Roger Kitain | Oracle America

Principal Member Technical Staff

Exploring HTML5 Server Sent Events With Java Server Faces

Agenda

- Introduction
- Server Side Push
- Server Sent Events
- Server Sent Events And JSF

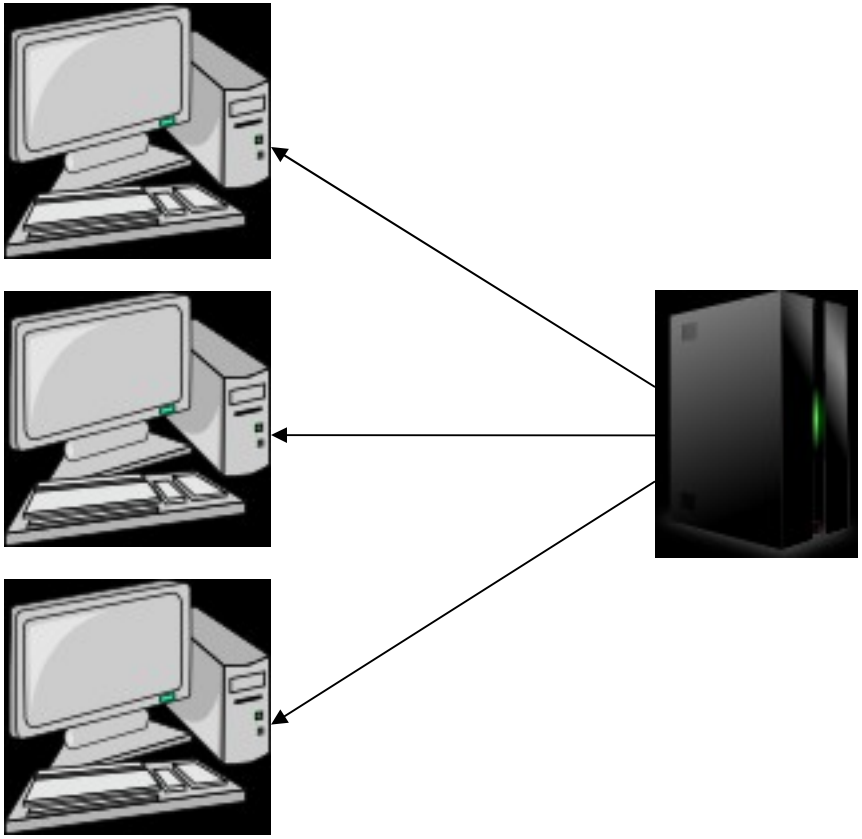
Introduction

- Web: More dynamic since 1990s
- HTTP
  - request/response model
  - No support for server initiated interactions
- Ajax
  - request/response model
  - Does not push data to client
  - Emulate push with client polling
- Comet
  - Asynchronous data push from server to client
  - Built on HTTP; Tricky: HTTP not designed for push

Server Side Push

Why?

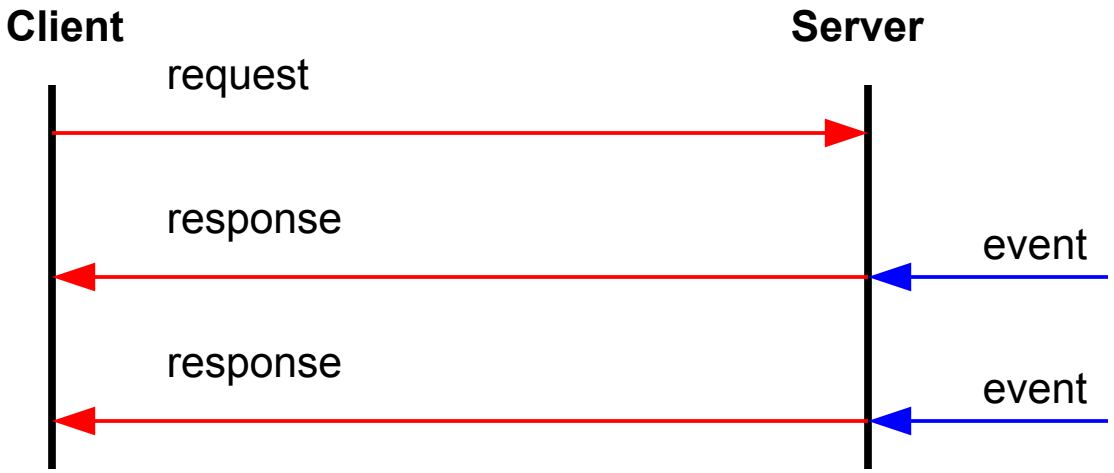
- Use Cases
  - Chat
  - Document Sharing
  - Streaming Data
  - Monitoring
  - Live Reporting



Server Side Push

Strategies

- Client Polling (Simulated)
  - Timed requests sent to server
- Long Polling
  - Request...wait...response Request…wait...response
- HTTP Streaming



