Writing Servlets

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Servlet Interface

```
public interface Servlet
{
  public void init(ServletConfig);
  public void service(ServletRequest req,
                      ServletResponse resp);
  public void destroy();
  public ServletConfig getServletConfig();
  public String getServletInfo();
}
```

GenericServlet class

```
public abstract class GenericServlet
         implements Servlet,
                    ServletConfig,
                    java.io.Serializable {
}
```

HttpServlet class

```
public class HttpServlet extends GenericServlet {
  public void service(ServletRequest req, ServletResponse resp) {
   service((HttpServletRequest)req, (HttpServletResponse)resp);
  }

  public void service(HttpServletRequest req, HttpServletResponse resp) {
    String verb = req.getMethod();
    if (verb.equals("GET")) doGet(req, resp);
    else if (verb.equals("POST")) doPost(req, resp);
    else ...
  }

  public void doGet(HttpServletRequest req, HttpServletResponse resp)
  {...}

  public void doPost(HttpServletRequest req, HttpServletResponse resp)
  {...}
  ...
}
```

HttpServlet class

```
public class HttpServlet extends GenericServlet {
  public void service(ServletRequest req, ServletResponse resp) {
   service((HttpServletRequest)req, (HttpServletResponse)resp);
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  public void service(HttpServletRequest req, HttpServletResponse resp) {
    String verb = req.getMethod();
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    else ...
  }

  public void doGet(HttpServletRequest req, HttpServletResponse resp)
  {...}

  public void doPost(HttpServletRequest req, HttpServletResponse resp)
  {...}
  ...
}
```

HttpServlet class

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public class HttpServlet extends GenericServlet {
  public void service(ServletRequest req, ServletResponse resp) {
   service((HttpServletRequest)req, (HttpServletResponse)resp);
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    String verb = req.getMethod();
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    else ...
  }

  public void doGet(HttpServletRequest req, HttpServletResponse resp)
  {...}

  public void doPost(HttpServletRequest req, HttpServletResponse resp)
  {...}
  ...
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HttpServlet class

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public class HttpServlet extends GenericServlet {
  public void service(ServletRequest req, ServletResponse resp) {
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  public void service(HttpServletRequest req, HttpServletResponse resp) {
    String verb = req.getMethod();
    if (verb.equals("GET")) doGet(req, resp);
    else if (verb.equals("POST")) doPost(req, resp);
    else ...
  }

  public void doGet(HttpServletRequest req, HttpServletResponse resp)
  {...}

  public void doPost(HttpServletRequest req, HttpServletResponse resp)
  {...}
  ...
}
```

How to Implement a Servlet

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

public class OurServlet extends HttpServlet {
  public init() {
    // Perform any instance initialisation
  }

  public void doGet(HttpServletRequest req,
    HttpServletResponse resp)
    throws ServletException, IOException {

    // Process the request and generate the response
  }
  ...
}
```

How to Implement a Servlet

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

@WebServlet("/home")
public class OurServlet extends HttpServlet {
  public init() {
    // Perform any instance initialisation
  }

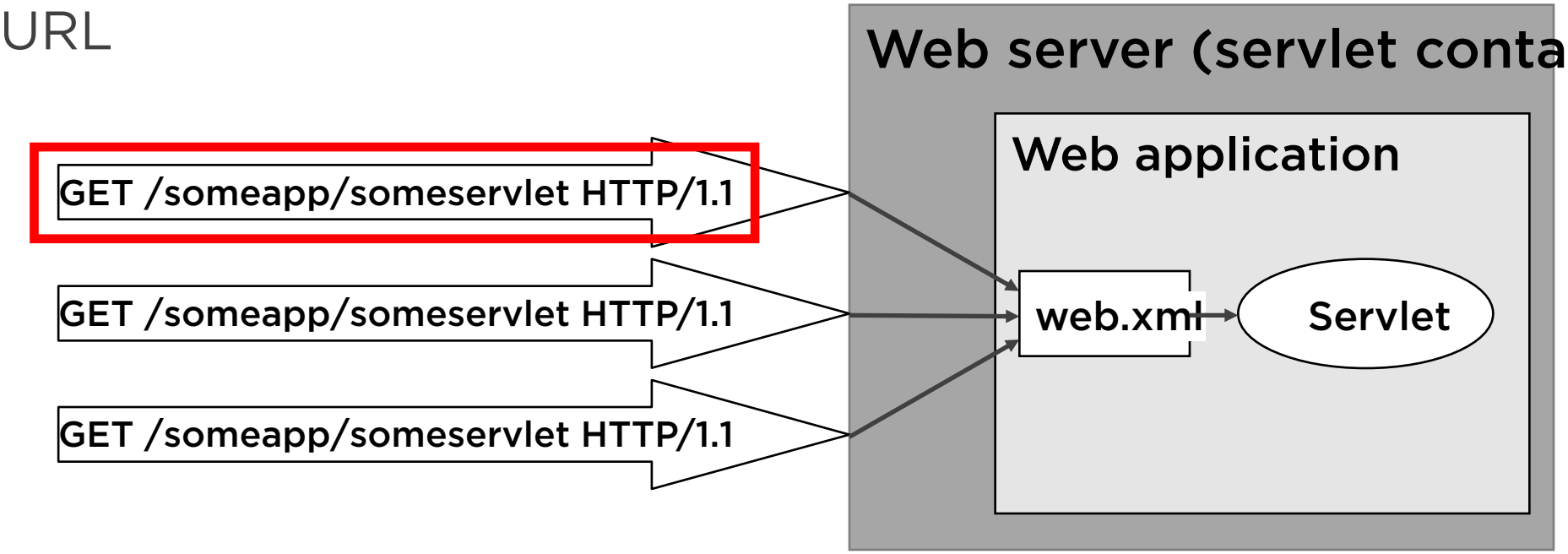
  public void doGet(HttpServletRequest req,
    HttpServletResponse resp)
    throws ServletException, IOException {

