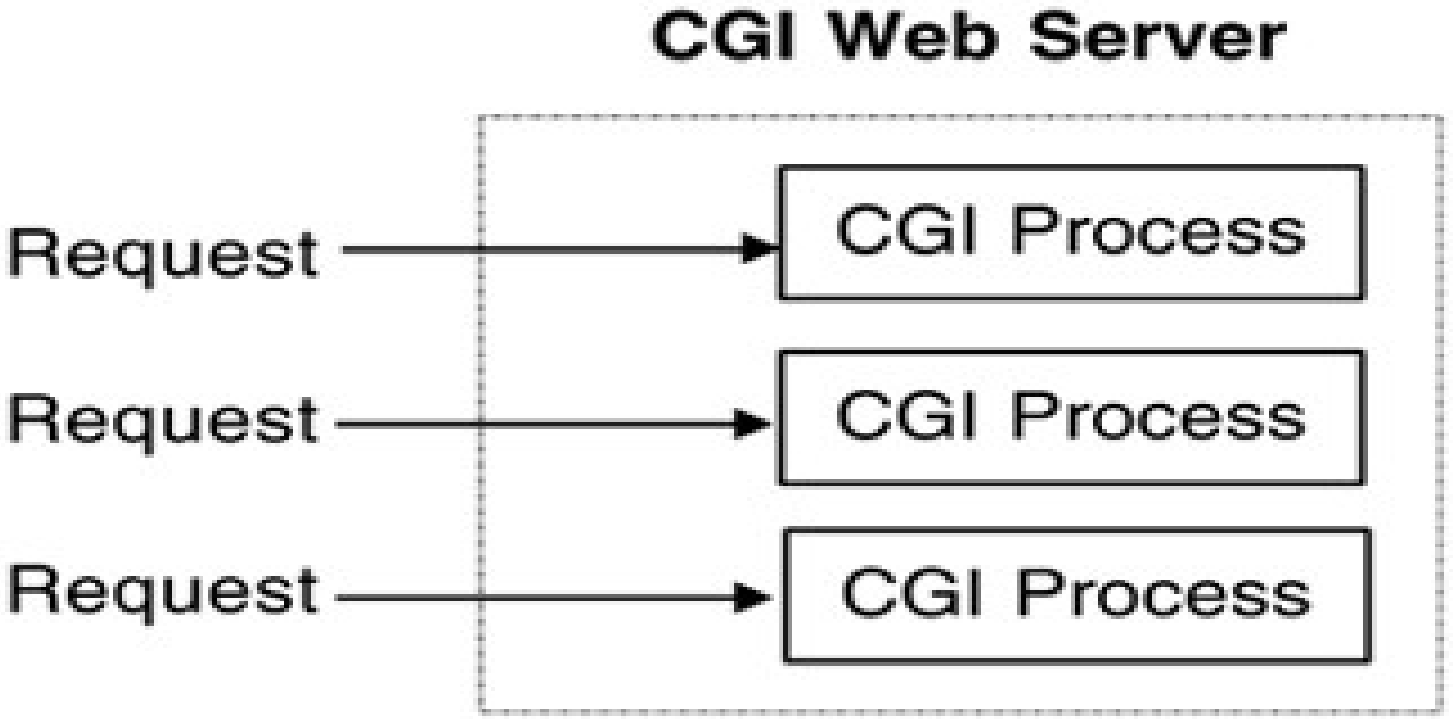
Common Gateway Interface (CGI)

Common Gateway Interface (CGI)

- The Common Gateway Interface, which is normally referred as CGI, was one of the practical technique developed for creating dynamic content.
- By using the CGI, a web server passes requests to an external program and after executing the program the content is sent to the client as the output.
- In CGI when a server receives a request it creates a new process to run the CGI program, so creating a process for each request requires significant server resources and time, which limits the number of requests that can be processed concurrently.

