IT404 Advanced Java Programming

Servlets and JSP

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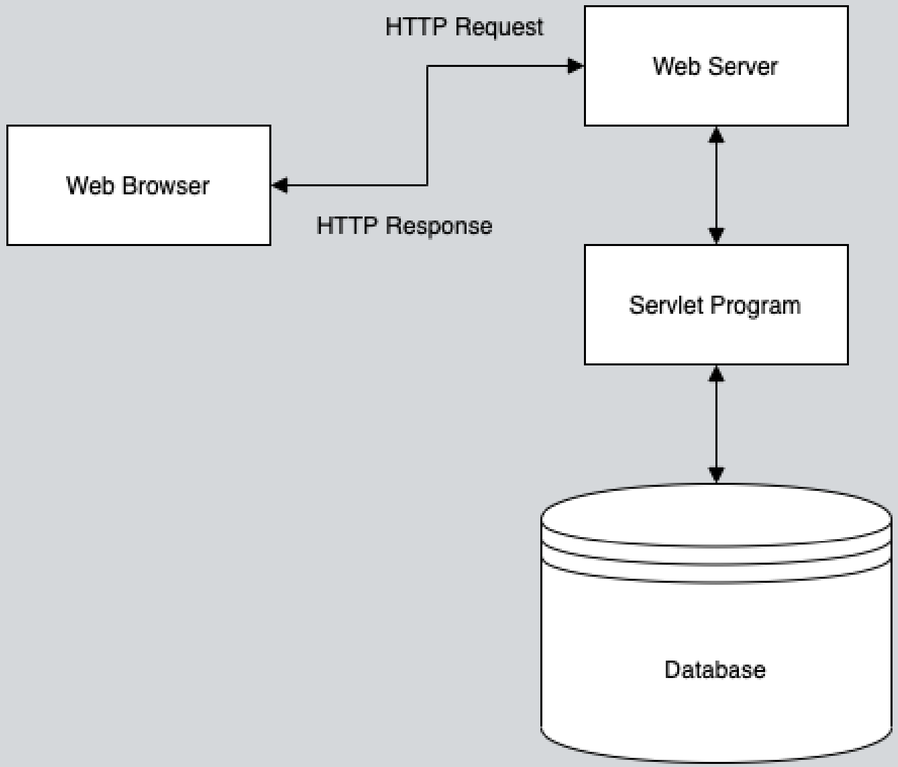


Servlets

Servlet technology is used to create a web application.

Servlet can be described in many ways, depending on the context.

- Servlet is a technology that is used to create a web application.
- Servlet is an API that provides many interfaces and classes.
- Servlet is a class that extends the capabilities of the servers and responds to incoming requests. It can respond to any requests.

Advantages of Servlets

Better Performance

Since servlets are compiled into bytecodes, they can execute more quickly as compared to other scripting languages. The bytecode compilation feature helps servlets to give much better performance.

Portability

Since servlets are written in Java, they are portable. That is, servlets are compatible with almost all operating systems. The programs written on one operating system can be executed on another operating system.

Robust and Secure

Because Servlets use Java language, all the benefits of Java in terms of Memory Leak prevention, Security and Garbage Collection are carried over.

HTTP

It is the data communication protocol used to establish communication between client and server.

01

HTTP Requests

It is the request send by the computer to a web server that contains all sorts of potentially interesting information.

02

Container

It is used in java for dynamically generating the web pages on the server side.

03

Server

It is used to manage the network resources and for running the program or software that provides services.

