

Per Scholas - Quality Engineering

Java EE Servlets - 01

Intro to Servlets

- Servlets
 - Definition - <https://javaee.github.io/tutorial/servlets001.html#BNAFE>
 - Life Cycle
 - Instantiation
 - the container (e.g., Tomcat) loads and instantiates the servlet class
 - Initialization
 - The servlet gets initialized upon the first request
 - `init()` method can be overridden to set configurations (based on configuration files), initialize resources and perform any other one-time activities
 - the `initParams` attribute of the `@WebServlet` annotation can also be used to customize initialization - <https://www.codejava.net/java-ee/servlet/webinitparam-annotation-examples>
 - Service
 - the service provided to the client by the servlet
 - implemented in the `do`-methods (`doGet`, `doDelete`, `doOptions`, `doPost`, `doPut`, or `doTrace`) of `HttpServlet`
 - also implemented in the `service` method of a `GenericServlet` (not commonly used in web development)
 - the service methods function to:
 - extract information from the request

- access external resources
- populate the response
- HttpServlet service methods utilize HttpServletRequest and HttpServletResponse objects as arguments
- <https://javaee.github.io/tutorial/servlets005.html>
- Destruction
 - if the web container determines that a servlet should be removed from service, it calls the destroy method of the Servlet interface
 - this can happen for reasons such as the container is being shut down or it wants to reclaim memory resources
 - the servlet's service methods should be complete prior to destruction
 - the server tries to ensure this by calling the destroy method only after all service requests have been returned or after a server-specific grace period
- Servlet Container
 - Software responsible for managing servlets
 - Tomcat
 - Glassfish
 - Main functions are to load, initialize and run the servlets to serve client requests
 - Decides which servlet to call based on a configuration file
- Servlet API - Available in two packages
 - javax.servlet
 - <https://javaee.github.io/javaee-spec/javadocs/javax/servlet/package-summary.html>
 - javax.servlet.http

- <https://javaee.github.io/javaee-spec/javadocs/javax/servlet/http/package-summary.html>
- Servlet Class Hierarchy: Servlet -> GenericServlet -> HttpServlet
 - Servlet interface: declares the standard API that all servlet implementations must adhere to
 - <https://javaee.github.io/javaee-spec/javadocs/javax/servlet/Servlet.html#getServletInfo-->
 - GenericServlet abstract class: defines a generic, protocol-independent servlet which can serve non-http requests
 - <https://javaee.github.io/javaee-spec/javadocs/javax/servlet/GenericServlet.html>
 - HttpServlet abstract class: used to serve http client requests
 - <https://javaee.github.io/javaee-spec/javadocs/javax/servlet/http/HttpServlet.html>
 - An instance of HttpServlet must override at least one method, usually one of the following do-methods
 - doGet - called by the server to allow a servlet to handle a GET request which should be safe (i.e., without any side effects for which users are held responsible)
 - doPost - called by the server to allow a servlet to handle a POST request which allows the client to send data of unlimited length to the web server a single time
 - doPut - called by the server to allow a servlet to handle a PUT request which allows the client to place a file on the server
 - delete - called by the server to allow a servlet to handle a DELETE request which allows a client to remove a document or web page from the server

- init - called by the servlet container to indicate to a servlet that it is being placed into service
- destroy - called by the servlet container to indicate to a servlet that it is being taken out of service
- getServletInfo - returns information about the servlet such as author, copyright and version
- ServletRequest Interface
 - <https://javaee.github.io/javaee-spec/javadocs/javax/servlet/ServletRequest.html>
 - HttpServletRequest interface extends the ServletRequest interface
 - <https://javaee.github.io/javaee-spec/javadocs/javax/servlet/http/HttpServletRequest.html>
 - contains methods to access request information by HttpServletRequest implementations
 - used by servlets to access parameters sent by the client as part of the http request from the browser or other client information such as port number, client protocol or form field values
- ServletResponse Interface
 - <https://javaee.github.io/javaee-spec/javadocs/javax/servlet/ServletResponse.html>
 - HttpServletResponse interface extends ServletResponse interface
 - <https://javaee.github.io/javaee-spec/javadocs/javax/servlet/http/HttpServletResponse.html>
 - contains methods for managing the response sent by an HttpServletResponse implementation to the client
 - It also contains a set of status codes for sending the request status to the client

- The servlet container creates an HttpServletResponse object and passes it as an object to the service methods for handling the response
- The web.xml File
- A configuration file which captures the application configuration and deployment details of a web application
- The following are some important configuration tags
 - context-param:
 - servlet: sets a name for referencing the servlet class
 - servlet-mapping: used for mapping the servlet to a URL
 - welcome-file-list: can be used to set the welcome file name or names to direct the request to the correct home/welcome page for the application
- Create a simple servlet
- Create a servlet with init and destroy methods overridden by the developer
- Create a basic login form with a success page
- <https://javaee.github.io/tutorial/toc.html>
- <https://javaee.github.io/tutorial/servlets.html#BNAFD>
- <https://javaee.github.io/javaee-spec/javadocs/>
- https://www.youtube.com/watch?v=7TOmdDJc14s&list=PLsyeobzWxl7pUPF2xjjJiG4BKC9x_GY46