Common Gateway Interface (CGI)

- CGI applications are platform dependent.
- There is no doubt that CGI played a major role in the explosion of the Internet but its performance, scalability issues make it less than optimal solutions.



Advantages of CGI Programs

- CGI programs have the following advantages:
  - Programs can be written in a variety of languages, although they are primarily written in Perl.
  - A CGI program with bugs does not crash the web server.
  - Because CGI programs execute in separate processes, concurrency issues are isolated at the database.
  - CGI support is very common.

Disadvantages of CGI Programs

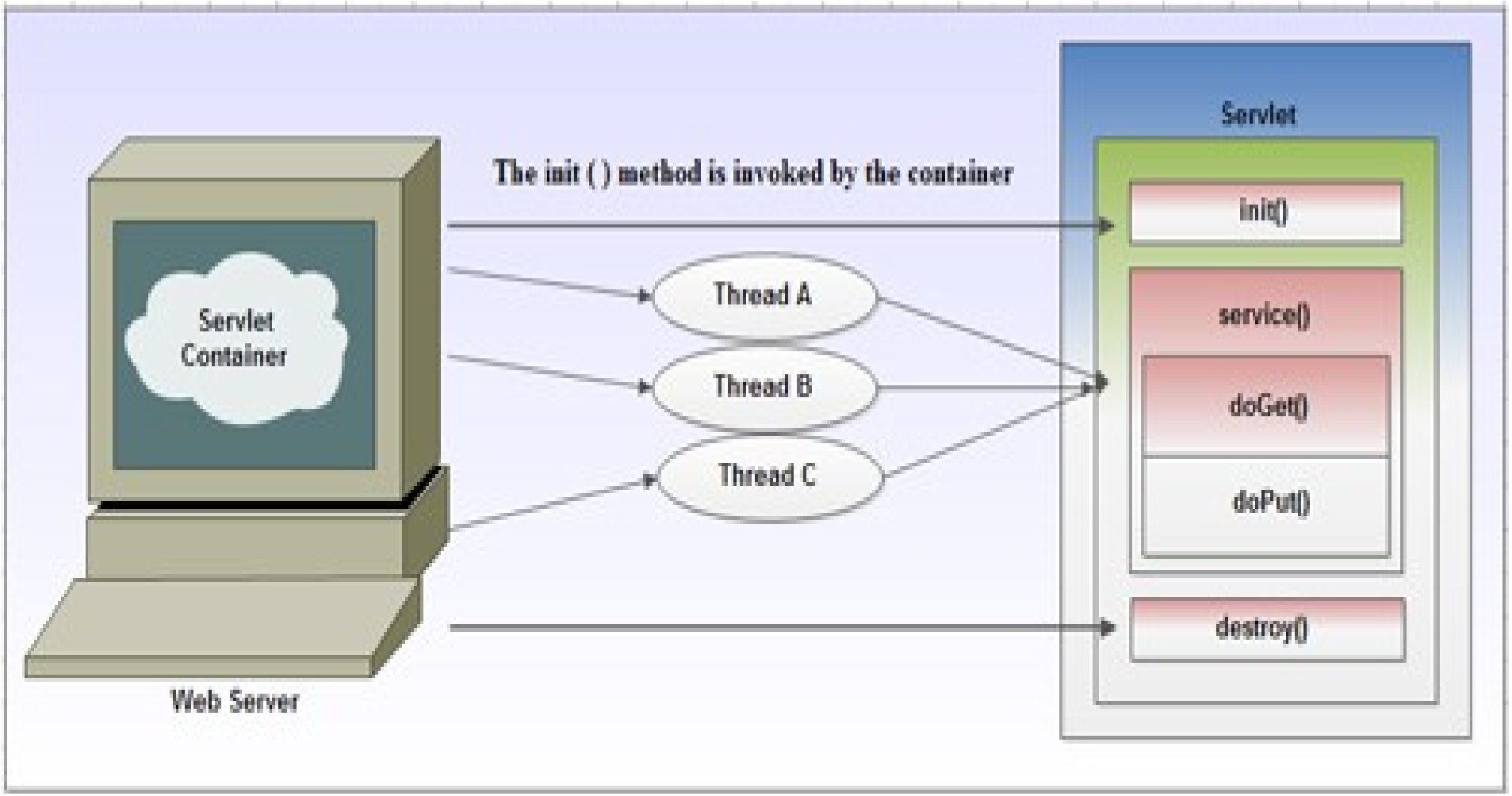
- CGI program also have the following distinct disadvantages:
- The response time of CGI programs is high because the creation of a new process is a heavyweight activity for the operating system (OS).
- CGI does not scale well.
- The languages for CGI are not always secure r or object-oriented.
- The CGI script has to generate an HTML response,so the CGI code is mingled with HTML. This is not good separation of presentation and business logic.