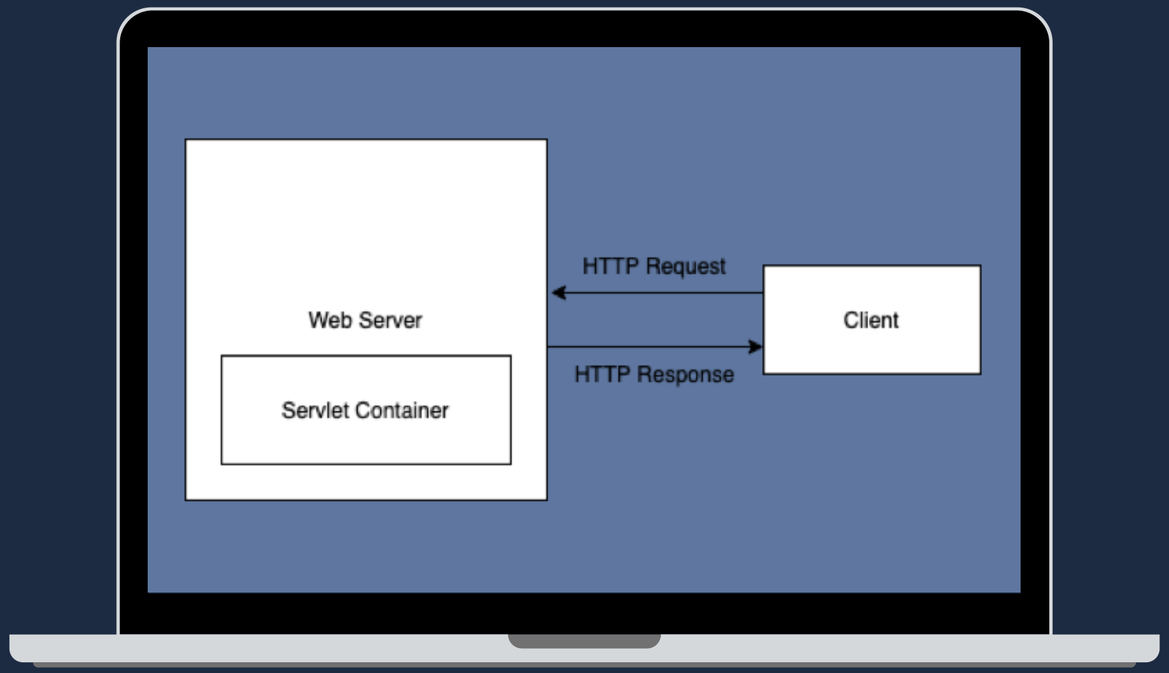
04

COMMON WEB TERMINOLOGY

Servlet Container

Servlet container, also known as Servlet engine is an integrated set of objects that provide run time environment for Java Servlet components.

In simple words, it is a system that manages Java Servlet components on top of the Web server to handle the Web client requests.



The Servlet container is essentially a part of a web server that interacts with the servlets.

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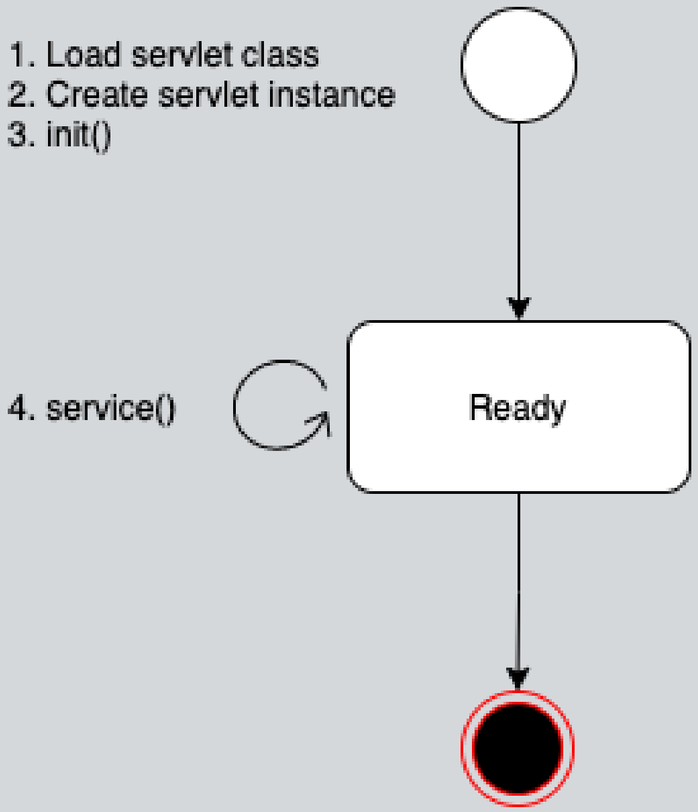
Servlet Container Services