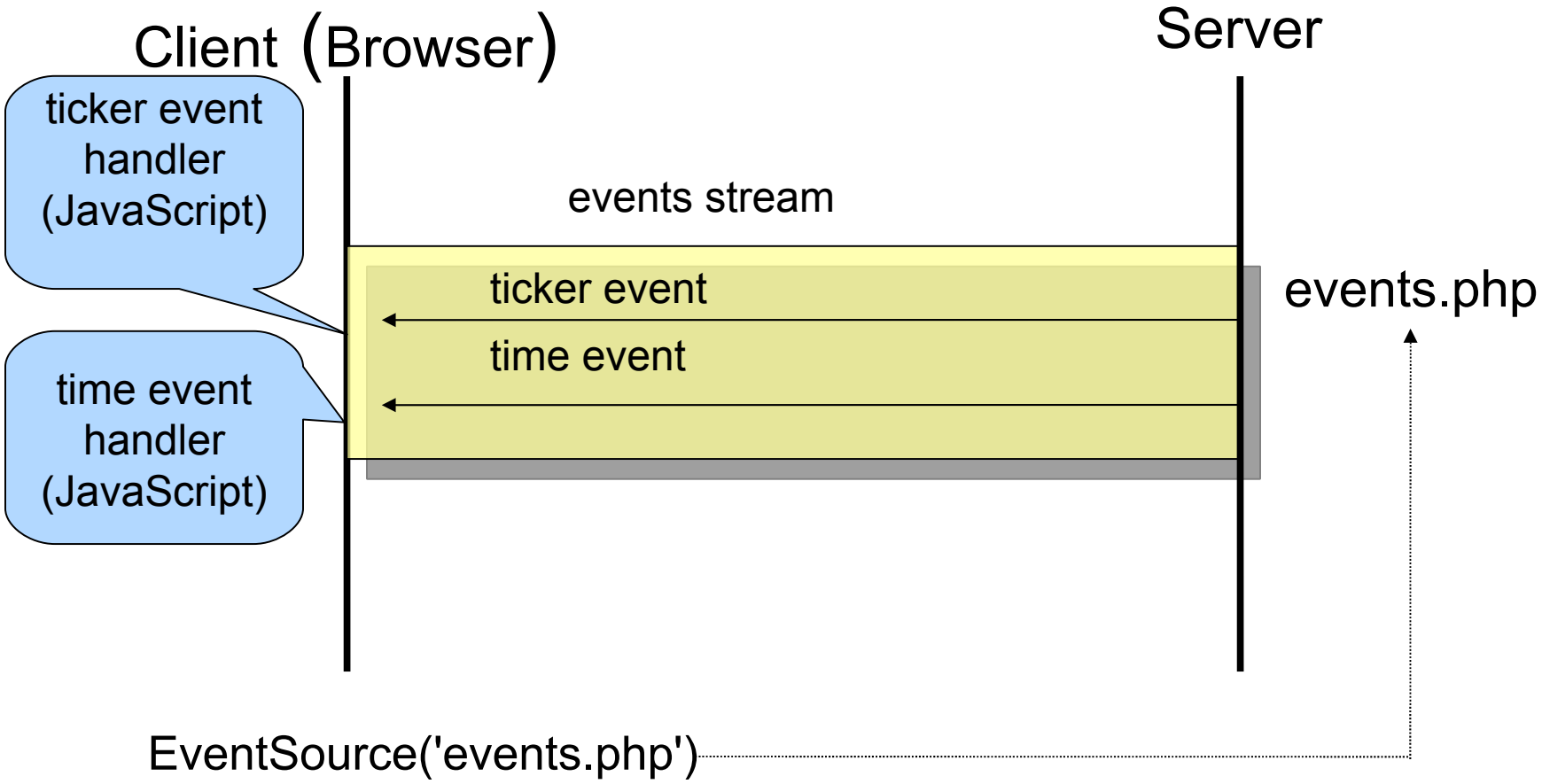
Server Sent Events

HTML5 “Streaming”

- API allows web page to subscribe to a stream of DOM events from the server
- Unidirectional : events from server to client
- Sent over HTTP
- Use cases:
  - Data does not need to be sent from client
  - Think stock quotes, financial data, …
- Evolved from an April, 2004 proposal:
  - http://ln.hixie.ch/?count=1&start=1083167110
- Now in its own specification:
  - http://www.w3.org/TR/eventsource/

Server Sent Events

HTML5 “Streaming”



Server Sent Events

Client

```
<html>
 <head>
   <script type='text/javascript'>
    var source = new EventSource('serverevents');
    source.onmessage = function (event) {
    ev = document.getElementById('events');
    ev.innerHTML += "<br>[in] " + event.data;};
     </script>
  </head>
  <body>
    <div id="events"></div>
  </body>
</html>
```

client-side end point

event source URL

Server Sent Events

Server: Event Stream Response Format

- text/event-stream Content-Type
- Basic form:

```
data: my message\n\n
```

- Multiline:

```
data: first line\n
data: second line\n\n
```

Single string concatenated with newline chars passed to event handler

- JSON data:

```
data: {\n
data: “msg”: “hello world”,\n
data: “id”: 12345\n
data: }\n\n
```