Java Servlets

Java Servlets

- Unlike CGI, Servlets don't use multiple processes to handle separate request.
- Servets can be handled by separate threads within the same process. Servlets are also portable and platform independent.
- Servlets are used with web servers and run inside a Java Virtual Machine (JVM) on the server so these are safe and portable.

Java Servlets



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Advantages of Java Servlets

- Each request is run in a separate thread within a single process, so servlet request processing is significantly faster than traditional CGI processing.
- Servlets are much more scalable than CGI. Many more requests can be executed because the web container uses a thread rather than an OS process. Threads are lightweight and the host OS can support many more of them.
- Servlets benefit from the simple, robust, platform independent, and object-oriented nature of the Java programming language.
- Servlets have access to standardized and easy-to-use logging capabilities.
- The web container provides additional services to the servlets, such as error handling and security.

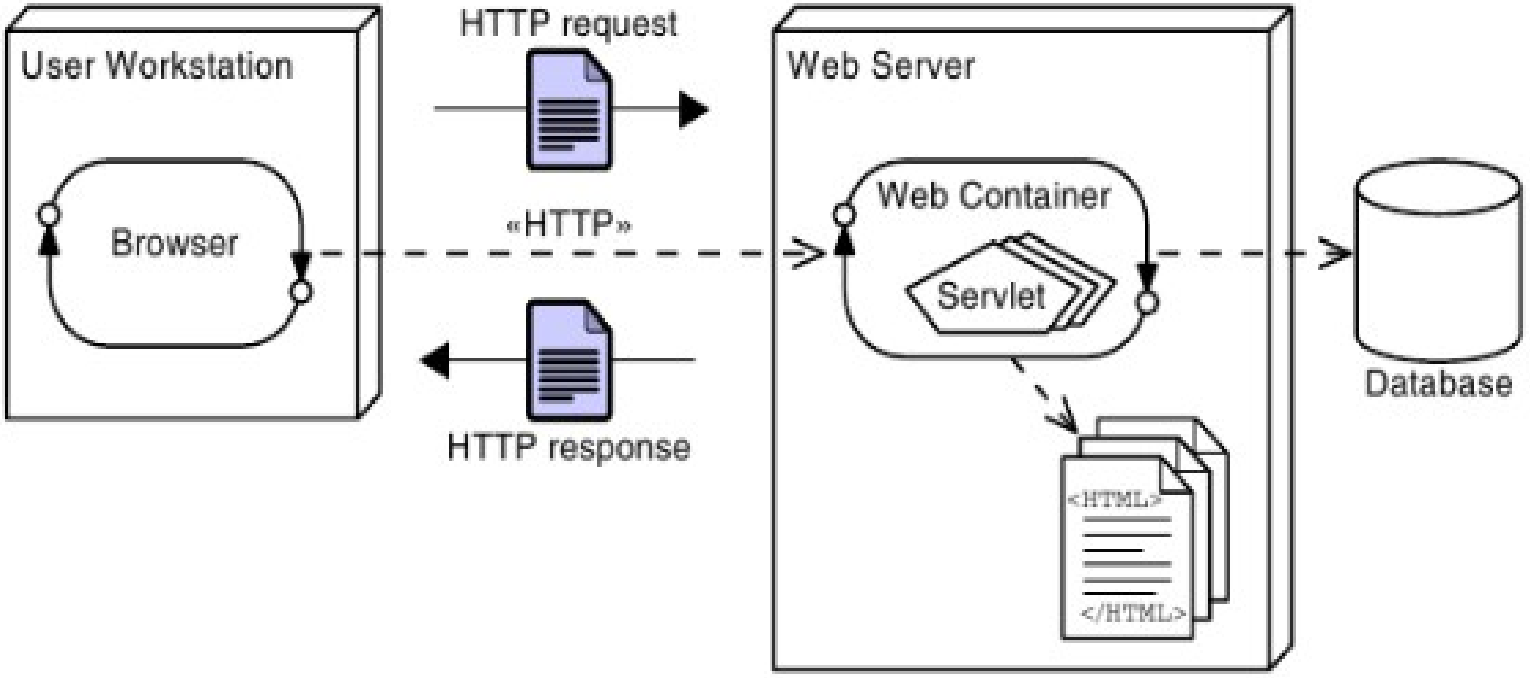
Disadvantages of Java Servlets

- Servlets can only be written in the Java programming language, so developers are required to be competent with this language.
- Servlets might introduce new concurrency issues not found in CGI.

Java Servlet

- Servlets run within the Java Platform Enterprise Edition (Java EE) component container architecture.
- This container is called the web container (also known as the servlet engine).
- The web container is a JavaTM technology program that implements the servlet application programming interface (API)
- Servlets are components that respond to HTTP requests.
- The web container performs initial processing, and selects the intended servlet to handle the request.
- The container also controls the life-cycle of the servlet.

Web Server Architecture With Java Servlets



