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HTML5 and Java Technologies

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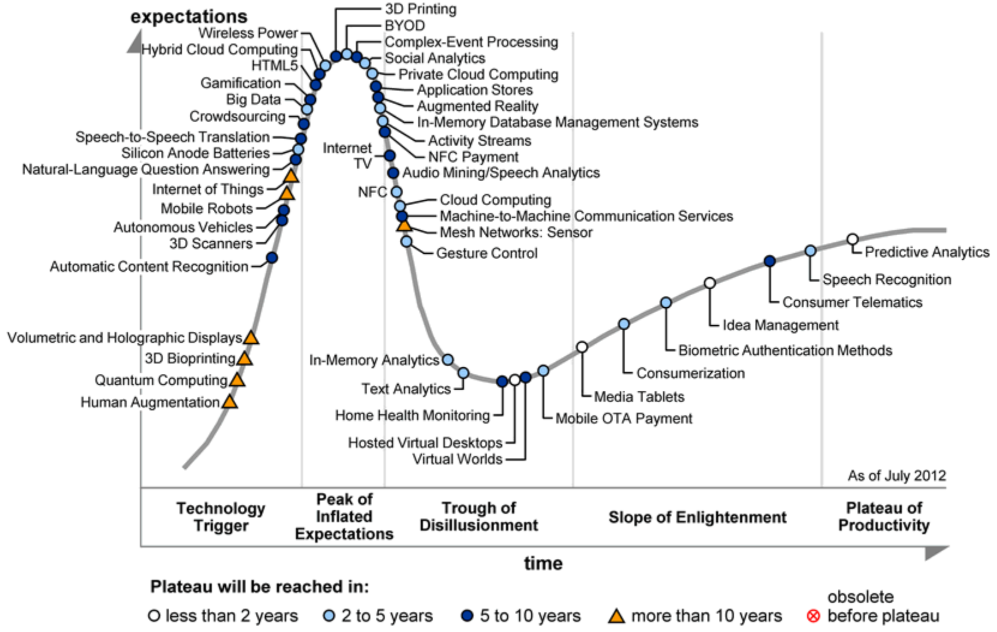
Agenda

- Motivation
- HTML5 Overview
  - Related Java Technologies
- Thin Server Architecture
- Demo

Motivation



Gartner's 2012 Emerging Technologies Hype Cycle

- Need for clarification
  - What is behind the hype
- Architectural consequences of new trends
- What does the Java platform offer to meet the new challenges
- Building of common understanding

Web Technology History

- 1991 HTML
- 1994 HTML2
- 1996 CSS1
- 1997 HTML4
- 1998 CSS2
- 2000 XHTML1
- 2002 Tableless Web Design
- 2005 AJAX
- 2009 HTML5: as of Dec 2012 W3C CR

- 1995 JavaScript @ Netscape
- 1996 ECMAScript 1.0, 1.1
- 1997 ECMAScript 1.2
- 1998 ECMAScript 1.3
- 2000 ECMAScript 3
- 2010 ECMAScript 5
- Next: ECMAScript 6 Harmony

HTML5 Features

W3C / Web Hypertext Application Technology Working Group(WHATWG)

- Markup
  - Semantic markup replacing common usages of generic <span>, <div>
    - <nav>, <footer>,<audio>, <video>, ...
- API
  - Canvas 2D (for immidate mode 2D drawing),Timed media playback
  - Offline Web Applications, Local Srorage and Filesystem, Web Storage
  - Geolocation, Web Storage, IndexedDB
  - File API, Drag-and-Drop, Browser History
  - ...

HTML5 Features

Offloaded to other specs, originally part of HTML5

- WebSocket API, Server-Sent Events(SSE), Web Messaging, Web Workers, Web Storage (Web Apps WG)
- WebSocket Protocol (IETF HyBi WG)
- WebRTC (WebRTC WG)
- Canvas 2D (HTML WG)
- …

HTML5 Standards Association

Device

Geolocation
Device orientation and motion
Multimedia

Data

Web storage, Offline Web Applications
File System,   Indexed database
Web socket
Server-sent events

