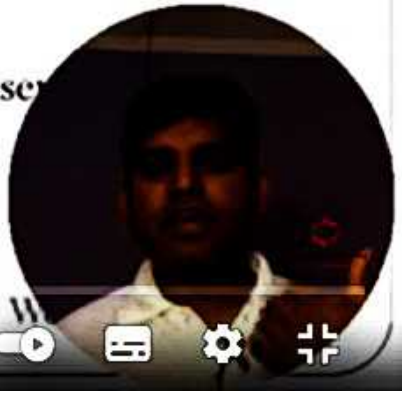
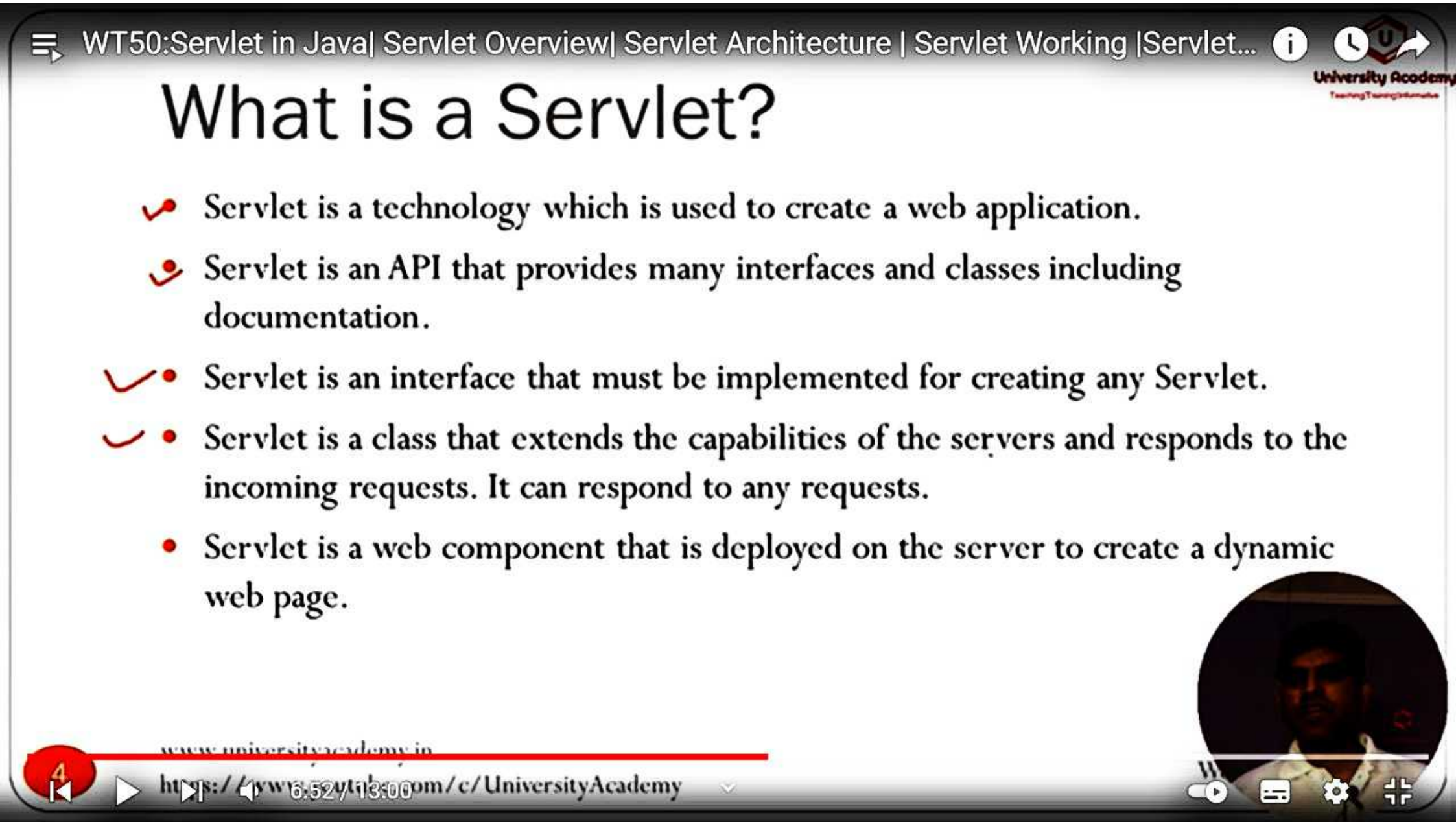
Servlet Overview

