Lab session

Google Application Engine - GAE

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# Available projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Company</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Financial Services</td>
<td>Innovation TIC</td>
<td>Vasco Mendès</td>
</tr>
<tr>
<td>Bluetooth low energy Application on Smart Phone</td>
<td>ST semiconductor</td>
<td>Lionel Chastion</td>
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<tr>
<td>Proximity Traffic Safety Warning</td>
<td>Eurecom</td>
<td>Jerome Haerri</td>
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<tr>
<td>E-mobility Proximity Charging Service</td>
<td>Eurecom</td>
<td>Jerome Haerri</td>
</tr>
<tr>
<td>Clustering usage pattern of mobile devices</td>
<td>EURECOM</td>
<td>Soumya Datta</td>
</tr>
<tr>
<td>Mobile Travel Assistant</td>
<td>3Hpartner</td>
<td>Stefano Crosta</td>
</tr>
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</table>
From the Last Session

- From offline to walled-garden to a true-online access
- Wireless system and technology evolution
- Run time environments
  - OS war
  - Mobile OS vs application-specific execution environment
- App store
Overall Interactions

Client-side Programming

- XHTML
- HTML for display

HTTP for transport

Clients (browsers)

XML dialects

XSLT (Transformations)

Server-side Programming

- XML for Data
- DB Access, Web Services

Source: P. Michiardi, S. Crosta
Protocol Interaction

HTTP
TCP
IP
L1/L2
Air Interface

Client

Router
IP
L1/L2
SONET interface

Web server

Router
IP
SONET interface
Ethernet interface
Ethernet

HTTP message
TCP segment
IP packet
SONET link

Source: P. Michiardi
Client- vs Server-side Programming

**Client-side**
- HTML and script sent to client
- Script processed before display
- Script visible to client

**Server-side**
- Script processed before sending HTML to client
- Client receives and displays processed HTML
- Script hidden from client

Source: P. Michiardi, S. Crosta
Servlet job and life cycle

- Extend the server capabilities by means of request-response programming model

- Usage
  - Read and store data and process request from the client
  - Send data / response back to the client
  - Build a dynamic content
  - Manage state information

**Servlet**

- **Servlet container**
  - Manage the life cycle
  - Dispatch/mapping the URL

- **Servlet API**
  - Package: `javax.servlet.*`

- **Different data format may exist**
  - Html, xml, json
Project structure and files

**Project structure**

- `src/`
- `war/`
  - `WEB-INF/`
    - appengine-generated/
    - classes/
    - lib/
    - appengine-web.xml
    - web.xml

**Web.xml**

```xml
<servlet>
  <servlet-name>Helloworldgae</servlet-name>
  <!-- class name -->
  <servlet-class>eurecom.fr.helloworldgae.HelloworldgaeServlet</servlet-class>
  <!-- class tree -->
</servlet>

<servlet-mapping>
  <servlet-name>Helloworldgae</servlet-name>
  <!-- class name -->
  <url-pattern>/helloworldgae</url-pattern>
</servlet-mapping>

<!-- Class pattern in the URL-->
```
Servlet

- Java class that runs on the server side that receives HTTP data and does a processing or more following the constraints of the HTTP protocol

```java
@WebServlet("/Hello")
public class Hello extends HttpServlet {

// called at the reception of the http POST request
protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
    response.setContentType("text/html;charset=UTF-8");
    PrintWriter out = response.getWriter();
    try {
        out.println("Hello World");
    } finally {
        out.close();
    }
}

// called at the reception of the http GET request
protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
    response.setContentType("text/plain");
    String msg = "Hello, world";
    if (request.getParameter("name") != null) {
        msg += " from " + request.getParameter("name");
    }
    response.getWriter().println(msg);
}
```
HTTP Response

- **Response type** (see [http://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html](http://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html))
  - 1XX: informative
  - 2XX: success
  - 3XX: redirection
  - 4XX: client error
  - 5XX: server error

- **Generate error**

```java
protected void doXXX(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
    response.setContentType("text/html;charset=UTF-8");
    PrintWriter out = response.getWriter();
    try {
        response.sendError(HttpServletResponse.SC_SERVICE_UNAVAILABLE, "the server is overloaded. Please try later.");
        PrintWriter out = response.getWriter();
        try {
            response.sendError(HttpServletResponse.SC_SERVICE_UNAVAILABLE, "the server is overloaded. Please try later.");
        } finally {
            out.close();
        }
    }
    finally {
        out.close();
    }
}
```

The JavaServer Pages is a technology for inserting dynamic content into a HTML or XML page using a Java servlet container

- **Declaration:** `<%! int serverInstanceVariable = 1; %>`

- **Scriptlet:** `<% int localStackBasedVariable = 1; out.println(localStackBasedVariable); %>`

- **Expression:** `<%= "expanded inline data " + 1 %>`

- **Comment:** `<%-- This is my first JSP. --%>`

- **Directive:** `<%@ page import="java.util.*" %>`
Lab Session Steps

1. Helloworldgae [10 minutes]

2. Hellomoonggae [40 minutes]
   1. Create a servlet
   2. JSP
   3. Publish and deploy the code

3. AddressBook [1h30]
   1. Database
   2. POST and GET
   3. List of contact and contact details
   4. Modify contact
   5. Output format in json

4. Website [10 minutes]
Technology

- **Google App Engine GAE**
  - PaaS cloud computing platform
  - Developing and hosting web applications in Google Data Center

- **Appache Tomcat (formerly Jakarta Tomcat)**
  - Open source web server and servlet container
  - Implements Java servlet and JavaServer pages
EURECOM MEMBERS

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Telecom ParisTech

Politecnico di Torino

Aalto University School of Science and Technology

Technische Universität München

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Un rôle à part dans le monde.