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A First Java Servlet

- A servlet is invoked by the web container when an appropriate request isreceived by that container. In Java EE 6, an annotation specifies the URL (or URL pattern) that the servlet is used to respond to.
- The method in the servlet that is invoked depends on the type of HTTP request so, for example, an HTTP GET request will invoke the doGet method in the servlet.
- The doGet method takes two parameters, one which carries information related to the original request, and another which provides for control of the response.
- The servlet's job is two-fold. First, it must perform the required computation; second, it must present the results in a well-formed HTML page.

The code for a very simple servlet

```
import javax.servlet.http.*;
import javax.servlet.*;
import java.io.*;
public class DemoServlet extends HttpServlet{
public void doGet(HttpServletRequest req,HttpServletResponse res)
throws ServletException,IOException
{
res.setContentType("text/html");//setting the content type
PrintWriter pw=res.getWriter();//get the stream to write the data

}}
```

HTTP Methods

- GET : Asks to get the resource at the requested URL.
- POST: Asks the server to accept the body info attached. It is like GET request with extra info sent with the request.
- HEAD: Asks for only the header part of whatever a GET would return. Just like GET but with no body.
- PUT: Asks for the loopback of the request message, for testing or troubleshooting.

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HTTP Methods

- DELETE: Says to put the enclosed info (the body) at the requested URL.
- OPTIONS: Says to delete the resource at the requested URL.
- TRACE: Asks for a list of the HTTP methods to which the thing at the request URL can respond

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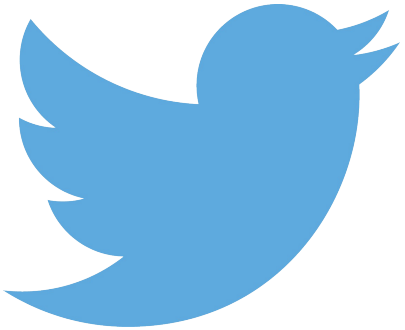

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