- **Servlet** are simple Java Programs that run on Server.
- Servlet are most commonly used with HTTP hence it is also called HTTP Servlet.
- **Servlet** technology is used to create a web application (resides at server side and generates a dynamic web page).
- **Servlet** technology is robust and scalable because of java language.
- Before Servlet, CGI (Common Gateway Interface) scripting language was common as a server-side programming language.
- There are many interfaces and classes in the Servlet API such as Servlet, GenericServlet, HttpServlet, ServletRequest, ServletResponse, etc.
- The javax.servlet and javax.servlet.http packages represent interfaces and classes for se

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What is a Servlet?
Servlet is a technology which is used to create a web application.
Servlet is an API that provides many interfaces and classes including documentation.
Servlet is an interface that must be implemented for creating any Servlet.
Servlet is a class that extends the capabilities of the servers and responds to the incoming requests. It can respond to any requests.
Servlet is a web component that is deployed on the server to create a dynamic web page.
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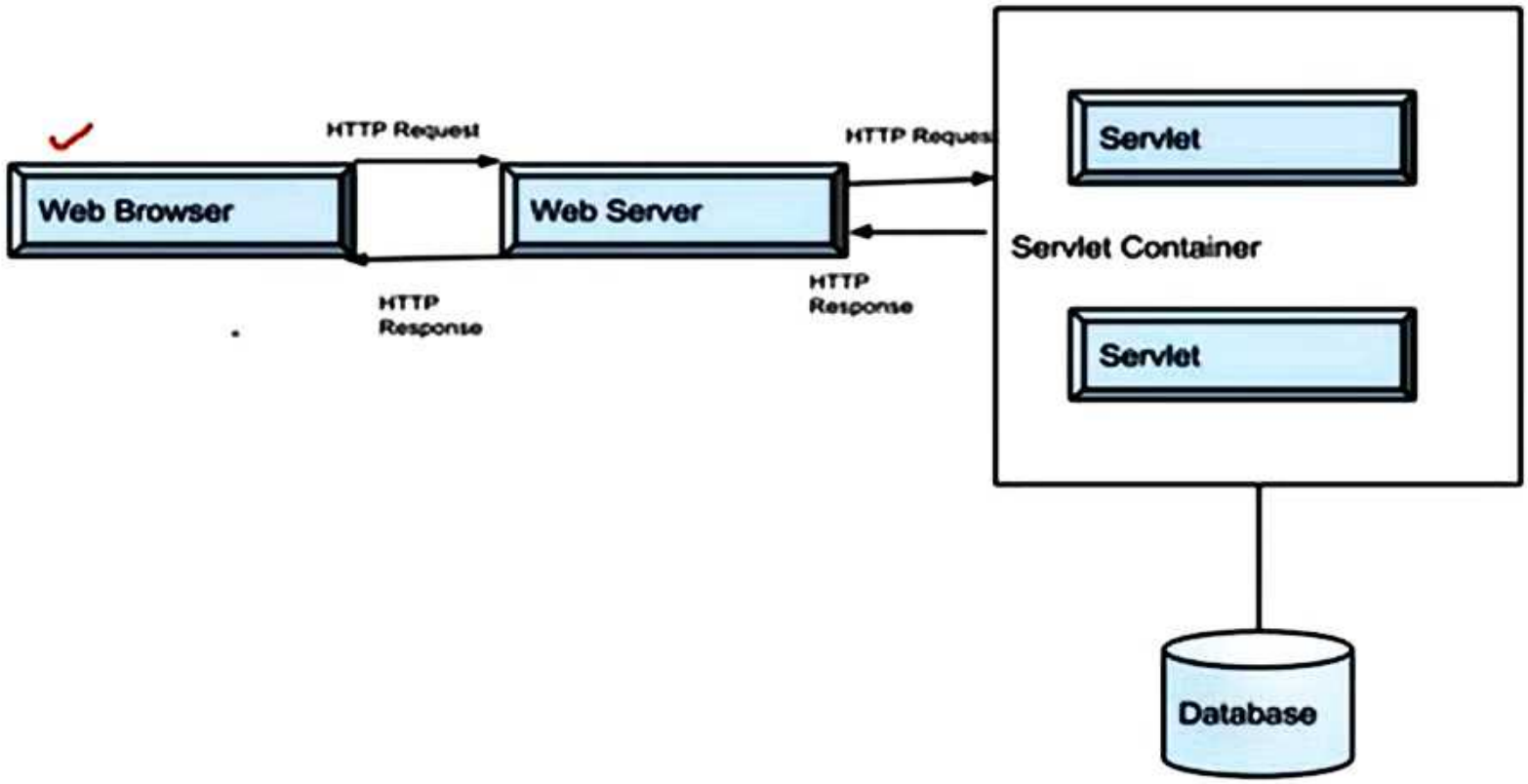
Servlets Architecture