Network	The Servlet container provides the network services over which the request and response are sent.
Resource Management	Manages the static and dynamic resources, such as HTML files, Servlets and JSP pages.
Security	Handles authorization and authentication of resource access.
Session Management	Maintains a session by appending a session ID to the URL path.



Servlet Life Cycle

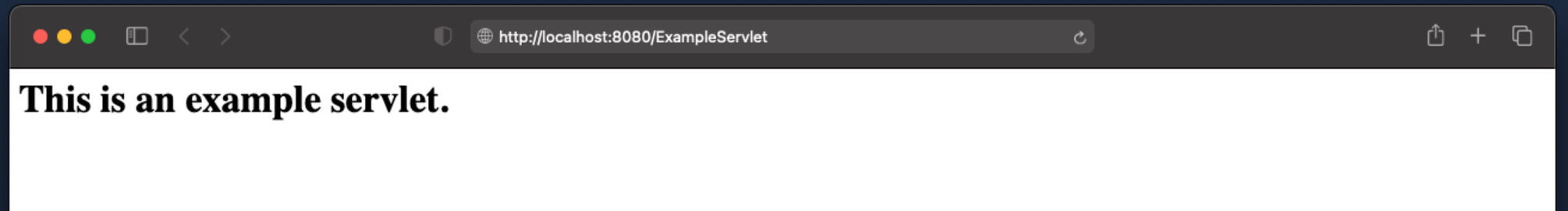
A servlet life cycle can be defined as the entire process from its creation till the destruction. The following are the paths followed by a servlet:

- The servlet is initialized by calling the init() method.
- The servlet calls service() method to process a client's request.
- The servlet is terminated by calling the destroy() method.

Finally, the servlet is garbage collected by the garbage collector of the JVM.

Example

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;

public class ExampleServlet extends HttpServlet {

   private String message;

   public void init() throws ServletException {
      message = “This is an example servlet.“;
   }

   public void doGet(HttpServletRequest request, HttpServletResponse response)
      throws ServletException, IOException {

      response.setContentType("text/html");

      PrintWriter out = response.getWriter();
      out.println("<h1>" + message + "</h1>");
   }

   public void destroy() {}
}
```



JSP Fundamentals

JSP technology is used to create web application just like Servlet technology. It can be thought of as an extension to Servlet because it provides more functionality than servlet such as expression language, JSTL, etc.

Scripting Elements

In JSP, JAVA code can be written inside the JSP page using the scriptlet tag. Three types:

1. scriptlet
2. expression
3. declaration

Directives

Importing tag libraries - to import required classes, set output buffering options, include content from external files.

Implicit Objects

Provides access to server-side objects

The available implicit objects are out, request, response, config, session, application, page, pageContext, exception.

Actions

The action tags are used to control the flow between pages and to use Java Bean. There are various types of actions.

JSP Example

```jsp
<%@ page language="java" contentType="text/html; charset=UTF-8"
    pageEncoding="UTF-8"%>

<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>JSP Example</title>
</head>
<body>

<%
    int x = 10; int z;
    int y = 4;

    z = x*y;
%>
      <h3>x = </h3><%= x %>
      <h3>y = </h3><%= y %>

      <h3>z (x*y) = </h3><%= z %>
      <h3>x+y = </h3><%= x+y %>
      <h3>x-y = </h3><%= x-y %>
      <h3>x/y = </h3><%= x/y %>
<%
%>

</body>
</html>
```