Logic

Web workers
Touch events

+

UI

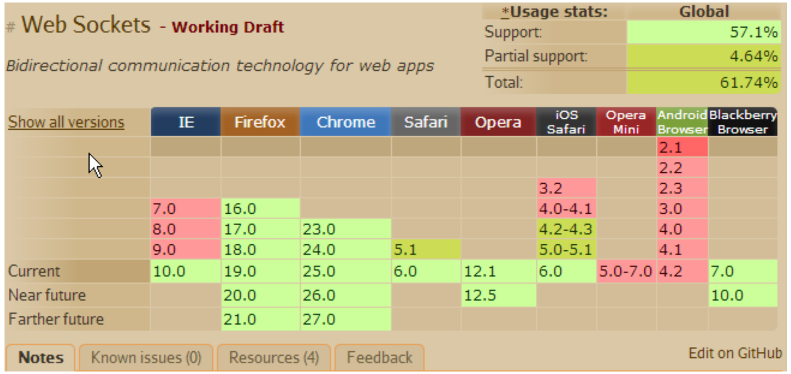
Elements
Canvas
Svg, webgl

+

HTML5 Related Technologies at Oracle

- ADF Mobile and JavaFX
  - Contain WebView component, that uses open source browser engine WebKit
- JAX-RS, WebSocket, JSON
  - Part of Java EE 7, iImplemented in GlassFish 4.0, TBD in WebLogic
- Server-Sent Events
  - Implemented in GlassFish 4.0, TBD in WebLogic
- Partially supported in JSF 2.2, part of Java EE 7
- HTML5 support in NetBeans

HTML5 Browser Support and Demos



Web Sockets - **Working Draft**

Bidirectional communication technology for web apps

*Usage stats:	Global
Support:	57.1%
Partial support:	4.64%
Total:	61.74%

Show all versions	IE	Firefox	Chrome	Safari	Opera	iOS Safari	Opera Mini	Android Browser	Blackberry Browser
								2.1	
								2.2	
						3.2		2.3	
	7.0	16.0				4.0-4.1		3.0	
	8.0	17.0	23.0			4.2-4.3		4.0	
	9.0	18.0	24.0	5.1		5.0-5.1		4.1	
Current	10.0	19.0	25.0	6.0	12.1	6.0	5.0-7.0	4.2	7.0
Near future		20.0	26.0		12.5				10.0
Farther future		21.0	27.0						

Notes | Known issues (0) | Resources (4) | Feedback | Edit on GitHub

- Brouser test and support
  - http://acid3.acidtests.org
  - http://caniuse.com
- Amazing presentation of HTML5 features
  - http://slides.html5rocks.com
- HTML5 Canvas 3D (WebGL)
  - http://oos.moxiecode.com/js_webgl/fish/index.html
  - http://oos.moxiecode.com/js_webgl/world/index.html

Modern Web Development

Exciting Industry Trend

- It's difficult and potentially costly to build modern web applications
  - Web? Native? Flash? Build for many? Build for one? Form factor?
  - Expertise, development cost, testing and support across platforms
- HTML5 is designed to address the cross-platform jungle
  - Attempts to codify best-practices that have emerged
  - Well suited for mobile devices