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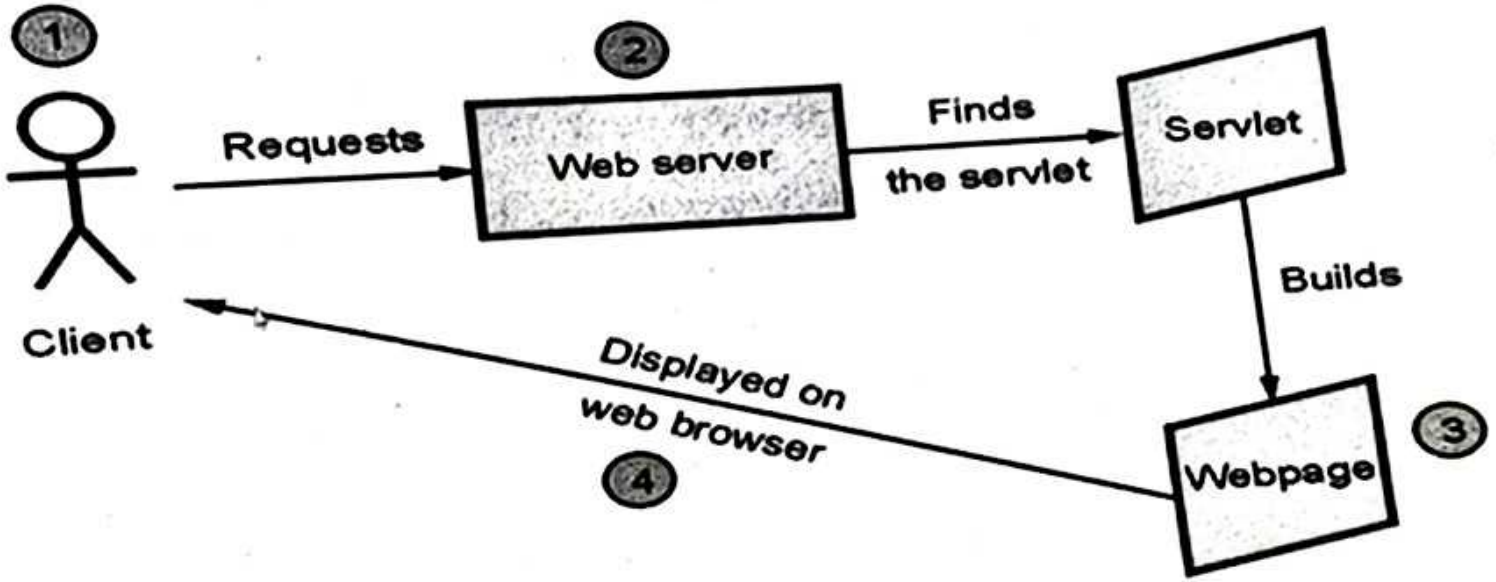
Working of Servlet