    // Process the request and generate the response
  }
  ...
}
```

Request Routing

Server routes request to servlet using configuration info

- Held in web.xml
- By default, one servlet instance handles all requests to associated URL



Servlet Mapping in web.xml

```
<web-app>
        <servlet>
                <servlet-name>Home</servlet-name>
                <servlet-class>com.mantiso.OurServlet</servlet-class>
        </servlet>

        <servlet-mapping>
                <servlet-name>Home</servlet-name>
                <url-pattern>/Bar</url-pattern>
        </servlet-mapping>

        <servlet-mapping>
                <servlet-name>Home</servlet-name>
                <url-pattern>*.abc</url-pattern>
        </servlet-mapping>
</web-app>
```

Servlet Mapping in web.xml

```
<web-app>
        <servlet>
                <servlet-name>Home</servlet-name>
                <servlet-class>com.mantiso.OurServlet</servlet-class>
        </servlet>

        <servlet-mapping>
                <servlet-name>Home</servlet-name>
                <url-pattern>/Bar</url-pattern>
        </servlet-mapping>

        <servlet-mapping>
                <servlet-name>Home</servlet-name>
                <url-pattern>*.abc</url-pattern>
        </servlet-mapping>
</web-app>
```

Servlet Mapping in web.xml

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<web-app>
        <servlet>
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        <servlet-mapping>
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                <url-pattern>*.abc</url-pattern>
        </servlet-mapping>
</web-app>
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Servlet Mapping in web.xml

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<web-app>
        <servlet>
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        </servlet-mapping>
</web-app>
```

Servlet Mapping in web.xml

```
<web-app>
        <servlet>
                <servlet-name>Home</servlet-name>
                <servlet-class>com.mantiso.OurServlet</servlet-class>
        </servlet>

        <servlet-mapping>
                <servlet-name>Home</servlet-name>
                <url-pattern>/Bar</url-pattern>
        </servlet-mapping>

        <servlet-mapping>
                <servlet-name>Home</servlet-name>
                <url-pattern>*.abc</url-pattern>
        </servlet-mapping>
</web-app>
```

How to Implement a Servlet

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

@WebServlet(urlPatterns = {"/home", "*.do"})
public class OurServlet extends HttpServlet {
  public init() {
    // Perform any instance initialisation
  }

  public void doGet(HttpServletRequest req,
    HttpServletResponse resp)
    throws ServletException, IOException {

    // Process the request and generate the response
  }
  ...
}
```

HTTP Request Processing

`HttpServletRequest` **wraps an HTTP request**

```
public void doGet(HttpServletRequest req,HttpServletResponse resp)
  throws ServletException, IOException {

  // Read HTTP headers
  String strHost = req.getHeader("Host");

  // Read Content-Type of request body
  String strContentType = req.getContentType();

  // Read parameters
  // e.g. http://someserver/someapp/someservlet?uid=bob
  String strName = req.getParameter("uid");

  // Access request body
  BufferedReader = req.getReader();
  ...
}
```

Generate HTTP Response

`HttpServletResponse` **wraps the potential HTTP response**

```
public void doGet(HttpServletRequest req, HttpServletResponse resp)
  throws ServletException, IOException {
  try {
    if (notLoggedOn()) {
      resp.sendRedirect("/logon");
      return;
    }
    resp.setContentType("text/xml");
    resp.setHeader("X-Custom-Header", new Date());
    PrintWriter out = resp.getWriter();
    out.write("<message>Hello world</message>");
  } catch (Exception e) {
    resp.sendError(response.SC_INTERNAL_SERVER_ERROR);
  }
}
```

Providing Initialization Parameters

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

@WebServlet(urlPatterns = {"/home", "*.do"})
public class OurServlet extends HttpServlet {
  public init() {
    connstr = getInitParameter("connstr");
  }

  ...
}
```

Providing Initialization Parameters

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

@WebServlet(urlPatterns = {"/home", "*.do"},
            initParams =
            {@WebInitParam(name="connstr",
                           value="server=...")})
public class OurServlet extends HttpServlet {
  public init() {
    connstr = getInitParameter("connstr");
  }

  ...
}
```

Providing Initialization Parameters

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

@WebServlet(urlPatterns = {"/home", "*.do"},
            initParams =
            {@WebInitParam(name = "connstr",
                           value="server=...")})
public class OurServlet extends HttpServlet {
  public init() {
    connstr = getInitParameter("connstr");
  }

  ...
}
```

Using Initialisation Parameters

```
<web-app>
  <servlet>
    <servlet-name>Foo</servlet-name>
    <servlet-class>com.mantiso.OurServlet</servlet-class>
    <init-param>
      <param-name>connstr</param-name>
      <param-value>server=homer;catalog=pubs;uid=sa;pwd=;</param-value>
    </init-param>
  </servlet>
</web-app>
```

```
public class OurServlet extends HttpServlet {
  String connstr;
  public void init() {
    connstr = getInitParameter("connstr");
  }
}
```

ServletContext

```
<web-app>
    <context-param>
      <param-name>connstr</param-name>
      <param-value>server=homer;catalog=pubs;uid=sa;pwd=;</param-value>
    </context-param>
</web-app>
```

```
public class OurServlet extends HttpServlet {
  String connstr;
  public void init() {
    connstr = getServletContext().getInitParameter("connstr");
  }
}
```

Summary

Servlets

- Typically extend HttpServlet

Lifecycle

- init
- service
  - doGet/doPost
- destroy

Service passed (Http)ServletRequest/(Http)ServletResponse

Initialize from web.xml or annotations

What's Next