HTML5 Architectural Implications

The Browser Is the Platform

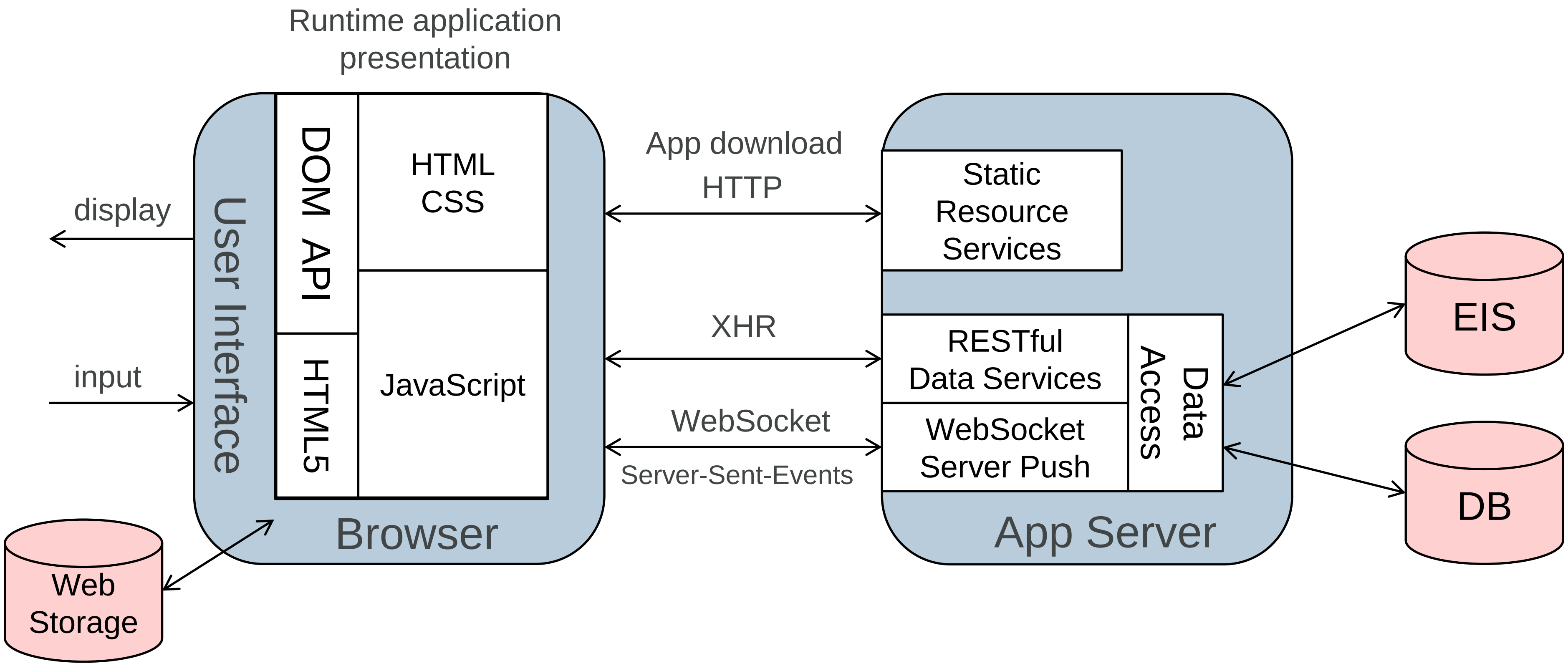
- HTML5 is the new UI across devices
  - Applications == HTML5 + JavaScript + CSS3 + Server Resources
- Requires a different programming approach
  - Servers no longer generating markup language
  - Clients responsible for presentation logic and execution
  - JavaScript is part of the domain model, JSON is the payload
  - Event-Driven
  - No need for browser plugin

Thin Server Architecture (TSA)

Background

- Main idea: move the presentation layer to the client. The server is responsible for providing access to the application data and for serving the static resources that implement the presentation layer.
- Similar architectures
  - SOFEA: Service-Oriented Front-End Architecture
  - RIA: Rich Internet Application (Flash, Silverlight, JavaFX)
  - SPA: Single Page Application
    - AJAX, browser plugins (for Flash, Silverlight, JavaFX)
- www.thinserverarchitecture.com (2008)