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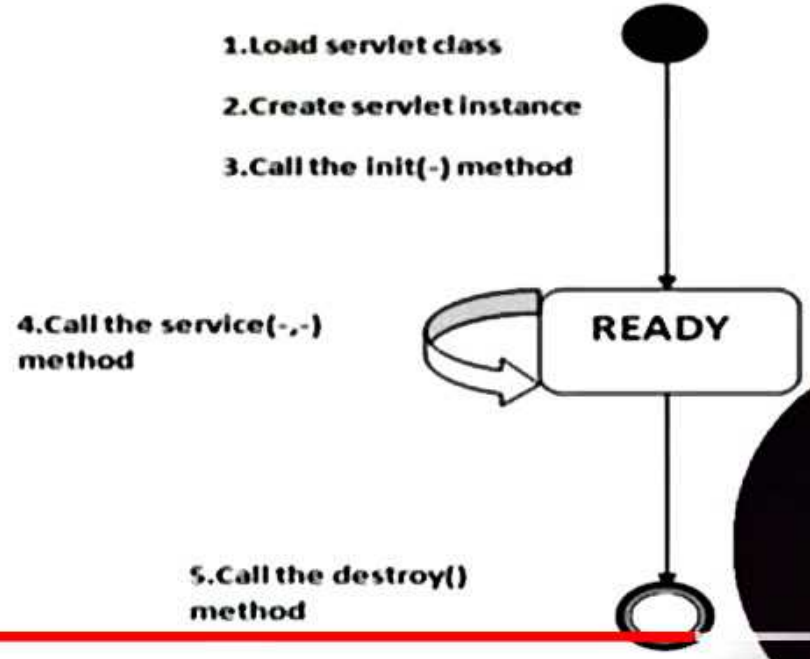
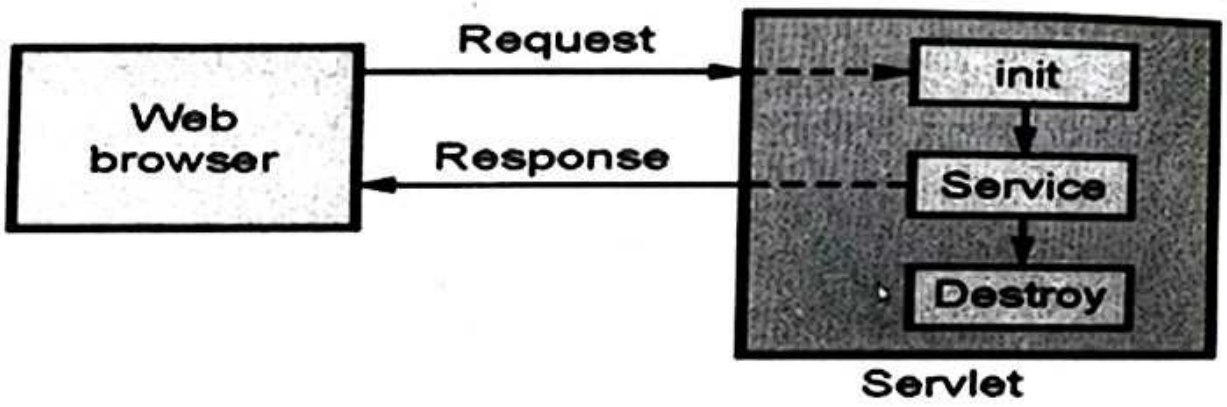
Life Cycle of a Servlet

- The web container maintains the life cycle of a servlet instance. Let's see the life cycle of the servlet:
  - Servlet class is loaded.
  - Servlet instance is created.
  - init method is invoked.
  - service method is invoked.
  - destroy method is invoked.



Life Cycle of a Servlet

- The web container calls the ***init*** method only once after creating the servlet instance. The init method is used to initialize the servlet.
- The web container calls the ***service*** method each time when request for the servlet is received.
- The web container calls the ***destroy*** method before removing the servlet instance from the service.



(Servlet Lecture.2)

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(Web Engineering - Java Servlet Lecture.2) [Servlet life cycle] Imp..

public void init() throws ServletException
{ // Initialization code
}

Called only once.

only called once at end of a servlet life cycle.

destroy()

public void destroy()
{ // cleanup code.
}

init()

Servlet is created

Servlet is in Service

checks the HTTP request type (Get, Post) and calls the doGet, doPost etc.

Service() → main method that performs actual task.
↳ to handle requests coming from client.

Client — Servlet Container (web server)

doPost

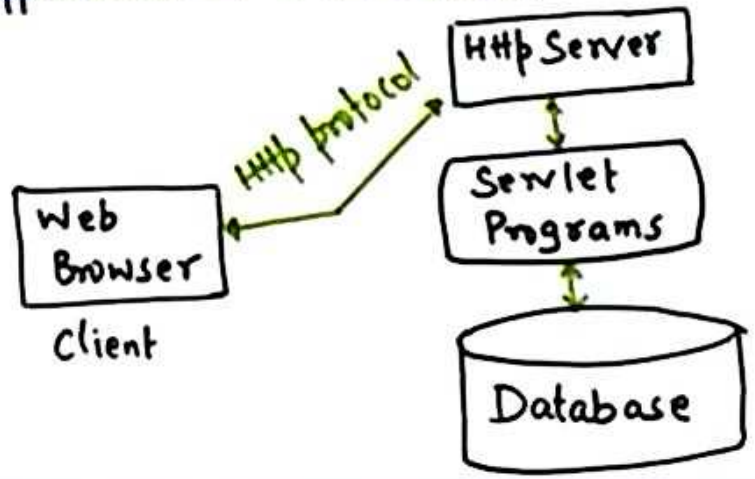
public void doGet(
HTTPServletRequest request,
HTTPServlet Response response
throws ServletException, IOException)
}

public void service (ServletRequest req,
ServletResponse res) throws
ServletException, IOException { }

(Web Engineering - Java Servlet Lecture 1.)