Server Sent Events

Server: Event Stream Response Format

- Associate *id* with event:
  - Browsers keep track of last event fired
  - If server connection dropped, special HTTP header (Last-Event-ID) set with new request

```
id: 1234\n
data: GOOG\n
data: 446\n\n
```

- Control reconnection timeout
  - Default: browser reconnects to source 3 seconds after each connection is closed. Can override with retry followed by number of milliseconds to wait before trying to reconnect

```
retry: 10000\n
Data: hello\n\n
```

Sets the reconnection timeout to 10 seconds

Server Sent Events

Server: Canceling an Event Stream

- Event stream can be cancelled from the client or server
  - From the client:

```
var source = new
EventSource(......);
.....
source.close();
```

  - From the server:
    - Respond with a non “text/event-stream” Content-Type or return an HTTP status other than 200 OK (e.g. 404 Not Found)

Server Sent Events

Browser Support

	IE	Firefox	Safari	Chrome	Opera	IOS Safari	Opera Mini	Opera Mobile	Android Browser
Three Versions Back	5.5	2.0	3.1	5.0	10.0-10.1				
Two Versions Back	6.0	3.0	3.2	6.0	10.5	3.2			2.1
Previous Version	7.0	3.5	4.0	7.0	10.6	4.0-4.1			2.2
Current	8.0	3.6	5.0	8.0	11.0	4.2	5.0	10.0	2.3
Near (early 2011)	8.0	4.0	5.0	9.0	11.1				
Future(mid/late 2011)	9.0	4.0	6.0	10.0	11.1				

Supported | Partial support | Not supported | Support Unknown

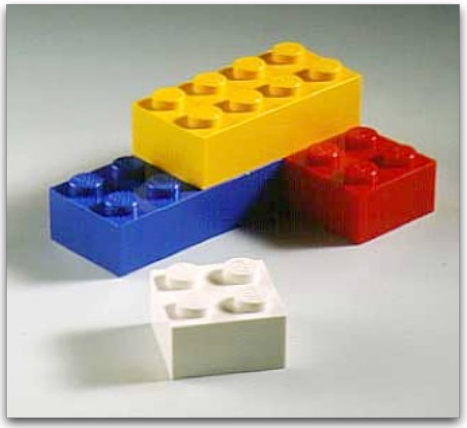
Server Sent Events And JSF

JSF 2.0 Component Model

- Facelets is the foundation:
  - Optimized for JSF
  - XHTML and tags
  - Templating
- Powerful tools:
  - Templating
  - Composite Components

Server Sent Events And JSF

JSF Composite Components



- Reusable component
- What's inside?
  - Interface
    - Usage contract
    - Everything page author needs to know to use component
  - Implementation
    - Markup used to create the component
    - How the component is implemented

Server Sent Events And JSF

JSF Composite Components and JavaScript

- Together make “rich” “dynamic” components
- JSF 2.0 introduced JavaScript to promote Ajax
  - Direct JavaScript: jsf.ajax.request
  - Declarative model: <f:ajax/>
- Composite components can leverage the Server Sent Event JavaScript API

Server Sent Events And JSF

Client Side Possiblities

- Create/use JavaScript API in JSF views:
  - *JSF.sse.connect(url, eventOptions);*

server endpoint
Example:
“/myApp/stock”

event names and associated handlers
Example:
{stock:shandler,time:thandler}

- Typically you'll have one in your view

Server Sent Events And JSF

Client Side Possiblities

- Declarative model:
  - *<h5:sse url="myApp/stock"*

    events="{stock:shandler,time:thandler}"/>

composite namespace

event name

event name

event handler name

event handler name

Server Sent Events And JSF

Server Side Possibilities

- Server endpoint (JavaScript, Java, php, ..)
  - “publish” response follows format rules in Server Sent Events specification
  - Typically will utilize other services, APIs (Yahoo stock quotes, RSS feeds, …)
- Possibilities for JSF:
  - Managed bean as handler
    - Publishes response

Demo

Web Sockets vs Server Sent Events

- Web Sockets
  - Richer protocol for bi-directional, full-duplex communication
  - Two-way channel more attractive for games, messaging apps, real-time updates in both directions
- Server Sent Events
  - Unidirectional – use when data does not need to be sent from client
  - Just need updates from server
  - Stock tickers, news feeds
  - Sent over traditional HTTP (no special protocol needed)

Summary

- Server Side Push
  - Why?
  - Strategies
- Server Sent Events
- JSF 2.0 Component Model / Composite Components
  - JavaScript
- Server Sent Events / JSF Possibilities
  - Client / server

Resources

- Server Sent Events Specification:
  - http://www.w3.org/TR/eventsource/
- JSF Implementations:
  - http://java.net/projects/javaserverfaces (Mojarra)
  - http://myfaces.apache.org/ (MyFaces)
- Interesting articles:
  - http://today.java.net/article/2010/03/31/html5-server-push-technologies-part-1
  - http://html5doctor.com/methods-of-communication/

Roger Kitain | Oracle America

roger.kitain@oracle.com

https://twitter.com/rogerk09

http://www.java.net/blogs/rogerk