Thin Server Architecture Diagram



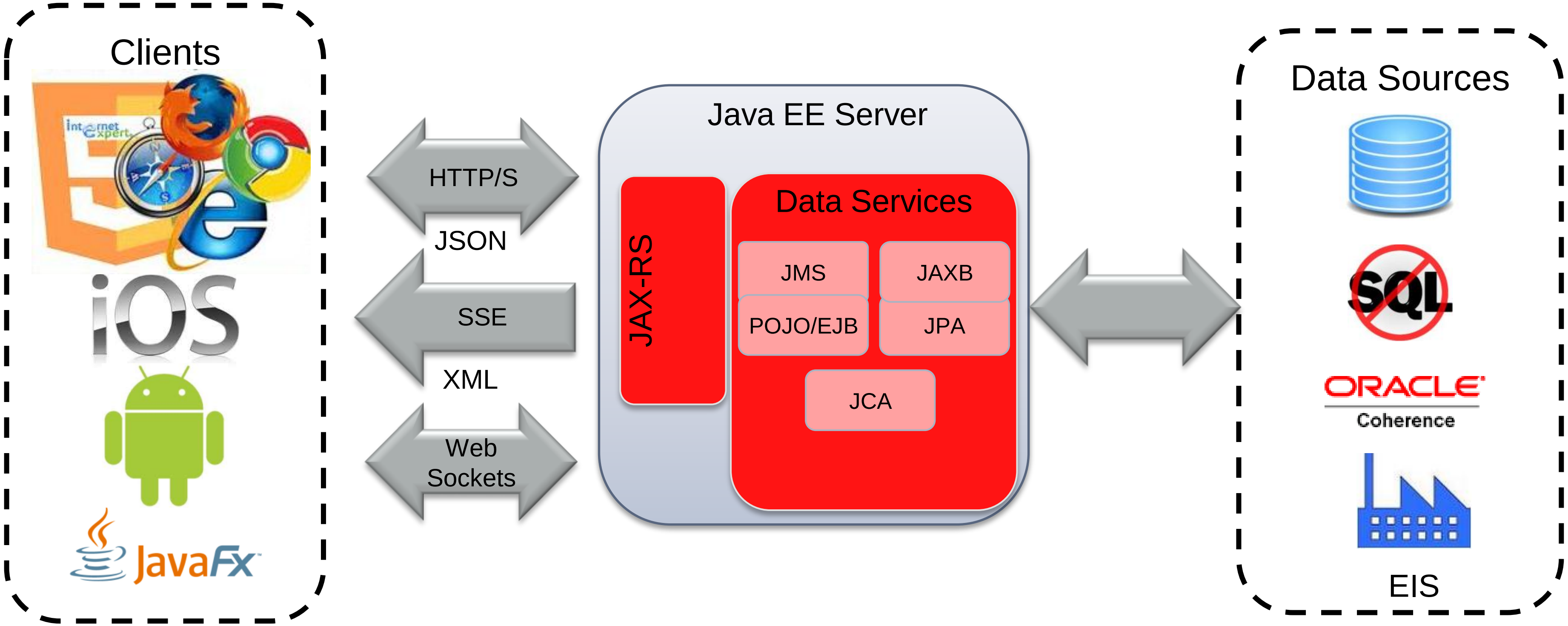
Thin Server Architecture

Advantages

- Improved performance
  - Caching, no presentation data transmitted again and again
- Scalability
  - Less data to transfer, session state is on the client
- Reduced complexity
  - UI control is not split bethween client and server, UI events stay on client
- Improved user experience
- Offline support only possible with TSA

Thin Server Architecture

With Java EE



Thin Server Architecture

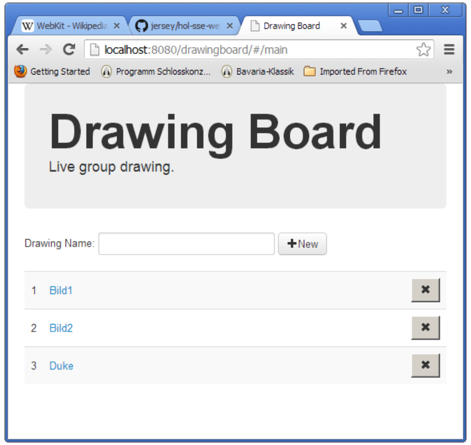
Related Oracle Projects

- Avatar
  - Ent-to-end TSA framework based on HTML5 and JavaScript (also server-side)
- Easel
  - JavaScript tooling support
- Nashorn
  - JavaScript implementation on the JVM
- EclipseLink/TopLink data services
  - Enable REST access to RDBMS and NoSQL data using JSON or XML
  - Live Data Notifications over WebSockets or Server Sent Events
- PaaS for FMW

Drawing Board Demo

http://github.com/jersey/hol-sse-websocket

- Collaborative drawing
- Two-page application
  - List of drawings
  - Drawing
- Demonstrating
  - Server-side: JAX-RS, JSON, WebSocket, SSE Java API
  - Client-side: JAX-RS, WebSocket, SSE Java and JavaScript API
  - JavaFX hybrid Java/HTML5 application


WebKit - Wikipedia | jersey/hol-sse-we | Drawing Board

localhost:8080/drawingboard/#/main

Getting Started | Programm Schlosskonz... | Bavaria-Klassik | Imported From Firefox

Drawing Board

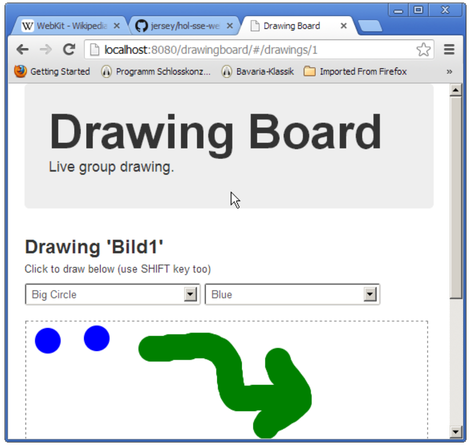
Live group drawing.

Drawing Name: +New

1 Bild1

2 Bild2

3 Duke


WebKit - Wikipedia | jersey/hol-sse-we | Drawing Board

localhost:8080/drawingboard/#/drawings/1

Getting Started | Programm Schlosskonz... | Bavaria-Klassik | Imported From Firefox

Drawing Board

Live group drawing.