Introduction to Java Servlet

- Java Servlets are the programs that run on a web Application Server. It acts as a middle layer b/w a requests from web browser/client and database/ application on HTTP Server.



Advantages of Servlets over CGI

↳ Common Gateway Interface.

i) Better Performance
ii) Servlets executes within add. space of Server.
iii) Platform-independent
iv) More Secure.
v) Communicate with other Appln with RMI.

Uses of Servlet → HTML Form

i) Read explicit data sent by browser.
ii) Read implicit HTTP request data.
iii) Process the data ↳ Cookies etc.
iv) Send explicit data
v) Send Implicit data

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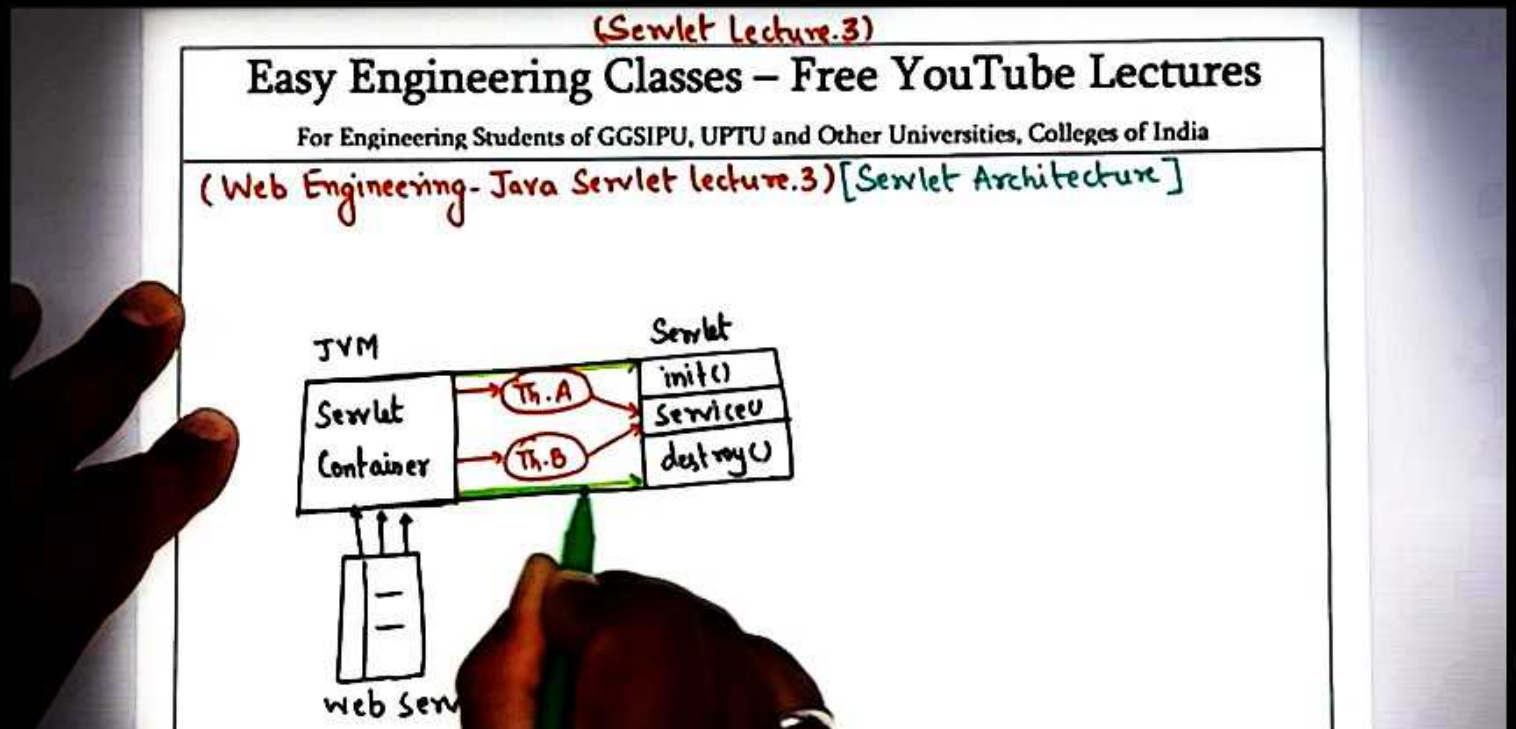

