n|w University of Applied Sciences Northwestern Switzerland
School of Engineering

Institute of 4D Technologies

Dojo Toolkit 1.0 and Comet
Module: Web Frameworks

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Introduction – Agenda

- The Dojo Toolkit 1.0
- JavaScript Development Tools
- Beyond Ajax: Comet
  - Communication techniques
  - Protocols
  - Samples

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Dojo Toolkit – What is Dojo?

- JavaScript/Ajax library
- Development Tools (Package System, Unit Tests, Linker, ShrinkSafe)
- A Non-profit foundation
- Developer Community

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Dojo Toolkit – Architecture

- Dojo.* Core
  - Ajax library
  - Events
  - Packaging
  - CSS-based querying
  - Animations
  - JSON
  - Language utilities
- Dijit.*
  - Widget toolkit
- Dojox.*
  - Experimental and specialized extensions

Credits: dojotoolkit.org

Dojo Toolkit – Demo – Gantry Patient Database

JavaScript Development – Tools

− Mozilla Firefox Add-Ons
  − Web developer toolbar – http://chrispederick.com/work/web-developer/
  − Firebug – http://www.getfirebug.com/
  − LiveHTTPHeaders – http://livehttpheaders.mozdev.org/
− Eclipse Plug-ins for JavaScript
  − MyEclipse – Commercial – www.myeclipseide.com
  − JavaScript Development Tools/AJAX Toolkit Framework – incubator –
    http://www.eclipse.org/atf/

Exercise – Development tools

− AB18: Browser Tools for Web Development
  https://web.imvs.technik.fhnw.ch/_zope/wf/themen/dojo-and-comet/ab18-browser-tools-for-web-development

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Comet – AJAX and Comet

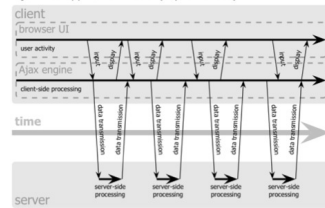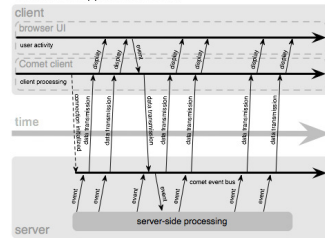http://comet.sitepen.com:9000/tests/magnets/

Comet – AJAX and Comet

- AJAX
  - Asynchronous XMLHttpRequests
  - Request/response communication model
- Comet
  - Tunnel for pushing events and data from server to client
  - Long-living connections
  - Low latency data transmission
  - Subscribe/publish communication model

Credits: dojotoolkit.org

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Comet – Communication Techniques

- Long-polling (using XMLHttpRequest (XHR)):
  - Response not sent until new data is available
  - Reconnection is established after each datagram
- Forever-frame:
  - Long-lived HTTP connection in a hidden `<IFRAME>`
  - Connection stays alive
  - Response is rendered progressively by a JavaScript
- Callback polling:
  - `<script href="${comet_server}">` waits for response
  - Response is a script which among other functionality creates a new `<script href="${comet_server}">` tag
- Flash:
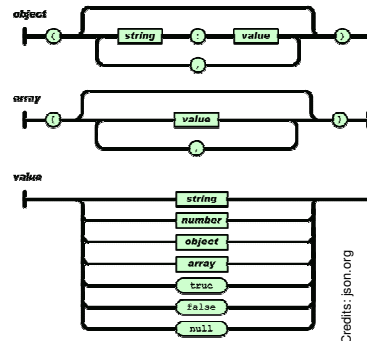 - Use the browser flash plugin for transport

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Comet – Protocol – JavaScript Object Notation (JSON)

- Lightweight data interchange format
- Used by many AJAX Applications
- Text format, based on JavaScript

```
{
  "name": "Jack \"Bee\"",
  "format": {
    "type":      "rect",
    "width":     1920,
    "height":    1080,
    "interlace": false
  },
  "position": [
    [0, -1, 0],
    [1, 0, 0],
    [0, 0, 1]
  ]
}
```


Credits: json.org

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Comet – Protocol – Bayeux

- A JSON protocol for Publish/Subscribe event delivery
- Clients subscribe to channels (e.g. "/hello/world")
- Server pushes events to all registered clients
- Reserved channels (/meta/*) for client-server communication:
  - handshake, ping, status
  - connect, reconnect, disconnect
  - subscribe, unsubscribe

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Comet – Setup - Infrastructure

−Eclipse Webapp-Project for Tomcat 5.5
−Patched with Jetty cometd server classes
  (http://martin.ankerl.com/2007/08/21/ajax-dojo-comet-tutorial/)
  −cometd-api-0.9.20071105.jar
  −cometd-bayeux-6.1.6.jar
  −jetty-6.1.6.jar
  −jetty-util-6.1.6.jar
  −servlet-api-2.5-6.1.6.jar

−dojo-release-1.0.2

Comet – Setup – web.xml

```
3:     <servlet>
4:         <servlet-name>cometd</servlet-name>
5:         <servlet-class>
6:             org.mortbay.cometd.continuation.ContinuationCometdServlet
7:         </servlet-class>
8:         <load-on-startup>1</load-on-startup>
9:     </servlet>
10:    <servlet-mapping>
11:        <servlet-name>cometd</servlet-name>
12:        <url-pattern>/cometd/*</url-pattern>
13:    </servlet-mapping>
```

Comet – Hello world client demo

```
0: <html>
1:  <head>
2:    <script type="text/javascript" src="./dojo/dojo/dojo.js"></script>
3:    <script type="text/javascript" src="./dojo/dojox/cometd.js"></script>
4:    <script type="text/javascript">
5:      dojo.require("dojox.cometd");
6:      var sample = {
7:        _init : function() {
8:          dojox.cometd.init("./cometd");
9:          dojox.cometd.subscribe("/hello/world", sample, "publishHandler");
10:       },
11:
12:       publishHandler : function(msg){
13:         alert(msg.data.test);
14:       }
15:     };
16:     dojo.addOnLoad(sample, "_init");
17:    </script>
18:  </head>
19:  <body>
20:    <input type="button" value="Click Me!"
21:      onclick="dojox.cometd.publish('/hello/world', {test: 'hello world'})">
22:  </body>
23: </html>
```

Comet – Hello world server demo

```
0: <%@page import="java.util.*"%>
1: <%@page import="dojox.cometd.*" %>
2: <%
3: Bayeux b = (Bayeux)getServletContext()
                    .getAttribute(Bayeux.DOJOX_COMETD_BAYEUX);
4: Channel c = b.getChannel("/hello/world", false);
5: if (c == null) {
6:   %>Please open <a href="sample1.html">sample1.html</a><%
7: } else {
8:    Map<String,Object> message = new HashMap<String,Object>();
9:    message.put("test", "jsp calls hello world");
10:   c.publish(b.newClient("server_user", null), message,
11:      "new server message");
12: }
13: %>
```

Exercise – Collaborative Paint

− AB19: Collaborative Paint

https://web.imvs.technik.fhnw.ch/_zope/wf/themen/dojo-and-comet/ab18-browser-tools-for-web-development