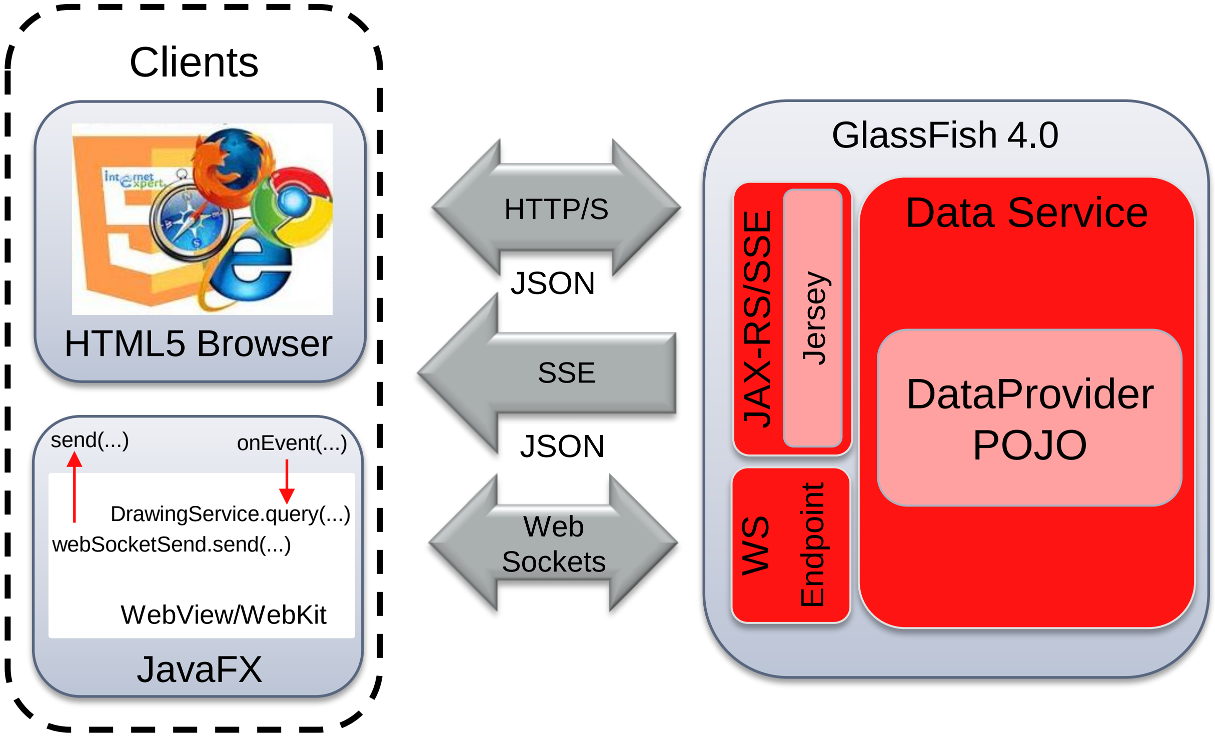
Drawing 'Bild1'

Click to draw below (use SHIFT key too)

Big Circle | Blue

Drawing Board Demo

TSA - Architecture



Drawing Board Demo

Technology usage

- JAX-RS: CRUD for drawings
- SSE: distributing the list of drawings to all connected clients
- WebSocket: distributing the updates of a drawing to all connected clients
- JSON: implementing of encoder/decoder of the WebSocket server endpoint
- Java – JavaScript bridge(WebEngine): modifying the AngularJS client by replacing the WebSocket/SSE JavaScript client communication with a Java implementation in the JavaFX client

Links

- HTML5
  - http://www.w3.org/TR/html5/
  - http://www.whatwg.org/specs/web-apps/current-work/multipage/
  - http://en.wikipedia.org/wiki/HTML5
- Thin Server Architecture
  - http://www.thinserverarchitecture.com
  - http://review.us.oracle.com/review2/Review.html#reviewId=130188
- JAX-RS
  - http://jax-rs-spec.java.net
  - http://jersey.java.net
- JSON
  - http://json-processing-spec.java.net
  - http://jsonp.java.net
- WebSocket
  - http://websocket-spec.java.net
  - http://tyrus.java.net
- Server-Sent Events
  - http://jersey.java.net
- JavaFX
  - http://www.oracle.com/technetwork/java/javafx/overview/index.html
  - http://docs.oracle.com/javafx/2/api/javafx/scene/web/WebEngine.html

Hardware and Software

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