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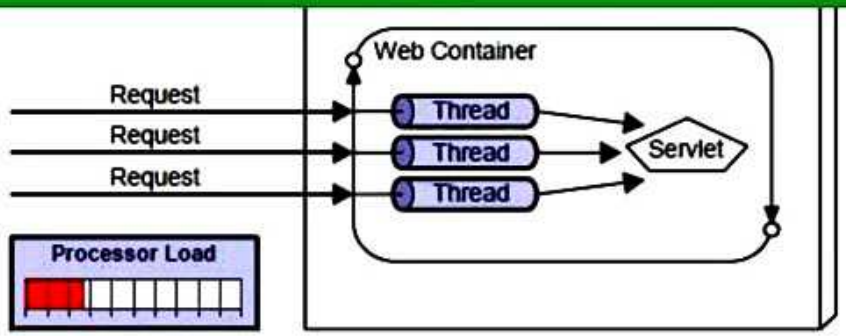
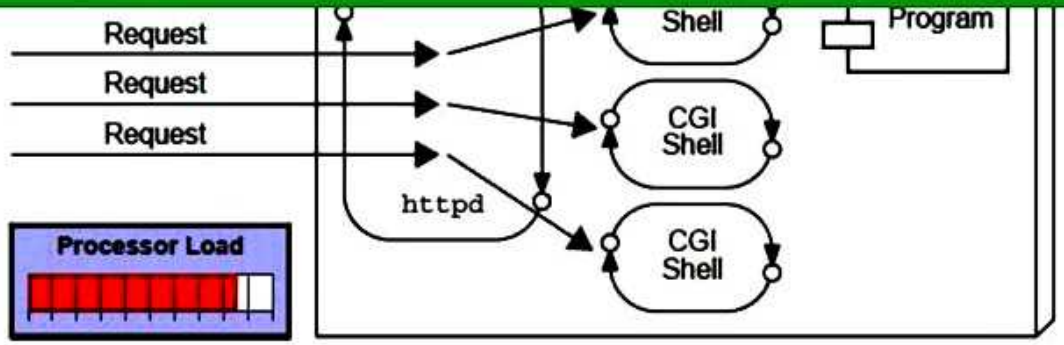


There are many advantages of Servlet over CGI. The web container creates threads for handling the multiple requests to the Servlet. Threads have many benefits over the Processes such as they share a common memory area, lightweight, cost of communication between the threads are low. The advantages of Servlet are as follows:

1. **Better performance:** because it creates a thread for each request, not process.
2. **Portability:** because it uses Java language.
3. **Robust:** JVM manages Servlets, so we don't need to worry about the memory leak, garbage collection, etc.
4. **Secure:** because it uses java language.



Disadvantages of CGI

There are many problems in CGI technology:

1. If the number of clients increases, it takes more time for sending the response.
2. For each request, it starts a process, and the web server is limited to start processes.
3. It uses platform dependent language e.g. C, C++, perl.

Advantages of Servlet

javax.servlet Interface And Class

Interface	Description
Servlet	This interface defines all the life cycle methods.
ServletConfig	This interface obtains the initialization parameters.
ServletContext	Using this interface the events can be logged.
ServletRequest	This interface is useful in reading the data from the client request.
ServletResponse	This interface is useful in writing the data to the client response.

Class	Description
GenericServlet	This class implements the **Servlet** and **ServletConfig** interfaces.
ServletInputStream	This class provides the input stream for reading the client's request.
ServletOutputStream	This class provides the output stream for writing the client's response.
ServletException	This class is used to raise the exception when an error occurs.

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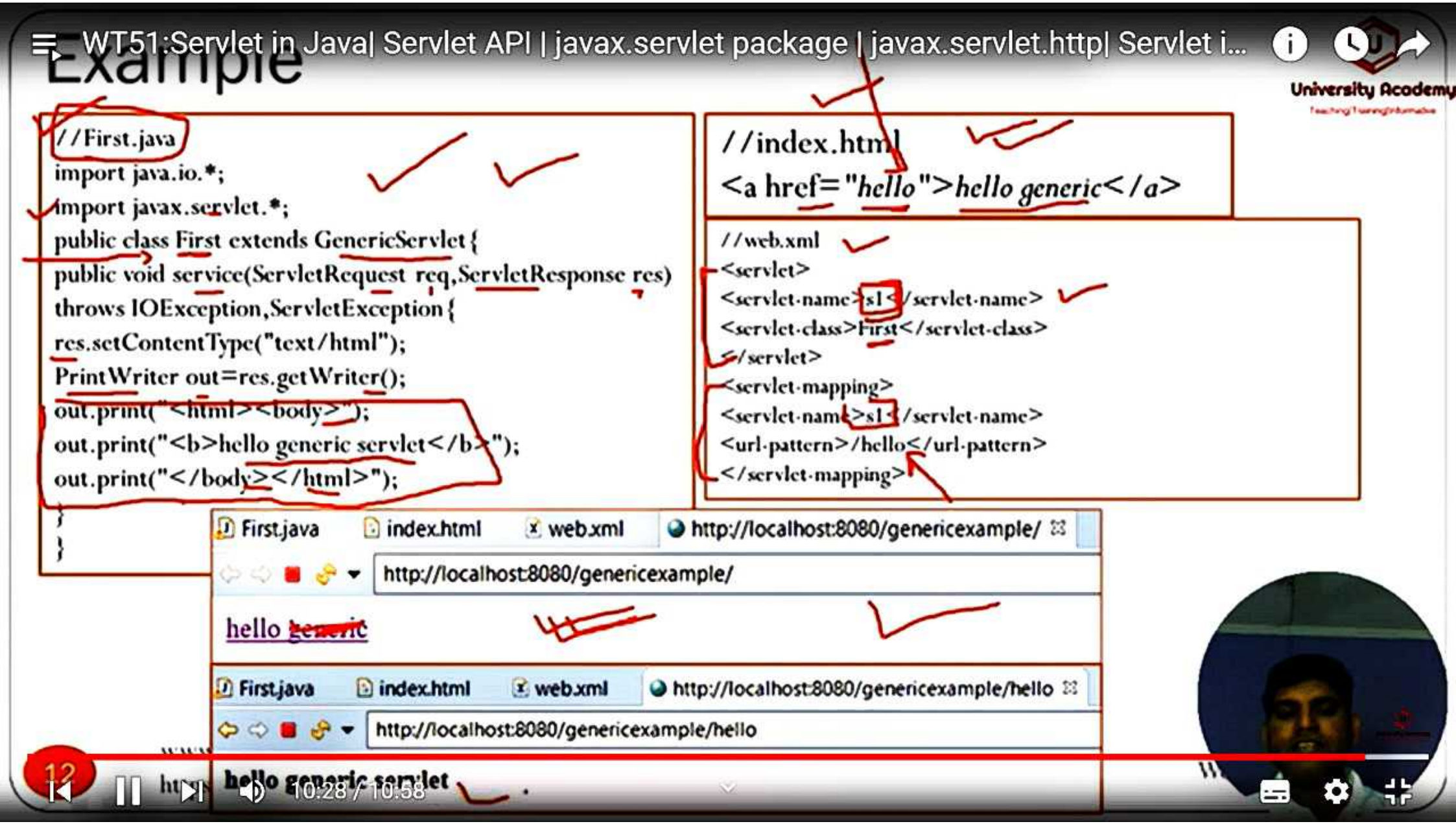
Servlet API

- There are two packeges used to implement the Servlet.
  - javax.servlet : The **javax.servlet** package contains many interfaces and classes that are used by the servlet or web container. These are not specific to any protocol.
  - javax.servlet.http: The **javax.servlet.http** package contains interfaces and classes that are responsible for http requests only.

Servlet Interface

- **Servlet interface provides** common behavior to all the servlets. Servlet interface defines methods that all servlets must implement.
- There are 5 methods in Servlet interface.
- The init, service and destroy are the life cycle methods of servlet.
- These are invoked by the web container.

Method	Description
public void init(ServletConfig config)	initializes the servlet. It is the life cycle method of servlet and invoked by the web container only once.
public void service(ServletRequest request,ServletResponse response)	provides response for the incoming request. It is invoked at each request by the web container.
public void destroy()	is invoked only once and indicates that servlet is being destroyed.
public ServletConfig getServletConfig()	returns the object of ServletConfig.
public String getServletInfo()	returns information about servlet such as writer, copyright, version etc.


WT51:Servlet in Java| Servlet API | javax.servlet package | javax.servlet.http| Servlet i...
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Example
//First.java
import java.io.*;
import javax.servlet.*;
public class First extends GenericServlet{
public void service(ServletRequest req,ServletResponse res)
throws IOException,ServletException{
res.setContentType("text/html");
PrintWriter out=res.getWriter();
out.print("<html><body>");
out.print("hello generic servlet");
out.print("</body></html>");
}
}
//index.html
hello generic
//web.xml
<servlet>
<servlet-name>s1</servlet-name>
<servlet-class>First</servlet-class>
</servlet>
<servlet-mapping>
<servlet-name>s1</servlet-name>
<url-pattern>/hello</url-pattern>
</servlet-mapping>
First.java
index.html
web.xml
http://localhost:8080/genericexample/
http://localhost:8080/genericexample/
hello generic
First.java
index.html
web.xml
http://localhost:8080/genericexample/hello
http://localhost:8080/genericexample/hello
hello generic servlet
10:28 / 10:58

javax.servlet.http package

Interface	Description
HttpSession	The session data can be read or written using this interface.
HttpServletRequest	The servlet can read the information from the HTTP request using this interface.
HttpServletResponse	The servlet can write the data to HTTP response using this interface.
HttpSessionBindingListener	This interface tells the object about its binding with the particular session.

Class	Description
Cookie	This class is used to write the cookies.
HttpServlet	It is used when developing servlets that receive and process HTTP requests.
HttpSessionEvent	This class is used to handle the session events.
HttpSessionBindingEvent	When a listener is bound to a value.

Example 2

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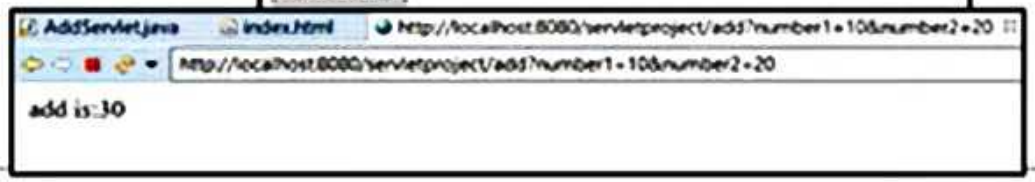
```
//AddServlet.java
package mypack;
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
public class AddServlet extends HttpServlet
{
public void service(HttpServletRequest req,HttpServletResponse res) throws IOException
{
int i=Integer.parseInt(req.getParameter("number1"));

int j=Integer.parseInt(req.getParameter("number2"));

int k=i+j;
PrintWriter out=res.getWriter();
out.println("add is:" + k);
}
}
```

```
//index.html
<html>
<body>
<h1>
<form method="" action="add">
FIRST NO<input type="text" name="number1"><br>
SECOND NO<input type="text" name="number2"><br>
<input type="submit" value="ADD DATA">
</form>
</h1>
</body>
</html>
```

```
//web.xml
<servlet>
 <servlet-name>s1</servlet-name>
  <servlet-class>mypack.AddServlet</servlet-class>
 </servlet>
 <servlet-mapping>
    <servlet-name>s1</servlet-name>
     <url-pattern>/add</url-pattern>
 </servlet-mapping>
```



SendRedirect in servlet

- The **sendRedirect()** method of **HttpServletResponse** interface can be used to redirect response to another resource, it may be servlet, jsp or html file.
- It accepts relative as well as absolute URL.
- The sendRedirect() method works at client side.
- It always sends a new request.
- It can be used within and outside the server.

Http is a *stateless* protocol, means that it can't persist the information. It always treats each request as a new request. In Http client makes a connection to the server, sends the request., gets the response, and closes the connection.

In session management client first make a request for any servlet or any page, the container receives the request and generate a unique session ID and gives it back to the client along with the response. This ID gets stores on

the client machine. Thereafter when the client request again sends a request to the server then it also sends the session Id with the request. There the container sees the Id and sends back the request.

Session Tracking can be done in Four ways:

1. **Hidden Form Fields:**
2. **Cookies**
3. **HttpSession**
4. **URL Rewriting**